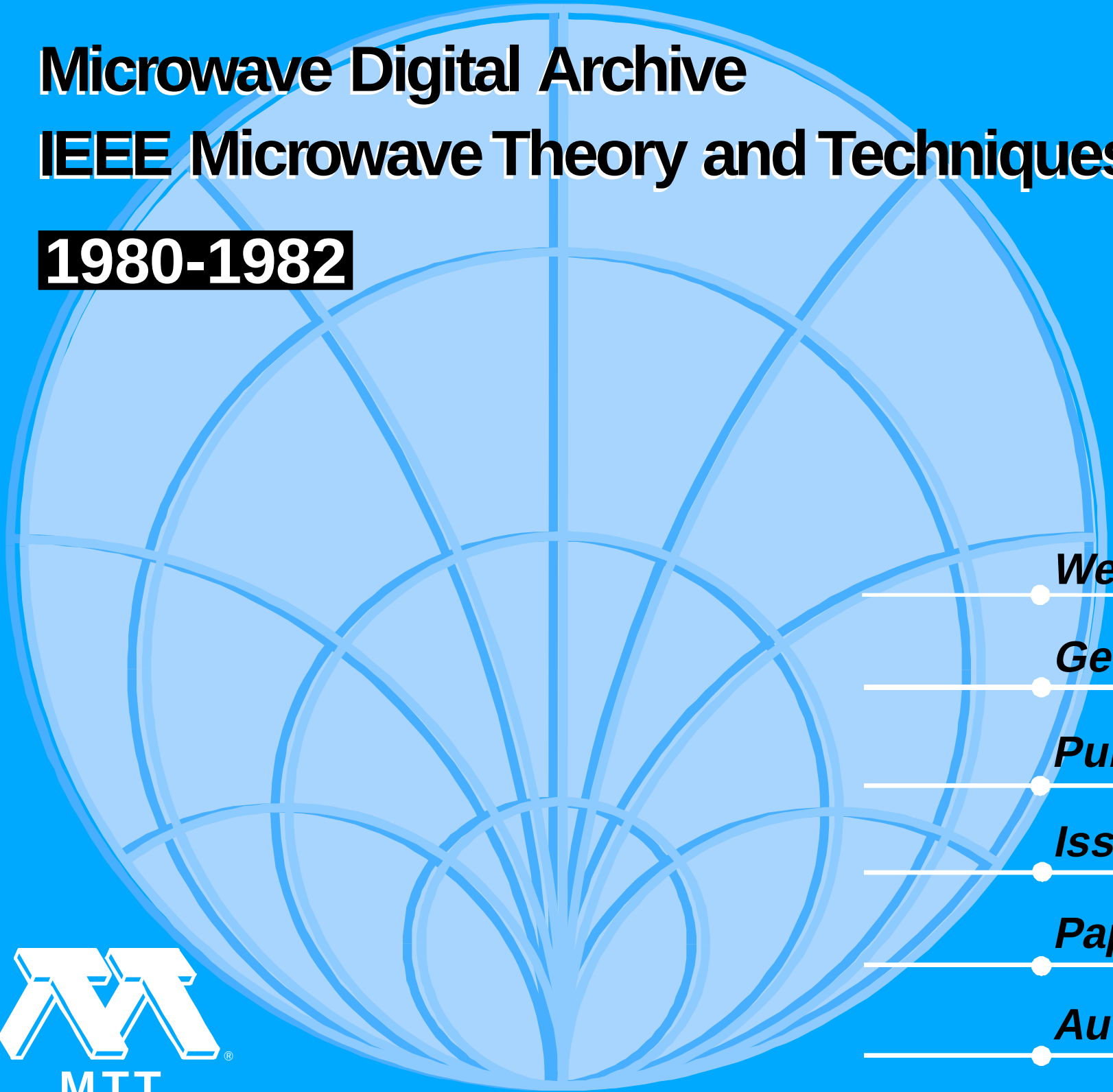
# Microwave Digital Archive
# IEEE Microwave Theory and Techniques Society

## 1980-1982





MTT®

# Welcome

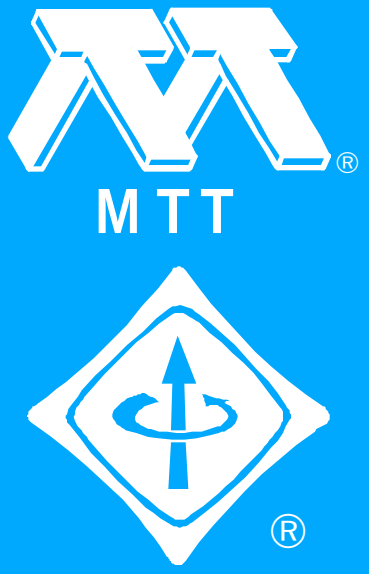
The Microwave Theory and Techniques Society of the IEEE has finished a complete archive of all reviewed and published material since 1953. Yearly updates of the published material will be compiled in the future. As digital media changes over the years, it will be necessary to update the format of the material, so this initial electronic release blazes a trail into the future.

The section “Getting Started” tells you how to optimize the Acrobat Reader Preferences to improve the readability of the document. If you need customer support before January 2001, call 831.657.2420 or 800.447.9100. If you find errors in the CD-ROM, e-mail a note to c.jackson@ieee.org, or mail a comment to the current President of the MTT Society.

Remember that the quality of the old journals is not perfect, and that some photographs will not be as clear as Technicolor. Also, the optical character recognition is good, but not perfect, so some spelling errors will occur. None the less, you can copy and paste the material for your own uses and personal study.

All papers were electronic files or images scanned from hard copy and converted to Adobe Acrobat PDF file format for cross-platform access. Since some of the papers were scanned from hard copy, the viewing quality will vary with the size and quality of fonts used. Even though the viewing quality on your monitor may vary, all papers print clearly.

Thank You and Enjoy!




Contents

# Welcome

## ACKNOWLEDGMENTS

This CD- ROM was assembled from the electronic files provided to us by Adam Philippidis at IEEE headquarters and from scanned originals provided by Ted Saad. Many people have contributed to the entire CD-ROM Archival effort. Most notably, Ted Saad provided nearly all the hard copy material, and sacrificed his entire collection of journals for the project. He also wrote a number of the original articles. Another notable contributor, Roger Pollard convinced the Society that this was a worthwhile project. The team at Sony Electronic Publishing Services, and Adam Philippidis, at the IEEE Headquarters, have also provided substantial amounts of help in completing this archival project.

## REFERENCES

IEEE Catalog Number: JP-17-0-0-C-0

ISBN: 0-7803-9906-4

# Welcome

## COPYRIGHT

Copyright discussions are appropriate, although, at times they seem tedious. The amount of Intellectual Property contained in this Microwave Digital Archive is astounding. Please treat it with the respect that our profession demands.



MTT®

IEEE®

Contents

# Welcome

## TRADEMARKS

# Getting Started

## INTRODUCTION

This Electronic Guide file contains hypertext links to separate article files. Links are represented by colored text (e.g. a name or title); clicking on the text activates the link.

Before you start browsing and using the information on this CD-ROM, you will need to install Adobe Acrobat Reader + Search 3.0. If you already have Acrobat Reader installed on your system, make sure it is version 3.0 or higher and includes the Search plug-in.

In many instances, we refer to the “menu bar”, shown here for reference.


## ACROBAT PREFERENCES

To make viewing and searching easier, we recommend changing two default Acrobat Preferences (found under File > Preferences on the menu bar.)

In the dialog box shown for **General** Preferences, turn OFF the "Open Cross-Document Links in Same Window" option; this will keep the Guide file open when you view article files and allows you to return to the same page in the Guide when you close an article.

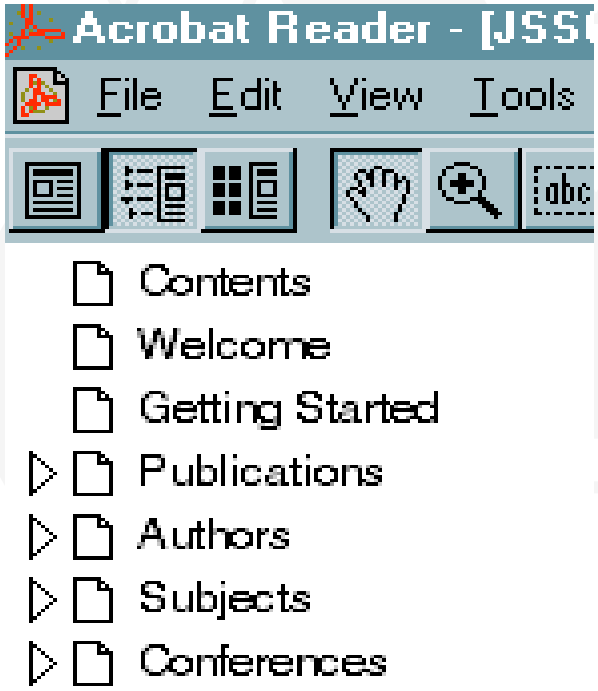
In the dialog box shown for **Search** Preferences, turn ON the "Show Fields" option so that Title, Author, Keywords, and Subject fields are visible when specifying search criteria. If for some reason this preference option is not present on your system, check to see that you have the Search plug-in installed. The Search icon  will be present on the Acrobat Toolbar if the function is properly installed. Specifics of the Search function are described later in this section.

## EXITING AN ARTICLE

To exit an article after viewing, and return to the electronic guide, select File > Close from the menu bar. To switch between the article and the electronic guide or any other PDF file that is open, select "Window" and pick the open file you wish to return to.

## USING BOOKMARKS

In addition to links, you can navigate through the Electronic Guide using Bookmarks. If they are not already visible, choose View > Bookmarks and Page from the menu bar or press the “Display Page and Bookmarks” button on the tool bar. A panel opens on the left side of the screen displaying Bookmarks in a hierarchy.




Each Bookmark corresponds to a page in the Guide. Click on the text in a Bookmark to go to that page.

Entries with lower level Bookmarks show an arrowhead, pointing down when subordinate Bookmarks are visible, pointing right when hidden. To view subordinate Bookmarks, click on the arrowhead. To hide them, click on the arrowhead again. Dragging the right margin of the bookmark panel resizes it.

## PRINTING ARTICLES

Articles may have text outside normal print-area defaults. We recommend selecting “Shrink to Fit” in the print menu (File > Print) to capture the complete image for your printout. This setting will become your new default.

## SELECTING GRAPHICS

To copy graphics to the Clipboard, choose Tools > Select Graphics from the menu bar. The cursor changes to the cross-hair icon.

Drag a rectangle around the graphic to select it. When you release the mouse button, the selected graphic is highlighted.

Choose Edit > Copy from the menu bar to copy the selected graphic to the Clipboard. To view the graphic, choose Window > Show Clipboard. The graphic is copied in the WMF (Windows), PICT (Macintosh), or XPIXMAP (UNIX) format. With UNIX, the graphic is pasted in the primary selection.

# Getting Started

## NAVIGATION BUTTONS

This Guide contains a variety of navigational aids to help you easily explore the contents.

### Section Map

The Electronic Guide is constructed in sections: e.g. Sessions, Authors, Getting Started. The current section is shown at the top of each page. The “path” to this section is shown at the right. Clicking these text buttons moves you to the start of that section.

### Next Page button

Click to advance to the next page in the section.

### Previous Page button

Click to go back to the previous page in the section. The first and last pages of a section show only one button.

The Page Up and Page Down keys perform the same functions.

# Getting Started

## ACROBAT TOOLBAR

**View Modes**

Display Thumbnails and Page
Display Bookmarks and Page
Display Page

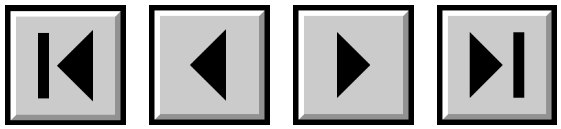

**Zoom/Selection**

Select Text
Zoom In (Magnify)
Move Page Image

# Getting Started

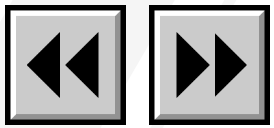
## ACROBAT TOOLBAR (continued)

### Navigation



Go to Last Page
Go Forward One Page
Go Backward One Page
Go to First Page

### History



Next (One Link)
Previous (One Link)

## ACROBAT TOOLBAR (continued)

**Page View**

Fit Width
Fit Page
Actual Size

**Find/Search**

Next Hit
Previous Hit
View Search Results
Search
Find

Contents

## SEARCHING

Two types of searching are possible with Acrobat: Find and full-text Search. Choosing Find (from the Toolbar or Tools > Find) opens a dialog box. Type a search string in the field provided, check the appropriate options and press the “Find” button. Find searches linearly through the currently open Acrobat file (not necessarily the entire Electronic Guide) from the cursor forward.

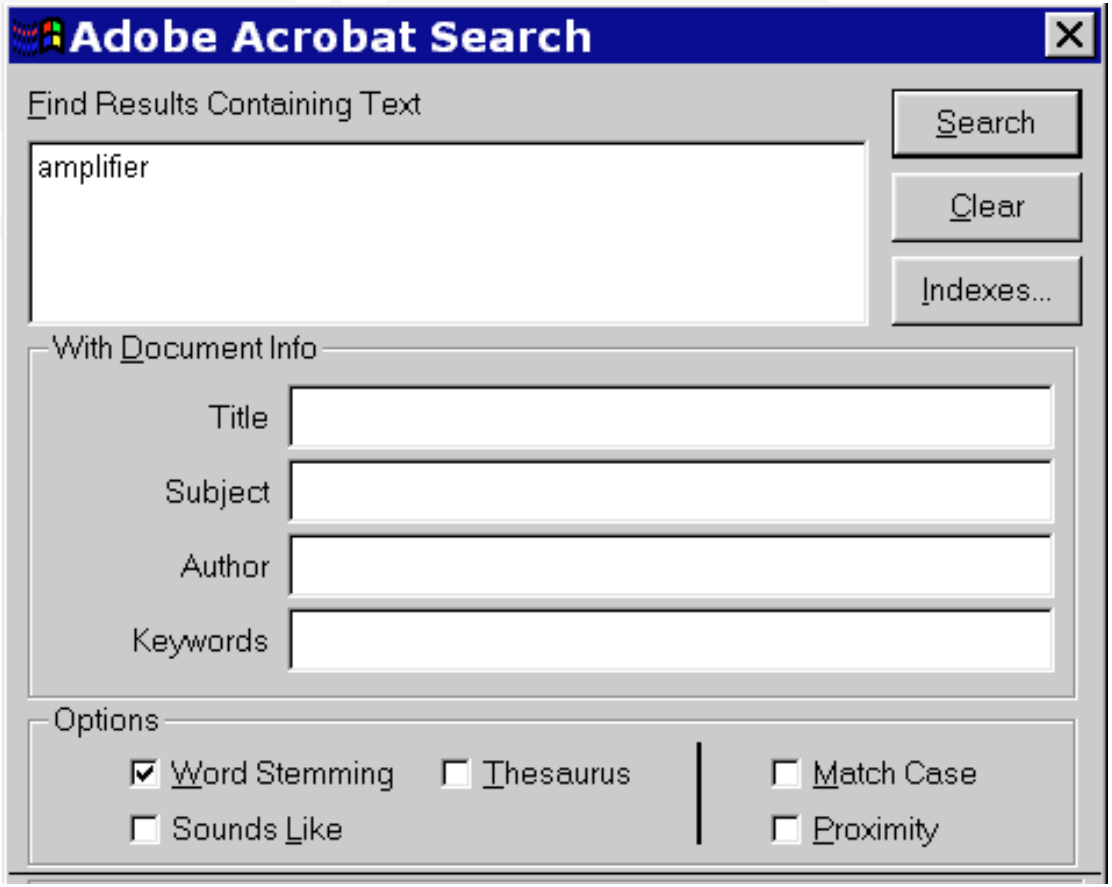
Choosing the Search button or Search menu item (Tools > Search), selecting the Query item, opens a dialog box from which you can access the more powerful full-text search engine (if you installed Acrobat with the Search plug-in from this CD-ROM). Its dialog box is shown on the next page.

Typing a term in the text box at the top of the Search dialog box and pressing the “Search” button causes a full-text search of all words in the body of papers in the collection. Entering a term in one or more of the fixed fields (Title, Author, Subject or Keywords) will cause a search for hits in only those fields.

# Getting Started

If you are not finding files you think should show in the results list, Acrobat may not be attached to the correct index file. To check, press the “Indexes...” button for a list of available indexes. If this title is not listed, press the “Add...” button and look in the root directory of the CD-ROM for a file called “index.pdx”. Click on that file to add it to the list. If none exists, this title was not indexed.

See the Search Online Guide (on Help menu) for more complete instructions on selecting appropriate options, constructing boolean queries, etc.



# Publications

- 1980 Transactions on Microwave Theory and Techniques
- 1981 Transactions on Microwave Theory and Techniques
- 1981 MTT-S International Microwave Symposium Digest
- 1982 MTT-S International Microwave Symposium Digest
- 1982 Microwave and Millimeter-Wave Monolithic Circuits Symposium Digest

Contents

Click on title for a list of issues.

# Issues by Publication

## 1980 Transactions on Microwave Theory and Techniques

- Jan. 1980 [T-MTT]
- Feb. 1980 [T-MTT]
- Mar. 1980 [T-MTT]
- Apr. 1980 [T-MTT]
- May 1980 [T-MTT] (Special Issue on Gigabit Logic for Microwave Systems)
- Jun. 1980 [T-MTT]
- Jul. 1980 [T-MTT]
- Aug. 1980 [T-MTT]
- Sep. 1980 [T-MTT]
- Oct. 1980 [T-MTT]
- Nov. 1980, Part I [T-MTT]
- Nov. 1980, Part II [T-MTT] (27-Year Cumulative Index)
- Dec. 1980 [T-MTT] (1980 Symposium Issue)

Click on issue for a list of papers.

# Issues by Publication

## 1981 Transactions on Microwave Theory and Techniques

- Jan. 1981 [T-MTT]
- Feb. 1981 [T-MTT]
- Mar. 1981 [T-MTT]
- Apr. 1981 [T-MTT]
- May 1981 [T-MTT] (Joint Special Issue on Surface-Acoustic-Wave Device Applications)
- Jun. 1981, Part I [T-MTT]
- Jun. 1981, Part II [T-MTT] (28-Year Cumulative Index)
- Jul. 1981 [T-MTT]
- Aug. 1981 [T-MTT]
- Sep. 1981 [T-MTT] (Special Issue on Open Guided Wave Structures)
- Oct. 1981 [T-MTT]
- Nov. 1981 [T-MTT]

# Issues by Publication

- Dec. 1981 [T-MTT] (1981 Symposium Issue)



Contents

Publications

Click on issue for a list of papers.

# Issues by Publication

## 1981 MTT-S International Microwave Symposium Digest

- 1981 [MWSYM]

# Issues by Publication

## 1982 MTT-S International Microwave Symposium Digest

- 1982 [MWSYM]

# Issues by Publication

## 1982 Microwave and Millimeter-Wave Monolithic Circuits Symposium Digest

- 1982 [MCS]

Contents
Publications

Click on issue for a list of papers.

# Issues

- Jan. 1980 [T-MTT]
- Feb. 1980 [T-MTT]
- Mar. 1980 [T-MTT]
- Apr. 1980 [T-MTT]
- May 1980 [T-MTT] (Special Issue on Gigabit Logic for Microwave Systems)
- Jun. 1980 [T-MTT]
- Jul. 1980 [T-MTT]
- Aug. 1980 [T-MTT]
- Sep. 1980 [T-MTT]
- Oct. 1980 [T-MTT]
- Nov. 1980, Part I [T-MTT]
- Nov. 1980, Part II [T-MTT] (27-Year Cumulative Index)
- Dec. 1980 [T-MTT] (1980 Symposium Issue)
- Jan. 1981 [T-MTT]
- Feb. 1981 [T-MTT]



Click on issue for a list of papers.

# Issues

- Mar. 1981 [T-MTT]
- Apr. 1981 [T-MTT]
- May 1981 [T-MTT] (Joint Special Issue on Surface-Acoustic-Wave Device Applications)
- Jun. 1981, Part I [T-MTT]
- Jun. 1981, Part II [T-MTT] (28-Year Cumulative Index)
- Jul. 1981 [T-MTT]
- Aug. 1981 [T-MTT]
- Sep. 1981 [T-MTT] (Special Issue on Open Guided Wave Structures)
- Oct. 1981 [T-MTT]
- Nov. 1981 [T-MTT]
- Dec. 1981 [T-MTT] (1981 Symposium Issue)
- 1981 [MWSYM]
- 1982 [MWSYM]
- 1982 [MCS]

Contents
Publications

Click on issue for a list of papers.

# Papers by Issue

## Jan. 1980 [T-MTT]

- Front Cover (Jan. 1980 [T-MTT])
- Intermodulation Distortion Analysis of MESFET Amplifiers Using the Volterra Series Representation
- Analysis and Improvement of Intermodulation Distortion in GaAs Power FET's
- On the Theory of Corrugated Optical Disk Waveguides
- Scattering from an Arbitrarily Located Off-Axis Inhomogeneity in a Step-Index Optical Fiber (Jan. 1980 [T-MTT])
- On the Accuracy of Scalar Approximation Technique in Optical Fiber Analysis
- Analysis of Open Dielectric Waveguides Using Mode-Matching Technique and Variational Methods (Jan. 1980 [T-MTT])
- Propagation in Twisted Square Waveguide
- Dispersion Relations for Comb-Type Slow-Wave Structures

Click on title for a paper summary.

# Papers by Issue

- DC- and Microwave-Biased Extrinsic GaAs Photoconductors
- Analysis of an End Launcher for a Circular Cylindrical Waveguide (Correction)
- Contributors (Jan. 1980 [T-MTT])
- IEEE Copyright Form (Jan. 1980 [T-MTT])
- Back Cover (Jan. 1980 [T-MTT])

Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

## Feb. 1980 [T-MTT]




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Papers by Issue

- Techniques for Broad-Banding Above Resonance Circulator Junctions without the Use of External Matching Networks
- A Broad-Band Model for a Coaxial-to-Stripline Transition
- Scattering and Mode Conversion of Guided Modes by a Spherical Object in an Optical Fiber
- A Theoretical Basis for Microwave and RF Field Effects on Excitable Cellular Membranes
- Easy Determination of the Characteristic Impedance of the Coaxial System Consisting of an Inner Regular Polygon Concentric with an Outer Circle (Short Paper)
- A K-Band Ruby Maser with 500-MHz Bandwidth (Short Paper)
- Microstrip Characteristic Impedance (Comments)
- Microstrip Characteristic Impedance (Response to Comments)
- Slot-Line Parameters (Computer Program Description)
- Contributors (Feb. 1980 [T-MTT])

Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- IEEE Journals on Microfilm (Advertisement) (Feb. 1980 [T-MTT])
- Membership Application (Feb. 1980 [T-MTT])
- IEEE Standard Dictionary (Advertisement) (Feb. 1980 [T-MTT])
- Back Cover (Feb. 1980 [T-MTT])

MTT
IEEE
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

## Mar. 1980 [T-MTT]




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Papers by Issue

- High-Accuracy Wide-Range Measurement Method for Determination of Complex Permittivity in Reentrant Cavity: Part A --- Theoretical Analysis of the Method
- High-Accuracy Wide-Range Measurement Method for Determination of Complex Permittivity in Reentrant Cavity: Part B -- Experimental Analysis of Measurement Errors
- Wave Propagation through Weakly Anisotropic Straight and Curved Rectangular Dielectric Optical Guides
- Radiation Fields of Optical Stripline Waveguides
- Ridge-Shaped Narrow Wall Directional Coupler Using TE/sub 10/, TE/sub 20/, and TE/sub 30/ Modes
- A Design Procedure for Bandpass Channel Multiplexers Connected at a Common Junction
- Closed-Form Expressions for the Current or Charge Distribution on Parallel Strips or Microstrip
- Theory of Dispersion in Microstrip Arbitrary Width
- An Expansion for the Fringing Capacitance (Short Paper)

Click on title for a paper summary.

# Papers by Issue

- Diathermy Applicators with Circular Aperture and Corrugated Flange (Short Paper)
- On Design of Coupled Microstrip Lines (Letters)
- Characteristics of Coupled Microstriplines (Correction)
- Waveguide Modes in Inhomogeneous Media (Computer Program Descriptions)
- Computation of the Shielded and Coupled Microstrip Parameters in Suspended and Conventional Form (Computer Program Descriptions)
- Computer Analysis of Microwave and Millimeter-Wave Mixers (Computer Program Descriptions)
- Mathieu Functions of Integral Orders and Real Arguments (Computer Program Descriptions)
- Contributors (Mar. 1980 [T-MTT])
- IEEE Journals on Microfilm (Advertisement) (Mar. 1980 [T-MTT])
- Membership Application (Mar. 1980 [T-MTT])

Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- IEEE Standard Dictionary (Advertisement) (Mar. 1980 [T-MTT])
- Back Cover (Mar. 1980 [T-MTT])



MTT
IEEE
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

## Apr. 1980 [T-MTT]



Click on title for a paper summary.

# Papers by Issue

- Computer-Aided Analysis and Design of Networks Containing Commensurate and Noncommensurate Delay Lines
- A Simple Method for Spacing the Adjacent Passbands of a Coupled-Line Filter
- Design Formulas for a Quasi-Optical Diplexer or Multiplexer
- Conformal Transformations Combined with Numerical Techniques, with Applications to Coupled-Bar Problems
- Corner Function Analysis of Microstrip Transmission Lines
- Analysis of Elliptic and Cylindrical Striplines Using Laplace's Equation
- Analysis of the Dispersion Characteristic of Slot Line with Thick Metal Coating
- An Approximate Dynamic Green's Function in Three Dimensions for Finite Length Microstripline
- A Proposal of Low-Loss Leaky Waveguide for Submillimeter Waves Transmission
- A Multilayer Fiber Guide with Rectangular Core

Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- Quarter-Wavelength Coupled Dielectric Plate Resonators for High Selectivity TE/sub 10/-Mode Filters
- Novel Optical Control Techniques for Solid-State Radar Transmitters
- In Vivo Probe Measurement Technique for Determining Dielectric Properties at VHF through Microwave Frequencies
- Theorems on Match and Isolation in Multiport Networks (Short Papers)
- Schottky Barrier Impedance Measurements at UHF (Short Papers)
- Transmission Loss of the Double-Strip Modified H Guide at 50 GHz (Short Papers)
- A Simple Full-Band Matched 180° E Plane Waveguide Bend (Letters)
- Determination of Conductor Losses in Planar Waveguide Structures (A Comment to Some Published Results for Microstrips and Microslots) (Letters)

MTT®
IEEE®
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- Accurate Resonant Frequencies of Dielectric Resonators (Correction)
- Contributors (Apr. 1980 [T-MTT])
- Back Cover (Apr. 1980 [T-MTT])

# Papers by Issue

## May 1980 [T-MTT] (Special Issue on Gigabit Logic for Microwave Systems)




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Papers by Issue




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Papers by Issue

## Jun. 1980 [T-MTT]




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Papers by Issue

- Numerical Experiments on the Determination of Cutoff Frequencies of Waveguides of Arbitrary Cross Section
- Spectral Domain Analysis of Elliptic Microstrip Disk Resonators
- Transmission Matrix of a Linear Double Taper in Rectangular Waveguides
- A Novel Low-Loss Dielectric Waveguide for Millimeter and Submillimeter Wavelengths
- Transponder Antennas in and Near a Three-Layered Body
- Direct Noniterative Numerical Solution of Field Theory Problems Having Irregular Boundaries Using Network Analogs
- Transmission Characteristic Measurement of Two-Mode Optical Fiber with a Nearly Optimum Index-Profile
- Transverse Discontinuities in Nonreciprocal Waveguides
- Characteristics of Circulators Using Planar Triangular and Disk Resonators Symmetrically Loaded with Magnetic Ridges

Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- Characteristics of Crossed Rectangular Coaxial Structures
- Behavior of Bleustein-Gulyaev Waves in a Periodically Corrugated Piezoelectric Crystal
- Power Considerations on IMPATT-Diode Arrays with Incomplete Thermal Isolation
- Extension of Existing Models to Ion-Implanted MESFET's
- Electronic Modulated Beam-Steerable Silicon Waveguide Array Antenna
- Noise Analysis of Nonlinear Feedback Oscillator with AM-PM Conversion Coefficient
- A Broad-Band Optoelectronic Microwave Switch
- Upper Limits on the Error of an Improved Approximation for the Characteristic Impedance of Rectangular Coaxial Line (Short Papers)
- Plane-Wave Interaction with Structures of Thin Absorbing Films (Short Papers)
- A Fast Low-Loss Low-Drive 14-GHz Microstrip p-i-n Phase Shifter (Short Papers)

Click on title for a paper summary.

# Papers by Issue

- Computer Aided Analysis of Noise in Lossy Microwave Filters (Short Papers)
- The Design of Coupled Microstrip Lines (Correction)
- An Accurate Solution of the Cylindrical Dielectric Resonator Problem (Correction)
- Contributors (Jun. 1980 [T-MTT])
- IEEE Journals on Microfilm (Advertisement) (Jun. 1980 [T-MTT])
- Membership Application (Jun. 1980 [T-MTT])
- IEEE Open Order Plan for Non-Periodical Publications (Advertisement) (Jun. 1980 [T-MTT])
- Back Cover (Jun. 1980 [T-MTT])

Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

## Jul. 1980 [T-MTT]

- Front Cover (Jul. 1980 [T-MTT])
- A Novel Polarization-Independent Beam Splitter
- Generalized Fresnel Power Transmission Coefficients for Curved Graded-Index Media
- TE/sub 011/ Mode Sectorial Circular Cylindrical Cavities Filters (Jul. 1980 [T-MTT])
- Toroidal Resonators for Electromagnetic Waves--II
- Attenuation and Radiation Characteristics of the HE/sub 11/ -Mode
- Conducting Spheres in Rectangular Waveguides
- On the Propagation of Leaky Waves in a Longitudinally Slotted Rectangular Waveguide
- Method for Equalizing Phase Velocities of Coupled Microstrip Lines by Using Anisotropic Substrate
- Effects of Randomization on Periodic Coupling

MTT
IEEE
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- Transmission-Line Identities for a Class of Interconnected Coupled-Line Sections with Application to Adjustable Microstrip and Stripline Tuners
- Spectral Domain Immitance Approach for Dispersion Characteristics of Generalized Printed Transmission Lines
- Millimeter-Wave Fin-Line Characteristics
- The Accuracy of TLM Analysis of Finned Rectangular Waveguides
- A Quadriphase Fin-Line Modulator
- Electric Probe Measurements on Microstrip
- Efficient Power Combining (Jul. 1980 [T-MTT])
- An 8-18-GHz YIG-Tuned FET Oscillator
- The Design of Linearizing Networks for High-Power Varactor-Tuned Frequency Modulators
- A Low Phase Shift Step Attenuator Using p-i-n Diodes Switches

Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- Diplexer Operation of Stripline Y Circulators: Part 1--Basic Performance of Diplexer Operation
- An Evaluation of the Performance of the VLA Circular Waveguide System
- A Swept-Frequency Magnitude Method for the Dielectric Characterization of Chemical and Biological Systems
- Irradiation of Prolate Spheroidal Models of Humans in the Near Field of a Short Electric Dipole
- A General Equivalent Network of the Input Impedance of Symmetric Three-Port Circulators (Short Paper)
- Rigorous Analysis of the Step Discontinuity in a Planar Dielectric Waveguide (Correction)
- Broad-Band Coupling to High-Q Resonant Loads (Comment)
- Contributors (Jul. 1980 [T-MTT])
- Back Cover (Jul. 1980 [T-MTT])

MTT
IEEE
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

## Aug. 1980 [T-MTT]

- Front Cover (Aug. 1980 [T-MTT])
- A Highly Stabilized GaAs FET Oscillator Using a Dielectric Resonator Feedback Circuit in 9-14 GHz (Aug. 1980 [T-MTT])
- A VHF Hybrid Parametric Amplifier
- The Hybrid Parametric Amplifier (Aug. 1980 [T-MTT])
- High-Accuracy WKB Analyses of alpha-Power Graded-Core Fibers
- SAW Bandpass Filter Design for 1.6-GHz PCM Timing Tank Applications
- Simplified Equivalent Representations for Multicoupled Lines and Their Application to Filter Design
- Propagation in a Rectangular Waveguide Periodically Loaded with Resonant Irises (Aug. 1980 [T-MTT])

Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- Transmission Characteristics and a Design Method of Transmission-Line Low-Pass Filters with Multiple Pairs of Coincident Zeros and Multiple Pairs of Coincident Poles
- Spatial and Temporal Coherence of a 35-GHz Gyromonotron Using the TE/sub 01/ Circular Mode
- The Variational Principle for Non-Self-Adjoint Electromagnetic Problems
- On the Design and Optimization of the Shielded-Pair Transmission Line
- The Dyadic Green's Functions for Cylindrical Waveguides and Cavities
- Measurements of Embedding Impedance of Millimeter-Wave Diode Mounts
- An Investigation of Nonreciprocal Periodic Structures
- Ray Optic Approach to Magnetostatic Bulk Wave Propagation in a YIG Film Delay Line
- Surface Electromagnetic Wave Field Strength Measurements on Railroad Tracks

Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- A Broad-Band Element for Microstrip Bias or Tuning Circuits (Short Papers)
- Dispersion in n Coupled Microstrip Meanders (Short Papers)
- The Bandwidth of Image Guide (Short Papers)
- Tolerance Analysis of Cascaded Structures (Short Papers)
- Contributors (Aug. 1980 [T-MTT])
- Order Form (Aug. 1980 [T-MTT])
- Back Cover (Aug.1980 [T-MTT])

MTT
IEEE
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

## Sep. 1980 [T-MTT]




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Papers by Issue

- Excitation of Surface Waves and the Scattered Radiation Fields by Rough Surfaces of Arbitrary Slope
- Comparative Testing of Leaky Coaxial Cables for Communications and Guided Radar
- The Influence of the Energy Dissipation and of the Geometry on Toroidal Resonators with a Conducting Separating Wall
- General Extracted Pole Synthesis Technique with Applications to Low-Loss TE/sub 011/ Mode Filters
- On the Design of Temperature Stabilized Delay Lines (Short Papers)
- Periodically Loaded Transmission Lines (Short Papers)
- Resonant Frequencies of Rectangular Dielectric Resonators (Short Papers)
- Numerical Calculation of Electromagnetic Energy Deposition for a Realistic Model of Man (Comment)

Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- Upper Bound Calculations on Capacitance of Microstrip Line Using Variational Method and Spectral Domain Approach (Comments)
- Contributors (Sep. 1980 [T-MTT])
- IEEE Journals on Microfilm (Advertisement) (Sep. 1980 [T-MTT])
- Back Cover (Sep. 1980 [T-MTT])

MTT
IEEE
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

## Oct. 1980 [T-MTT]




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Papers by Issue

- Wide-Band Equivalent Circuits of Microwave Planar Networks
- High-Accuracy Numerical Data on Propagation Characteristics of alpha-Power Graded-Core Fibers
- Inductive Grids in the Region of Diffraction Anomalies: Theory, Experiment, and Applications
- Differing Effects of Pulsed and CW Microwave Energy Upon Nerve Function as Detected by Birefringence Measurement
- Computer-Aided Design of Stripline Ferrite Junction Circulators (Short Papers)
- A Quasi-Optical Single Sideband Filter Employing a Semiconfocal Resonator (Short Papers)
- Green's Functions for Triangular Segments in Planar Microwave Circuits (Short Papers)
- Closed-Form Expressions for the Current or Charge Distribution on Parallel Strips or Microstrip (Addendum)
- Contributors (Oct. 1980 [T-MTT])
- Overseas Abstracts (Oct. 1980 [T-MTT])

Click on title for a paper summary.

# Papers by Issue

- IEEE Annual Combined Index (Advertisement) (Oct. 1980 [T-MTT])
- Back Cover (Oct. 1980 [T-MTT])



MTT
IEEE
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

## Nov. 1980, Part I [T-MTT]



Click on title for a paper summary.

# Papers by Issue

- Microstrip Discontinuity Capacitances and Inductances for Double Steps, Mitered Bends with Arbitrary Angle, and Asymmetric Right-Angle Bends
- Electromagnetic Coupling Between a Thin-Wire Antenna and a Neighboring Biological Body: Theory and Experiment
- On the Odd-Mode Capacitance of the Coupled Microstriplines (Short Papers)
- Low Impedance Microstrip Calculations Using MSTRIP (Letters)
- Contributors (Nov. 1980, Part I [T-MTT])
- IEEE Annual Combined Index (Advertisement) (Nov. 1980, Part I [T-MTT])
- Inside Back Cover (Nov. 1980, Part I [T-MTT])

# Papers by Issue

## Nov. 1980, Part II [T-MTT] (27-Year Cumulative Index)

# Papers by Issue

## Dec. 1980 [T-MTT] (1980 Symposium Issue)




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Papers by Issue

- Trapped Image Guide For Millimeter-Wave Circuits (Dec. 1980 [T-MTT])
- Use of Microstrip Impedance- Measurement Technique in the Design of a BARITT Diplex Doppler Sensor
- Dominant and Second-Order Mode Cutoff Frequencies in Fin Lines Calculated with a Two-Dimensional TLM Program
- Density-Independent Moisture Metering in Fibrous Materials Using a Double-Cutoff Gunn Oscillator (Dec. 1980 [T-MTT])
- Electromagnetic-Energy Deposition in an Inhomogeneous Block Model of Man for Near-Field Irradiation Conditions
- 1-W Millimeter-Wave Gunn Diode Combiner
- A New Microstrip Radiator For Medical Applications
- The Traveling-Wave Divider/Combiner
- A Least Squares Solution for Use in the Six-Port Measurement Technique (Dec. 1980 [T-MTT])
- Circular-Electric Mode Waveguide Couplers and Junctions for Use in Gyrotron Traveling-Wave Amplifiers (Dec. 1980 [T-MTT])

Click on title for a paper summary.

# Papers by Issue

- Mode Coupling and Power Transfer in a Coaxial Sector Waveguide with a Sector Angle Taper (Dec. 1980 [T-MTT])
- Contributors (Dec. 1980 [T-MTT])
- Index, IEEE Transactions on Microwave Theory and Techniques, Volume MTT-28, 1980
- Back Cover (Dec. 1980 [T-MTT])

MTT
IEEE
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

## Jan. 1981 [T-MTT]




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Papers by Issue

- Eigenvalue Spectrum of Rectangular Waveguide with Two Symmetrically Placed Double Ridges
- Asymmetric Realizations for Dual-Mode Bandpass Filters
- Dispersion Characteristics of Microstrip Lines
- Microwave Measurement of Conductivity and Permittivity of Semiconductor Spheres by Cavity Perturbation Technique
- Permittivity Measurement of Modified Infinite Samples by a Directional Coupler and a Sliding Load (Short Papers)
- Impedance Transformation Equations for Exponential, Cosine-Squared, and Parabolic Tapered Transmission Lines (Short Papers)
- Green's Functions for Circular Sectors, Annular Rings, and Annular Sectors in Planar Microwave Circuits (Short Papers)
- Segmentation Method Using Impedance Matrices for Analysis of Planar Microwave Circuits (Short Papers)
- Dispersion Relations for Comb-Type Slow-Wave Structures (Correction)

MTT®
IEEE®
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- A Theoretical Basis for Microwave and RF Field Effects on Excitable Cellular Membranes (Correction)
- Contributors (Jan. 1981 [T-MTT])
- IEEE Copyright Form (Jan. 1981 [T-MTT])
- Inside Back Cover (Jan. 1981 [T-MTT])

MTT
IEEE
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

## Feb. 1981 [T-MTT]




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Papers by Issue

- Maximum Q-Factor of Microstrip Resonators
- A New Approach in the Computation of Ultrahigh Degree Equal-Ripple Polynomials for 90°-Coupler Synthesis
- Approximate Formulas for Line Capacitance and Characteristic Impedance of Microstrip Line
- Bloch-Wave Analysis of Stripline- and Microstrip-Array Slow-Wave Structures
- Analysis of Small Aperture Coupling Between Rectangular Waveguide and Microstrip Line
- A Compact Waveguide "Resolver" for the Accurate Measurement of Complex Reflection and Transmission Coefficients Using the 6-Port Measurement Concept
- Suspended Coupled Slotline Using Double Layer Dielectric (Short Papers)
- The Design of Broadside-Coupled Stripline Circuits (Short Papers)
- Synthesis of Lange Couplers (Short Papers)

MTT®
IEEE®
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- A Universal Overlay for Surface Impedance Calculations for Composite Conductors (Short Papers)
- A Time Domain Reflectometer Using a Semiautomatic Network Analyzer and the Fast Fourier Transform (Short Papers)
- Extension of Existing Models to Ion-Implanted MESFET's (Correction)
- Contributors (Feb. 1981 [T-MTT])
- IEEE Annual Combined Index (Advertisement) (Feb. 1981 [T-MTT])
- Back Cover (Feb. 1981 [T-MTT])

MTT
IEEE
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

## Mar. 1981 [T-MTT]




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Papers by Issue

- Analysis of Open-Type Dielectric Waveguides by the Finite-Element Iterative Method
- Helical Resonators for Measuring Dielectric Properties of Materials
- Measurement of Losses in Noise-Matching Networks
- Dependence of Electromagnetic Energy Deposition Upon Angle of Incidence for an Inhomogeneous Block Model of Man Under Plane-Wave Irradiation
- Dual-Mode Microwave System to Enhance Early Detection of Cancer
- Performance and Design of Microwave FET Harmonic Generators (Short Papers)
- On the Design of Transitions Between a Metal and Inverted Strip Dielectric Waveguide for Millimeter Waves (Short Papers)
- A Coaxial Waveguide Commutator Feed for a Scanning Circular Phased Array Antenna (Short Papers)

MTT®
IEEE®
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- Coupling Between Two Collinear Parallel-Plate Waveguides of Unequal Widths (Short Papers)
- Slotted and Loose Braid Cables: Brief Conclusions of a Comparative Study (Short Papers)
- Contributors (Mar. 1981 [T-MTT])
- Inside Back Cover (Mar. 1981 [T-MTT])

Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

## Apr. 1981 [T-MTT]




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Papers by Issue

- Numerical Analysis of Pulse Broadening in Graded Index Optical Fibers
- Characteristics of Unilateral Fin-Line Structures with Arbitrarily Located Slots (Apr. 1981 [T-MTT])
- Variable Bandpass Filters Using Varactor Diodes
- Stepped-Ferrite Tunable Evanescent Filters
- A Dual Six-Port Automatic Network Analyzer (Apr. 1981 [T-MTT])
- Mode and Energy Guidance Properties of a Slab of Inhomogeneous Medium with Transverse Variations of the Gain Only
- Two Simple Methods for the Measurement of the Dielectric Permittivity of Low-Loss Microstrip Substrates (Short Papers)
- Empirical Relations for Capacitive and Inductive Coupling Coefficients of Coupled Microstrip Lines (Short Papers)
- Contributors (Apr. 1981[T-MTT])
- Back Cover (Apr. 1981 [T-MTT])

Click on title for a paper summary.

# Papers by Issue

## May 1981 [T-MTT] (Joint Special Issue on Surface-Acoustic-Wave Device Applications)




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Papers by Issue

- Implementation of Satellite Communication Systems Using Surface Acoustic Waves
- Optimized SAW Spectral Control Filters for Digital Satellite Communications System
- Programmable Frequency-Hop Synthesizers Based on Chirp Mixing
- Acoustoelectric Convolver Technology for Spread-Spectrum Communications
- An Application of SAW Convolves to High Bandwidth Spread Spectrum Communications
- Wide-Band Signal Processing Using the Two-Beam Surface Acoustic Wave Acoustooptic Time Integrating Correlator
- Adaptive Deconvolution Using a SAW Storage Correlator
- Surface-Acoustic-Wave Random-Access Memories
- Contributors (May 1981 [T-MTT])
- Inside Back Cover (May 1981 [T-MTT])

Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

## Jun. 1981, Part I [T-MTT]




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Papers by Issue

- A 25-W 5-GHz GaAs FET Amplifier for a Microwave Landing System
- A New Technique for Magnetostatic Wave Delay Lines
- Near-Field Absorption in Prolate Spheroidal Models of Humans Exposed to a Small Loop Antenna of Arbitrary Orientation
- Reflection by a Sinusoidally Modulated Surface Reactance at Oblique Incidence
- Finite Element Analysis of Optical Waveguides (Jun. 1981, Part I [T-MTT])
- Microwave Oscillator Analysis (Short Papers)
- A Simple Numerical Method for the Cutoff Frequency of a Single-Mode Fiber with an Arbitrary Index-Profile (Short Papers)
- Microstrip Dispersion in a Wide-Frequency Range (Short Papers)
- Characteristic Impedances of Four-Conductor Transmission Line (Short Papers)

MTT®
IEEE®
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- On the Orthogonality of Approximate Waveguide Mode Functions (Short Papers)
- Conformal Transformations Combined with Numerical Techniques, with Applications to Coupled-Bar Problems (Comments)
- The Matched Feedback Amplifier: Ultrawide-Band Microwave Amplification with GaAs MESFET's (Comments)
- Contributors (Jun. 1981, Part I [T-MTT])
- IEEE Conference Records (Advertisement) (Jun. 1981, Part I [T-MTT])
- Membership Application (Jun. 1981, Part I [T-MTT])
- Back Cover (Jun. 1981, Part I [T-MTT])

MTT
IEEE
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

## Jun. 1981, Part II [T-MTT] (28-Year Cumulative Index)

# Papers by Issue

## Jul. 1981 [T-MTT]




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Papers by Issue

- Microstrip Spiral Directional Coupler
- Circulators Using Planar WYE Resonators
- Operation of Tracking Circulators
- Propagation Constant Below Cutoff Frequency in a Circular Waveguide with Conducting Medium
- Scattering of the TE/sub 01/ and TM/sub 01/ Modes on Transverse Discontinuities in a Rod Dielectric Waveguide -- Application to the Dielectric Resonators
- Analysis and Sensitivity Evaluation of 2p-Port Cascaded Networks (Jul. 1981 [T-MTT])
- Microwave Phase Detectors for PSK Demodulators
- Feasibility Study of Density-Independent Moisture Measurement with Microwaves
- The Stability of Magnetrons Under Short Pulse Conditions (Short Papers)
- Guided Magnetostatic Waves of the YIG Plate Magnetized Nonuniformly (Short Papers)

MTT
IEEE
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Papers by Issue

## Aug. 1981 [T-MTT]




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Papers by Issue

- On the Quasi-TEM Modes in Inhomogeneous Multiconductor Transmission Lines
- Equivalent Circuits of Binomial Form Nonuniform Coupled Transmission Lines
- Time-Dependent Microwave Heating and Surface Cooling of Simulated Living Tissues
- Graph Design of p-i-n Diode Phase Shifters (Short Papers)
- Transmission Line Identities for a Class of Interconnected Coupled-Line Sections with Application to Adjustable Microstrip and Stripline Tuners (Comment)
- High-Accuracy Numerical Data on Propagation Characteristics of alpha-Power Graded-Core Fibers (Correction)
- Patent Abstracts (Aug. 1981 [T-MTT])
- Contributors (Aug. 1981 [T-MTT])
- IEEE Conference Records (Advertisement) (Aug. 1981 [T-MTT])
- IEEE on Microfilm (Advertisement) (Aug. 1981 [T-MTT])

MTT
IEEE
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- Back Cover (Aug. 1981 [T-MTT])



Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

## Sep. 1981 [T-MTT] (Special Issue on Open Guided Wave Structures)




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Papers by Issue

- A Quasioptical Circuit Technology for Shortmillimeter-Wavelength Multiplexer
- Irregular Magneto-Optical Waveguides
- Analysis of Periodic Ferrite Slab Waveguides by Means of Improved Perturbation Method
- Fundamental Considerations in Millimeter and Near-Millimeter Component Design Employing Magnetoplasmons
- A Hybrid Method for Paraxial Beam Propagation in Multimode Optical Waveguides
- Asymptotic Eigenequations and Analytic Formulas for the Dispersion Characteristics of Open Wide Microstrip Lines
- Method of Analysis of Planar Networks Including Radiation Loss
- Millimeter-Wave Passive Components and Six-Port Network Analyzer in Dielectric Waveguide
- Millimeter-Wave Dielectric Image Line Detector-Circuit Employing Etched Slot Structure
- Millimeter-Wave InP Image Line Self-Mixing Gunn Oscillator

Click on title for a paper summary.

# Papers by Issue

- Metal Walls in Close Proximity to a Dielectric Waveguide Antenna
- Circularly Polarized Linear Array Antenna Using a Dielectric Image Line
- A Periodic Branching Filter for Millimeter-Wave Integrated Circuits
- Microwave Modeling of Optical Periodic Waveguides (Short Papers)
- Anomalous Low-Loss Transmission in a Gas-Confined Dielectric Waveguide for Millimeter and Submillimeter Wavelengths (Short Papers)
- Composite Dielectric Waveguides with Two Elliptic-Cylinder Boundaries (Short Papers)
- Patent Abstracts (Sep. 1981 [T-MTT])
- Back Cover (Sep. 1981 [T-MTT])

Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

## Oct. 1981 [T-MTT]




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Papers by Issue

- Resonant Frequency Stability of the Dielectric Resonator on a Dielectric Substrate
- Toroidal Resonators and Waveguides of Arbitrary Cross Section
- Analysis and Design of TE/sub 11/-to-HE/sub 11/ Corrugated Cylindrical Waveguide Mode Converters
- Surface Waves and Their Relation to the Eigenfrequencies of a Circular-Cylindrical Cavity
- The Modeling of Singularities in the Finite-Difference Approximation of the Time-Domain Electromagnetic-Field Equations
- Coupled-Mode Theory Analysis of Distributed Nonreciprocal Structures
- Asymptotic High-Frequency Modes of Homogeneous Waveguide Structures with Impedance Boundaries
- Desegmentation Method for Analysis of Two-Dimensional Microwave Circuits

Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- Broad-Band Active Phase Shifter Using Dual-Gate MESFET (Short Papers)
- Suspended Slot Line Using Double Layer Dielectric (Short Papers)
- Open-End Discontinuity in Shielded Mlcrostrip Circuits (Short Papers)
- Extension of an Old Circulator Model (Short Papers)
- First-Order Bragg Interactions in a Gyromagnetic-Dielectric Waveguide (Short Papers)
- Microwave Pulse-Induced Acoustic Resonances in Spherical Head Models (Short Papers)
- Proposal for an Electrically Tunable Surface Plasmon Light Emitter (Letters)
- Design of Microwave GaAs MESFET's for Broad-Band Low-Noise Amplifiers (Addendum)
- Cylindrical Dielectric Resonators and Their Applications in TEM Line Microwave Circuits (Correction)

MTT
IEEE
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- Approximate Formulas for Line Capacitance and Characteristic Impedance of Microstrip Line (Erratum)
- Patent Abstracts (Oct. 1981 [T-MTT])
- Overseas Abstracts (Oct. 1981 [T-MTT])
- Call for Papers - Special Issue on Millimeter Waves (Oct. 1981 [T-MTT])
- Call for Papers - 1982 IEEE MTT-S International Microwave Symposium (Oct. 1981 [T-MTT])
- Call for Papers - Joint Special Issue on GaAs IC's (Oct. 1981 [T-MTT])
- Inside Back Cover (Oct. 1981 [T-MTT])

MTT
IEEE
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

## Nov. 1981 [T-MTT]




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Papers by Issue

- Equivalent Reactance of a Shorting Septum in a Fin-Line: Theory and Experiment
- Energy Absorption from Small Radiating Coaxial Probes in Lossy Media
- Dielectric Loss in Biogenic Steroids at Microwave Frequencies
- Analysis of Miniature Electric Field Probes with Resistive Transmission Lines
- Probing Amplitude, Phase, and Polarization of Microwave Field Distributions in Real Time
- The Thermal Dielectric Quotient for Characterizing Dielectric Heat Conductors (Short Papers)
- Planar Broad-Band 180° Hybrid Power Divider/Combiner Circuit (Short Papers)
- An Empirical Relationship for Electromagnetic Energy Absorption in Man for Near-Field Exposure Conditions (Short Papers)

MTT®
IEEE®
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- An Easy Tunable Stepped Coupled Lines Filter (Short Papers)
- Boundary Integral Equation Analysis of Transmission-Line Singularities (Short Papers)
- Design of Cylindrical Dielectric Resonators in Inhomogeneous Media (Corrections)
- Patent Abstracts (Nov. 1981 [T-MTT])
- Special Issue on Guided Wave Technology (Announcement) (Nov. 1981 [T-MTT])
- Back Cover (Nov. 1981 [T-MTT])

MTT
IEEE
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

## Dec. 1981 [T-MTT] (1981 Symposium Issue)





Click on title for a paper summary.

# Papers by Issue

- An Analysis of Minimally Perturbing Temperature Probe and Thermographic Measurements in Microwave Diathermy
- A 63-W W-Band Injection-Locked Pulsed Solid-State Transmitter (Dec. 1981 [T-MTT])
- A Study of High Power Pulsed Characteristics of Low-Noise GaAs MESFET's (Dec. 1981 [T-MTT])
- Horn Image-Guide Leaky-Wave Antenna (Dec. 1981 [T-MTT])
- Field Profile in a Single-Mode Curved Dielectric Waveguide of Rectangular Cross Section
- Status of the Microwave Power Transmission Components for the Solar Power Satellite (Dec. 1981 [T-MTT])
- SAW Oscillators in UHF Transit Satellite Links (Dec. 1981 [T-MTT])
- Analysis of Microstrip Circuits Coupled to Dielectric Resonators
- Performance Predictions for Isolators and Differential Phase Shifters for the Near-Millimeter Wave Range

Click on title for a paper summary.

# Papers by Issue

- A New Fin-Line Ferrite Isolator for Integrated Millimeter-Wave Circuits
- Integrated Circuit Compatible Surface Acoustic Wave Devices on Gallium Arsenide
- A High-Power Dual Six-Port Automatic Network Analyzer Used in Determining Biological Effects of RF and Microwave Radiation
- Propagation Parameters of Coupled Microstrip-Like Transmission Lines for Millimeter-Wave Applications (Dec. 1981 [T-MTT])
- Patent Abstracts (Dec. 1981 [T-MTT])
- Special Issue on Guided Wave Technology (Announcement) (Dec. 1981 [T-MTT])
- Call for Papers - 1982 IEEE Microwave and Millimeter-Wave Monolithic Circuits Symposium (Dec. 1981 [T-MTT])
- Index, IEEE Transactions on Microwave Theory and Techniques, Volume MTT-29, 1981
- Back Cover (Dec. 1981 [T-MTT])

Click on title for a paper summary.

# Papers by Issue

## 1981 [MWSYM]

# Papers by Issue

- Field Profile in a Single-Mode Curved Dielectric Waveguide
- Horn Image Guide Leaky-Wave Antenna (1981 [MWSYM])
- Session B -- Microwave FET Devices
- Sub-Half-Micron GaAs FETs for Applications Through K Band
- K-Band Power GaAs FETs
- 2-18 GHz, High-Efficiency, Medium-Power GaAs FET Amplifiers
- Plated Source Bridge (PSB) GaAs Power FET with Improved Reliability
- Silicon-On-Sapphire (SOS) Monolithic Transceiver Module Components for L- and S-Band
- Optical Tuning in GaAs MESFET Oscillators
- A Microwave Model for the Dual-Gate GaAs MESFET
- Ion-Implanted K-Band GaAs Power FET
- Session C -- Computer Aided Design and Measurements
- Computer-Aided Design for the 1980's

Click on title for a paper summary.

# Papers by Issue

- Computer-Aided Design of Microstrip Couplers with Accurate Discontinuity Models
- Microwave Filter Design in the Time Domain
- Microwave Analysis Using Time-Domain Plots Created from Frequency-Domain Reflections
- An Interactive Optimal Postproduction Tuning Technique Utilizing Simulated Sensitivities and Response Measurements
- A Novel Harmonic Balancing Bridge for Characterizing Microwave Modules for Phased Array Antenna Service
- A Dual Four-Port for Automatic Network Analysis
- Session D -- Latin American Session
- Finite-Difference Method for the Arbitrary Cross-Section Waveguide Problem Using the Best-Fit Boundary Approximation
- A Model of the Coupling Between Posts in Waveguides Using Equivalent Transmission Lines

MTT®
IEEE®
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- Slotline-Microstrip Transition on Iso/Anisotropic Substrate: Broadband Design
- Analysis of Single and Coupled Striplines with Anisotropic Substrates
- A New Method of Pulse Dispersion Analysis for Simple-Mode Optical Fibers
- A Resonator Method for Permittivity Measurements
- Microwave Modelling of H. F. Antennas Over Lossy Earth
- The Development of Microwave Components for Earth Station Receiver
- Session E -- Millimeter Wave Integrated Circuits - Printed Circuits
- Shielded Microstrip: Transmission Media for MM-Wave Integrated Circuits
- Empirical Analytical Expressions for Fin Line Design
- Experimental Assessment of Bilateral Fin-Line Impedance for Device Matching

MTT®
IEEE®
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- Experimental Characterization of Fin Line Discontinuities Using Resonant Techniques
- A Broad-Band, Low-Noise Receiver at W-Band
- Millimeter-Wave Planar Slot Antennas with Dielectric Feeds
- 94 GHz Subharmonic Mixer Using Beam Lead Diodes
- Session F -- FET Applications
- 4-8 GHz High Power Cascadable Packaged GaAs FET Amplifier
- Broadband Lumped-Element GaAs FET Power Amplifiers
- A 4.5 W, 26 dB Gain FET Power Amplifier at Ku-Band
- Compact Multi-Stage Single-Ended Amplifiers for S-C Band Operation
- A Power FET Octave Bandwidth Traveling Wave Combiner Amplifier
- Wideband Cavity Tuned GaAs FET Oscillator
- Decade Bandwidth FET Functions
- Balanced Dual Gate GaAs FET Frequency Doublers

MTT®
IEEE®
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- Session G1 -- The Six-Port and Its Applications
- Singularities in the Calibration of Six-Port Network Analyzers
- The Use of a Matched Symmetrical Five-Port Junction to Make Six-Port Measurements
- A Broad Band Stripline or Coaxial 'Resolver' for the Accurate Measurement of Complex Reflection Coefficients Using the 6 Port Measurement Concept
- A High-Power Dual Six-Port Automatic Network Analyzer for Determining Biological Effects of RF and Microwave Radiation
- Session G2 -- Dielectric Resonators
- TM/sub 01p/ Tubular and Cylindrical Dielectric Resonator Mode
- Coupling of Cylindrical Dielectric Resonators to Microstrip Lines
- A Dielectric Resonator Bandstop Filter
- Session H -- Japanese Session

MTT®
IEEE®
Contents
Publications
Issues

# Papers by Issue

- Progress of Microwave Semiconductor Devices in Japan
- Millimeterwave Integrated Circuits
- Advanced RF Circuit Miniaturization for 800 MHz Land Mobile Radio Unit
- Miniaturized Diplexer for Land Mobile Communication Using High Dielectric Ceramics
- Very Low Power Gigabit Logic Circuits with Enhancement-Mode GaAs MESFETs
- CH/sub 3/F Submillimeter Laser Using New Type of Resonator
- Recent Development on Fiber Optic Devices
- Optical Fiber Communication Systems in Japan
- Session I -- Passive Components and Networks
- Problems in Microstrip Filter Design
- Design of Filters with Ideal Amplitude and Any Prescribed Phase

MTT®
IEEE®
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- Miniaturized Microwave Filter Construction with Dielectric-Loaded Resonator and Space Coupling
- A New Diplexer - Realized in Stripline
- Contiguous Broadband Matching of Multiple Resonant Loads
- Inhomogeneous Broadside-Coupled Striplines
- Rectangular, Coaxial-Line, Split-Tee Power Dividers
- New Differential Phase Shift Networks Combining All-Pass and Band-Pass Elements
- Session J1 -- Solid State Circuits and Devices
- Computer-Aided Design of Microwave Parametric Frequency Dividers
- Analysis of Waveguide IMPATT Oscillator Circuits
- Coaxially Coupled Ridge Waveguide Tunable Oscillator
- High Efficiency Mode Characterization in a 20 GHz MBE GaAs IMPATT Diode Amplifier
- Session J2 -- Chinese Session

Click on title for a paper summary.

# Papers by Issue

- A 12 GHz TV Receiver for Direct Satellite Broadcasting
- V-Band GaAs Gunn Diode
- Status of Microwave Semiconductor Devices in China
- Session K -- High Power Circuits and Systems
- A 100-kW Solid-State Coaxial Limiter for L-Band
- A 2000 Watt CW MIC 20-500 MHz SPDT PIN Diode Switch Module
- The Development of High-Power, Low-Frequency PIN Diodes
- A Study of High Power Pulsed Characteristics of Low-Noise GaAs MESFETs (1981 [MWSYM])
- Design of Single-Anode, MIG-Type Gyrotron Gun for a 35 GHz Gyro-TWT
- Design of a High Power Earth Station Transmitter for the Band 7.9 to 8.4 GHz
- Design and Operation of an Orotron-A Tunable Source of Coherent Millimeter Wave Radiation

Click on title for a paper summary.

# Papers by Issue

- Status of the Microwave Power Transmission Components for the Solar Power Satellite (SPS) (1981 [MWSYM])
- A High Power Gyrotron Operating in the TE/sub 041/ Mode
- A Nonlinear Gyro-Device Theory
- Session L -- Ferrite Applications
- Coupled-Mode Theory Analysis of Distributed Nonreciprocal Devices
- Analysis of Wide-Band Microstrip Circulators by Point-Matching Technique
- Performance Characteristics of Magnetoplasmon Based Submillimeter Wave Nonreciprocal Devices
- A Ferrimagnetic Resonance Thermometer for Microwave Power Environment
- A K-Band High Power Low Loss Latching Switch
- Fin Line Ferrite Isolator for Integrated Millimeterwave Circuits
- Session M -- Microwave Integrated Circuits

Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- Asymmetric Microstrip DC Blocks with Rippled Response
- Simple Balun-Coupled Mixers
- Computer-Aided Design of Semiconductor Mounts in Fin-Line Technology
- A Measurement Method for Accurate Characterization and Modeling of MESFET Chips
- A Frequency-Stabilized MIC Oscillator Using a Newly-Developed Dielectric Resonator
- A 1.75 - 6 GHz Miniaturized GaAs FET Amplifier Using Quasi-Lumped Element Impedance Matching Networks
- A 10.5 GHz MIC Direction Sensitive Doppler Module Using a GaAs Fet and a Ag/Pd Thick Film
- Session N -- Millimeter Wave Solid State Devices
- A 30 GHz - 100 mW GaAs FET
- A 69 GHz FET Oscillator
- Beam-Lead Schottky-Barrier Planar Mixer Diodes for Millimeter Wave Applications

Click on title for a paper summary.

# Papers by Issue

- A Wideband, Backshort-Tunable Second Harmonic W-Band Gunn-Oscillator
- Metal-Barrier-Metal Junctions for Room Temperature Millimeter-Wave Mixing and Detection
- A 63 W W-Band Injection-Locked Pulsed Solid State Transmitter (1981 [MWSYM])
- Millimeter-Wave Silicon IMPATT Sources and Combiners for the 110-260 GHz Range (1981 [MWSYM])
- Chip Level IMPATT Combining at 40 GHz (1981 [MWSYM])
- Session O -- GaAs Monolithic Circuits
- A Study of Optimal Matching Circuit Topologies for Broadband Monolithic Power Amplifiers
- A Monolithic GaAs 0.1 to 10 GHz Amplifier
- A 2-12 GHz Feedback Amplifier on GaAs
- A Planar-Type Low-Noise GaAs Monolithic Microwave Amplifier
- A High-Speed Monolithic GaAs 10/11 Counter

Click on title for a paper summary.

# Papers by Issue

- An 8 GHz MMIC Preamplifier
- A Comparison Between Actively and Passively Matched S-Band GaAs Monolithic FET Amplifiers
- Use of Switching Q in the Design of FET Microwave Switches
- Session P -- Microwave Acoustics
- SAW Based Direct Frequency Synthesizers
- SAW Stabilized Radiosondes
- SAW Oscillator in UHF Transit Satellite Links (1981 [MWSYM])
- Tunable Magnetostatic Surface Wave Oscillator at 4 GHz
- IC Compatible SAW Devices on GaAs
- SAW Bandpass Filter Components for Microwave Systems
- A SAW Interferometer Direction - Finding and Frequency Identification Method
- Magnetostatic Wave Compressive Receiver
- Session Q -- Microwave and Millimeter-Wave Systems

MTT
IEEE
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- A Phase Alignment Network for Space Diversity Combining
- Direct Generation of MSK Modulation at Microwave Frequencies
- A Dielectric Resonator Filter as Low Loss Delay Element for 14 GHz On-Board 4/spl 0slash/- DCPSK Demodulation
- 14 GHz Differential QPSK Demodulator for Regenerative Satellite Repeater
- Channelized Receiver Covering 26 to 60 GHz with Planar Integrated-Circuit Components
- A W-Band, Coherent, Pulse-Compression Radar Transceiver Using Linear Frequency Modulation
- Session R -- Phased and Active Array Techniques
- A Scanning Switch Matrix for a Cylindrical Array
- Beam Steering Antenna Control Technique
- 35 GHz Active Aperture
- Small Active Phased Array Characteristics with GaAs IMPATT Amplifier Modules

MTT
IEEE
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- Broadband Dual-Gate FET Continuously Variable Phase Shifter
- Active Microwave Power Combiner/Divider Using a Dual-Gate MESFET
- A Continuously Variable Ku-Band Phase/Amplitude Control Module
- Session S -- Low Noise Techniques
- A Low Noise Solid State Amplifier for Replacement of a Ka-Band TWTA
- Cooled Low Noise GaAs Monolithic Mixers at 110 GHz
- A 4GHz Low Noise GaAsFET Amplifier
- Impact of Low Noise Technology on Present and Future STACOM Systems (Abstract Only)
- Highly Reliable Low-Noise MM-Wave Mixers with Whisker-Contacted Honeycomb Diodes
- A Subharmonically Pumped Fin-Line Mixer for Satellite TV Receiver Applications

MTT
IEEE
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- Analysis of Balanced Subharmonically Pumped Mixers with Unsymmetrical Diodes
- Session T -- Biological Effects and Medical Applications
- 27 MHz Waveguide Applicators for Localized Hyperthermia Treatment of Cancer
- Microstrip Loop Radiators for Local Hyperthermia
- A New Optical Technique for the Measurement of Temperature in RF and Microwave Fields
- Non-Pertubing Temperature Probe and Thermography Measurements in Microwave Diathermy
- Hyperthermia
- The Effects of High Power Microwave Pulses on Red Blood Cells and the Relationship to Transmembrane Thermal Gradients (Nov. 1981 [T-MTT])
- Microwave Thawing of Frozen Packed Red Blood Cells
- Application of Moment-Methods to Electromagnetic Biological Imaging

Click on title for a paper summary.

# Papers by Issue

- Microwave Imaging: Numerical Simulation and Results
- Session U -- Microwave Field And Network Theory
- Propagation Parameters of Coupled Microstrip-Like Transmission Lines for Millimeter Wave Applications (1981 [MWSYM])
- Hybrid Mode Analysis of Microstrip Lines on Anisotropic Substrates (1981 [MWSYM])
- Analysis of Microstrrip Line on Semiconductor Substrate
- Wave Propagation in Inhomogeneous Anisotropic Rectangular Waveguides by the Effective Index Method
- Improved Technique for Evaluation of Slot Discontinuities in Rectangular Waveguide
- Two-Dimensional Analysis for Stripline/Microstrip Circuits
- A Generalized n-Port Cascade Connection
- Projective Matrix Transformations in Microwave Network Theory
- Session V -- Guided Wave Optics and Signal Processing

Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- The Integrated Optic Spectrum Analyzer -- A First Demonstration
- Guided Wave Optical RF Spectrum Analyzer
- A Generalized Two-Dimensional Coupled-Mode Analysis of Curved and Chirped Periodic Structures in Open Dielectric Waveguides (1981 [MWSYM])
- Nonreciprocal Propagation Characteristics of YIG Thin-Film
- Experiment on Light Intensity Modulation Based on Guided-to-Radation Mode Coupling in Hetero-Structure Thin Film Waveguide
- Polarization-Rotated Radiation Conversion in Electrooptic Waveguides
- Exhibition Guide (1981 [MWSYM])
- Index of Authors (1981 [MWSYM])
- Back Cover (1981 [MWSYM])

MTT
IEEE
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

## 1982 [MWSYM]

# Papers by Issue

- Quick Reference Guide to Sessions by Letter (1982 [MWSYM])
- Technical Program (1982 [MWSYM])
- Table of Contents (1982 [MWSYM])
- Welcome Page (1982 [MWSYM])
- Session A -- Opening Session (1982 [MWSYM])
- 30 Years of Microwaves
- Thirty Years of Microwaves in China
- Microwaves - The Years to Come
- Session B -- Low Noise Techniques
- Low-Noise Technology, 1982 State-of-the-Art
- Millimetre Wave Low Noise E-Plane Balanced Mixers Incorporating Planar MBE GaAs Mixer Diodes
- A 30 GHz FET Receiver
- A 22 to 24 GHz Cryogenically Cooled Low Noise FET Amplifier in Coplanar Waveguide

# Papers by Issue

- Session C -- Microwave Mixers
- The Gap Diode: A New High Frequency Mixer and Detector
- Subharmonic Mixer Using Planar Doped Barrier Diodes
- Single-Sideband Mixers for Communications Systems
- A Novel Broadband Double Balanced Mixer for the 18-40 GHz Range
- The Image Rejection Harmonic Mixer
- Session D -- Microwave Acoustics: Devices and Applications
- A Review of Electronic Warfare (EW) Receivers with Acoustic Devices
- A SAW Resonator Stabilized Oscillator for a CATV Set-Top Converter
- 800 MHz Low Loss SAW Filter Using New Phase Weighting
- Hybrid FET/SAW Programmable Transversal Filter
- Session E -- High Power Techniques
- High-Power 2-9 GHz Solid State Switch

Click on title for a paper summary.

# Papers by Issue

- A Linearized High Power Microwave Digital Phase Modulator
- A High Power W-Band (90-99 GHz) Solid State Transmitter for High Duty Cycles and Wide Bandwidth
- Non Linear Equivalent Circuit for Broadband GaAs MESFET Power Amplifier Design
- A 4.5 GHz 40 Watt GaAs FET Amplifier
- An RF-Primed All-Halogen Gas Plasma Microwave High Power Receiver Protector
- Potential Arc Hazard Produced by Handling Connectors While Operating Pulsed Microwave Equipment
- L-Band Si Power V-FET
- Session F -- Magnetostatic Waves: Devices and Applications
- An Epitaxial YIG 10-Channel Filter Bank
- Simultaneous Pulse Separator
- Ion Implanted Oblique Incidence Magnetostatic Waves

MTT
IEEE
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- Magnetostatic Wave Propagation within Obliquely Magnetized YIG Films
- Session G -- Radiometers
- Flight Test Evaluation of a Noise Injection Dicke Microwave Radiometer Employing Digital Signal Processing
- An Experimental Millimetre-Wave Radiometric Tracker
- High Sensitivity, Accurate MMW Radiometers for Ground-Mapping Systems
- Performance Simulator for a Wind Scatterometer
- Session H -- Optical and Microwave Techniques for Guided Wave Structures
- Microwave Circuit Models of Semiconductor Injection Lasers (1982 [MWSYM])
- Comparison of Numerical and Effective-Index Methods for a Class of Dielectric Waveguides
- Capacitively Loaded Transmission Line for Subnanosecond Stepped Delta beta Operation of an Integrated Optical Directional Coupler Switch

Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- Proposal of an Analytical Technique Using Circularly Polarized Waves and its Application
- Phase Matched Optical Dielectric Waveguide Using 'The Artificial Anisotropic Structure'
- Design of Chirped Grating Lenses in Planar Optical Waveguides
- A Planar Electro-Optic Beam Splitter with a Sawtooth Electrode
- Session I -- Two Terminal Devices and Combining Techniques
- A 1kW/sub peak/, 300 W/sub avg/ IMPATT Diode Injection Locked Oscillator
- A Dual Diode TM /sub 020/ Cavity for IMPATT Diode Power Combining
- Multidiode Waveguide Power Combiners
- 120-Gunn Diode Power Combining at 23 GHz
- Analysis and Use of Harkless Diode Mount for IMPATT Oscillators

Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- Power Combiners with Gunn Diode Oscillators (Abstract Only)
- Gallium Arsenide IMPATT Diodes at 20 GHz
- Pulsed Characterization of X-Band GaAs DDR IMPATT Diodes
- Session J -- GaAs FET Amplifiers
- S-Band GaAs Power FET
- Internally Matched (IM) Plated Source Bridge (PSB) Power GaAs FET Achieving a High Performance Power Amplifier in X-Band
- K- and Ka-band Power GaAs FETs
- Design of Medium Power, 6-12 GHz GaAs FET Amplifier, Using High Dielectric Networks
- A Network Modeling and Design Method for a 2-18 GHz Feedback Amplifier (1982 [MWSYM])
- A 26.5-40.0 GHz GaAs FET Amplifier

MTT
IEEE
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- Class B Operation of Microwave FETs for Array Module Applications
- Design and Fabrication Techniques for Lumped-Element GaAs MESFET Power Amplifiers Using Automated Assembly Procedures
- Session K -- Phased Array Techniques
- Solid State Radar's Path to GaAs
- High Phase Accuracy Active Phased Array Module for Multi-Function Radars
- Dual Polarization Phased Array Diode Phase Shifter Module
- Experimental Thin-Film, Etched-Circuit Rectenna
- A Commutative Spot Transmissive Lens Antenna
- Substrate Optimization for Integrated Circuit Antennas (1982 [MWSYM])
- Extra Broad Band Phase-Shifter Modules
- Session L -- Millimeter Wave Integrated Circuits (1982 [MWSYM])

Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- New Structures for Impedance Transformation in Fin-Lines
- Wideband Subharmonically Pumped W-Band Mixer in Single-Ridge Fin-Line
- Broadband Planar Balanced Mixers for Millimeter-Wave Applications
- A Zero-Bias GaAs Millimeter Wave Integrated Detector Circuit
- Widely Tunable Millimeter-Wave Mixers Using Beam-Lead Diodes
- Microstrip Devices for Millimetric Frequencies
- Millimeter-Wave Hybrid-Open Microstrip Techniques
- Hybrid Coupled Microstrip Reflection Amplifiers
- Session M -- Microwave Systems Applications
- A 20-Watt C-Band BPSK Modulated FET Transmitter for Microwave Landing System
- A 1 Watt GaAs Power Amplifier for the NASA 30/20 GHz Communication System

Click on title for a paper summary.

# Papers by Issue

- A 50 GHz MIC Transmitter/Receiver Using a Dielectric Resonator Oscillator
- A Compact Low Cost 60 GHz Communicator
- A Low Noise Frequency Agile X-Band Source
- A 14 GHz DCPSK Direct Demodulator for Satellite Applications
- Coupler Crossbar Microwave Switch Matrix
- Direct Baseband to Microwave MSK Generation by Using Injection Locked Oscillator
- Session N -- Ferrite Applications (1982 [MWSYM])
- A Resonantly Coupled, Ferrite-Tuned Buncher-Cavity System for the Los Alamos Proton Storage Ring
- Broadband Fin-Line Circulators
- Low Loss 92-100 GHz Circulators
- Dielectric Waveguide Phase Shifter
- A 60 GHz Dual-Mode Ferrite Phase Shifter

Click on title for a paper summary.

# Papers by Issue

- High Power, Low Phase Distortion, Electronic Ferrite Attenuator
- Design and Performance of a K - Band YIG Tuned Multiplier
- Session O -- Nonlinear Applications of GaAs FETs
- GaAs FET Limiting Amplifier Designed for Low AM to PM Conversion
- BR FET: A Band Rejection FET for Amplifier and Mixer Applications
- Varactor Tuned Dielectric Resonator GaAs FET Oscillator in X-Band
- Efficient Low-Noise Three Port X-Band FET Oscillator Using Two Dielectric Resonators
- Frequency Doublers with GaAs FET's
- A 45 GHz GaAs FET MIC Oscillator-Doubler
- X-Band Burnout Characteristics of GaAs MESFETs (1982 [MWSYM])
- Monolithic Microwave Integrated GaAs FET Oscillators

Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- Session P -- Microwave Field Theory
- A Unified Analysis for Planar Transmission Lines
- Analysis of Trapped Image Guides Using Effective Dielectric Constants and Surface Impedances
- Coupling Through a Slot Between a Dielectric Image Line and a Parallel Plate Guide
- Bends in Nonradiative Dielectric Waveguides (1982 [MWSYM])
- Variational Methods for Nonstandard Eigenvalue Problems in Microwave Field Analysis
- New Aspects Concerning the Definition of Microstrip Characteristic Impedance as a Function of Frequency
- Compensation of Discontinuities in Planar Transmission Lines (1982 [MWSYM])
- Analytical Expressions for the Parameters of Finned and Ridged Waveguides
- Session Q -- Automated Microwave Measurements

Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- Aspects of the Calibration of a Single Six-Port Using a Load and Offset Reflection Standards (1982 [MWSYM])
- Diode Detector Characteristics for a 94 GHz Six-Port Application (1982 [MWSYM])
- Phase and Amplitude Characteristics of Dielectric Waveguide Coupler and Six-Port Network
- A Computer-Controlled Dielectric Constant Measurement System: The Moving Vane Dielectometer
- A Two-Tier Deembedding Technique for Packaged Transistors
- Computer-Aided Determination of Resonator Characteristics Based on Expansion in Normal Modes and Using Automatic Network Analyser Data
- A Microprocessor Controlled Phase Measurement System for 2856 MHz Pulses
- Session R -- Microwave Measurements
- Microstrip Measurements

Click on title for a paper summary.

# Papers by Issue

- Measurement of the Characteristic Impedance of Microstrip Over a Wide Frequency Range
- Large-Signal Characterization of Two-Port Nonlinear Active Networks
- A Programmable Load for Power and Noise Characterization
- Noise Waves, a Concept Leading to Deep Insight and Accurate Noise Characterization
- De-Embedding the Capacitance of a Resonant Circuit Using Time-Domain Reversal and Subtraction
- An Automated Power Meter Calibration System
- A Better Waveguide Short Circuit
- Session S -- Millimeter-Wave Solid-State Devices
- 141GHz Generation by a GaAs Gunn Oscillator Up-Converter Chain
- Millimeter-Wave BARITT Diode Mixers and Detectors
- A W-Band Wideband Crossbar Mixer

Click on title for a paper summary.

# Papers by Issue

- Beam Lead Dielectric Crossbar Mixers from 60 to 140 GHz
- 140 GHz Quasi-Optical Planar Mixers
- Quasi-Optical Polarization-Duplexed Balanced Mixer
- A Ka-Band Orthogonal Hybrid Fin-Line Mixer
- Numerical Analysis of Subharmonic Mixers Using a Bilinear Diode Model
- Session T -- Filters and Multiplexers
- Miniature Filters and Equalizers Utilizing Dual Mode Dielectric Resonator Loaded Cavities
- Mode Suppressor for Dielectric Resonator Filters
- Coupling Coefficient Between Magnetic Loop and a Dielectric Resonator in an Evanescent Waveguide
- The Generalised Integrated-Pole Direct Coupled Cavity Filter (Abstract Only)
- Improved Selectivity in Cylindrical TE/sub 011/ Filters by TE/sub 211//TE/sub311/ Mode Control
- Varactor Tuned Microwave Filters

Click on title for a paper summary.

# Papers by Issue

- Synthesis of Low-Pass Elliptic Filters for MIC as a Class of Non-Commensurate Distributed Circuits
- An 11 GHz Contiguous Band Output Multiplexing Network for INTELSAT VI Spacecraft
- Session U -- Microwave Integrated Circuits
- Phase Velocity Compensation in Parallel-Coupled Microstrip
- The Equad: A Flat Amplitude, Octave Bandwidth Planar Quadrature Network
- MIC Directional Filters Using Dielectric Resonators
- Variable Coupling Directional Couplers Using Varactor Diodes
- An Improved PIN Diode Attenuator for High Reliability MIC Applications
- An Analytic Design Approach for 2-18 GHz Planar Mixer Circuits
- A Compact Broadband Multifunction MIC Module

MTT®
IEEE®
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- The Use of Sampling Techniques for Miniaturized Microwave Synthesis Applications
- Session V -- Microwave Biological Effects
- Changes in Cardiac-Cell Membrane Noise During Microwave Exposure
- A Self-Balancing Microwave Radiometer for Non-Invasively Measuring the Temperature of Subcutaneous Tissues During Localized Hyperthermia Treatments of Cancer
- Thermal Drift in Microwave Thermography
- Dynamic 'In Vivo' Performance of Temperature Controlled Local Microwave Hyperthermia at 2.45 GHz
- Session W -- Computer-Aided Design
- Large-Signal GaAs FET Amplifier CAD Program
- A Computer-Aided Approach to the Nonlinear Design of Microwave Transistor Oscillators
- An Optimization Technique for Lumped - Distributed Two Ports

Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- Odd Order Impedance Matching Networks for Low Cost Microwave Integrated Circuits
- Processing System for Design and Analysis of Microwave-Integrated-Circuits Layouts
- A Novel Approach to Computer Automated Microwave Circuit Mask Design
- Automatic Artwork Generation for Microwave Integrated Circuits
- Computer-Aided Design of Millimeter-Wave E-Plane Filters (1982 [MWSYM])
- Session X -- GaAs Monolithic Circuits
- X, Ku-Band GaAs Monolithic Amplifier
- GaAs Monolithic Wideband (2-18 GHz) Variable Attenuators
- Monolithic Voltage Controlled Oscillator for X and Ku-Bands (1982 [MWSYM])
- A Monolithic X-Band Four-Bit Phase Shifter

MTT®
IEEE®
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- A Multi-Chip GaAs Monolithic Transmit/Receive Module for X-Band
- Session Y -- Solid State Millimeter Wave Sources
- A Broadband, Solid State Millimeter-Wave Synthesizer
- 41 GHz 10 Watt Solid State Amplifier
- A Medium Power Solid State Amplifier for V-Band
- CW InP Gunn Diode Power Combining at 90 GHz
- On the Harmonic Operation of Millimeterwave Gunn Diodes
- Performance Capabilities of Indium Phosphide n/sup +/-n-n/sup +/ Transferred Electron Devices at Millimetre Wave Frequencies
- High Frequency Limitation of GaAs Transit-Time Diodes
- V-Band InP Gunn Diode
- Session Z -- Filters and Passive Networks
- Equivalent Transformations for Mixed Lumped and Distributed Circuits

MTT
IEEE
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- Octave-Wide Matched Symmetrical, Reciprocal, 4- And 5 Ports
- Passive Superconducting Microwave Circuits for 2-20 GHz Bandwidth Analog Signal Processing
- Waveguide Power Divider Using Metallic Septum with Resistive Coupling Slot
- A Simplified "Real Frequency" Technique Appliable to Broadband Multistage Microwave Amplifiers
- CAD of Rectangular and Ridged Waveguide Bandpass Filters
- Sub-Miniature, Microwave Printed Circuit Filters with Arbitrary Passband and Stopband Widths
- 1982 IEEE/MTT-S Exhibition Floor Plans (1982 [MWSYM])
- Exhibitors (1982 [MWSYM])
- Exhibition Guide (1982 [MWSYM])
- Index of Authors (1982 [MWSYM])
- Hotel Layout (1982 [MWSYM])

MTT®
IEEE®
Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

## 1982 [MCS]




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Papers by Issue

- Slow-Wave Approach for Monolithic GaAs ICs
- Heterodyne Experiments from Millimeter Wave to Optical Frequencies Using GaAs MESFETs Above f/sub T/
- Ka-Band Monolithic GaAs Balanced Mixers (1982 [MCS])
- Yield Considerations for Ion Implanted GaAs MMICs (1982 [MCS])
- The Design and Calibration of a Universal MMIC Test Fixture
- An X-Band 10 W Monolithic Transmit-Receive GaAs FET Switch
- A Practical Wide Band GaAs Phase Detector
- Monolithic GaAs Interdigitated 90° Hybrids with 50- and 25-Ohm Impedances
- Design and Fabrication of GaAs Analog-to-Digital ICs
- Fabrication Techniques for X-Band Monolithic VCOs
- A Two-Stage Monolithic IF Amplifier Utilizing a High Dielectric Constant Capacitor

Contents
Publications
Issues

Click on title for a paper summary.

# Papers by Issue

- Back Cover (1982 [MCS])

Contents
Publications
Issues

Click on title for a paper summary.

# Paper Index



Colored letters and/or numbers are active links to the index.

MTT®

IEEE®


Contents

Publications

Issues

# Paper Index

## 1




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Paper Index




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Paper Index

## 9



## A




MTT®

IEEE®

Contents

Publications

Issues


Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index



Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index



Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index




MTT®

IEEE®

Contents

Publications

Issues


Click on title for a paper summary.

# Paper Index




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index




MTT®

IEEE®

Contents

Publications

Issues


Click on title for a paper summary.

# Paper Index




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Paper Index



Click on title for a paper summary.

# Paper Index



Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index



**B**





Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Paper Index



## C

# Paper Index





Click on title for a paper summary.

# Paper Index




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index



**D**





Click on title for a paper summary.

# Paper Index




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index



## E

# Paper Index





Click on title for a paper summary.

# Paper Index



Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index

## F

# Paper Index




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index

## G




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Paper Index



**H**

# Paper Index



Click on title for a paper summary.

# Paper Index




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index




MTT®

IEEE®

Contents

Publications

Issues


Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Paper Index

# Paper Index



**M**




MTT®

IEEE®

Contents

Publications

Issues


Click on title for a paper summary.

# Paper Index



Click on title for a paper summary.

# Paper Index



Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Paper Index




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Paper Index



**N**

---





Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index

# Paper Index





Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index

## P

# Paper Index



Click on title for a paper summary.

# Paper Index



Click on title for a paper summary.

# Paper Index



Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Paper Index



Click on title for a paper summary.

# Paper Index

## S




Contents

Publications

Issues

Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index



Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index



Click on title for a paper summary.

# Paper Index



Click on title for a paper summary.

# Paper Index



Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index



**T**

# Paper Index



Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index




MTT

IEEE

Contents

Publications

Issues


Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index





Click on title for a paper summary.

# Paper Index




MTT®

IEEE®

Contents

Publications

Issues


Click on title for a paper summary.

# Paper Index




MTT®

IEEE®

Contents

Publications

Issues


Click on title for a paper summary.

# Paper Index



Click on title for a paper summary.

# Paper Index

## W

# Paper Index



**X**

---



**Y**

---




Contents

Publications

Issues

Click on title for a paper summary.

# Author Index



Colored letters are active links to the index.

# Author Index

## A




MTT

IEEE

Contents

Authors


Click on author name for a list of papers.

# Author Index



## B




Contents

Authors


Click on author name for a list of papers.

# Author Index





Click on author name for a list of papers.

# Author Index




Contents

Authors


Click on author name for a list of papers.

# Author Index



## C




MTT

IEEE

Contents

Authors


Click on author name for a list of papers.

# Author Index





Click on author name for a list of papers.

# Author Index



Click on author name for a list of papers.

# Author Index





Click on author name for a list of papers.

# Author Index



## E




MTT

IEEE

Contents

Authors


Click on author name for a list of papers.

# Author Index



## F





Click on author name for a list of papers.

# Author Index



## G





Click on author name for a list of papers.

# Author Index



Click on author name for a list of papers.

# Author Index



## H




MTT

IEEE

Contents

Authors


Click on author name for a list of papers.

# Author Index




Contents

Authors


Click on author name for a list of papers.

# Author Index



Click on author name for a list of papers.

# Author Index



## I





Click on author name for a list of papers.

# Author Index

## J



## K

# Author Index




Contents

Authors


Click on author name for a list of papers.

# Author Index



Click on author name for a list of papers.

# Author Index

## L




Contents

Authors


Click on author name for a list of papers.

# Author Index



Click on author name for a list of papers.

# Author Index

## M





Click on author name for a list of papers.

# Author Index



Click on author name for a list of papers.

# Author Index



Click on author name for a list of papers.

# Author Index



Click on author name for a list of papers.

# Author Index




Contents

Authors


Click on author name for a list of papers.

# Author Index

## P





Click on author name for a list of papers.

# Author Index



**R**



Click on author name for a list of papers.

# Author Index



Click on author name for a list of papers.

# Author Index



## S




MTT

IEEE

Contents

Authors


Click on author name for a list of papers.

# Author Index



Click on author name for a list of papers.

# Author Index



Click on author name for a list of papers.

# Author Index





Click on author name for a list of papers.

# Author Index



## T




MTT

IEEE

Contents

Authors


Click on author name for a list of papers.

# Author Index




Contents

Authors


Click on author name for a list of papers.

# Author Index





Click on author name for a list of papers.

# Author Index



## W




MTT

IEEE

Contents

Authors


Click on author name for a list of papers.

# Author Index





Click on author name for a list of papers.

# Author Index




Contents

Authors


Click on author name for a list of papers.

# Author Index

## Z




Contents

Authors


Click on author name for a list of papers.

# Papers by Author




MTT

IEEE

Contents

Authors

Click on title for a paper summary.

# Papers by Author



Click on title for a paper summary.

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author

# Papers by Author




Contents

Authors


Click on title for a paper summary.

# Papers by Author

- Contributors (May 1980 [T-MTT])
- Determination of the Electrode Capacitance Matrix for GaAs FET's
- On the Theory of Corrugated Optical Disk Waveguides
- Substrate Optimization for Integrated Circuit Antennas (1982 [MWSYM])

**Allen, D.E.**

- SAW Bandpass Filter Components for Microwave Systems

**Allen, P.J.**

- Analysis and Use of Harkless Diode Mount for IMPATT Oscillators

**Alley, G.D.**

- Cooled Low Noise GaAs Monolithic Mixers at 110 GHz

Contents
Authors

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author

## Ananasso, F.G.

- A Low Phase Shift Step Attenuator Using p-i-n Diodes Switches
- Contributors (Jul. 1980 [T-MTT])

## Anand, Y.

- Millimeter-Wave BARITT Diode Mixers and Detectors

## Anders, P.

- Contributors (Nov. 1980, Part I [T-MTT])
- Microstrip Discontinuity Capacitances and Inductances for Double Steps, Mitered Bends with Arbitrary Angle, and Asymmetric Right-Angle Bends

## Anderson, A.C.

- Passive Superconducting Microwave Circuits for 2-20 GHz Bandwidth Analog Signal Processing

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author

- The Sector Coupler -- Theory and Performance

**Arfin, B.**

- A High Power Gyrotron Operating in the TE/sub 041/ Mode

**Arima, M.**

- Graph Design of p-i-n Diode Phase Shifters (Short Papers)

**Armenise, M.N.**

- Wave Propagation in Inhomogeneous Anisotropic Rectangular Waveguides by the Effective Index Method

**Armstrong, B.M.**

- Contributors (Dec. 1980 [T-MTT])
- Use of Microstrip Impedance- Measurement Technique in the Design of a BARITT Diplex Doppler Sensor

**Arndt, F.**

- Contributors (Nov. 1980, Part I [T-MTT])

# Papers by Author

- Microstrip Discontinuity Capacitances and Inductances for Double Steps, Mitered Bends with Arbitrary Angle, and Asymmetric Right-Angle Bends

## Arnett, P.C.

- Contributors (May 1980 [T-MTT])
- Power Design for Gigabit Josephson Logic Systems

## Arnodo, C.

- An E-Beam Fabricated GaAs D-Type Flip-Flop IC
- Contributors (May 1980 [T-MTT])

## Arnold, J.M.

- Contributors (Sep. 1980 [T-MTT])
- Rigorous Evanescent Wave Theory for Guided Modes in Graded Index Optical Fibers

# Papers by Author

# Papers by Author

## Atia, A.

- Coupling of Cylindrical Dielectric Resonators to Microstrip Lines

## Atia, A.E.

- Analysis of Microstrip Circuits Coupled to Dielectric Resonators
- Contributors (Apr. 1981[T-MTT])
- Design of Cylindrical Dielectric Resonators in Inhomogeneous Media

## Atsuki, K.

- Composite Dielectric Waveguides
- Composite Dielectric Waveguides with Two Elliptic-Cylinder Boundaries (Short Papers)
- Contributors (Sep. 1980 [T-MTT])
- Microstrip Dispersion in a Wide-Frequency Range (Short Papers)

Contents
Authors

Click on title for a paper summary.

# Papers by Author




Contents

Authors


Click on title for a paper summary.

# Papers by Author

# Papers by Author

- Coupled-Mode Theory Analysis of Distributed Nonreciprocal Structures
- Experiment on Light Intensity Modulation Based on Guided-to-Radation Mode Coupling in Hetero-Structure Thin Film Waveguide

## Ayasli, Y.

- A Monolithic X-Band Four-Bit Phase Shifter
- A Multi-Chip GaAs Monolithic Transmit/Receive Module for X-Band
- An X-Band 10 W Monolithic Transmit-Receive GaAs FET Switch
- Analysis of Wide-Band Stripline Circulators by Integral Equation Technique
- Contributors (Mar. 1980 [T-MTT])

## Ayer, Jr., R.K.

- Changes in Cardiac-Cell Membrane Noise During Microwave Exposure

Contents
Authors

Click on title for a paper summary.

# Papers by Author

## Baars, R.D.

- Characteristics of Circulators Using Planar Triangular and Disk Resonators Symmetrically Loaded with Magnetic Ridges
- Contributors (Jun. 1980 [T-MTT])

## Bahar, E.

- Contributors (Sep. 1980 [T-MTT])
- Excitation of Surface Waves and the Scattered Radiation Fields by Rough Surfaces of Arbitrary Slope
- Waveguide Modes in Inhomogeneous Media (Computer Program Descriptions)

## Bahl, I.J.

- A New Microstrip Radiator For Medical Applications
- Analysis of a Microstrip Covered with a Lossy Dielectric
- Aperture Coupling Between Dielectric Image Lines
- Characteristics of Coupled Microstriplines (Correction)

# Papers by Author

- Characteristics of Inhomogeneous Broadside-Coupled Striplines
- Contributors (Dec. 1980 [T-MTT])
- Contributors (Feb. 1980 [T-MTT])
- Contributors (Jun. 1980 [T-MTT])
- Contributors (Mar. 1980 [T-MTT])
- Contributors (Nov. 1980, Part I [T-MTT])
- Design of Loaded-Line p-i-n Diode Phase Shifter Circuits
- Leaky-Wave Antennas Using Artificial Dielectrics at Millimeter Wave Frequencies
- Microstrip Loop Radiators for Local Hyperthermia
- The Design of Broadside-Coupled Stripline Circuits (Short Papers)

Contents
Authors

Click on title for a paper summary.

# Papers by Author

## Baird, J.M.

- Circular-Electric Mode Waveguide Couplers and Junctions for Use in Gyrotron Traveling-Wave Amplifiers (Dec. 1980 [T-MTT])
- Contributors (Dec. 1980 [T-MTT])
- Design of Single-Anode, MIG-Type Gyrotron Gun for a 35 GHz Gyro-TWT
- Mode Coupling and Power Transfer in a Coaxial Sector Waveguide with a Sector Angle Taper (Dec. 1980 [T-MTT])

## Balabaud, J.P.

- TM/sub 01p/ Tubular and Cylindrical Dielectric Resonator Mode

## Ball, D.

- Broadband Planar Balanced Mixers for Millimeter-Wave Applications

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author

- Pulse Regeneration in the Gigabit-Per-Second Range Using a Diode Differential Regenerator

## Barber, P.W.

- Contributors (Jul. 1980 [T-MTT])
- Irradiation of Prolate Spheroidal Models of Humans in the Near Field of a Short Electric Dipole

## Bardati, F.

- Contributors (Aug. 1981 [T-MTT])
- Time-Dependent Microwave Heating and Surface Cooling of Simulated Living Tissues

## Barnett, L.R.

- Circular-Electric Mode Waveguide Couplers and Junctions for Use in Gyrotron Traveling-Wave Amplifiers (Dec. 1980 [T-MTT])
- Contributors (Dec. 1980 [T-MTT])

# Papers by Author

- Mode Coupling and Power Transfer in a Coaxial Sector Waveguide with a Sector Angle Taper (Dec. 1980 [T-MTT])

**Barth, H.**

- 141GHz Generation by a GaAs Gunn Oscillator Up-Converter Chain
- A Wideband, Backshort-Tunable Second Harmonic W-Band Gunn-Oscillator

**Barvet, S.**

- Decade Bandwidth FET Functions

**Bastida, E.M.**

- Contributors (Apr. 1980 [T-MTT])
- GaAs Monolithic Circuits Mounted Over High Q Dielectric Resonators
- Slow-Wave Approach for Monolithic GaAs ICs
- Study of the Harmonic Effects for Waveguide Gunn-Diode Oscillator Optimization

Contents
Authors

# Papers by Author

## Bates, B.D.

- Analysis and Use of Harkless Diode Mount for IMPATT Oscillators
- Analysis of Waveguide IMPATT Oscillator Circuits

## Bates, R.N.

- Millimetre Wave Low Noise E-Plane Balanced Mixers Incorporating Planar MBE GaAs Mixer Diodes

## Battles, J.W.

- A Computer-Controlled Dielectric Constant Measurement System: The Moving Vane Dielectometer

## Baughman, C.R.

- GaAs FET Limiting Amplifier Designed for Low AM to PM Conversion

Contents
Authors

Click on title for a paper summary.

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author

- A Subharmonically Pumped Fin-Line Mixer for Satellite TV Receiver Applications
- Contributors (Jul. 1980 [T-MTT])

**Behar, D.**

- Adaptive Deconvolution Using a SAW Storage Correlator
- Contributors (May 1981 [T-MTT])

**Behari, J.**

- Dielectric Loss in Biogenic Steroids at Microwave Frequencies

**Benet, J.A.**

- The Design and Calibration of a Universal MMIC Test Fixture

**Benjamin, J.H.**

- Microwave Modelling of H. F. Antennas Over Lossy Earth

Contents
Authors

Click on title for a paper summary.

# Papers by Author

# Papers by Author




MTT®

IEEE®

Contents

Authors


Click on title for a paper summary.

# Papers by Author

- Contributors (Sep. 1980 [T-MTT])

**Beyer, A.**

- A New Fin-Line Ferrite Isolator for Integrated Millimeter-Wave Circuits
- Analysis of the Characteristics of an Earthed Fin Line
- Contributors (Jul. 1981 [T-MTT])
- Fin Line Ferrite Isolator for Integrated Millimeterwave Circuits

**Beyer, J.B.**

- Contributors (Mar. 1980 [T-MTT])
- The Traveling Wave IMPATT Mode: Part II -- The Effective Wave Impedance and Equivalent Transmission Line

**Bhartia, P.**

- Aperture Coupling Between Dielectric Image Lines
- Characteristics of Inhomogeneous Broadside-Coupled Striplines

Contents
Authors

# Papers by Author

- Contributors (Jun. 1980 [T-MTT])
- Contributors (Nov. 1980, Part I [T-MTT])
- Leaky-Wave Antennas Using Artificial Dielectrics at Millimeter Wave Frequencies
- The Design of Broadside-Coupled Stripline Circuits (Short Papers)

**Bhat, B.**

- Contributors (Jun. 1980 [T-MTT])
- Propagation Parameters of Coupled Microstrip-Like Transmission Lines for Millimeter Wave Applications (1981 [MWSYM])
- Propagation Parameters of Coupled Microstrip-Like Transmission Lines for Millimeter-Wave Applications (Dec. 1981 [T-MTT])
- Spectral Domain Analysis of Elliptic Microstrip Disk Resonators

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author

- Integrated Circuit Compatible Surface Acoustic Wave Devices on Gallium Arsenide

**Blackman, C.F.**

- A Swept-Frequency Magnitude Method for the Dielectric Characterization of Chemical and Biological Systems
- Contributors (Jul. 1980 [T-MTT])

**Blaisdell, A.**

- A Novel Broadband Double Balanced Mixer for the 18-40 GHz Range

**Bliek, P.J.**

- Contributors (Oct. 1980 [T-MTT])
- Inductive Grids in the Region of Diffraction Anomalies: Theory, Experiment, and Applications

Contents
Authors

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author

- Performance Predictions for Isolators and Differential Phase Shifters for the Near-Millimeter Wave Range

**Bonetti, R.**

- Coupling of Cylindrical Dielectric Resonators to Microstrip Lines

**Bonetti, R.R.**

- Analysis of Microstrip Circuits Coupled to Dielectric Resonators
- Contributors (Apr. 1981[T-MTT])
- Design of Cylindrical Dielectric Resonators in Inhomogeneous Media
- Design of Cylindrical Dielectric Resonators in Inhomogeneous Media (Corrections)

**Booth, P.L.**

- Contributors (Jan. 1981 [T-MTT])
- Frequency Tuning of Microstrip TRAPATT Oscillators

# Papers by Author




MTT

IEEE

Contents

Authors

Click on title for a paper summary.

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author




Contents

Authors


Click on title for a paper summary.

# Papers by Author

## Brown, R.

- Contributors (Dec. 1980 [T-MTT])
- Use of Microstrip Impedance- Measurement Technique in the Design of a BARITT Diplex Doppler Sensor

## Brown, W.C.

- Experimental Thin-Film, Etched-Circuit Rectenna
- Status of the Microwave Power Transmission Components for the Solar Power Satellite (Dec. 1981 [T-MTT])
- Status of the Microwave Power Transmission Components for the Solar Power Satellite (SPS) (1981 [MWSYM])

## Brumfield, W.T.

- A Review of Electronic Warfare (EW) Receivers with Acoustic Devices

## Budreau, A.J.

- SAW Based Direct Frequency Synthesizers

Contents
Authors

# Papers by Author




Contents

Authors


Click on title for a paper summary.

# Papers by Author

## Burton, M.N.

- Analytical Expressions for the Parameters of Finned and Ridged Waveguides

## Butler, C.M.

- Coupling Through a Slot Between a Dielectric Image Line and a Parallel Plate Guide

## Butler, J.K.

- Comparison of Numerical and Effective-Index Methods for a Class of Dielectric Waveguides
- Contributors (Mar. 1980 [T-MTT])
- Radiation Fields of Optical Stripline Waveguides

## Butter, C.

- Ka-Band Monolithic GaAs Balanced Mixers (1982 [MCS])

## Byloff, J.R.

- An Automated Power Meter Calibration System

Contents
Authors

Click on title for a paper summary.

# Papers by Author

## Cain, C.A.

- A Theoretical Basis for Microwave and RF Field Effects on Excitable Cellular Membranes
- A Theoretical Basis for Microwave and RF Field Effects on Excitable Cellular Membranes (Correction)
- Contributors (Feb. 1980 [T-MTT])

## Cain, F.L.

- Contributors (Apr. 1980 [T-MTT])
- In Vivo Probe Measurement Technique for Determining Dielectric Properties at VHF through Microwave Frequencies

## Calandra, E.F.

- Stability Analysis of Injection-Locked Oscillators in Their Fundamental Mode of Operation

Contents
Authors

Click on title for a paper summary.

# Papers by Author

## Callsen, H.

- Spurious Resonances in Asymmetrical Fin-Line Junctions

## Caloccia, E.M.

- An Evaluation of the Performance of the VLA Circular Waveguide System
- Contributors (Jul. 1980 [T-MTT])
- Contributors (Mar. 1981 [T-MTT])
- The Sector Coupler -- Theory and Performance

## Calviello, J.A.

- Widely Tunable Millimeter-Wave Mixers Using Beam-Lead Diodes

## Camargo, E.

- The Development of Microwave Components for Earth Station Receiver

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author

## Cap, F.

- Contributors (Jul. 1980 [T-MTT])
- Toroidal Resonators and Waveguides of Arbitrary Cross Section
- Toroidal Resonators for Electromagnetic Waves--II

## Cappello, A.

- A 22 to 24 GHz Cryogenically Cooled Low Noise FET Amplifier in Coplanar Waveguide

## Cardiasmenos, A.G.

- 94-GHz Beam-Lead Balanced Mixer

## Carlin, H.J.

- A Simplified "Real Frequency" Technique Appliable to Broadband Multistage Microwave Amplifiers

## Carr, K.L.

- Contributors (Mar. 1981 [T-MTT])

# Papers by Author

- Dual-Mode Microwave System to Enhance Early Detection of Cancer
- Thermal Drift in Microwave Thermography

**Carter, R.L.**

- Ion Implanted Oblique Incidence Magnetostatic Waves
- Tunable Magnetostatic Surface Wave Oscillator at 4 GHz

**Casseday, M.W.**

- Contributors (May 1981 [T-MTT])
- Wide-Band Signal Processing Using the Two-Beam Surface Acoustic Wave Acoustooptic Time Integrating Correlator

**Caulton, M.**

- The Development of High-Power, Low-Frequency PIN Diodes

Contents
Authors

Click on title for a paper summary.

# Papers by Author

## Cavallaro, N.

- A Novel Approach to Computer Automated Microwave Circuit Mask Design

## Cavicchio, C.

- A Multi-Chip GaAs Monolithic Transmit/Receive Module for X-Band

## Ch'en, D.R.

- A Monolithic GaAs 0.1 to 10 GHz Amplifier
- An 8 GHz MMIC Preamplifier

## Chadha, R.

- Compensation of Discontinuities in Planar Transmission Lines (1982 [MWSYM])
- Green's Functions for Circular Sectors, Annular Rings, and Annular Sectors in Planar Microwave Circuits (Short Papers)

# Papers by Author

- Green's Functions for Triangular Segments in Planar Microwave Circuits (Short Papers)
- Segmentation Method Using Impedance Matrices for Analysis of Planar Microwave Circuits (Short Papers)
- Two-Dimensional Analysis for Stripline/Microstrip Circuits

**Chakraborti, N.B.**

- Empirical Relations for Capacitive and Inductive Coupling Coefficients of Coupled Microstrip Lines (Short Papers)

**Chakraborty, A.**

- Contributors (Jun. 1980 [T-MTT])
- Transmission Matrix of a Linear Double Taper in Rectangular Waveguides

**Chambers, D.S.G.**

- The Generalised Integrated-Pole Direct Coupled Cavity Filter (Abstract Only)

# Papers by Author

## Chang, C.C.

- A Zero-Bias GaAs Millimeter Wave Integrated Detector Circuit

## Chang, D.C.

- A Hybrid Method for Paraxial Beam Propagation in Multimode Optical Waveguides
- A Variational Expression for the Scattering Matrix of a Double-Step Discontinuity in a Coaxial Line and its Application to a TEM Cell
- Closed-Form Expressions for the Current or Charge Distribution on Parallel Strips or Microstrip
- Closed-Form Expressions for the Current or Charge Distribution on Parallel Strips or Microstrip (Addendum)
- Contributors (Jan. 1981 [T-MTT])
- Contributors (Mar. 1980 [T-MTT])
- Foreword (Sep. 1981 [T-MTT])

Contents
Authors

Click on title for a paper summary.

# Papers by Author

- Theory of Dispersion in Microstrip Arbitrary Width

## Chang, K.

- A 63 W W-Band Injection-Locked Pulsed Solid State Transmitter (1981 [MWSYM])
- A 63-W W-Band Injection-Locked Pulsed Solid-State Transmitter (Dec. 1981 [T-MTT])
- Contributors (Apr. 1980 [T-MTT])
- Millimeter-Wave Silicon IMPATT Sources and Combiners for the 110-260 GHz Range (1981 [MWSYM])
- Millimeter-Wave Silicon IMPATT Sources and Combiners for the 110-260-GHz Range (Dec. 1981 [T-MTT])
- W-Band Power Combiner Design

## Chang, R.-S.

- Contributors (Feb. 1980 [T-MTT])
- Microstrip Transmission Line with Finite-Width Dielectric

Contents
Authors

Click on title for a paper summary.

# Papers by Author

## Chang, W.S.C.

- A Generalized Two-Dimensional Coupled-Mode Analysis of Curved and Chirped Periodic Structures in Open Dielectric Waveguides (1981 [MWSYM])
- A Generalized Two-Dimensional Coupled-Mode Analysis of Curved and Chirped Periodic Structures in Open Dielectric Waveguides (Sep. 1981 [T-MTT])
- Design of Chirped Grating Lenses in Planar Optical Waveguides

## Changyan, C.

- A 12 GHz TV Receiver for Direct Satellite Broadcasting

## Chao, C.

- Beam-Lead Schottky-Barrier Planar Mixer Diodes for Millimeter Wave Applications
- Ka-Band Monolithic GaAs Balanced Mixers (1982 [MCS])

# Papers by Author

## Chapman, A.G.

- A Broad-Band Model for a Coaxial-to-Stripline Transition
- Contributors (Feb. 1980 [T-MTT])

## Chapman, R.C.

- Miniature Filters and Equalizers Utilizing Dual Mode Dielectric Resonator Loaded Cavities

## Chatterjee, I.

- An Empirical Relationship for Electromagnetic Energy Absorption in Man for Near-Field Exposure Conditions (Short Papers)
- Contributors (Dec. 1980 [T-MTT])
- Contributors (Mar. 1981 [T-MTT])
- Dependence of Electromagnetic Energy Deposition Upon Angle of Incidence for an Inhomogeneous Block Model of Man Under Plane-Wave Irradiation

Contents
Authors

# Papers by Author

- Electromagnetic-Energy Deposition in an Inhomogeneous Block Model of Man for Near-Field Irradiation Conditions

**Chaudhuri, B.B.**

- Contributors (Mar. 1980 [T-MTT])
- Wave Propagation through Weakly Anisotropic Straight and Curved Rectangular Dielectric Optical Guides

**Chen, C.H.**

- A Variational Theory for Wave Propagation in Inhomogeneous Dielectric Slab Loaded Waveguides
- Contributors (Aug. 1980 [T-MTT])
- Contributors (Aug. 1981 [T-MTT])
- The Variational Principle for Non-Self-Adjoint Electromagnetic Problems

**Chen, J.**

- Millimeter-Wave BARITT Diode Mixers and Detectors

Contents
Authors

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author

## Chew, W.C.

- Approximate Formulas for Line Capacitance and Characteristic Impedance of Microstrip Line
- Approximate Formulas for Line Capacitance and Characteristic Impedance of Microstrip Line (Erratum)
- Asymptotic Eigenequations and Analytic Formulas for the Dispersion Characteristics of Open Wide Microstrip Lines
- Contributors (Feb. 1980 [T-MTT])
- Contributors (Feb. 1981 [T-MTT])
- Effects of Fringing Fields on the Capacitance of Circular Microstrip Disk

## Chigira, T.

- Direct-Coupled GaAs Monolithic IC Amplifiers

## Childs, W.H.

- Automatic Artwork Generation for Microwave Integrated Circuits

Contents
Authors

Click on title for a paper summary.

# Papers by Author

## Chin, J.Y.

- GaAs FET Limiting Amplifier Designed for Low AM to PM Conversion

## Chow, Y.L.

- An Approximate Dynamic Green's Function in Three Dimensions for Finite Length Microstripline
- Contributors (Apr. 1980 [T-MTT])

## Christou, A.

- Contributors (Jul. 1981 [T-MTT])
- Reliability of Power GaAs FET's--Au Gates and Al-Au Linked Gates

## Chu, A.

- A Two-Stage Monolithic IF Amplifier Utilizing a High Dielectric Constant Capacitor

Contents
Authors

Click on title for a paper summary.

# Papers by Author

- Heterodyne Experiments from Millimeter Wave to Optical Frequencies Using GaAs MESFETs Above f/sub T/

**Chu, K.R.**

---

- Contributors (Apr. 1980 [T-MTT])
- Contributors (Aug. 1980 [T-MTT])
- Contributors (Sep. 1980 [T-MTT])
- Methods of Efficiency Enhancement and Scaling for the Gyrotron Oscillator
- Practical Considerations in the Design of a High-Power 1-mm Gyromonotron
- Spatial and Temporal Coherence of a 35-GHz Gyromonotron Using the TE/sub 01/ Circular Mode
- Theory and Simulation of the Gyrotron Traveling Wave Amplifier Operating at Cyclotron Harmonics

Contents
Authors

Click on title for a paper summary.

# Papers by Author





Click on title for a paper summary.

# Papers by Author

- Rigorous Analysis of the Scattering of Surface Waves in an Abruptly Ended Slab Dielectric Waveguide
- Scattering of the TE/sub 01/ and TM/sub 01/ Modes on Transverse Discontinuities in a Rod Dielectric Waveguide -- Application to the Dielectric Resonators

**Clavin, A.**

- The 1981 MTT-S International Microwave Symposium (Dec. 1981 [T-MTT])

**Clifton, B.J.**

- Cooled Low Noise GaAs Monolithic Mixers at 110 GHz

**Cockrill, J.R.**

- A Comparison Between Actively and Passively Matched S-Band GaAs Monolithic FET Amplifiers

**Codon, F.**

- Analysis of Microstrrip Line on Semiconductor Substrate

Contents
Authors

Click on title for a paper summary.

# Papers by Author




Contents

Authors


Click on title for a paper summary.

# Papers by Author




Contents

Authors


Click on title for a paper summary.

# Papers by Author

- On the Theory of Corrugated Optical Disk Waveguides

**Correra, F.S.**

- The Development of Microwave Components for Earth Station Receiver

**Cory, H.**

- Contributors (Jan. 1981 [T-MTT])
- Dispersion Characteristics of Microstrip Lines

**Courtney, W.E.**

- A Two-Stage Monolithic IF Amplifier Utilizing a High Dielectric Constant Capacitor

**Cowhart, G.A.H.**

- Surface Waves and Their Relation to the Eigenfrequencies of a Circular-Cylindrical Cavity

Contents
Authors

Click on title for a paper summary.

# Papers by Author

# Papers by Author

- Diode Detector Characteristics for a 94 GHz Six-Port Application (1982 [MWSYM])

**Crouch, Jr., J.N.**

- Contributors (Jan. 1980 [T-MTT])
- DC- and Microwave-Biased Extrinsic GaAs Photoconductors

**Crowley, J.D.**

- A Low Noise Solid State Amplifier for Replacement of a Ka-Band TWTA
- A Medium Power Solid State Amplifier for V-Band
- CW InP Gunn Diode Power Combining at 90 GHz

**Cuhaci, M.**

- A Linearized High Power Microwave Digital Phase Modulator

Contents
Authors

Click on title for a paper summary.

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author




Contents

Authors


Click on title for a paper summary.

# Papers by Author

## Darby, B.J.

- Contributors (May 1981 [T-MTT])
- Programmable Frequency-Hop Synthesizers Based on Chirp Mixing

## Das, B.N.

- Analysis of an End Launcher for a Circular Cylindrical Waveguide (Correction)
- Analysis of Elliptic and Cylindrical Striplines Using Laplace's Equation
- Analysis of Small Aperture Coupling Between Rectangular Waveguide and Microstrip Line
- Contributors (Apr. 1980 [T-MTT])
- Contributors (Feb. 1981 [T-MTT])

## Dasgupta, D.

- Contributors (Jan. 1981 [T-MTT])

Contents
Authors

# Papers by Author

- Eigenvalue Spectrum of Rectangular Waveguide with Two Symmetrically Placed Double Ridges

**Davies, I.**

- Performance Capabilities of Indium Phosphide n/sup +/-n-n/sup +/ Transferred Electron Devices at Millimetre Wave Frequencies

**Davies, J.B.**

- Accurate Analysis of Tapered Planar Transmission Lines for Microwave Integrated Circuits
- Computation of the Shielded and Coupled Microstrip Parameters in Suspended and Conventional Form (Computer Program Descriptions)
- Contributors (Feb. 1981 [T-MTT])

**Davis, A.**

- A Novel Approach to Computer Automated Microwave Circuit Mask Design

Contents
Authors

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author

## de Ronde, F.C.

- A Simple Full-Band Matched 180° E Plane Waveguide Bend (Letters)
- Octave-Wide Matched Symmetrical, Reciprocal, 4- And 5 Ports

## de Santis, P.

- Contributors (Jun. 1980 [T-MTT])
- Extension of Existing Models to Ion-Implanted MESFET's
- Extension of Existing Models to Ion-Implanted MESFET's (Correction)
- On the Design of Temperature Stabilized Delay Lines (Short Papers)

## De Sario, M.

- Wave Propagation in Inhomogeneous Anisotropic Rectangular Waveguides by the Effective Index Method

# Papers by Author

## Decker, D.R.

- A Monolithic GaAs 0.1 to 10 GHz Amplifier
- A Monolithic GaAs DC to 2 GHz Feedback Amplifier
- An 8 GHz MMIC Preamplifier
- Yield Considerations for Ion Implanted GaAs MMICs (1982 [MCS])

## Degenford, J.E.

- A Study of Optimal Matching Circuit Topologies for Broadband Monolithic Power Amplifiers
- Class B Operation of Microwave FETs for Array Module Applications

## DeHaan, R.L.

- Changes in Cardiac-Cell Membrane Noise During Microwave Exposure

Contents
Authors

Click on title for a paper summary.

# Papers by Author

## Delavaux, J.

- A Generalized Two-Dimensional Coupled-Mode Analysis of Curved and Chirped Periodic Structures in Open Dielectric Waveguides (1981 [MWSYM])

## Delavaux, J.-M.

- A Generalized Two-Dimensional Coupled-Mode Analysis of Curved and Chirped Periodic Structures in Open Dielectric Waveguides (Sep. 1981 [T-MTT])
- Design of Chirped Grating Lenses in Planar Optical Waveguides

## Deleuil, R.

- Contributors (Oct. 1980 [T-MTT])
- Inductive Grids in the Region of Diffraction Anomalies: Theory, Experiment, and Applications

## Delogne, P.P.

- Contributors (Oct. 1980 [T-MTT])

# Papers by Author

- Theory of the Slotted Coaxial Cable

**Denlinger, E.J.**

- Contributors (Jun. 1980 [T-MTT])
- Losses of Microstrip Lines

**Denning, A.**

- A Broad-Band, Low-Noise Receiver at W-Band

**Densenouci, D.**

- Millimeter-Wave BARITT Diode Mixers and Detectors

**Deshpande, M.D.**

- Analysis of an End Launcher for a Circular Cylindrical Waveguide (Correction)

**Deutsch, R.**

- Contributors (Jul. 1980 [T-MTT])
- Contributors (Sep. 1980 [T-MTT])

Contents
Authors

# Papers by Author

- The Influence of the Energy Dissipation and of the Geometry on Toroidal Resonators with a Conducting Separating Wall
- Toroidal Resonators for Electromagnetic Waves--II

**DiBiase, R.**

- A Low Noise Frequency Agile X-Band Source

**Dickman, R.L.**

- Contributors (Aug. 1981 [T-MTT])
- Contributors (Mar. 1980 [T-MTT])
- Cryogenic Parametric Amplifier Noise Performance at 4.2 K
- Super-Schottky Mixer Performance at 92 GHz

**Dietterle, R.E.**

- SAW Oscillator in UHF Transit Satellite Links (1981 [MWSYM])
- SAW Oscillators in UHF Transit Satellite Links (Dec. 1981 [T-MTT])

Click on title for a paper summary.

# Papers by Author




MTT

IEEE

Contents

Authors

Click on title for a paper summary.

# Papers by Author



Click on title for a paper summary.

# Papers by Author

## Dormer, L.

- A Study of High Power Pulsed Characteristics of Low-Noise GaAs MESFET's (Dec. 1981 [T-MTT])
- A Study of High Power Pulsed Characteristics of Low-Noise GaAs MESFETs (1981 [MWSYM])

## Dottin, A.

- A Power FET Octave Bandwidth Traveling Wave Combiner Amplifier

## Dowling, T.

- A Novel Approach to Computer Automated Microwave Circuit Mask Design

## Dragone, C.

- Attenuation and Radiation Characteristics of the HE/sub 11/ -Mode
- Contributors (Jul. 1980 [T-MTT])

Contents
Authors

Click on title for a paper summary.

# Papers by Author

## Dragonetti, P.G.

- A Radar System Application of an 840-MHz SAW Resonator Stabilized Oscillator
- Contributors (May 1981 [T-MTT])

## Drewe, J.

- Microwave Thawing of Frozen Packed Red Blood Cells

## Drobot, A.T.

- Contributors (Apr. 1980 [T-MTT])
- Contributors (Aug. 1980 [T-MTT])
- Contributors (Sep. 1980 [T-MTT])
- Practical Considerations in the Design of a High-Power 1-mm Gyromonotron
- Spatial and Temporal Coherence of a 35-GHz Gyromonotron Using the TE/sub 01/ Circular Mode
- Theory and Simulation of the Gyrotron Traveling Wave Amplifier Operating at Cyclotron Harmonics

# Papers by Author




Contents

Authors


Click on title for a paper summary.

# Papers by Author

# Papers by Author

- Efficient Power Combining (Jul. 1980 [T-MTT])
- Shielded Microstrip: Transmission Media for MM-Wave Integrated Circuits

**Dyer, G.R.**

- Schottky Barrier Impedance Measurements at UHF (Short Papers)

**Earley, L.M.**

- A Resonantly Coupled, Ferrite-Tuned Buncher-Cavity System for the Los Alamos Proton Storage Ring

**East, J.R.**

- Millimeter-Wave BARITT Diode Mixers and Detectors

**Ebbeson, H.F.**

- Singularities in the Calibration of Six-Port Network Analyzers

Contents
Authors

Click on title for a paper summary.

# Papers by Author

## Ebert, R.L.

- Contributors (Apr. 1980 [T-MTT])
- W-Band Power Combiner Design

## Eckstein, R.J.

- 35 GHz Active Aperture

## Eddison, I.G.

- Performance Capabilities of Indium Phosphide n/sup +/-n-n/sup +/ Transferred Electron Devices at Millimetre Wave Frequencies

## Eden, R.C.

- Contributors (May 1980 [T-MTT])
- MSI High-Speed Low-Power GaAs Integrated Circuits Using Schottky Diode FET Logic (May 1980 [T-MTT])

## Edwards, T.C.

- Microstrip Measurements

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author

- Exact Analysis of Shielded Microstrip Lines and Bilateral Fin Lines (Jul. 1981 [T-MTT])
- Hybrid Mode Analysis of Microstrip Lines on Anisotropic Substrates (1981 [MWSYM])
- Hybrid Mode Analysis of Microstrip Lines on Anisotropic Substrates (Dec. 1981 [T-MTT])

**Ellis, S.**

- Millimeter-Wave BARITT Diode Mixers and Detectors

**Elmoazzen, Y.E.**

- Coupling Between Two Collinear Parallel-Plate Waveguides of Unequal Widths (Short Papers)

**Elta, M.E.**

- A Two-Stage Monolithic IF Amplifier Utilizing a High Dielectric Constant Capacitor

Contents
Authors

Click on title for a paper summary.

# Papers by Author

## Enegren, T.A.

- An Investigation of Nonreciprocal Periodic Structures
- Contributors (Aug. 1980 [T-MTT])
- Contributors (Jun. 1980 [T-MTT])
- Transverse Discontinuities in Nonreciprocal Waveguides

## Engen, G.F.

- A Least Squares Solution for Use in the Six-Port Measurement Technique (Dec. 1980 [T-MTT])
- Contributors (Dec. 1980 [T-MTT])
- Singularities in the Calibration of Six-Port Network Analyzers

## Erickson, N.R.

- A 200-350-GHz Heterodyne Receiver
- Contributors (Jun. 1981, Part I [T-MTT])

# Papers by Author





Click on title for a paper summary.

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author

## Ferguson, P.E.

- An Experimental Gyro-TWT
- Contributors (Aug. 1981 [T-MTT])
- Contributors (Mar. 1981 [T-MTT])
- Gyrotron-TWT Operating Characteristics

## Fetterman, H.R.

- Heterodyne Experiments from Millimeter Wave to Optical Frequencies Using GaAs MESFETs Above f/sub T/

## Fiedziuszko, S.J.

- Miniature Filters and Equalizers Utilizing Dual Mode Dielectric Resonator Loaded Cavities

## Fildes, R.D.

- The Use of Sampling Techniques for Miniaturized Microwave Synthesis Applications

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author

## Fliflet, A.W.

- Circular-Electric Mode Waveguide Couplers and Junctions for Use in Gyrotron Traveling-Wave Amplifiers (Dec. 1980 [T-MTT])
- Contributors (Dec. 1980 [T-MTT])
- Mode Coupling and Power Transfer in a Coaxial Sector Waveguide with a Sector Angle Taper (Dec. 1980 [T-MTT])

## Fong-Tom, R.A.

- Diode Detector Characteristics for a 94 GHz Six-Port Application (1982 [MWSYM])

## Forouhar, S.

- A Generalized Two-Dimensional Coupled-Mode Analysis of Curved and Chirped Periodic Structures in Open Dielectric Waveguides (1981 [MWSYM])

Contents
Authors

Click on title for a paper summary.

# Papers by Author

- A Generalized Two-Dimensional Coupled-Mode Analysis of Curved and Chirped Periodic Structures in Open Dielectric Waveguides (Sep. 1981 [T-MTT])
- Design of Chirped Grating Lenses in Planar Optical Waveguides

**Forrest, J.R.**

- High Phase Accuracy Active Phased Array Module for Multi-Function Radars

**Fortunato, M.P.**

- A Broadband, Solid State Millimeter-Wave Synthesizer

**Foster, K.R.**

- The Effects of High Power Microwave Pulses on Red Blood Cells and the Relationship to Transmembrane Thermal Gradients (Dec.1981 [T-MTT])

# Papers by Author

- The Effects of High Power Microwave Pulses on Red Blood Cells and the Relationship to Transmembrane Thermal Gradients (Nov. 1981 [T-MTT])

**Fox, J.D.**

- A Microprocessor Controlled Phase Measurement System for 2856 MHz Pulses

**Franz, M.**

- Contributors (Mar. 1980 [T-MTT])
- The Traveling Wave IMPATT Mode: Part II -- The Effective Wave Impedance and Equivalent Transmission Line

**Frater, R.H.**

- An Active "Cold" Noise Source
- Contributors (Apr. 1981[T-MTT])

**Freibergs, E.**

- Contributors (Jun. 1980 [T-MTT])

# Papers by Author

- Electronic Modulated Beam-Steerable Silicon Waveguide Array Antenna

**Freitag, R.G.**

- A Study of Optimal Matching Circuit Topologies for Broadband Monolithic Power Amplifiers
- Class B Operation of Microwave FETs for Array Module Applications

**Friedenthal, E.**

- 27 MHz Waveguide Applicators for Localized Hyperthermia Treatment of Cancer
- A Self-Balancing Microwave Radiometer for Non-Invasively Measuring the Temperature of Subcutaneous Tissues During Localized Hyperthermia Treatments of Cancer

**Friend, A.W.**

- Potential Arc Hazard Produced by Handling Connectors While Operating Pulsed Microwave Equipment

Contents
Authors

Click on title for a paper summary.

# Papers by Author

- The Effects of High Power Microwave Pulses on Red Blood Cells and the Relationship to Transmembrane Thermal Gradients (Nov. 1981 [T-MTT])

**Friend, Jr., A.W.**

- The Effects of High Power Microwave Pulses on Red Blood Cells and the Relationship to Transmembrane Thermal Gradients (Dec.1981 [T-MTT])

**Fryklund, D.J.**

- Dual Polarization Phased Array Diode Phase Shifter Module

**Fuchen, W.**

- Monolithic Microwave Integrated GaAs FET Oscillators

**Fukasawa, A.**

- A 40-GHz Digital Distribution Radio with a Single Oscillator
- Contributors (Sep. 1980 [T-MTT])

# Papers by Author

- Miniaturized Microwave Filter Construction with Dielectric-Loaded Resonator and Space Coupling

**Fukuda, O.**

- Contributors (Jun. 1980 [T-MTT])
- Transmission Characteristic Measurement of Two-Mode Optical Fiber with a Nearly Optimum Index-Profile

**Fukuden, N.**

- A 4.5 GHz 40 Watt GaAs FET Amplifier

**Fukui, H.**

- Design of Microwave GaAs MESFET's for Broad-Band Low-Noise Amplifiers (Addendum)

**Fukui, K.**

- Contributors (Oct. 1980 [T-MTT])
- Power Combining Ladder Network with Many Active Devices

# Papers by Author




Contents

Authors


Click on title for a paper summary.

# Papers by Author

- Contributors (Sep. 1980 [T-MTT])

**Galin, I.**

- 94-GHz Beam-Lead Balanced Mixer
- A New Diplexer - Realized in Stripline

**Galli, J.G.**

- The Use of Sampling Techniques for Miniaturized Microwave Synthesis Applications

**Gandhi, O.P.**

- An Empirical Relationship for Electromagnetic Energy Absorption in Man for Near-Field Exposure Conditions (Short Papers)
- Application of Moment-Methods to Electromagnetic Biological Imaging
- Contributors (Dec. 1980 [T-MTT])
- Contributors (Mar. 1981 [T-MTT])

Contents
Authors

# Papers by Author

- Dependence of Electromagnetic Energy Deposition Upon Angle of Incidence for an Inhomogeneous Block Model of Man Under Plane-Wave Irradiation
- Electromagnetic-Energy Deposition in an Inhomogeneous Block Model of Man for Near-Field Irradiation Conditions

**Ganguly, A.K.**

- Contributors (Apr. 1980 [T-MTT])
- Methods of Efficiency Enhancement and Scaling for the Gyrotron Oscillator

**Garault, Y.**

- A Dielectric Resonator Bandstop Filter
- Accurate Resonant Frequencies of Dielectric Resonators (Correction)
- Analysis of Microstrrip Line on Semiconductor Substrate
- Coupling Coefficient Between Magnetic Loop and a Dielectric Resonator in an Evanescent Waveguide

# Papers by Author

- Efficient Low-Noise Three Port X-Band FET Oscillator Using Two Dielectric Resonators
- TM/sub 01p/ Tubular and Cylindrical Dielectric Resonator Mode

**Garg, R.**

- Characteristics of Coupled Microstriplines (Correction)

**Gartner, S.L.**

- Potential Arc Hazard Produced by Handling Connectors While Operating Pulsed Microwave Equipment
- The Effects of High Power Microwave Pulses on Red Blood Cells and the Relationship to Transmembrane Thermal Gradients (Dec.1981 [T-MTT])
- The Effects of High Power Microwave Pulses on Red Blood Cells and the Relationship to Transmembrane Thermal Gradients (Nov. 1981 [T-MTT])

Contents
Authors

Click on title for a paper summary.

# Papers by Author




MTT

IEEE

Contents

Authors

Click on title for a paper summary.

# Papers by Author

- Scattering of the TE/sub 01/ and TM/sub 01/ Modes on Transverse Discontinuities in a Rod Dielectric Waveguide -- Application to the Dielectric Resonators

**Geoffroy, R.**

- A Novel Broadband Double Balanced Mixer for the 18-40 GHz Range

**Gerardo, G.G.**

- Microwave Modelling of H. F. Antennas Over Lossy Earth

**Geshiro, M.**

- A Method for Diminishing Total Transmission Losses in Curved Dielectric Optical Waveguides

**Getsinger, W.J.**

- Measurement of the Characteristic Impedance of Microstrip Over a Wide Frequency Range
- Microstrip Characteristic Impedance (Response to Comments)

Click on title for a paper summary.

# Papers by Author

# Papers by Author

- Processing System for Design and Analysis of Microwave-Integrated-Circuits Layouts

**Gilchrist, B.E.**

- The Use of Sampling Techniques for Miniaturized Microwave Synthesis Applications

**Gilden, M.**

- IC Compatible SAW Devices on GaAs
- Integrated Circuit Compatible Surface Acoustic Wave Devices on Gallium Arsenide

**Gilgenbach, R.M.**

- Contributors (Aug. 1980 [T-MTT])
- Spatial and Temporal Coherence of a 35-GHz Gyromonotron Using the TE/sub 01/ Circular Mode

# Papers by Author

## Glance, B.

- A Fast Low-Loss Low-Drive 14-GHz Microstrip p-i-n Phase Shifter (Short Papers)

## Gloanec, M.

- An E-Beam Fabricated GaAs D-Type Flip-Flop IC
- Contributors (May 1980 [T-MTT])

## Goben, C.A.

- Contributors (Aug. 1980 [T-MTT])
- Surface Electromagnetic Wave Field Strength Measurements on Railroad Tracks

## Godone, A.

- Analysis of Schottky-Barrier Millimetric Varactor Doublers

## Goebel, U.

- Broadband Fin-Line Circulators

Contents
Authors

# Papers by Author

## Goel, J.

- A 1 Watt GaAs Power Amplifier for the NASA 30/20 GHz Communication System

## Gold, R.B.

- Application of the Two-Way Balanced Amplifier Concept to Wide-Band Power Amplification Using GaAs MESFET's
- Contributors (Apr. 1980 [T-MTT])
- Contributors (Mar. 1980 [T-MTT])
- The Matched Feedback Amplifier: Ultrawide-Band Microwave Amplification with GaAs MESFET's

## Goldie, H.

- A 100-kW Solid-State Coaxial Limiter for L-Band
- An RF-Primed All-Halogen Gas Plasma Microwave High Power Receiver Protector

Contents
Authors

# Papers by Author

# Papers by Author

## Goudelis, M.

- Non Linear Equivalent Circuit for Broadband GaAs MESFET Power Amplifier Design

## Gough, R.A.

- Design of a High Power Earth Station Transmitter for the Band 7.9 to 8.4 GHz

## Granatstein, V.L.

- Circular-Electric Mode Waveguide Couplers and Junctions for Use in Gyrotron Traveling-Wave Amplifiers (Dec. 1980 [T-MTT])
- Contributors (Aug. 1980 [T-MTT])
- Contributors (Dec. 1980 [T-MTT])
- Spatial and Temporal Coherence of a 35-GHz Gyromonotron Using the TE/sub 01/ Circular Mode

Contents
Authors

Click on title for a paper summary.

# Papers by Author




Contents

Authors


Click on title for a paper summary.

# Papers by Author

- Gallium-Arsenide FET Logic Pseudorandom Code Generator

**Griffin, D.W.**

- A Novel Harmonic Balancing Bridge for Characterizing Microwave Modules for Phased Array Antenna Service
- Computer-Aided Determination of Resonator Characteristics Based on Expansion in Normal Modes and Using Automatic Network Analyser Data

**Griffin, J.**

- The Image Rejection Harmonic Mixer

**Grondin, R.O.**

- Millimeter-Wave BARITT Diode Mixers and Detectors

**Grubin, H.L.**

- Contributors (May 1980 [T-MTT])

# Papers by Author

- Switching Characteristics of Nonlinear Field-Effect Transistors: Gallium-Arsenide Versus Silicon

**Grudkowski, T.W.**

- IC Compatible SAW Devices on GaAs
- Integrated Circuit Compatible Surface Acoustic Wave Devices on Gallium Arsenide

**Gruner, K.**

- Airborne Imaging System Using a Cryogenic 90-GHz Receiver
- Contributors (Jun. 1981, Part I [T-MTT])

**Gruner, L.**

- Characteristics of Crossed Rectangular Coaxial Structures
- Contributors (Jun. 1980 [T-MTT])

# Papers by Author

## Gudmundsen, RA.

- A Laser-Induced Traveling-Wave Device for Generating Millimeter Waves

## Guillon, P.

- A Dielectric Resonator Bandstop Filter
- Accurate Resonant Frequencies of Dielectric Resonators (Correction)
- Coupling Coefficient Between Magnetic Loop and a Dielectric Resonator in an Evanescent Waveguide
- TM/sub 01p/ Tubular and Cylindrical Dielectric Resonator Mode

## Gunther, J.

- Channelized Receiver Covering 26 to 60 GHz with Planar Integrated-Circuit Components

Contents
Authors

Click on title for a paper summary.

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author

- Contributors (Mar. 1980 [T-MTT])
- Desegmentation Method for Analysis of Two-Dimensional Microwave Circuits
- Design of Loaded-Line p-i-n Diode Phase Shifter Circuits
- Green's Functions for Circular Sectors, Annular Rings, and Annular Sectors in Planar Microwave Circuits (Short Papers)
- Green's Functions for Triangular Segments in Planar Microwave Circuits (Short Papers)
- Segmentation Method Using Impedance Matrices for Analysis of Planar Microwave Circuits (Short Papers)
- Two-Dimensional Analysis for Stripline/Microstrip Circuits

**Gupta, M.S.**

- Performance and Design of Microwave FET Harmonic Generators (Short Papers)

Contents
Authors

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author

- Contributors (Sep. 1980 [T-MTT])
- Investigations of Broad-Band, Linear Phase Shifters Using Optimum Varactor Diode Doping Profiles
- Millimeter-Wave BARITT Diode Mixers and Detectors
- Read-Type Varactors for Parametric Amplifier Applications
- Theoretical Investigations of TRAPATT Amplifier Operation

**Haggis, D.**

- Design and Fabrication Techniques for Lumped-Element GaAs MESFET Power Amplifiers Using Automated Assembly Procedures

**Hagmann, M.J.**

- An Empirical Relationship for Electromagnetic Energy Absorption in Man for Near-Field Exposure Conditions (Short Papers)
- Application of Moment-Methods to Electromagnetic Biological Imaging

Contents
Authors

Click on title for a paper summary.

# Papers by Author

- Contributors (Dec. 1980 [T-MTT])
- Contributors (Mar. 1981 [T-MTT])
- Dependence of Electromagnetic Energy Deposition Upon Angle of Incidence for an Inhomogeneous Block Model of Man Under Plane-Wave Irradiation
- Electromagnetic-Energy Deposition in an Inhomogeneous Block Model of Man for Near-Field Irradiation Conditions

**Hagstrom, C.E.**

- Contributors (Aug. 1980 [T-MTT])
- Measurements of Embedding Impedance of Millimeter-Wave Diode Mounts

**Hallford, B.R.**

- Simple Balun-Coupled Mixers
- Single-Sideband Mixers for Communications Systems

**Hamilton, S.E.**

- Multidiode Waveguide Power Combiners

# Papers by Author

- Small Active Phased Array Characteristics with GaAs IMPATT Amplifier Modules

**Hammerstad, E.**

- Computer-Aided Design of Microstrip Couplers with Accurate Discontinuity Models

**Hanes, L.**

- An X-Band 10 W Monolithic Transmit-Receive GaAs FET Switch
- GaAs Monolithic Wideband (2-18 GHz) Variable Attenuators
- X, Ku-Band GaAs Monolithic Amplifier

**Hannah, J.M.**

- Contributors (May 1981 [T-MTT])
- Programmable Frequency-Hop Synthesizers Based on Chirp Mixing

Contents
Authors

# Papers by Author

# Papers by Author

## Hara, E.H.

- A Broad-Band Optoelectronic Microwave Switch
- Contributors (Jun. 1980 [T-MTT])

## Harrington, R.F.

- A Nonmodal Formulation for Electromagnetic Transmission through a Filled Slot of Arbitrary Cross Section in a Thick Conducting Screen
- Contributors (Jun. 1980 [T-MTT])
- Flight Test Evaluation of a Noise Injection Dicke Microwave Radiometer Employing Digital Signal Processing

## Harris, M.

- Pulsed Characterization of X-Band GaAs DDR IMPATT Diodes

Contents
Authors

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author

- Digital Frequency Multipliers Using Multisection Two-Strip Coupled Line
- Microstrip Spiral Directional Coupler

**Haung, C.**

- A 26.5-40.0 GHz GaAs FET Amplifier

**Hawks, D.A.**

- A Ferrimagnetic Resonance Thermometer for Microwave Power Environment

**Hayakawa, M.**

- A 4.5 GHz 40 Watt GaAs FET Amplifier

**Hayashi, Y.**

- Analysis of the Dispersion Characteristic of Slot Line with Thick Metal Coating
- Contributors (Apr. 1980 [T-MTT])
- Coupled Slots on an Anisotropic Sapphire Substrate

Contents
Authors

Click on title for a paper summary.

# Papers by Author

## Hayashibara, G.M.

- Millimeter-Wave Silicon IMPATT Sources and Combiners for the 110-260 GHz Range (1981 [MWSYM])
- Millimeter-Wave Silicon IMPATT Sources and Combiners for the 110-260-GHz Range (Dec. 1981 [T-MTT])

## Haydl, W.H.

- Contributors (May 1981 [T-MTT])
- On the Harmonic Operation of Millimeterwave Gunn Diodes
- Precision SAW Filters for a Large Phased-Array Radar System

## Hazama, K.

- Contributors (May 1981 [T-MTT])
- TV Tuning Systems with SAW Comb Filter

## Hecken, R.P.

- Analysis of Linear Noisy Two-Ports Using Scattering Waves

Contents
Authors

Click on title for a paper summary.

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author

## Helszajn, J.

- Characteristics of Circulators Using Planar Triangular and Disk Resonators Symmetrically Loaded with Magnetic Ridges
- Circulators Using Planar WYE Resonators
- Contributors (Jul. 1981 [T-MTT])
- Contributors (Jun. 1980 [T-MTT])
- Contributors (Jun. 1981, Part I [T-MTT])
- Low-Loss High-Peak-Power Microstrip Circulators
- Operation of Tracking Circulators
- Standing Wave Solutions of Planar Irregular Hexagonal and Wye Resonators

## Henaff, J.

- Contributors (May 1981 [T-MTT])
- Implementation of Satellite Communication Systems Using Surface Acoustic Waves

Contents
Authors

Click on title for a paper summary.

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author



Click on title for a paper summary.

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author

- Contributors (Sep. 1980 [T-MTT])

**Hikita, M.**

- 800 MHz Low Loss SAW Filter Using New Phase Weighting

**Hill, D.A.**

- Contributors (Apr. 1980 [T-MTT])
- Contributors (Feb. 1980 [T-MTT])
- Electromagnetic Theory of the Loosely Braided Coaxial Cable: Part II--Numerical Results
- Propagation Along a Coaxial Cable with a Helical Shield

**Hill, G.N.**

- Chip Level IMPATT Combining at 40 GHz (1981 [MWSYM])
- Chip Level IMPATT Combining at 40 GHz (Dec. 1981 [T-MTT])

**Hines, M.E.**

- Contributors (Apr. 1981[T-MTT])

Contents
Authors

# Papers by Author

- Inherent Signal Losses in Resistive-Diode Mixers

**Hinken, J.H.**

- Conducting Spheres in Rectangular Waveguides
- Contributors (Jul. 1980 [T-MTT])

**Hinton, J.H.**

- On Design of Coupled Microstrip Lines (Letters)

**Hirabayashi, M.**

- A Frequency-Stabilized MIC Oscillator Using a Newly-Developed Dielectric Resonator

**Hirahata, T.**

- Microstrip Dispersion in a Wide-Frequency Range (Short Papers)

**Hislop, A.**

- A Compact Low Cost 60 GHz Communicator

Contents
Authors

# Papers by Author

## Hitchcock, N.S.

- A Linearized High Power Microwave Digital Phase Modulator

## Hitchens, W.R.

- Application of the Two-Way Balanced Amplifier Concept to Wide-Band Power Amplification Using GaAs MESFET's
- Contributors (Apr. 1980 [T-MTT])
- Contributors (Mar. 1980 [T-MTT])
- The Matched Feedback Amplifier: Ultrawide-Band Microwave Amplification with GaAs MESFET's

## Ho, N.

- Contributors (May 1980 [T-MTT])
- Gallium-Arsenide FET Logic Pseudorandom Code Generator

MTT
IEEE
Contents
Authors

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author

- Experimental Characterization of Fin Line Discontinuities Using Resonant Techniques
- The Accuracy of TLM Analysis of Finned Rectangular Waveguides

## Hoer, C.A.

- A High-Power Dual Six-Port Automatic Network Analyzer for Determining Biological Effects of RF and Microwave Radiation
- A High-Power Dual Six-Port Automatic Network Analyzer Used in Determining Biological Effects of RF and Microwave Radiation

## Hoffmann, D.

- Capacitively Loaded Transmission Line for Subnanosecond Stepped Delta beta Operation of an Integrated Optical Directional Coupler Switch

Contents
Authors

Click on title for a paper summary.

# Papers by Author

**Hoffmann, J.F.**

- A Review of Electronic Warfare (EW) Receivers with Acoustic Devices

**Hofmann, H.**

- Characteristics of Unilateral Fin-Line Structures with Arbitrarily Located Slots (Apr. 1981 [T-MTT])
- Contributors (Apr. 1981[T-MTT])

**Hollis, M.A.**

- A Swept-Frequency Magnitude Method for the Dielectric Characterization of Chemical and Biological Systems
- Contributors (Jul. 1980 [T-MTT])

**Holmes, C.**

- Computer-Aided Design for the 1980's

**Hongzhi, Z.**

- V-Band InP Gunn Diode

Contents
Authors

Click on title for a paper summary.

# Papers by Author

## Honjo, K.

- A 25-W 5-GHz GaAs FET Amplifier for a Microwave Landing System
- Contributors (Jul. 1981 [T-MTT])
- Contributors (Jun. 1981, Part I [T-MTT])
- GaAs FET Ultrabroad-Band Amplifiers for Gbit/s Data Rate Systems

## Hoppe, W.

- Contributors (Dec. 1980 [T-MTT])
- Density-Independent Moisture Metering in Fibrous Materials Using a Double-Cutoff Gunn Oscillator (Dec. 1980 [T-MTT])

## Hori, S.

- Direct-Coupled GaAs Monolithic IC Amplifiers

# Papers by Author





Click on title for a paper summary.

# Papers by Author




Contents

Authors


Click on title for a paper summary.

# Papers by Author

- The Effects of High Power Microwave Pulses on Red Blood Cells and the Relationship to Transmembrane Thermal Gradients (Nov. 1981 [T-MTT])

**Howes, M.J.**

- A Reflection Coefficient Approach to the Design of One-Port Negative Impedance Oscillators
- Contributors (Aug. 1981 [T-MTT])
- Schottky Barrier Impedance Measurements at UHF (Short Papers)

**Hsu, T.-I.**

- Guidance and Leakage Properties of a Class of Open Dielectric Waveguides: Part II--New Physical Effects

**Hu, C.-L.J.**

- A Novel Approach to the Design of Multiple-Probe High-Power Microwave Automatic Impedance Measuring Schemes

Contents
Authors

# Papers by Author

- Contributors (Dec. 1980 [T-MTT])

**Hu, C.P.**

- A Broad-Band, Low-Noise Receiver at W-Band

**Huang, C.**

- Sub-Half-Micron GaAs FETs for Applications Through K Band

**Huang, C.-H.**

- A Planar Electro-Optic Beam Splitter with a Sawtooth Electrode

**Huang, H.-C.**

- Broad-Band Active Phase Shifter Using Dual-Gate MESFET (Short Papers)
- Broadband Dual-Gate FET Continuously Variable Phase Shifter
- Contributors (Mar. 1981 [T-MTT])

# Papers by Author

- Dual-Gate MESFET Variable-Gain Constant-Output Power Amplifier
- Monolithic GaAs Interdigitated 90° Hybrids with 50- and 25-Ohm Impedances
- Planar Broad-Band 180° Hybrid Power Divider/Combiner Circuit (Short Papers)

**Huang, M.Y.**

- SAW Stabilized Radiosondes

**Huber, C.J.**

- Contributors (May 1981 [T-MTT])
- Optimized SAW Spectral Control Filters for Digital Satellite Communications System

**Humphry, F.J.**

- A Resonantly Coupled, Ferrite-Tuned Buncher-Cavity System for the Los Alamos Proton Storage Ring

# Papers by Author

**Hung-chia, H.**

- Thirty Years of Microwaves in China

**Hunter, I.C.**

- Varactor Tuned Microwave Filters

**Hunton, J.K.**

- New Differential Phase Shift Networks Combining All-Pass and Band-Pass Elements

**Huruya, J.**

- Contributors (Aug. 1980 [T-MTT])
- Transmission Characteristics and a Design Method of Transmission-Line Low-Pass Filters with Multiple Pairs of Coincident Zeros and Multiple Pairs of Coincident Poles

**Ida, M.**

- Contributors (May 1980 [T-MTT])
- High-Speed Enhancement-Mode GaAs MESFET Logic

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author

# Papers by Author

- Intrinsic Response Time of Normally Off MESFET's of GaAs, Si, and InP
- Power Considerations on IMPATT-Diode Arrays with Incomplete Thermal Isolation

**Iobst, K.W.**

- An Optimization Technique for Lumped - Distributed Two Ports

**Irie, M.**

- Plated Source Bridge (PSB) GaAs Power FET with Improved Reliability

**Irzinski, E.P.**

- A Coaxial Waveguide Commutator Feed for a Scanning Circular Phased Array Antenna (Short Papers)

**Ishida, O.**

- Waveguide Power Divider Using Metallic Septum with Resistive Coupling Slot

Contents
Authors

Click on title for a paper summary.

# Papers by Author

## Ishihara, O.

- A 10.5 GHz MIC Direction Sensitive Doppler Module Using a GaAs Fet and a Ag/Pd Thick Film
- A 30 GHz - 100 mW GaAs FET
- A Highly Stabilized GaAs FET Oscillator Using a Dielectric Resonator Feedback Circuit in 9-14 GHz (Aug. 1980 [T-MTT])
- Contributors (Aug. 1980 [T-MTT])

## Ishii, T.

- 10-GHz 10-W Internally Matched Flip-Chip GaAs Power FET's (Apr. 1981 [T-MTT])
- Contributors (Apr. 1981[T-MTT])

## Ishikawa, H.

- 4-8 GHz High Power Cascadable Packaged GaAs FET Amplifier

Contents
Authors

Click on title for a paper summary.

# Papers by Author



Click on title for a paper summary.

# Papers by Author

- Microwave Imaging: Numerical Simulation and Results
- Near-Field Absorption in Prolate Spheroidal Models of Humans Exposed to a Small Loop Antenna of Arbitrary Orientation

**Isoda, Y.**

- Waveguide Power Divider Using Metallic Septum with Resistive Coupling Slot

**Itanami, T.**

- A Periodic Branching Filter for Millimeter-Wave Integrated Circuits
- Circularly Polarized Linear Array Antenna Using a Dielectric Image Line

**Ito, K.**

- Computer-Oriented Synthesis of Optimum Circuit Pattern of 3-dB Hybrid Ring by the Planar Circuit Approach
- Contributors (Mar. 1981 [T-MTT])

Click on title for a paper summary.

# Papers by Author

## Itoh, T.

- Analysis of Periodic Ferrite Slab Waveguides by Means of Improved Perturbation Method
- Analysis of Trapped Image Guides Using Effective Dielectric Constants and Surface Impedances
- Characteristics of Unilateral Fin-Line Structures with Arbitrarily Located Slots (Apr. 1981 [T-MTT])
- Computer-Aided Design of Millimeter-Wave E-Plane Filters (1982 [MWSYM])
- Contributors (Apr. 1981[T-MTT])
- Contributors (Dec. 1980 [T-MTT])
- Contributors (Jul. 1980 [T-MTT])
- Contributors (Sep. 1980 [T-MTT])
- Coupled-Mode Theory Analysis of Distributed Nonreciprocal Devices
- Coupled-Mode Theory Analysis of Distributed Nonreciprocal Structures

Contents
Authors

Click on title for a paper summary.

# Papers by Author

- Directive Planar Excitation of an Image-Guide
- Foreword (Sep. 1981 [T-MTT])
- Millimeter-Wave Planar Slot Antennas with Dielectric Feeds
- Open Guided Wave Structures for Millimeter-Wave Circuits
- Quasi-Optical Polarization-Duplexed Balanced Mixer
- Spectral Domain Analysis of Dominant and Higher Order Modes in Fin-Lines (Sep. 1980 [T-MTT])
- Spectral Domain Immitance Approach for Dispersion Characteristics of Generalized Printed Transmission Lines
- Trapped Image Guide For Millimeter-Wave Circuits (Dec. 1980 [T-MTT])

**Ivanek, F.**

- Microwave Communication Technology

**Ivanov, S.A.**

- Characteristic Impedances of Four-Conductor Transmission Line (Short Papers)

Contents
Authors

Click on title for a paper summary.

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author

**Jaworski, M.**

- An Accurate Solution of the Cylindrical Dielectric Resonator Problem (Correction)

**Jerinic, G.**

- A 1kW/sub peak/, 300 W/sub avg/ IMPATT Diode Injection Locked Oscillator

**Jervis, B.W.**

- Two Simple Methods for the Measurement of the Dielectric Permittivity of Low-Loss Microstrip Substrates (Short Papers)

**Jingzhi, F.**

- V-Band InP Gunn Diode

**Jinting, L.**

- Status of Microwave Semiconductor Devices in China

Contents
Authors

Click on title for a paper summary.

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author

- Contributors (Mar. 1981 [T-MTT])

**Joseph, T.R.**

- The Integrated Optic Spectrum Analyzer -- A First Demonstration

**Joshi, K.K.**

- Analysis of Elliptic and Cylindrical Striplines Using Laplace's Equation
- Analysis of Small Aperture Coupling Between Rectangular Waveguide and Microstrip Line
- Contributors (Apr. 1980 [T-MTT])
- Contributors (Feb. 1981 [T-MTT])

**Juravlev, G.A.**

- A Multilayer Fiber Guide with Rectangular Core
- Contributors (Apr. 1980 [T-MTT])

Contents
Authors

Click on title for a paper summary.

# Papers by Author

## Kaczkowski, A.

- Contributors (Mar. 1980 [T-MTT])
- High-Accuracy Wide-Range Measurement Method for Determination of Complex Permittivity in Reentrant Cavity: Part A --- Theoretical Analysis of the Method
- High-Accuracy Wide-Range Measurement Method for Determination of Complex Permittivity in Reentrant Cavity: Part B -- Experimental Analysis of Measurement Errors

## Kadowaki, Y.

- A 30 GHz - 100 mW GaAs FET

## Kajfez, D.

- Asymmetric Microstrip DC Blocks with Rippled Response
- Computer Aided Analysis of Noise in Lossy Microwave Filters (Short Papers)
- Contributors (Sep. 1980 [T-MTT])
- Design Equations for Symmetric Microstrip DC Blocks

Contents
Authors

Click on title for a paper summary.

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author

## Kantor, G.

- A 2450-MHz Slab-Loaded Direct Contact Applicator with Choke (Dec. 1980 [T-MTT])
- An Analysis of Minimally Perturbing Temperature Probe and Thermographic Measurements in Microwave Diathermy
- Contributors (Dec. 1980 [T-MTT])
- Diathermy Applicators with Circular Aperture and Corrugated Flange (Short Paper)
- Non-Pertubing Temperature Probe and Thermography Measurements in Microwave Diathermy

## Karimullah, K.

- Contributors (Nov. 1980, Part I [T-MTT])
- Electromagnetic Coupling Between a Thin-Wire Antenna and a Neighboring Biological Body: Theory and Experiment

## Karmel, P.R.

- Contributors (Jul. 1980 [T-MTT])

# Papers by Author

- TE/sub 011/ Mode Sectorial Circular Cylindrical Cavities Filters (Jul. 1980 [T-MTT])

**Katechi, P.**

- Contributors (Feb. 1980 [T-MTT])
- Coupled Microstrip Disk Resonators

**Katehi, P.B.**

- Substrate Optimization for Integrated Circuit Antennas (1982 [MWSYM])

**Kato, N.**

- Contributors (May 1980 [T-MTT])
- High-Speed Enhancement-Mode GaAs MESFET Logic
- Very Low Power Gigabit Logic Circuits with Enhancement-Mode GaAs MESFETs

**Kato, Y.**

- Contributors (Jun. 1980 [T-MTT])

# Papers by Author

- Transmission Characteristic Measurement of Two-Mode Optical Fiber with a Nearly Optimum Index-Profile

**Kawamura, M.**

- CH/sub 3/F Submillimeter Laser Using New Type of Resonator
- Transmission Loss of the Double-Strip Modified H Guide at 50 GHz (Short Papers)

**Keeping, K.J.**

- A Scanning Switch Matrix for a Cylindrical Array

**Kellner, A.L.**

- Guided Wave Optical RF Spectrum Analyzer

**Kemerley, R.T.**

- X-Band Burnout Characteristics of GaAs MESFETs (1982 [MWSYM])

Contents
Authors

Click on title for a paper summary.

# Papers by Author

## Kennis, P.

- Contributors (Jul. 1981 [T-MTT])
- Resonant Frequencies of Rectangular Dielectric Resonators (Short Papers)
- Scattering of the TE/sub 01/ and TM/sub 01/ Modes on Transverse Discontinuities in a Rod Dielectric Waveguide -- Application to the Dielectric Resonators

## Keriakos, M.H.

- Computer-Aided Analysis and Design of Networks Containing Commensurate and Noncommensurate Delay Lines
- Contributors (Apr. 1980 [T-MTT])

## Kermarrec, C.

- Monolithic Circuits for 12 GHz Direct Broadcasting Satellite Reception

Contents
Authors

Click on title for a paper summary.

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author

- Analysis of Balanced Subharmonically Pumped Mixers with Unsymmetrical Diodes
- Analysis of Waveguide IMPATT Oscillator Circuits
- Numerical Analysis of Subharmonic Mixers Using a Bilinear Diode Model

**Khanna, A.P.S.**

- Efficient Low-Noise Three Port X-Band FET Oscillator Using Two Dielectric Resonators
- Microwave Oscillator Analysis (Short Papers)

**Kharadly, M.M.Z.**

- An Investigation of Nonreciprocal Periodic Structures
- Contributors (Aug. 1980 [T-MTT])
- Contributors (Jun. 1980 [T-MTT])
- Transverse Discontinuities in Nonreciprocal Waveguides

Contents
Authors

Click on title for a paper summary.

# Papers by Author

## Kheifets, S.A.

- Contributors (Mar. 1981 [T-MTT])
- Electromagnetic Fields in an Axial Symmetric Waveguide with Variable Cross Section

## Khilla, A.M.

- Analysis of Wide-Band Microstrip Circulators by Point-Matching Technique

## Kiehl, R.A.

- Contributors (Apr. 1980 [T-MTT])
- Novel Optical Control Techniques for Solid-State Radar Transmitters
- Performance of Optically Coupled Microwave Switching Devices

Contents
Authors

Click on title for a paper summary.

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author

# Papers by Author

## Klatskin, J.B.

- Broadband Lumped-Element GaAs FET Power Amplifiers
- Design and Fabrication Techniques for Lumped-Element GaAs MESFET Power Amplifiers Using Automated Assembly Procedures

## Klein-Lebbink, E.

- An 11 GHz Contiguous Band Output Multiplexing Network for INTELSAT VI Spacecraft

## Klohn, K.L.

- Contributors (Jun. 1980 [T-MTT])
- Electronic Modulated Beam-Steerable Silicon Waveguide Array Antenna
- Metal Walls in Close Proximity to a Dielectric Waveguide Antenna

# Papers by Author

# Papers by Author

- Contributors (Feb. 1981 [T-MTT])
- Equivalent Circuits of Binomial Form Nonuniform Coupled Transmission Lines
- Equivalent Transformations for Mixed Lumped and Distributed Circuits
- Kuroda's Identity for Mixed Lumped and Distributed Circuits and Their Application to Nonuniform Transmission Lines

**Kobayashi, M.**

- Contributors (Jul. 1980 [T-MTT])
- Method for Equalizing Phase Velocities of Coupled Microstrip Lines by Using Anisotropic Substrate

**Kobayashi, Y.**

- Contributors (Oct. 1980 [T-MTT])
- Resonant Modes of a Dielectric Rod Resonator Short-Circuited at Both Ends by Parallel Conducting Plates

Contents
Authors

Click on title for a paper summary.

# Papers by Author

## Kobiki, M.

- 10-GHz 10-W Internally Matched Flip-Chip GaAs Power FET's (Apr. 1981 [T-MTT])
- Contributors (Apr. 1981[T-MTT])
- Internally Matched (IM) Plated Source Bridge (PSB) Power GaAs FET Achieving a High Performance Power Amplifier in X-Band
- Plated Source Bridge (PSB) GaAs Power FET with Improved Reliability

## Kodama, T.

- Contributors (May 1981 [T-MTT])
- SAW Vestigial Sideband Filter for TV Broadcasting Transmitter

## Koike, T.

- Magnetostatic Wave Propagation within Obliquely Magnetized YIG Films

Contents
Authors

Click on title for a paper summary.

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author

## Komizo, H.

- Contributors (Jul. 1981 [T-MTT])
- Microstrip Spiral Directional Coupler
- Millimeterwave Integrated Circuits

## Kondoh, H.

- Contributors (Dec. 1980 [T-MTT])
- Corporate and Tandem Structures for Combining Power from 3/sup N/ and 2N+1 Oscillators
- High Efficiency Mode Characterization in a 20 GHz MBE GaAs IMPATT Diode Amplifier

## Kondoh, Y.

- Contributors (Jan. 1980 [T-MTT])
- On the Accuracy of Scalar Approximation Technique in Optical Fiber Analysis

# Papers by Author

## Kong, J.A.

- Approximate Formulas for Line Capacitance and Characteristic Impedance of Microstrip Line
- Approximate Formulas for Line Capacitance and Characteristic Impedance of Microstrip Line (Erratum)
- Asymptotic Eigenequations and Analytic Formulas for the Dispersion Characteristics of Open Wide Microstrip Lines
- Contributors (Feb. 1980 [T-MTT])
- Contributors (Feb. 1981 [T-MTT])
- Effects of Fringing Fields on the Capacitance of Circular Microstrip Disk

## Kosco, E.G.

- A Radar System Application of an 840-MHz SAW Resonator Stabilized Oscillator
- Contributors (May 1981 [T-MTT])

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author

# Papers by Author

## Kudsia, C.M.

- An 11 GHz Contiguous Band Output Multiplexing Network for INTELSAT VI Spacecraft

## Kuester, E.F.

- A Hybrid Method for Paraxial Beam Propagation in Multimode Optical Waveguides
- Closed-Form Expressions for the Current or Charge Distribution on Parallel Strips or Microstrip
- Closed-Form Expressions for the Current or Charge Distribution on Parallel Strips or Microstrip (Addendum)
- Contributors (Mar. 1980 [T-MTT])
- Theory of Dispersion in Microstrip Arbitrary Width

## Kumagai, N.

- A New Technique for Magnetostatic Wave Delay Lines
- Behavior of Bleustein-Gulyaev Waves in a Periodically Corrugated Piezoelectric Crystal

# Papers by Author

- Contributors (Feb. 1980 [T-MTT])
- Contributors (Jan. 1980 [T-MTT])
- Contributors (Jun. 1980 [T-MTT])
- Contributors (Jun. 1981, Part I [T-MTT])
- On the Accuracy of Scalar Approximation Technique in Optical Fiber Analysis
- Scattering and Mode Conversion of Guided Modes by a Spherical Object in an Optical Fiber

**Kumar, M.**

- Broad-Band Active Phase Shifter Using Dual-Gate MESFET (Short Papers)
- Broadband Dual-Gate FET Continuously Variable Phase Shifter
- Contributors (Mar. 1981 [T-MTT])
- Dual-Gate MESFET Variable-Gain Constant-Output Power Amplifier

Contents
Authors

# Papers by Author

- Monolithic GaAs Interdigitated 90° Hybrids with 50- and 25-Ohm Impedances
- Planar Broad-Band 180° Hybrid Power Divider/Combiner Circuit (Short Papers)

**Kumar, S.**

- Direct Generation of MSK Modulation at Microwave Frequencies

**Kunieda, H.**

- Contributors (Aug. 1980 [T-MTT])
- Simplified Equivalent Representations for Multicoupled Lines and Their Application to Filter Design

**Kurazono, S.**

- Contributors (Jun. 1981, Part I [T-MTT])
- Y Dielectric Waveguide for Millimeter- and Submillimeter-Wave

# Papers by Author

## Kurita, O.

- Contributors (Jun. 1980 [T-MTT])
- Power Considerations on IMPATT-Diode Arrays with Incomplete Thermal Isolation

## Kusakawa, H.

- Contributors (May 1980 [T-MTT])
- GaAs MOSFET High-Speed Logic

## Kusano, K.

- Proposal of an Analytical Technique Using Circularly Polarized Waves and its Application

## Kusunoki, K.

- A 10.5 GHz MIC Direction Sensitive Doppler Module Using a GaAs Fet and a Ag/Pd Thick Film

Contents
Authors

Click on title for a paper summary.

# Papers by Author

- Internally Matched (IM) Plated Source Bridge (PSB) Power GaAs FET Achieving a High Performance Power Amplifier in X-Band

**Kuvas, R.L.**

- Analysis and Improvement of Intermodulation Distortion in GaAs Power FET's
- Contributors (Jan. 1980 [T-MTT])

**Kuzuya, R.**

- Composite Dielectric Waveguides
- Contributors (Sep. 1980 [T-MTT])

**Lagasse, P.E.**

- Contributors (Jun. 1981, Part I [T-MTT])
- Finite Element Analysis of Optical Waveguides (Jun. 1981, Part I [T-MTT])

# Papers by Author

**Lagendijk, J.W.**

- Microstrip Loop Radiators for Local Hyperthermia

**Lai, B.C.H.**

- Contributors (Aug. 1980 [T-MTT])
- Surface Electromagnetic Wave Field Strength Measurements on Railroad Tracks

**Laighton, D.**

- Silicon-On-Sapphire (SOS) Monolithic Transceiver Module Components for L- and S-Band

**Lakhtakia, A.**

- Contributors (Jun. 1981, Part I [T-MTT])
- Near-Field Absorption in Prolate Spheroidal Models of Humans Exposed to a Small Loop Antenna of Arbitrary Orientation

Contents
Authors

Click on title for a paper summary.

# Papers by Author

## Laloux, A.A.

- Contributors (Oct. 1980 [T-MTT])
- Theory of the Slotted Coaxial Cable

## Lampen, J.L.

- Contributors (Jul. 1981 [T-MTT])
- Single-Frequency Analysis of Radial and Planar Amplifier Combiner Circuits

## Langmann, U.

- Capacitively Loaded Transmission Line for Subnanosecond Stepped Delta beta Operation of an Integrated Optical Directional Coupler Switch

## Lao, B.Y.

- SAW Oscillator in UHF Transit Satellite Links (1981 [MWSYM])

Contents
Authors

Click on title for a paper summary.

# Papers by Author

- SAW Oscillators in UHF Transit Satellite Links (Dec. 1981 [T-MTT])

## Larsen, L.E.

- Contributors (Oct. 1980 [T-MTT])
- Differing Effects of Pulsed and CW Microwave Energy Upon Nerve Function as Detected by Birefringence Measurement

## Larsson, M.A.

- Contributors (Mar. 1981 [T-MTT])
- Planar Meanderline Ferrite-Dielectric Phase Shifter

## Laton, R.

- A Dual Diode TM /sub 020/ Cavity for IMPATT Diode Power Combining
- Pulsed Characterization of X-Band GaAs DDR IMPATT Diodes

MTT
IEEE
Contents
Authors

Click on title for a paper summary.

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author




MTT®

IEEE®

Contents

Authors


Click on title for a paper summary.

# Papers by Author

**Leavitt, R.P.**

- Design and Operation of an Orotron-A Tunable Source of Coherent Millimeter Wave Radiation

**Lee, C.A.**

- High Efficiency Mode Characterization in a 20 GHz MBE GaAs IMPATT Diode Amplifier

**Lee, C.L.**

- A Planar Electro-Optic Beam Splitter with a Sawtooth Electrode

**Lee, F.S.**

- Contributors (May 1980 [T-MTT])
- MSI High-Speed Low-Power GaAs Integrated Circuits Using Schottky Diode FET Logic (May 1980 [T-MTT])

**Lee, J.N.**

- Contributors (May 1981 [T-MTT])

Contents
Authors

Click on title for a paper summary.

# Papers by Author

- Wide-Band Signal Processing Using the Two-Beam Surface Acoustic Wave Acoustooptic Time Integrating Correlator

**Lee, J.Y.**

- The Integrated Optic Spectrum Analyzer -- A First Demonstration

**Lee, K.W.**

- Varactor Tuned Dielectric Resonator GaAs FET Oscillator in X-Band

**Lee, N.**

- High Frequency Limitation of GaAs Transit-Time Diodes

**Lee, T.T.**

- Performance and Design of Microwave FET Harmonic Generators (Short Papers)

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author

- Direct Noniterative Numerical Solution of Field Theory Problems Having Irregular Boundaries Using Network Analogs
- Improved Single and Multiaperature Waveguide Coupling Theory, Including Explanation of Mutual Interactions

## Lewin, L.

- Contributors (Jan. 1980 [T-MTT])
- Contributors (Oct. 1980 [T-MTT])
- Coupling of Degenerate Modes on Curved Dielectric Slab Sections and Application to Directional Couplers
- Propagation in Twisted Square Waveguide

## Lewis, J.E.

- Contributors (Jul. 1980 [T-MTT])
- Contributors (Oct. 1980 [T-MTT])
- Dielectric Loaded Elliptical Waveguides

Contents
Authors

Click on title for a paper summary.

# Papers by Author

- Mathieu Functions of Integral Orders and Real Arguments (Computer Program Descriptions)
- On the Propagation of Leaky Waves in a Longitudinally Slotted Rectangular Waveguide
- The Elliptical Surface Wave Transmission Line

**Li, S.**

- Precise Calculations and Measurements on the Complex Dielectric Constant of Lossy Materials Using TM/sub 010/ Cavity Perturbation Techniques

**Lien, C.-D.**

- Contributors (Aug. 1980 [T-MTT])
- The Variational Principle for Non-Self-Adjoint Electromagnetic Problems

**Lin, J.C.**

- Microwave Pulse-Induced Acoustic Resonances in Spherical Head Models (Short Papers)

# Papers by Author

## Lin, T.S.

- A Practical Wide Band GaAs Phase Detector

## Lin, W.-G.

- Contributors (Apr. 1980 [T-MTT])
- Contributors (Nov. 1980, Part I [T-MTT])
- Electromagnetic Wave Propagating in Uniform Waveguides Containing Inhomogeneous Dielectric
- Low-Frequency Scattering of Dielectric Cylinders

## Lin, Z.-Q.

- A Generalized Two-Dimensional Coupled-Mode Analysis of Curved and Chirped Periodic Structures in Open Dielectric Waveguides (1981 [MWSYM])
- A Generalized Two-Dimensional Coupled-Mode Analysis of Curved and Chirped Periodic Structures in Open Dielectric Waveguides (Sep. 1981 [T-MTT])

# Papers by Author

## Lindell, I.V.

- Asymptotic High-Frequency Modes of Homogeneous Waveguide Structures with Impedance Boundaries
- Contributors (Aug. 1981 [T-MTT])
- On the Quasi-TEM Modes in Inhomogeneous Multiconductor Transmission Lines
- Variational Methods for Nonstandard Eigenvalue Problems in Microwave Field Analysis

## Lindgren, G.M.

- Coupler Design in Open Dielectric Waveguide with Web Registration

## Lingren, T.D.

- Improved Selectivity in Cylindrical TE/sub 011/ Filters by TE/sub 211//TE/sub311/ Mode Control

Contents
Authors

Click on title for a paper summary.

# Papers by Author




Contents

Authors


Click on title for a paper summary.

# Papers by Author

- Contributors (Jul. 1981 [T-MTT])

**Liu, C.-T.**

- A Variational Theory for Wave Propagation in Inhomogeneous Dielectric Slab Loaded Waveguides
- Contributors (Aug. 1981 [T-MTT])

**Liu, S.G.**

- Ion-Implanted K-Band GaAs Power FET

**Lo, G.J.P.**

- A Linearized High Power Microwave Digital Phase Modulator

**Lo, Y.T.**

- Contributors (Aug. 1980 [T-MTT])
- Propagation in a Rectangular Waveguide Periodically Loaded with Resonant Irises (Aug. 1980 [T-MTT])

# Papers by Author

## LoCascio, C.

- Power Combiners with Gunn Diode Oscillators (Abstract Only)

## Lodwig, R.A.

- The Thermal Dielectric Quotient for Characterizing Dielectric Heat Conductors (Short Papers)

## Long, S.I.

- Contributors (May 1980 [T-MTT])
- MSI High-Speed Low-Power GaAs Integrated Circuits Using Schottky Diode FET Logic (May 1980 [T-MTT])

## Longley, S.R.

- Contributors (Jan. 1981 [T-MTT])
- Frequency Tuning of Microstrip TRAPATT Oscillators

Contents
Authors

Click on title for a paper summary.

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author

**Lucey, Jr., R.F.**

- Contributors (Aug. 1980 [T-MTT])
- Spatial and Temporal Coherence of a 35-GHz Gyromonotron Using the TE/sub 01/ Circular Mode

**Lukaszek, T.J.**

- SAW Stabilized Radiosondes

**Lull, J.M.**

- A High-Speed Monolithic GaAs 10/11 Counter

**Lundgren, R.E.**

- A High-Speed Monolithic GaAs 10/11 Counter

**Luqueze, M.A.**

- The Development of Microwave Components for Earth Station Receiver

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author



Click on title for a paper summary.

# Papers by Author

- Reliability of Power GaAs FET's--Au Gates and Al-Au Linked Gates

**MacPhie, R.H.**

- Contributors (Apr. 1980 [T-MTT])
- Contributors (Apr. 1981[T-MTT])
- On Solving Waveguide Junction Scattering Problems by the Conservation of Complex Power Technique
- Quarter-Wavelength Coupled Dielectric Plate Resonators for High Selectivity TE/sub 10/-Mode Filters

**Macropoulos, W.**

- Cooled Low Noise GaAs Monolithic Mixers at 110 GHz

**Madihian, M.**

- 120-Gunn Diode Power Combining at 23 GHz

**Madjar, A.**

- A Large-Signal Model for the GaAs MESFET

Click on title for a paper summary.

# Papers by Author

- Contributors (Aug. 1981 [T-MTT])

**Magarshack, J.**

- Commercial Applications of Microwave Monolithic Circuits?

**Mahapatra, S.**

- Contributors (Apr. 1980 [T-MTT])
- Corner Function Analysis of Microstrip Transmission Lines

**Mahoney, L.J.**

- A Two-Stage Monolithic IF Amplifier Utilizing a High Dielectric Constant Capacitor

**Maini, R.**

- Microwave Imaging: Numerical Simulation and Results

**Mains, R.K.**

- Contributors (Oct. 1980 [T-MTT])

# Papers by Author

- Investigations of Broad-Band, Linear Phase Shifters Using Optimum Varactor Diode Doping Profiles
- Theoretical Investigations of TRAPATT Amplifier Operation

**Majewski, M.L.**

- Contributors (Aug. 1981 [T-MTT])
- MIC Directional Filters Using Dielectric Resonators
- Modeling and Characterization of Microstrip-to-Coaxial Transitions

**Maki, D.W.**

- A 69 GHz FET Oscillator

**Makimoto, M.**

- Bandpass Filters Using Parallel Coupled Stripline Stepped Impedance Resonators
- Contributors (Dec. 1980 [T-MTT])

# Papers by Author

## Makimura, T.

- Contributors (Jun. 1980 [T-MTT])
- Contributors (Sep. 1980 [T-MTT])
- Hybrid Integrated Triplers Frequency Doublers and to 300 and 450 GHz
- Power Considerations on IMPATT-Diode Arrays with Incomplete Thermal Isolation

## Makino, S.

- A 40-GHz Digital Distribution Radio with a Single Oscillator
- Contributors (Sep. 1980 [T-MTT])

## Makino, T.

- Resonant Frequency Stability of the Dielectric Resonator on a Dielectric Substrate

Contents
Authors

Click on title for a paper summary.

# Papers by Author

**Malamis, P.**

- High Phase Accuracy Active Phased Array Module for Multi-Function Radars

**Malarkey, E.C.**

- Guided Wave Optical RF Spectrum Analyzer

**Malik, R.J.**

- Subharmonic Mixer Using Planar Doped Barrier Diodes

**Maliszewski, R.**

- Coupler Crossbar Microwave Switch Matrix

**Malocha, D.C.**

- An Application of SAW Convolves to High Bandwidth Spread Spectrum Communications
- Contributors (May 1981 [T-MTT])

Contents
Authors

Click on title for a paper summary.

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author

- Contributors (Jul. 1980 [T-MTT])
- The Design of Linearizing Networks for High-Power Varactor-Tuned Frequency Modulators

**March, S.**

- Computer-Aided Design for the 1980's

**March, S.L.**

- Phase Velocity Compensation in Parallel-Coupled Microstrip

**Marinilli, A.S.**

- A 1kW/sub peak/, 300 W/sub avg/ IMPATT Diode Injection Locked Oscillator

**Masaoka, Y.**

- A New Technique for Magnetostatic Wave Delay Lines
- Contributors (Jun. 1981, Part I [T-MTT])

Contents
Authors

Click on title for a paper summary.

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author

- TV Tuning Systems with SAW Comb Filter

**Matsumoto, E.**

- A 50 GHz MIC Transmitter/Receiver Using a Dielectric Resonator Oscillator

**Mau, G.S.F.**

- A Microwave Model for the Dual-Gate GaAs MESFET

**Maupin, J.A.**

- Contributors (May 1980 [T-MTT])
- Determination of the Electrode Capacitance Matrix for GaAs FET's

**Maystre, D.**

- Contributors (Oct. 1980 [T-MTT])
- Inductive Grids in the Region of Diffraction Anomalies: Theory, Experiment, and Applications

Contents
Authors

Click on title for a paper summary.

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author

**McDonald, N.A.**

- MIC Directional Filters Using Dielectric Resonators

**McGregor, J.**

- Automatic Artwork Generation for Microwave Integrated Circuits

**McIntosh, S.**

- A SAW Resonator Stabilized Oscillator for a CATV Set-Top Converter

**McPhedran, R.C.**

- Contributors (Oct. 1980 [T-MTT])
- Inductive Grids in the Region of Diffraction Anomalies: Theory, Experiment, and Applications

**McQuiddy, Jr., D.N.**

- Solid State Radar's Path to GaAs

# Papers by Author

- Welcome to the 1982 International Microwave Symposium (1982 [MWSYM])

**Medley, M.**

- Computer-Aided Design for the 1980's

**Meier, P.J.**

- Channelized Receiver Covering 26 to 60 GHz with Planar Integrated-Circuit Components
- Wideband Subharmonically Pumped W-Band Mixer in Single-Ridge Fin-Line

**Mekerta, S.**

- A Dielectric Resonator Bandstop Filter

**Mello, L.A.C.**

- Finite-Difference Method for the Arbitrary Cross-Section Waveguide Problem Using the Best-Fit Boundary Approximation

MTT
IEEE
Contents
Authors

# Papers by Author

## Mendecki, J.

- 27 MHz Waveguide Applicators for Localized Hyperthermia Treatment of Cancer
- A Self-Balancing Microwave Radiometer for Non-Invasively Measuring the Temperature of Subcutaneous Tissues During Localized Hyperthermia Treatments of Cancer

## Menna, R.J.

- Broad-Band Active Phase Shifter Using Dual-Gate MESFET (Short Papers)
- Broadband Dual-Gate FET Continuously Variable Phase Shifter
- Monolithic GaAs Interdigitated 90° Hybrids with 50- and 25-Ohm Impedances
- Planar Broad-Band 180° Hybrid Power Divider/Combiner Circuit (Short Papers)

Contents
Authors

Click on title for a paper summary.

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author

- Printed Circuit Coupled-Line Filters for Bandwidths Up to and Greater Than an Octave
- Sub-Miniature, Microwave Printed Circuit Filters with Arbitrary Passband and Stopband Widths

## Mirshekar-Syahkal, D.

- Accurate Analysis of Tapered Planar Transmission Lines for Microwave Integrated Circuits
- Computation of the Shielded and Coupled Microstrip Parameters in Suspended and Conventional Form (Computer Program Descriptions)
- Contributors (Feb. 1981 [T-MTT])

## Misra, D.K.

- Permittivity Measurement of Modified Infinite Samples by a Directional Coupler and a Sliding Load (Short Papers)

Contents
Authors

Click on title for a paper summary.

# Papers by Author

## Mitsui, Y.

- 10-GHz 10-W Internally Matched Flip-Chip GaAs Power FET's (Apr. 1981 [T-MTT])
- Contributors (Apr. 1981[T-MTT])

## Mittra, R.

- Analysis of Open Dielectric Waveguides Using Mode-Matching Technique and Variational Methods (Jan. 1980 [T-MTT])
- Contributors (Jan. 1980 [T-MTT])
- Coupling Characteristics of Planar Dielectric Waveguides of Rectangular Cross Section
- Field Profile in a Single-Mode Curved Dielectric Waveguide
- Field Profile in a Single-Mode Curved Dielectric Waveguide of Rectangular Cross Section
- Horn Image Guide Leaky-Wave Antenna (1981 [MWSYM])

Contents
Authors

Click on title for a paper summary.

# Papers by Author

- Horn Image-Guide Leaky-Wave Antenna (Dec. 1981 [T-MTT])
- On the Design of Transitions Between a Metal and Inverted Strip Dielectric Waveguide for Millimeter Waves (Short Papers)

**Miyagi, M.**

- A Proposal of Low-Loss Leaky Waveguide for Submillimeter Waves Transmission
- Contributors (Apr. 1980 [T-MTT])
- Contributors (Jun. 1980 [T-MTT])
- Transmission Characteristics of Dielectric Tube Leaky Waveguide

**Miyauchi, S.**

- Contributors (Mar. 1980 [T-MTT])
- The Design of Planar Circulators for Wide-Band Operation

Contents
Authors

Click on title for a paper summary.

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author

# Papers by Author




MTT

IEEE

Contents

Authors

Click on title for a paper summary.

# Papers by Author




Contents

Authors


Click on title for a paper summary.

# Papers by Author

## Morishita, K.

- Contributors (Apr. 1981[T-MTT])
- Contributors (Jan. 1980 [T-MTT])
- Numerical Analysis of Pulse Broadening in Graded Index Optical Fibers
- On the Accuracy of Scalar Approximation Technique in Optical Fiber Analysis

## Morita, K.

- Contributors (Mar. 1980 [T-MTT])
- K-Band Integrated Double-Balanced Mixer

## Morita, N.

- Contributors (Feb. 1980 [T-MTT])
- Scattering and Mode Conversion of Guided Modes by a Spherical Object in an Optical Fiber

Contents
Authors

Click on title for a paper summary.

# Papers by Author

# Papers by Author




MTT

IEEE

Contents

Authors

Click on title for a paper summary.

# Papers by Author

- Diplexer Operation of Stripline Y Circulators: Part 1--Basic Performance of Diplexer Operation

**Nagaya, K.**

- Contributors (Jun. 1980 [T-MTT])
- Numerical Experiments on the Determination of Cutoff Frequencies of Waveguides of Arbitrary Cross Section

**Naito, Y.**

- Contributors (Jun. 1981, Part I [T-MTT])
- Nonreciprocal Propagation Characteristics of YIG Thin-Film
- Parallel Component μ /sub z/ of Partially Magnetized Microwave Ferrites
- Phase Matched Optical Dielectric Waveguide Using 'The Artificial Anisotropic Structure'

# Papers by Author




Contents

Authors


Click on title for a paper summary.

# Papers by Author

**Nara, A.**

- A 30 GHz - 100 mW GaAs FET

**Nava J., H.O.**

- A Model of the Coupling Between Posts in Waveguides Using Equivalent Transmission Lines

**Navarro, M.S.**

- Contributors (Aug. 1980 [T-MTT])
- Propagation in a Rectangular Waveguide Periodically Loaded with Resonant Irises (Aug. 1980 [T-MTT])

**Nayfeh, A.H.**

- Contributors (Nov. 1980, Part I [T-MTT])
- Stopbands of the First-Order Bragg Interaction in a Parallel-Plate Waveguide Having Multiperiodic Wall Corrugations

**Neidhard, R.A.**

- 35 GHz Active Aperture

# Papers by Author

## Nelson, S.R.

- 2-18 GHz, High-Efficiency, Medium-Power GaAs FET Amplifiers

## Nemoto, Y.

- Contributors (Aug. 1981 [T-MTT])
- Contributors (Feb. 1981 [T-MTT])
- Equivalent Circuits of Binomial Form Nonuniform Coupled Transmission Lines
- Equivalent Transformations for Mixed Lumped and Distributed Circuits
- Kuroda's Identity for Mixed Lumped and Distributed Circuits and Their Application to Nonuniform Transmission Lines

## Nevels, R.D.

- Coupling Through a Slot Between a Dielectric Image Line and a Parallel Plate Guide

Contents
Authors

Click on title for a paper summary.

# Papers by Author




MTT

IEEE

Contents

Authors

Click on title for a paper summary.

# Papers by Author

- The Matched Feedback Amplifier: Ultrawide-Band Microwave Amplification with GaAs MESFET's

**Niehenke, E.C.**

- A Compact Broadband Multifunction MIC Module

**Nightingale, S.J.**

- An Experimental Millimetre-Wave Radiometric Tracker

**Niki, H.**

- Analysis of Open-Type Dielectric Waveguides by the Finite-Element Iterative Method
- Contributors (Mar. 1981 [T-MTT])

**Nisbet, W.T.**

- Characteristics of Circulators Using Planar Triangular and Disk Resonators Symmetrically Loaded with Magnetic Ridges
- Circulators Using Planar WYE Resonators

Contents
Authors

Click on title for a paper summary.

# Papers by Author

- Contributors (Jul. 1981 [T-MTT])
- Contributors (Jun. 1980 [T-MTT])

## Nishida, S.

- A Proposal of Low-Loss Leaky Waveguide for Submillimeter Waves Transmission
- Bends in Nonradiative Dielectric Waveguides (1982 [MWSYM])
- Contributors (Apr. 1980 [T-MTT])
- Contributors (Jun. 1980 [T-MTT])
- Nonradiative Dielectric Waveguide for Millimeter-Wave Integrated Circuits
- Transmission Characteristics of Dielectric Tube Leaky Waveguide

## Nishikawa, T.

- Miniaturized Diplexer for Land Mobile Communication Using High Dielectric Ceramics

Contents
Authors

Click on title for a paper summary.

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author




MTT

IEEE

Contents

Authors

Click on title for a paper summary.

# Papers by Author

## Nystrom, G.L.

- Analysis and Synthesis of Broad-Band Symmetric Power Dividing Trees
- Contributors (Mar. 1981 [T-MTT])
- Contributors (Nov. 1980, Part I [T-MTT])
- Synthesis of Broad-Band 3-dB Hybrids Based on the 2-Way Power Divider

## O'Sullivan, P.

- A 1 Watt GaAs Power Amplifier for the NASA 30/20 GHz Communication System

## Obregon, J.

- Decade Bandwidth FET Functions
- Efficient Low-Noise Three Port X-Band FET Oscillator Using Two Dielectric Resonators
- Microwave Oscillator Analysis (Short Papers)

Contents
Authors

Click on title for a paper summary.

# Papers by Author

## Ogai, M.

- Contributors (Mar. 1981 [T-MTT])
- The Sector Coupler -- Theory and Performance

## Ogata, F.

- A 4.5 GHz 40 Watt GaAs FET Amplifier

## Ogawa, H.

- A New MIC Magic-T Using Coupled Slot Lines
- Contributors (Jun. 1980 [T-MTT])
- Contributors (Mar. 1980 [T-MTT])
- K-Band Integrated Double-Balanced Mixer

## Ogusu, K.

- Contributors (Jan. 1981 [T-MTT])
- Propagation Properties of a Planar Dielectric Waveguide with Periodic Metallic Strips

Contents
Authors

Click on title for a paper summary.

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author

## Ohmori, M.



## Okano, S.




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author

## Okean, H.C.

- Impact of Low Noise Technology on Present and Future STACOM Systems (Abstract Only)

## Okoshi, T.

- Computer-Oriented Synthesis of Optimum Circuit Pattern of 3-dB Hybrid Ring by the Planar Circuit Approach
- Contributors (Aug. 1980 [T-MTT])
- Contributors (Mar. 1981 [T-MTT])
- Contributors (Oct. 1980 [T-MTT])
- High-Accuracy Numerical Data on Propagation Characteristics of alpha-Power Graded-Core Fibers
- High-Accuracy Numerical Data on Propagation Characteristics of alpha-Power Graded-Core Fibers (Correction)
- High-Accuracy WKB Analyses of alpha-Power Graded-Core Fibers

Contents
Authors

Click on title for a paper summary.

# Papers by Author




MTT®

IEEE®

Contents

Authors


Click on title for a paper summary.

# Papers by Author




MTT

IEEE

Contents

Authors

Click on title for a paper summary.

# Papers by Author




Contents

Authors


Click on title for a paper summary.

# Papers by Author




Contents

Authors


Click on title for a paper summary.

# Papers by Author

## Paglione, R.

- A Self-Balancing Microwave Radiometer for Non-Invasively Measuring the Temperature of Subcutaneous Tissues During Localized Hyperthermia Treatments of Cancer

## Paglione, R.W.

- 27 MHz Waveguide Applicators for Localized Hyperthermia Treatment of Cancer

## Paleta, Jr., R.J.

- Horn Image Guide Leaky-Wave Antenna (1981 [MWSYM])
- Horn Image-Guide Leaky-Wave Antenna (Dec. 1981 [T-MTT])

## Pan, D.-S.

- High Frequency Limitation of GaAs Transit-Time Diodes

# Papers by Author

# Papers by Author

- Contributors (Jul. 1980 [T-MTT])

**Park, P.K.**

- Improved Technique for Evaluation of Slot Discontinuities in Rectangular Waveguide

**Parkash, A.**

- Contributors (Jan. 1981 [T-MTT])
- Microwave Measurement of Conductivity and Permittivity of Semiconductor Spheres by Cavity Perturbation Technique

**Parodi, M.**

- Microstrip Characteristic Impedance (Comments)

**Parrish, P.T.**

- 94-GHz Beam-Lead Balanced Mixer

**Parsons, A.J.**

- High Phase Accuracy Active Phased Array Module for Multi-Function Radars

# Papers by Author





Click on title for a paper summary.

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author

**Payne, G.**

- An Experimental Millimetre-Wave Radiometric Tracker

**Peck, D.D.**

- Heterodyne Experiments from Millimeter Wave to Optical Frequencies Using GaAs MESFETs Above f/sub T/

**Peck, D.E.**

- A Measurement Method for Accurate Characterization and Modeling of MESFET Chips

**Peck, T.**

- Beam-Lead Schottky-Barrier Planar Mixer Diodes for Millimeter Wave Applications

**Pelose, J.R.**

- Coupler Crossbar Microwave Switch Matrix

MTT
IEEE
Contents
Authors

Click on title for a paper summary.

# Papers by Author

## Peltier, M.

- An E-Beam Fabricated GaAs D-Type Flip-Flop IC
- Contributors (May 1980 [T-MTT])

## Peltonen, J.K.

- Airborne Imaging System Using a Cryogenic 90-GHz Receiver
- Contributors (Jun. 1981, Part I [T-MTT])

## Peng, S.-T.

- Guidance and Leakage Properties of a Class of Open Dielectric Waveguides: Part I--Mathematical Formulations
- Guidance and Leakage Properties of a Class of Open Dielectric Waveguides: Part II--New Physical Effects

## Peng, S.T.

- Mode Conversion Effects in Bragg Reflection from Periodic Grooves in Rectangular Dielectric Image Guide

# Papers by Author

**Pengelly, R.S.**

- A Comparison Between Actively and Passively Matched S-Band GaAs Monolithic FET Amplifiers

**Perez, F.**

- A Graphical Method for the Design of Feedback Networks for Microwave Transistor Amplifiers: Theory and Applications

**Perini, J.**

- Periodically Loaded Transmission Lines (Short Papers)

**Petenzi, M.**

- Contributors (Feb. 1981 [T-MTT])
- Rigorous Analysis of the Scattering of Surface Waves in an Abruptly Ended Slab Dielectric Waveguide

**Petersen, W.C.**

- A Monolithic GaAs 0.1 to 10 GHz Amplifier

Contents
Authors

# Papers by Author

- A Monolithic GaAs DC to 2 GHz Feedback Amplifier
- An 8 GHz MMIC Preamplifier
- Yield Considerations for Ion Implanted GaAs MMICs (1982 [MCS])

## Peterson, D.F.

- A Measurement Method for Accurate Characterization and Modeling of MESFET Chips
- Contributors (Feb. 1980 [T-MTT])
- Contributors (Sep. 1980 [T-MTT])
- Investigations of Broad-Band, Linear Phase Shifters Using Optimum Varactor Diode Doping Profiles
- Large-Signal Characterization of Two-Port Nonlinear Active Networks
- Read-Type Varactors for Parametric Amplifier Applications
- Varactor Properties for Wide-Band Linear-Tuning Microwave VCO's

# Papers by Author

**Phillips, T.G.**

- Superconducting Tunnel Junctions as Mixers at 115 GHz

**Piacentini, W.J.**

- A Two-Stage Monolithic IF Amplifier Utilizing a High Dielectric Constant Capacitor
- Cooled Low Noise GaAs Monolithic Mixers at 110 GHz

**Pic, E.**

- Experimental Characterization of Fin Line Discontinuities Using Resonant Techniques

**Pierro, J.**

- A 22 to 24 GHz Cryogenically Cooled Low Noise FET Amplifier in Coplanar Waveguide

**Pileri, S.**

- Method of Analysis of Planar Networks Including Radiation Loss

Contents
Authors

Click on title for a paper summary.

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author




MTT

IEEE

Contents

Authors

Click on title for a paper summary.

# Papers by Author

## Podgorski, A.S.

- Contributors (Apr. 1980 [T-MTT])
- Quarter-Wavelength Coupled Dielectric Plate Resonators for High Selectivity TE/sub 10/-Mode Filters

## Poe, G.A.

- Contributors (Jan. 1981 [T-MTT])
- Sensitivity of the Total Power Radiometer with Periodic Absolute Calibration

## Poh, S.Y.

- Approximate Formulas for Line Capacitance and Characteristic Impedance of Microstrip Line
- Approximate Formulas for Line Capacitance and Characteristic Impedance of Microstrip Line (Erratum)
- Contributors (Feb. 1981 [T-MTT])

# Papers by Author

**Policky, G.**

- A 26.5-40.0 GHz GaAs FET Amplifier

**Pope, D.J.**

- Microwave Circuit Models of Semiconductor Injection Lasers (1982 [MWSYM])

**Porter, R.**

- High Power, Low Phase Distortion, Electronic Ferrite Attenuator

**Pospieszalski, M.W.**

- An Accurate Solution of the Cylindrical Dielectric Resonator Problem (Correction)
- Cylindrical Dielectric Resonators and Their Applications in TEM Line Microwave Circuits (Correction)

Contents
Authors

Click on title for a paper summary.

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author




Contents

Authors


Click on title for a paper summary.

# Papers by Author

- Contributors (Jun. 1981, Part I [T-MTT])
- Design Considerations for Monolithic Microwave Circuits

**Radovich, D.**

- Phase and Amplitude Characteristics of Dielectric Waveguide Coupler and Six-Port Network

**Rajaiah, K.**

- Contributors (Apr. 1980 [T-MTT])
- Corner Function Analysis of Microstrip Transmission Lines

**Ranganath, T.R.**

- The Integrated Optic Spectrum Analyzer -- A First Demonstration

**Rao, J.S.**

- Analysis of Small Aperture Coupling Between Rectangular Waveguide and Microstrip Line
- Contributors (Feb. 1981 [T-MTT])

# Papers by Author

# Papers by Author

- Contributors (Aug. 1980 [T-MTT])
- Contributors (Sep. 1980 [T-MTT])
- Methods of Efficiency Enhancement and Scaling for the Gyrotron Oscillator
- Practical Considerations in the Design of a High-Power 1-mm Gyromonotron
- Spatial and Temporal Coherence of a 35-GHz Gyromonotron Using the TE/sub 01/ Circular Mode

**Reed, K.W.**

- Ion Implanted Oblique Incidence Magnetostatic Waves

**Regan, J.F.**

- Thermal Drift in Microwave Thermography

**Reible, S.A.**

- Acoustoelectric Convolver Technology for Spread-Spectrum Communications
- Contributors (May 1981 [T-MTT])

Contents
Authors

Click on title for a paper summary.

# Papers by Author

- Passive Superconducting Microwave Circuits for 2-20 GHz Bandwidth Analog Signal Processing

**Reinert, W.**

- Airborne Imaging System Using a Cryogenic 90-GHz Receiver
- Contributors (Jun. 1981, Part I [T-MTT])

**Ren, C.-L.**

- Application of Dielectric Resonators in Microwave Components
- Contributors (Aug. 1981 [T-MTT])

**Ren, C.L.**

- Mode Suppressor for Dielectric Resonator Filters

**Rengarajan, S.R.**

- Contributors (Oct. 1980 [T-MTT])
- Dielectric Loaded Elliptical Waveguides

Contents
Authors

Click on title for a paper summary.

# Papers by Author

- Mathieu Functions of Integral Orders and Real Arguments (Computer Program Descriptions)
- The Elliptical Surface Wave Transmission Line

## Reynolds, L.D.

- A Monolithic X-Band Four-Bit Phase Shifter
- An X-Band 10 W Monolithic Transmit-Receive GaAs FET Switch

## Rhodes, J.D.

- A Design Procedure for Bandpass Channel Multiplexers Connected at a Common Junction
- Asymmetric Realizations for Dual-Mode Bandpass Filters
- Contiguous Broadband Matching of Multiple Resonant Loads
- Contributors (Jan. 1981 [T-MTT])
- Contributors (Mar. 1980 [T-MTT])
- Contributors (Sep. 1980 [T-MTT])

# Papers by Author

- General Extracted Pole Synthesis Technique with Applications to Low-Loss TE/sub 011/ Mode Filters
- The Generalised Integrated-Pole Direct Coupled Cavity Filter (Abstract Only)
- Varactor Tuned Microwave Filters

**Riblet, G.P.**

- A Broad Band Stripline or Coaxial 'Resolver' for the Accurate Measurement of Complex Reflection Coefficients Using the 6 Port Measurement Concept
- A Compact Waveguide "Resolver" for the Accurate Measurement of Complex Reflection and Transmission Coefficients Using the 6-Port Measurement Concept
- Aspects of the Calibration of a Single Six-Port Using a Load and Offset Reflection Standards (1982 [MWSYM])
- Contributors (Feb. 1980 [T-MTT])
- Contributors (Feb. 1981 [T-MTT])

Contents
Authors

Click on title for a paper summary.

# Papers by Author

- Techniques for Broad-Banding Above Resonance Circulator Junctions without the Use of External Matching Networks
- The Use of a Matched Symmetrical Five-Port Junction to Make Six-Port Measurements

## Riblet, H.J.

- An Expansion for the Fringing Capacitance (Short Paper)
- Contributors (Jul. 1981 [T-MTT])
- Two Limiting Values of the Capacitance of Symmetrical Rectangular Coaxial Strip Transmission Line (Jul. 1981 [T-MTT])
- Upper Limits on the Error of an Improved Approximation for the Characteristic Impedance of Rectangular Coaxial Line (Short Papers)

## Riddle, A.N.

- Odd Order Impedance Matching Networks for Low Cost Microwave Integrated Circuits

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author

- Analysis and Sensitivity Evaluation of 2p-Port Cascaded Networks (Jul. 1981 [T-MTT])
- Contributors (Jul. 1981 [T-MTT])
- Tolerance Analysis of Cascaded Structures (Short Papers)

**Rizzoli, V.**

- A Computer-Aided Approach to the Nonlinear Design of Microwave Transistor Oscillators
- A Resonance Method for the Broad-Band Characterization of General Two-Port Microstrip Discontinuities
- Bloch-Wave Analysis of Stripline- and Microstrip-Array Slow-Wave Structures
- Computer-Aided Design of Microwave Parametric Frequency Dividers
- Contributors (Feb. 1981 [T-MTT])
- Contributors (Jul. 1980 [T-MTT])
- Contributors (Jul. 1981 [T-MTT])

# Papers by Author

- The Design of Linearizing Networks for High-Power Varactor-Tuned Frequency Modulators

**Roberts, G.I.**

- A Zero-Bias GaAs Millimeter Wave Integrated Detector Circuit

**Robertson, R.S.**

- Coaxially Coupled Ridge Waveguide Tunable Oscillator

**Roeder, R.S.**

- High Sensitivity, Accurate MMW Radiometers for Ground-Mapping Systems

**Rogers, D.A.**

- A New Method of Pulse Dispersion Analysis for Simple-Mode Optical Fibers
- Analysis of Single and Coupled Striplines with Anisotropic Substrates

Contents
Authors

Click on title for a paper summary.

# Papers by Author

- Inhomogeneous Broadside-Coupled Striplines

**Rogers, D.S.**

- A Scanning Switch Matrix for a Cylindrical Array

**Rogers, R.G.**

- Transmission Line Identities for a Class of Interconnected Coupled-Line Sections with Application to Adjustable Microstrip and Stripline Tuners (Comment)

**Ronchi Abbozzo, L.**

- Contributors (Apr. 1981[T-MTT])
- Mode and Energy Guidance Properties of a Slab of Inhomogeneous Medium with Transverse Variations of the Gain Only

**Rose, R.W.**

- Contributors (Aug. 1981 [T-MTT])

# Papers by Author

- Modeling and Characterization of Microstrip-to-Coaxial Transitions

**Rosen, A.**

- The Development of High-Power, Low-Frequency PIN Diodes

**Rosenbaum, F.J.**

- A Large-Signal Model for the GaAs MESFET
- Contributors (Aug. 1981 [T-MTT])
- The Gap Diode: A New High Frequency Mixer and Detector

**Rosenberg, J.**

- A 26.5-40.0 GHz GaAs FET Amplifier

**Rosenheck, L.S.**

- K-Band Power GaAs FETs

Contents
Authors

Click on title for a paper summary.

# Papers by Author

## Rosowsky, D.

- 14 GHz Differential QPSK Demodulator for Regenerative Satellite Repeater

## Rotholz, E.

- Contributors (Apr. 1981[T-MTT])
- Transmission-Line Transformers

## Rowe, D.A.

- SAW Oscillator in UHF Transit Satellite Links (1981 [MWSYM])
- SAW Oscillators in UHF Transit Satellite Links (Dec. 1981 [T-MTT])

## Rozenfeld, P.

- Finite-Difference Method for the Arbitrary Cross-Section Waveguide Problem Using the Best-Fit Boundary Approximation

# Papers by Author

## Rozzi, T.E.

- Contributors (Aug. 1980 [T-MTT])
- Contributors (Feb. 1980 [T-MTT])
- Propagation in a Rectangular Waveguide Periodically Loaded with Resonant Irises (Aug. 1980 [T-MTT])
- Rigorous Analysis of the Step Discontinuity in a Planar Dielectric Waveguide (Correction)
- Variational Treatment of the Diffraction at the Facet of d.h. Lasers and of Dielectric Millimeter Wave Antennas

## Rubin, D.

- Hybrid Coupled Microstrip Reflection Amplifiers

## Rucker, C.T.

- Chip Level IMPATT Combining at 40 GHz (1981 [MWSYM])
- Chip Level IMPATT Combining at 40 GHz (Dec. 1981 [T-MTT])

MTT
IEEE
Contents
Authors

Click on title for a paper summary.

# Papers by Author




Contents

Authors


Click on title for a paper summary.

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author

- Eigenvalue Spectrum of Rectangular Waveguide with Two Symmetrically Placed Double Ridges

**Saito, T.**

- A 45 GHz GaAs FET MIC Oscillator-Doubler
- A 50 GHz MIC Transmitter/Receiver Using a Dielectric Resonator Oscillator

**Sakagami, I.**

- Contributors (Feb. 1981 [T-MTT])
- Digital Frequency Multipliers Using Multisection Two-Strip Coupled Line

**Sakane, T.**

- A 45 GHz GaAs FET MIC Oscillator-Doubler

# Papers by Author

## Sakayori, T.

- Internally Matched (IM) Plated Source Bridge (PSB) Power GaAs FET Achieving a High Performance Power Amplifier in X-Band

## Salama, A.E.

- An Interactive Optimal Postproduction Tuning Technique Utilizing Simulated Sensitivities and Response Measurements

## Saleh, A.A.M.

- Contributors (Apr. 1981[T-MTT])
- Contributors (Jul. 1980 [T-MTT])
- Contributors (Jun. 1980 [T-MTT])
- Contributors (Oct. 1980 [T-MTT])
- Improving the Graceful-Degradation Performance of Combined Power Amplifiers

Contents
Authors

Click on title for a paper summary.

# Papers by Author

- Planar Electrically Symmetric n-Way Hybrid Power Dividers/Combiners
- Planar Multiport Quadrature-Like Power Dividers/Combiners
- Theorems on Match and Isolation in Multiport Networks (Short Papers)
- Transmission-Line Identities for a Class of Interconnected Coupled-Line Sections with Application to Adjustable Microstrip and Stripline Tuners

**Salerno, M.**

- Synthesis of Low-Pass Elliptic Filters for MIC as a Class of Non-Commensurate Distributed Circuits

**Salles, A.A.**

- High Phase Accuracy Active Phased Array Module for Multi-Function Radars

**Sam, Y.W.**

- Tunable Magnetostatic Surface Wave Oscillator at 4 GHz

Contents
Authors

Click on title for a paper summary.

# Papers by Author

## Sanchez, A.

- Guidance and Leakage Properties of a Class of Open Dielectric Waveguides: Part II--New Physical Effects

## Sander, W.

- Contributors (May 1981 [T-MTT])
- Precision SAW Filters for a Large Phased-Array Radar System

## Sandler, B.H.

- Contributors (Jun. 1980 [T-MTT])
- Transponder Antennas in and Near a Three-Layered Body

## Sanyal, G.S.

- Contributors (Jun. 1980 [T-MTT])
- Transmission Matrix of a Linear Double Taper in Rectangular Waveguides

Contents
Authors

Click on title for a paper summary.

# Papers by Author

# Papers by Author

## Sato, R.

- Contributors (Aug. 1980 [T-MTT])
- Contributors (Aug. 1981 [T-MTT])
- Contributors (Feb. 1981 [T-MTT])
- Equivalent Circuits of Binomial Form Nonuniform Coupled Transmission Lines
- Equivalent Transformations for Mixed Lumped and Distributed Circuits
- Kuroda's Identity for Mixed Lumped and Distributed Circuits and Their Application to Nonuniform Transmission Lines
- Transmission Characteristics and a Design Method of Transmission-Line Low-Pass Filters with Multiple Pairs of Coincident Zeros and Multiple Pairs of Coincident Poles

## Sato, T.

- Miniaturized Microwave Filter Construction with Dielectric-Loaded Resonator and Space Coupling

Contents
Authors

Click on title for a paper summary.

# Papers by Author

## Saulich, G.

- A New Approach in the Computation of Ultrahigh Degree Equal-Ripple Polynomials for 90°-Coupler Synthesis
- A Simple Method for Spacing the Adjacent Passbands of a Coupled-Line Filter
- An Easy Tunable Stepped Coupled Lines Filter (Short Papers)
- Contributors (Apr. 1980 [T-MTT])
- Contributors (Feb. 1981 [T-MTT])

## Saviani, S.S.

- Processing System for Design and Analysis of Microwave-Integrated-Circuits Layouts

## Sawa, S.

- A Method for Diminishing Total Transmission Losses in Curved Dielectric Optical Waveguides

Contents
Authors

Click on title for a paper summary.

# Papers by Author

## Sawami, H.

- Analysis of Open-Type Dielectric Waveguides by the Finite-Element Iterative Method
- Contributors (Mar. 1981 [T-MTT])

## Sawano, H.

- A 10.5 GHz MIC Direction Sensitive Doppler Module Using a GaAs Fet and a Ag/Pd Thick Film
- A Highly Stabilized GaAs FET Oscillator Using a Dielectric Resonator Feedback Circuit in 9-14 GHz (Aug. 1980 [T-MTT])
- Contributors (Aug. 1980 [T-MTT])

## Scanlan, S.O.

- Contributors (Jan. 1981 [T-MTT])
- Contributors (Nov. 1980, Part I [T-MTT])
- Error Considerations in the Design of Microwave Transistor Amplifiers

# Papers by Author

- Matching Network Design Studies for Microwave Transistor Amplifiers
- Self-Consistent Solutions for IMPATT Diode Networks

**Scarman, R.E.**

- Millimeter-Wave Hybrid-Open Microstrip Techniques

**Schaefer, D.J.**

- A Swept-Frequency Magnitude Method for the Dielectric Characterization of Chemical and Biological Systems
- Contributors (Jul. 1980 [T-MTT])

**Schaffer, T.**

- A Zero-Bias GaAs Millimeter Wave Integrated Detector Circuit

**Scheitlin, D.**

- A Two-Tier Deembedding Technique for Packaged Transistors

Contents
Authors

Click on title for a paper summary.

# Papers by Author

## Schell, S.

- Low Loss 92-100 GHz Circulators

## Schellenberg, J.M.

- A 30 GHz FET Receiver
- A 69 GHz FET Oscillator

## Schilz, W.M.

- Contributors (Dec. 1980 [T-MTT])
- Contributors (Jul. 1981 [T-MTT])
- Density-Independent Moisture Metering in Fibrous Materials Using a Double-Cutoff Gunn Oscillator (Dec. 1980 [T-MTT])
- Feasibility Study of Density-Independent Moisture Measurement with Microwaves

## Schlossberg, H.

- A Quasi-Optical Single Sideband Filter Employing a Semiconfocal Resonator (Short Papers)

# Papers by Author

## Schmidt, L.-P.

- Contributors (Sep. 1980 [T-MTT])
- Spectral Domain Analysis of Dominant and Higher Order Modes in Fin-Lines (Sep. 1980 [T-MTT])

## Schmidt, L.P.

- Characteristics of Unilateral Fin-Line Structures with Arbitrarily Located Slots (Apr. 1981 [T-MTT])
- Contributors (Apr. 1981[T-MTT])

## Schneider, M.V.

- Contributors (Nov. 1980, Part I [T-MTT])
- Electrical Characteristics of Metal-Semiconductor Junctions

## Schneier, N.J.

- SAW Oscillator in UHF Transit Satellite Links (1981 [MWSYM])

Contents
Authors

Click on title for a paper summary.

# Papers by Author

- SAW Oscillators in UHF Transit Satellite Links (Dec. 1981 [T-MTT])

**Schoenwald, J.S.**

- SAW Oscillator in UHF Transit Satellite Links (1981 [MWSYM])
- SAW Oscillators in UHF Transit Satellite Links (Dec. 1981 [T-MTT])

**Schoti, F.W.**

- A Universal Overlay for Surface Impedance Calculations for Composite Conductors (Short Papers)

**Schroth, J.H.**

- Highly Reliable Low-Noise MM-Wave Mixers with Whisker-Contacted Honeycomb Diodes

**Schunemann, K.**

- A Quadriphase Fin-Line Modulator

Contents
Authors

# Papers by Author

- A Unified Analysis for Planar Transmission Lines
- Computer-Aided Design of Semiconductor Mounts in Fin-Line Technology
- Contributors (Jul. 1980 [T-MTT])
- New Structures for Impedance Transformation in Fin-Lines

**Schwarz, H.**

---

- A Microprocessor Controlled Phase Measurement System for 2856 MHz Pulses

**Scott, B.N.**

---

- Fabrication Techniques for X-Band Monolithic VCOs
- Monolithic Voltage Controlled Oscillator for X and Ku-Bands (1982 [MWSYM])

**Scott, J.R.**

---

- Contributors (Aug. 1981 [T-MTT])
- Modeling and Characterization of Microstrip-to-Coaxial Transitions

# Papers by Author




Contents

Authors


Click on title for a paper summary.

# Papers by Author




Contents

Authors


Click on title for a paper summary.

# Papers by Author




Contents

Authors


Click on title for a paper summary.

# Papers by Author

- Magnetic Waves Guided by a Linearly Tapered YIG Film
- Reflection by a Sinusoidally Modulated Surface Reactance at Oblique Incidence

**Seshadri, T.K.**

- Contributors (Apr. 1980 [T-MTT])
- Corner Function Analysis of Microstrip Transmission Lines

**Shaeffer, J.**

- Contributors (Mar. 1981 [T-MTT])
- Dual-Mode Microwave System to Enhance Early Detection of Cancer
- Thermal Drift in Microwave Thermography

**Shafai, L.**

- Coupling Between Two Collinear Parallel-Plate Waveguides of Unequal Widths (Short Papers)

Contents
Authors

Click on title for a paper summary.

# Papers by Author

# Papers by Author




Contents

Authors


Click on title for a paper summary.

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author

- Dominant and Second-Order Mode Cutoff Frequencies in Fin Lines Calculated with a Two-Dimensional TLM Program
- The Accuracy of TLM Analysis of Finned Rectangular Waveguides

**Shih, Y.C.**

- Computer-Aided Design of Millimeter-Wave E-Plane Filters (1982 [MWSYM])

**Shimada, S.**

- Optical Fiber Communication Systems in Japan

**Shinonaga, H.**

- Contributors (Jun. 1981, Part I [T-MTT])
- Y Dielectric Waveguide for Millimeter- and Submillimeter-Wave

**Shirahata, K.**

- A 30 GHz - 100 mW GaAs FET

Contents
Authors

# Papers by Author

- Recent Development on Fiber Optic Devices

**Shurtz, II, R.R.**

- A Laser-Induced Traveling-Wave Device for Generating Millimeter Waves

**Si-Fan, L.**

- CAD of Rectangular and Ridged Waveguide Bandpass Filters

**Siegel, P.H.**

- Computer Analysis of Microwave and Millimeter-Wave Mixers (Computer Program Descriptions)

**Silverstein, J.D.**

- Contributors (Sep. 1980 [T-MTT])
- Practical Considerations in the Design of a High-Power 1-mm Gyromonotron

MTT
IEEE
Contents
Authors

Click on title for a paper summary.

# Papers by Author

**Simoes, S.**

- A Dual Diode TM /sub 020/ Cavity for IMPATT Diode Power Combining

**Simons, R.**

- Suspended Slot Line Using Double Layer Dielectric (Short Papers)

**Simons, R.N.**

- Suspended Coupled Slotline Using Double Layer Dielectric (Short Papers)

**Simpson, G.R.**

- A Generalized n-Port Cascade Connection

**Singh, A.**

- Proposal for an Electrically Tunable Surface Plasmon Light Emitter (Letters)

# Papers by Author

**Sinha, S.K.**

- Contributors (Feb. 1980 [T-MTT])
- Coupled TEM Microstrip Impedance Transformer for S-Band TRAPATT Amplifiers

**Sisson, M.J.**

- Microstrip Devices for Millimetric Frequencies

**Siweris, H.J.**

- Slot-Line Parameters (Computer Program Description)

**Skatvold, Jr., A.R.**

- Beam Steering Antenna Control Technique

**Skudera, W.**

- A SAW Interferometer Direction - Finding and Frequency Identification Method

Contents
Authors

Click on title for a paper summary.

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author





Click on title for a paper summary.

# Papers by Author

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author

- Use of an SAW Multiplexer in FMCW Radar System

**Sollner, T.C.L.G.**

- Superconducting Tunnel Junctions as Mixers at 115 GHz

**Somekh, M.G.**

- Contributors (Feb. 1981 [T-MTT])
- Metallized Dielectric Horn and Waveguide Structures for Millimeter-Wave Oscillator/Mixer Systems

**Sommariva, A.M.**

- Stability Analysis of Injection-Locked Oscillators in Their Fundamental Mode of Operation

**Sone, J.**

- Contributors (Apr. 1981[T-MTT])
- K-Band High-Power GaAs FET Amplifiers

Contents
Authors

Click on title for a paper summary.

# Papers by Author

## Soohoo, J.

- A Laser-Induced Traveling-Wave Device for Generating Millimeter Waves

## Sorrentino, R.

- Contributors (Oct. 1980 [T-MTT])
- Method of Analysis of Planar Networks Including Radiation Loss
- Synthesis of Low-Pass Elliptic Filters for MIC as a Class of Non-Commensurate Distributed Circuits
- Wide-Band Equivalent Circuits of Microwave Planar Networks

## Souza, R.F.

- A New Method of Pulse Dispersion Analysis for Simple-Mode Optical Fibers

Contents
Authors

Click on title for a paper summary.

# Papers by Author




Contents

Authors


Click on title for a paper summary.

# Papers by Author

## Sreenivasiah, I.

- A Variational Expression for the Scattering Matrix of a Double-Step Discontinuity in a Coaxial Line and its Application to a TEM Cell
- Contributors (Jan. 1981 [T-MTT])

## Srivastava, N.C.

- Contributors (Aug. 1980 [T-MTT])
- Ray Optic Approach to Magnetostatic Bulk Wave Propagation in a YIG Film Delay Line

## St. Cyr, R.A.

- A Radar System Application of an 840-MHz SAW Resonator Stabilized Oscillator
- Contributors (May 1981 [T-MTT])

# Papers by Author





Click on title for a paper summary.

# Papers by Author

## Stern, G.J.

- Improved Technique for Evaluation of Slot Discontinuities in Rectangular Waveguide
- Small Active Phased Array Characteristics with GaAs IMPATT Amplifier Modules

## Sterzer, F.

- 27 MHz Waveguide Applicators for Localized Hyperthermia Treatment of Cancer
- A Self-Balancing Microwave Radiometer for Non-Invasively Measuring the Temperature of Subcutaneous Tissues During Localized Hyperthermia Treatments of Cancer

## Stewart, J.A.C.

- Contributors (Dec. 1980 [T-MTT])
- Use of Microstrip Impedance- Measurement Technique in the Design of a BARITT Diplex Doppler Sensor

Contents
Authors

Click on title for a paper summary.

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author




Contents

Authors


Click on title for a paper summary.

# Papers by Author

- Diathermy Applicators with Circular Aperture and Corrugated Flange (Short Paper)
- Microstrip Loop Radiators for Local Hyperthermia

**Stuchly, S.S.**

- A New Microstrip Radiator For Medical Applications
- A Resonator Method for Permittivity Measurements
- Analysis of a Microstrip Covered with a Lossy Dielectric
- Contributors (Dec. 1980 [T-MTT])
- Contributors (Feb. 1980 [T-MTT])
- Diathermy Applicators with Circular Aperture and Corrugated Flange (Short Paper)
- Microstrip Loop Radiators for Local Hyperthermia

**Subbarao, S.N.**

- Monolithic GaAs Interdigitated 90° Hybrids with 50- and 25-Ohm Impedances

Contents
Authors

Click on title for a paper summary.

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author

# Papers by Author

- Power Considerations on IMPATT-Diode Arrays with Incomplete Thermal Isolation

**Suzuki, M.**

- Analysis of the Dispersion Characteristic of Slot Line with Thick Metal Coating
- Contributors (Apr. 1980 [T-MTT])

**Suzuki, T.**

- Internally Matched (IM) Plated Source Bridge (PSB) Power GaAs FET Achieving a High Performance Power Amplifier in X-Band
- Plated Source Bridge (PSB) GaAs Power FET with Improved Reliability

**Swicord, M.L.**

- Energy Absorption from Small Radiating Coaxial Probes in Lossy Media

Contents
Authors

Click on title for a paper summary.

# Papers by Author

# Papers by Author

# Papers by Author

## Takase, M.

- 4-8 GHz High Power Cascadable Packaged GaAs FET Amplifier

## Takayama, Y.

- A 25-W 5-GHz GaAs FET Amplifier for a Microwave Landing System
- Contributors (Apr. 1981[T-MTT])
- Contributors (Jul. 1981 [T-MTT])
- Contributors (Jun. 1981, Part I [T-MTT])
- GaAs FET Ultrabroad-Band Amplifiers for Gbit/s Data Rate Systems
- K-Band High-Power GaAs FET Amplifiers

## Takeda, F.

- Waveguide Power Divider Using Metallic Septum with Resistive Coupling Slot

Contents
Authors

# Papers by Author

## Takiyama, K.

- Contributors (Jun. 1981, Part I [T-MTT])
- Submillimeter Guided-Wave Experiments with Dielectric Rib Waveguides

## Talisa, S.H.

- Fundamental Considerations in Millimeter and Near-Millimeter Component Design Employing Magnetoplasmons
- Performance Characteristics of Magnetoplasmon Based Submillimeter Wave Nonreciprocal Devices
- Performance Predictions for Isolators and Differential Phase Shifters for the Near-Millimeter Wave Range

## Tamir, T.

- Microwave Modeling of Optical Periodic Waveguides (Short Papers)

# Papers by Author

**Tanaka, S.**

- Contributors (Oct. 1980 [T-MTT])
- Resonant Modes of a Dielectric Rod Resonator Short-Circuited at Both Ends by Parallel Conducting Plates

**Tanaka, T.**

- Contributors (Mar. 1980 [T-MTT])
- Ridge-Shaped Narrow Wall Directional Coupler Using TE/sub 10/, TE/sub 20/, and TE/sub 30/ Modes

**Tanaka, Z.**

- Contributors (Jul. 1980 [T-MTT])
- Diplexer Operation of Stripline Y Circulators: Part 1--Basic Performance of Diplexer Operation

**Tang, W.C.**

- An 11 GHz Contiguous Band Output Multiplexing Network for INTELSAT VI Spacecraft

# Papers by Author




Contents

Authors


Click on title for a paper summary.

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author

## Thoren, G.R.

- A High Power W-Band (90-99 GHz) Solid State Transmitter for High Duty Cycles and Wide Bandwidth

## Thornton, M.J.

- Contiguous Broadband Matching of Multiple Resonant Loads

## Thrower, F.

- Millimeter-Wave Silicon IMPATT Sources and Combiners for the 110-260 GHz Range (1981 [MWSYM])

## Thrower, W.F.

- Millimeter-Wave Silicon IMPATT Sources and Combiners for the 110-260-GHz Range (Dec. 1981 [T-MTT])

## Tiwari, D.C.

- Proposal for an Electrically Tunable Surface Plasmon Light Emitter (Letters)

# Papers by Author




Contents

Authors


Click on title for a paper summary.

# Papers by Author

- Very Fast Signal Processors as a Result of the Coupling of Surface Acoustic Wave and Digital Technologies

**Toutain, S.**

- Contributors (Jul. 1981 [T-MTT])
- Resonant Frequencies of Rectangular Dielectric Resonators (Short Papers)
- Scattering of the TE/sub 01/ and TM/sub 01/ Modes on Transverse Discontinuities in a Rod Dielectric Waveguide -- Application to the Dielectric Resonators

**Toyoda, S.**

- Contributors (Apr. 1981[T-MTT])
- Variable Bandpass Filters Using Varactor Diodes
- Variable Coupling Directional Couplers Using Varactor Diodes

**Tranquilla, J.M.**

- Contributors (Jul. 1980 [T-MTT])

# Papers by Author

- On the Propagation of Leaky Waves in a Longitudinally Slotted Rectangular Waveguide

**Trew, R.J.**

- Odd Order Impedance Matching Networks for Low Cost Microwave Integrated Circuits

**Triner, J.F.**

- Experimental Thin-Film, Etched-Circuit Rectenna

**Trinh, T.**

- Coupling Characteristics of Planar Dielectric Waveguides of Rectangular Cross Section

**Trinh, T.N.**

- Field Profile in a Single-Mode Curved Dielectric Waveguide
- Field Profile in a Single-Mode Curved Dielectric Waveguide of Rectangular Cross Section
- Horn Image Guide Leaky-Wave Antenna (1981 [MWSYM])

Contents
Authors

Click on title for a paper summary.

# Papers by Author

- Horn Image-Guide Leaky-Wave Antenna (Dec. 1981 [T-MTT])

**Tripathi, V.K.**

---

- Contributors (Jan. 1981 [T-MTT])
- The Scattering Parameters and Directional Coupler Analysis of Characteristically Terminated Three-Line Structures in an Inhomogeneous Medium

**Tsai, M.-C.**

---

- Contributors (Feb. 1981 [T-MTT])
- Magnetic Waves Guided by a Linearly Tapered YIG Film

**Tsai, T.L.**

---

- A 20-Watt C-Band BPSK Modulated FET Transmitter for Microwave Landing System

Contents
Authors

Click on title for a paper summary.

# Papers by Author

## Tsai, W.C.

- A 1.75 - 6 GHz Miniaturized GaAs FET Amplifier Using Quasi-Lumped Element Impedance Matching Networks
- A 20-Watt C-Band BPSK Modulated FET Transmitter for Microwave Landing System

## Tserng, H.Q.

- 2-18 GHz, High-Efficiency, Medium-Power GaAs FET Amplifiers
- S-Band GaAs Power FET

## Tsironis, C.

- BR FET: A Band Rejection FET for Amplifier and Mixer Applications
- Monolithic Circuits for 12 GHz Direct Broadcasting Satellite Reception

MTT
IEEE
Contents
Authors

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author

## Tsutsumi, M.

- A New Technique for Magnetostatic Wave Delay Lines
- Behavior of Bleustein-Gulyaev Waves in a Periodically Corrugated Piezoelectric Crystal
- Contributors (Jun. 1980 [T-MTT])
- Contributors (Jun. 1981, Part I [T-MTT])
- First-Order Bragg Interactions in a Gyromagnetic-Dielectric Waveguide (Short Papers)

## Tucker, R.S.

- Contributors (Aug. 1981 [T-MTT])
- Microwave Circuit Models of Semiconductor Injection Lasers (1982 [MWSYM])
- RF Characterization of Microwave Power FET's

## Turner, J.A.

- A Comparison Between Actively and Passively Matched S-Band GaAs Monolithic FET Amplifiers

# Papers by Author

**Turski, Z.**

- Simultaneous Pulse Separator

**Uberall, H.**

- Surface Waves and Their Relation to the Eigenfrequencies of a Circular-Cylindrical Cavity

**Uchida, N.**

- Contributors (Jun. 1980 [T-MTT])
- Transmission Characteristic Measurement of Two-Mode Optical Fiber with a Nearly Optimum Index-Profile

**Uemura, Y.**

- Contributors (May 1981 [T-MTT])
- SAW Vestigial Sideband Filter for TV Broadcasting Transmitter

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author

- Coupled Microstrip Disk Resonators

**Vaitkus, R.**

- A Two-Tier Deembedding Technique for Packaged Transistors

**Vale, C.R.**

- Contributors (May 1981 [T-MTT])
- SAW Quadraphase Code Generator

**Valier, G.**

- Contributors (Aug. 1981 [T-MTT])
- Gyrotron-TWT Operating Characteristics

**Van Bladel, J.**

- Contributors (Apr. 1981[T-MTT])
- Dielectric Resonator in a Waveguide Below Cutoff

# Papers by Author





Click on title for a paper summary.

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author

- A Multi-Chip GaAs Monolithic Transmit/Receive Module for X-Band

**Vowinkel, B.**

- Airborne Imaging System Using a Cryogenic 90-GHz Receiver
- Contributors (Jun. 1981, Part I [T-MTT])

**Vyse, B.**

- The Stability of Magnetrons Under Short Pulse Conditions (Short Papers)

**Wagner, L.**

- A Dual Diode TM /sub 020/ Cavity for IMPATT Diode Power Combining
- Pulsed Characterization of X-Band GaAs DDR IMPATT Diodes

Contents
Authors

Click on title for a paper summary.

# Papers by Author




Contents

Authors


Click on title for a paper summary.

# Papers by Author





Click on title for a paper summary.

# Papers by Author

- Internally Matched (IM) Plated Source Bridge (PSB) Power GaAs FET Achieving a High Performance Power Amplifier in X-Band
- Plated Source Bridge (PSB) GaAs Power FET with Improved Reliability

**Waterman, R.**

- A Multi-Chip GaAs Monolithic Transmit/Receive Module for X-Band

**Watkins, E.**

- A 30 GHz FET Receiver

**Weglein, R.D.**

- A W-Band, Coherent, Pulse-Compression Radar Transceiver Using Linear Frequency Modulation

**Weil, C.M.**

- A Swept-Frequency Magnitude Method for the Dielectric Characterization of Chemical and Biological Systems

Contents
Authors

Click on title for a paper summary.

# Papers by Author

- Contributors (Jul. 1980 [T-MTT])

**Weiner, D.**

- The Image Rejection Harmonic Mixer

**Weinreb, S.**

- Contributors (Oct. 1980 [T-MTT])
- Low-Noise Cooled GASFET Amplifiers
- Low-Noise Technology, 1982 State-of-the-Art

**Weiss, J.A.**

- A Ferrimagnetic Resonance Thermometer for Microwave Power Environment

**Welch, B.M.**

- Contributors (May 1980 [T-MTT])
- MSI High-Speed Low-Power GaAs Integrated Circuits Using Schottky Diode FET Logic (May 1980 [T-MTT])

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author

## Whalen, J.J.

- X-Band Burnout Characteristics of GaAs MESFETs (1982 [MWSYM])

## Wheeler, H.A.

- Contributors (Feb. 1980 [T-MTT])
- The Thermal Dielectric Quotient for Characterizing Dielectric Heat Conductors (Short Papers)
- Transmission-Line Conductors of Various Cross Sections

## Whicker, L.R.

- The 1980 MTT-S International Microwave Symposium (Dec. 1980 [T-MTT])

## Whinnery, J.R.

- A Multilayer Fiber Guide with Rectangular Core
- Contributors (Apr. 1980 [T-MTT])

Contents
Authors

# Papers by Author



Click on title for a paper summary.

# Papers by Author

## Willing, H.A.

- Contributors (Oct. 1980 [T-MTT])
- Design of Broad-Band GaAs FET Power Amplifiers
- Experimental Assessment of Bilateral Fin-Line Impedance for Device Matching

## Wilser, W.T.

- A 2-12 GHz Feedback Amplifier on GaAs
- Application of the Two-Way Balanced Amplifier Concept to Wide-Band Power Amplification Using GaAs MESFET's
- Contributors (Apr. 1980 [T-MTT])
- Contributors (Mar. 1980 [T-MTT])
- The Matched Feedback Amplifier: Ultrawide-Band Microwave Amplification with GaAs MESFET's

## Wilson, W.J.

- Contributors (Aug. 1981 [T-MTT])

Contents
Authors

# Papers by Author

- Contributors (Mar. 1980 [T-MTT])
- Cryogenic Parametric Amplifier Noise Performance at 4.2 K
- Super-Schottky Mixer Performance at 92 GHz

**Wilt, R.E.**

- High Sensitivity, Accurate MMW Radiometers for Ground-Mapping Systems

**Winkler, C.**

- Contributors (Jul. 1980 [T-MTT])
- Generalized Fresnel Power Transmission Coefficients for Curved Graded-Index Media

**Wirth, W.-D.**

- Contributors (May 1981 [T-MTT])
- Precision SAW Filters for a Large Phased-Array Radar System

Contents
Authors

Click on title for a paper summary.

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author




Contents

Authors

Click on title for a paper summary.

# Papers by Author




MTT

IEEE

Contents

Authors


Click on title for a paper summary.

# Papers by Author

- Anomalous Low-Loss Transmission in a Gas-Confined Dielectric Waveguide for Millimeter and Submillimeter Wavelengths (Short Papers)
- Contributors (Jun. 1980 [T-MTT])

**Yamamoto, S.**

- Polarization-Rotated Radiation Conversion in Electrooptic Waveguides

**Yamamoto, T.**

- Graph Design of p-i-n Diode Phase Shifters (Short Papers)

**Yamamura, S.**

- 4-8 GHz High Power Cascadable Packaged GaAs FET Amplifier

**Yamasaki, H.**

- A 30 GHz FET Receiver
- A 69 GHz FET Oscillator

Contents
Authors

Click on title for a paper summary.

# Papers by Author

## Yamashita, E.

- Composite Dielectric Waveguides
- Composite Dielectric Waveguides with Two Elliptic-Cylinder Boundaries (Short Papers)
- Contributors (Sep. 1980 [T-MTT])
- Microstrip Dispersion in a Wide-Frequency Range (Short Papers)

## Yamashita, S.

- Bandpass Filters Using Parallel Coupled Stripline Stepped Impedance Resonators
- Contributors (Dec. 1980 [T-MTT])

## Yang, D.C.

- Large-Signal Characterization of Two-Port Nonlinear Active Networks

# Papers by Author




MTT

IEEE

Contents

Authors

Click on title for a paper summary.

# Papers by Author

## Yen, H.-C.

- A 63-W W-Band Injection-Locked Pulsed Solid-State Transmitter (Dec. 1981 [T-MTT])

## Yen, H.C.

- A 63 W W-Band Injection-Locked Pulsed Solid State Transmitter (1981 [MWSYM])

## Yen, P.

- 140 GHz Quasi-Optical Planar Mixers
- 94 GHz Subharmonic Mixer Using Beam Lead Diodes
- Beam Lead Dielectric Crossbar Mixers from 60 to 140 GHz
- Millimeter-Wave Planar Slot Antennas with Dielectric Feeds
- Subharmonic Mixer Using Planar Doped Barrier Diodes

## Yen, P.C.H.

- Millimeter-Wave Passive Components and Six-Port Network Analyzer in Dielectric Waveguide

# Papers by Author

## Yen, Y.H.

- Probing Amplitude, Phase, and Polarization of Microwave Field Distributions in Real Time

## Yi-Yuan, C.

- CAD of Rectangular and Ridged Waveguide Bandpass Filters

## Yip, G.L.

- Contributors (Jan. 1980 [T-MTT])
- Scattering from an Arbitrarily Located Off-Axis Inhomogeneity in a Step-Index Optical Fiber (Jan. 1980 [T-MTT])

## Ynoue, E.I.

- The Development of Microwave Components for Earth Station Receiver

# Papers by Author

## Yoder, M.

- Technical Program, Overview (1982 [MCS])

## Yokoyama, N.

- Contributors (May 1980 [T-MTT])
- GaAs MOSFET High-Speed Logic

## Yoneyama, T.

- Bends in Nonradiative Dielectric Waveguides (1982 [MWSYM])
- Nonradiative Dielectric Waveguide for Millimeter-Wave Integrated Circuits

## Yorinks, L.H.

- Rectangular, Coaxial-Line, Split-Tee Power Dividers

## Yoshikawa, S.

- Contributors (Aug. 1980 [T-MTT])

# Papers by Author

- SAW Bandpass Filter Design for 1.6-GHz PCM Timing Tank Applications

**Young, G.P.**

- Contributors (Nov. 1980, Part I [T-MTT])
- Error Considerations in the Design of Microwave Transistor Amplifiers
- Matching Network Design Studies for Microwave Transistor Amplifiers

**Young, L.**

- Microwaves - The Years to Come

**Youngxi, S.**

- V-Band InP Gunn Diode

**Yuan, L.**

- 140 GHz Quasi-Optical Planar Mixers
- Beam Lead Dielectric Crossbar Mixers from 60 to 140 GHz

Contents
Authors

Click on title for a paper summary.

# Papers by Author

**Yuan, S.**

- A 1 Watt GaAs Power Amplifier for the NASA 30/20 GHz Communication System

**Yukang, Y.**

- Monolithic Microwave Integrated GaAs FET Oscillators

**Yuki, S.**

- Advanced RF Circuit Miniaturization for 800 MHz Land Mobile Radio Unit

**Zaki, K.A.**

- An Optimization Technique for Lumped - Distributed Two Ports

**Zhenqi, H.**

- V-Band GaAs Gunn Diode

Contents
Authors

Click on title for a paper summary.

# Papers by Author

## Zhou, S.-T.

- A Generalized Two-Dimensional Coupled-Mode Analysis of Curved and Chirped Periodic Structures in Open Dielectric Waveguides (1981 [MWSYM])
- A Generalized Two-Dimensional Coupled-Mode Analysis of Curved and Chirped Periodic Structures in Open Dielectric Waveguides (Sep. 1981 [T-MTT])

## Zhou, W.B.

- Analysis of Trapped Image Guides Using Effective Dielectric Constants and Surface Impedances

## Zucca, R.

- Contributors (May 1980 [T-MTT])
- MSI High-Speed Low-Power GaAs Integrated Circuits Using Schottky Diode FET Logic (May 1980 [T-MTT])

Contents
Authors

Click on title for a paper summary.

# Papers by Author

## Zywietz, F.

- Dynamic 'In Vivo' Performance of Temperature Controlled Local Microwave Hyperthermia at 2.45 GHz

Contents
Authors

Click on title for a paper summary.

# Abstracts

## Front Cover (Jan. 1980 [T-MTT])

*"Front Cover (Jan. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.1 (Jan. 1980 [T-MTT]): f1-f2.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Intermodulation Distortion Analysis of MESFET Amplifiers Using the Volterra Series Representation

*R.A. Minasian. "Intermodulation Distortion Analysis of MESFET Amplifiers Using the Volterra Series Representation." 1980 Transactions on Microwave Theory and Techniques 28.1 (Jan. 1980 [T-MTT]): 1-8.*

Third-order intermodulation distortion generated in a MESFET amplifer is analyzed by means of the Volterra series representation. A transistor model is used which enables direct analytical determination of the nonlinear elements from small-signal measurements. The four nonlinearities considered are the gate capacitance, transconductance, drain feedback capacitance, and output conductance. Volterra transfer functions are derived for a simplified model and closed-form expressions for the third-order intermodulation ratio and intercept point are determined. The equations show the dependence of distortion on frequency, terminating impedances, and transistor parameters. Principal sources of distortion are identified and the influence of device parameters and network terminations is investigated. Experimental verification on specific MESFET amplifiers, with 2-µm and 1-µm gate devices, comparing predicted and measured intermodulation products for various load conditions is presented.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Analysis and Improvement of Intermodulation Distortion in GaAs Power FET's

*J.A. Higgins and R.L. Kuvas. "Analysis and Improvement of Intermodulation Distortion in GaAs Power FET's." 1980 Transactions on Microwave Theory and Techniques 28.1 (Jan. 1980 [T-MTT]): 9-17.*

Tailoring of the doping profile is a powerful tool in reducing the intermodulation distortion (IMD) in GaAs power FET's. Reproducible and uniform preparation of the required profiles is a difficult task for epitaxial techniques. This shortcoming has motivated the present investigation of fabricating highly linear power FET's by ion implantation. An analytical device model was developed for exploring the relationship between the active layer profile and the IMD. These calculations revealed a complex behavior in the variation of the distortion levels due to partial correlation between the contributions arising from nonlinear transconductance and output conductance. The device model was used to identify implant doses and energies for approaching an optimum active layer profile. Based on the results, a deep Se implant followed by a shallow compensating Be implant to reduce the doping level close to the surface was used in the device fabrication. The IMD of the transistors was measured by the two-tone method. Conventional epitaxial FET's with a flat doping profile were evaluated for comparison purposes. This comparison demonstrated that a 4-dB increase in the intercept point for the third-order intermodulation product can be realized by using the tailored implanted profile. The experiments demonstrated that the tuning conditions for maximum output power and minimum IMD are virtually identical for the implanted transistors, in contrast to the behavior of conventional devices with flat doping profiles. These performance advantages, coupled with the high levels of uniformity and reproducibility of doping parameters, show ion implantation to be a powerful technique in the fabrication of highly linear power FET's.

# Abstracts

## On the Theory of Corrugated Optical Disk Waveguides

*S.R. Kerner, N.G. Alexopoulos and R.F. Cordero-Iannarella. "On the Theory of Corrugated Optical Disk Waveguides." 1980 Transactions on Microwave Theory and Techniques 28.1 (Jan. 1980 [T-MTT]): 18-24.*

The corrugated disk dielectric waveguide is investigated by considering a linear combination of orthogonal wavefunctions of the uncorrugated device. It is shown that, just as in the case of corrugated planar slab waveguides, codirectional as well as contradirectional coupling of guided modes is possible. Some potential applications of the device are discussed and device parameters are investigated for specific waveguide materials.

# Abstracts

## Scattering from an Arbitrarily Located Off-Axis Inhomogeneity in a Step-Index Optical Fiber (Jan. 1980 [T-MTT])

*A. Safaai-Jazi and G.L. Yip. "Scattering from an Arbitrarily Located Off-Axis Inhomogeneity in a Step-Index Optical Fiber (Jan. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.1 (Jan. 1980 [T-MTT]): 24-32.*

An exact analysis using the Green's function formulation of an arbitrarily oriented off-axis dipole radiating into a dielectric rod waveguide is carried out. The method of analysis involves expressing the fields and the current source in a Fourier integral in the zeta-direction and a Fourier series in the phi-direction in a cylindrical coordinate system (rho, phi, zeta). The practical significance of this analysis, in particular with regard to its applications to the problem of scattering from an arbitrarily located inhomogeneity in a step-index optical fiber, is presented.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## On the Accuracy of Scalar Approximation Technique in Optical Fiber Analysis

*K. Morishita, Y. Kondoh and N. Kumagai. "On the Accuracy of Scalar Approximation Technique in Optical Fiber Analysis." 1980 Transactions on Microwave Theory and Techniques 28.1 (Jan. 1980 [T-MTT]): 33-36.*

The accuracy of the scalar approximation technique in optical fiber analysis is investigated in detail. The scalar approximate solutions are compared numberically with the vector (rigorous) solutions for various linear refractive-index distributions, and several interesting features which are of practical importance are pointed out.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Analysis of Open Dielectric Waveguides Using Mode-Matching Technique and Variational Methods (Jan. 1980 [T-MTT])

*R. Mittra, Y.-L. Hou and V. Jamnejad. "Analysis of Open Dielectric Waveguides Using Mode-Matching Technique and Variational Methods (Jan. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.1 (Jan. 1980 [T-MTT]): 36-43.*

The mode-matching technique is employed for computing the propagation constants and field distributions of an inverted strip dielectric waveguide. The results derived in this manner are further improved by using variational formulas expressly designed for open dielectric waveguides. Illustrative numerical results are presented and compared with an experimental measurement as well as those based on approximate methods found in the literature.

# Abstracts

## Propagation in Twisted Square Waveguide

*L. Lewin and T. Ruehle. "Propagation in Twisted Square Waveguide." 1980 Transactions on Microwave Theory and Techniques 28.1 (Jan. 1980 [T-MTT]): 44-48.*

The problem of propagation of TE modes in twisted rectangular waveguides has been solved except for the case where one of the propagating modes becomes degenerate. The purpose of this paper is to show how to obtain a solution for degenerate modes in a twisted rectangular waveguide, with emphasis on the particular case of the square waveguide, for which the lowest order mode is degerate. It is shown that the propagation constant for the twisted square waveguide can be expressed as an asymptotic series, the first term being the propagation constant for a straight square waveguide and the first order correction term being of order 1/ L where L is the distance in which the guide makes one full rotation. The propagation constant for a nondegenerate mode in a twisted rectangular waveguide, on the other hand, can be expressed in a similar manner except that the first-order correction term is of order 1/ L/sup2/. Some comments are offered on the nature of the transition when the propagating mode is almost degenerate.

# Abstracts

## Dispersion Relations for Comb-Type Slow-Wave Structures

*I.L. Verbitskii. "Dispersion Relations for Comb-Type Slow-Wave Structures." 1980 Transactions on Microwave Theory and Techniques 28.1 (Jan. 1980 [T-MTT]): 48-50.*

Asymptotically accurate dispersion relations for slow eigenwaves of a dense comb placed on the wall of a parallel-plate waveguide are given in closed form. The equations can be easily resolved numerically. An analysis of dispersion relations for combs, based on the above-mentioned equations, has advantages over commonly used methods because of the simplicity of the necessary calculations and clarity of results.

# Abstracts

## DC- and Microwave-Biased Extrinsic GaAs Photoconductors

*J.N. Crouch, Jr.. "DC- and Microwave-Biased Extrinsic GaAs Photoconductors." 1980 Transactions on Microwave Theory and Techniques 28.1 (Jan. 1980 [T-MTT]): 51-54.*

The theoretical performance of dc- and microwave-biased extrinsic GaAs photoconductors is presented. The variables are the electrical bandwidth (1 kHz to 10 MHz) and the background photon irradiance (10/sup 8/ to 10/sup16/ ph/s·cm²). Experimental results taken from the literature are compared to the theoretical values. It is concluded that the theoretical performance of a microwave-biased extrinsic GaAs photoconductor exceeds that of its dc-biased counterpart, particularly at wide electrical bandwidths and/or low backgrounds.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Analysis of an End Launcher for a Circular Cylindrical Waveguide (Correction)

*M.D. Deshpande and B.N. Das. "Analysis of an End Launcher for a Circular Cylindrical Waveguide (Correction)." 1980 Transactions on Microwave Theory and Techniques 28.1 (Jan. 1980 [T-MTT]): 55-55.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Contributors (Jan. 1980 [T-MTT])

*N.G. Alexopoulos, R.F. Cordero-Iannarella, J.N. Crouch, Jr., J.A. Higgins, Y.-L. Hou, V. Jamnejad, S.R. Kerner, Y. Kondoh, N. Kumagai, R.L. Kuvas, L. Lewin, R.A. Minasian, R. Mittra, K. Morishita, T. Ruehle, A. Safaai-Jazi, I.L. Verbitskii and G.L. Yip. "Contributors (Jan. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.1 (Jan. 1980 [T-MTT]): 56-58.*

# Abstracts

## IEEE Copyright Form (Jan. 1980 [T-MTT])

*"IEEE Copyright Form (Jan. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.1 (Jan. 1980 [T-MTT]): 59-60.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Back Cover (Jan. 1980 [T-MTT])

*"Back Cover (Jan. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.1 (Jan. 1980 [T-MTT]): b1-b2.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Front Cover (Feb. 1980 [T-MTT])

*"Front Cover (Feb. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.2 (Feb. 1980 [T-MTT]): f1-f2.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Variational Treatment of the Diffraction at the Facet of d.h. Lasers and of Dielectric Millimeter Wave Antennas

*T.E. Rozzi and G.H. in't Veld. "Variational Treatment of the Diffraction at the Facet of d.h. Lasers and of Dielectric Millimeter Wave Antennas." 1980 Transactions on Microwave Theory and Techniques 28.2 (Feb. 1980 [T-MTT]): 61-73.*

This paper presents an accurate variational treatment of the diffraction of TE and TM waves by an abrupt transverse discontinuity in a dielectric waveguide, such as the mirror of a double heterostructure (d.h.) injection laser, or the end plane of a dielectric slab antenna for millimeter waves, under the assumption of small aspect ratio. A matrix representation of the Green's function is derived analytically, in the limit of small efective frequency, for the TE case. For the TM case, the complication introduced by the discontinuity of the transverse electric field across the dielectric interface is discussed in detail. The numerical examples refer to the d.h. laser configuration. Both transverse directions (perpendicular as well as parallel) to the junction are studied. The effect of mode coupling at the mirror of a LOC laser as well as the effect of an antireflection coating are investigated.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Transmission-Line Conductors of Various Cross Sections

*H.A. Wheeler. "Transmission-Line Conductors of Various Cross Sections." 1980 Transactions on Microwave Theory and Techniques 28.2 (Feb. 1980 [T-MTT]): 73-83.*

The inner or outer conductor of an RF transmission line may have a noncircular shape of cross section, in which case it can be ascribed an effective radius which is valid if the two conductors are sufficiently separated (as by the ratio of radii). Moreover, there are some combinations of inner and outer conductors whose wave resistance can be evaluated exactly. These can be used to test the approximation of the effective radii. There are some unique shapes of combinations which have binary submultiples of 377 ohms wave resistance because the field pattern of each can be mapped on a set of squares. A variety of cross sections are described and evaluated, with due reference to their sources. They are related by conformal transformations, which are indicated but not derived. One example is an inner conductor whose cross section is a rectangle with rounded edges. One family is based on the crescent or biangle formed of two circular arcs between two angles.

# Abstracts

## Propagation Along a Coaxial Cable with a Helical Shield

*D.A. Hill and J.R. Wait. "Propagation Along a Coaxial Cable with a Helical Shield." 1980 Transactions on Microwave Theory and Techniques 28.2 (Feb. 1980 [T-MTT]): 84-89.*

A leaky coaxial cable is modelled by a dielectric coated conductor shielded by a finite number of unidirectional helical wires. A modal equation is derived and solved numerically for the propagation constants of both the monofilar and bifilar modes. Numerical results are also presented for the effective surface transfer impedance of the shield. This parameter is found to depend, in general, on the propagation constant.

# Abstracts

## Microstrip Transmission Line with Finite-Width Dielectric

*C.E. Smith and R.-S. Chang. "Microstrip Transmission Line with Finite-Width Dielectric." 1980 Transactions on Microwave Theory and Techniques 28.2 (Feb. 1980 [T-MTT]): 90-94.*

The results of a numerical solution for open microstrip transmission line with finite-width dielectric are presented for a quasi-TEM computational model. The related solution is based on moment methods using equivalent source models for the free and bound charges existing on boundary surfaces. Characteristic impedance and velocity of propagation are presented in graphical form for estimating the effects of dieletric truncation on microstrip circuits and for related circuit design.

# Abstracts

## Coupled Microstrip Disk Resonators

*N.K. Uzunoglu and P. Katechi. "Coupled Microstrip Disk Resonators." 1980 Transactions on Microwave Theory and Techniques 28.2 (Feb. 1980 [T-MTT]): 94-97.*

The coupling between microstrip disk resonators is investigated analytically and experimentally. The interaction between the printed disks is modeled by a gap capacitance, which is computed by solving the corresponding electrostatic problem. An integral equation is used to determine the nonsymmetric charge distribution on the disk resonators. Numerical results are presented for several cases. For a specific case the prediction of the theory is compared with the experiment.

# Abstracts

## Effects of Fringing Fields on the Capacitance of Circular Microstrip Disk

*W.C. Chew and J.A. Kong. "Effects of Fringing Fields on the Capacitance of Circular Microstrip Disk." 1980 Transactions on Microwave Theory and Techniques 28.2 (Feb. 1980 [T-MTT]): 98-104.*

The effects of fringing fields on the capacitance of a circular microstrip disk are studied with the dual integral equation formalism for practical microstrip circuits when the substrate thickness is small. Approximations as well as exact numerical evaluations are made in the calculation of the capacitance. With a seminumerical approach, an approximate formula for the capacitance is obtained and shown to yield accurate results with the simple use of a calculator. Asymptotic lower bound and exact numerical computations are also carried out. The various techniques are illustrated and compared with numerical results.

# Abstracts

## Analysis of a Microstrip Covered with a Lossy Dielectric

*I.J. Bahl and S.S. Stuchly. "Analysis of a Microstrip Covered with a Lossy Dielectric." 1980 Transactions on Microwave Theory and Techniques 28.2 (Feb. 1980 [T-MTT]): 104-109.*

The analysis of a microstrip line covered with a low-loss sheet material is presented in this paper. Numerical results show that the characteristics of a microstrip covered with a thick sheet of high dielectric constant are drastically affected. The effect is more for small values of W/h ratio. A closed-form expression for the dielectric loss of a multilayer structure is derived.The extension of present method to high-loss materials is also discussed. Numerical and experimental results for effective dielectric constant of a microstrip covered with low- and high-loss sheet materials are compared and found to be in good agreement.

# Abstracts

## Varactor Properties for Wide-Band Linear-Tuning Microwave VCO's

*D.F. Peterson. "Varactor Properties for Wide-Band Linear-Tuning Microwave VCO's." 1980 Transactions on Microwave Theory and Techniques 28.2 (Feb. 1980 [T-MTT]): 110-119.*

Varactor properties and a particular hyperabrupt doping profile are identified which can provide wide-band tuning linearity for an important class of microwave oscillators. The results are most appropiate for series-tuned oscillators realized with simple configurations of BJT's or FET's in chip, integrated, or monolithic form with low parasitics. The derivation for the doping profile is presented and includes the effects of large signals in modifying the effective varactor capacitance. In addition, breakdown conditions and the level and variation in series resistance are included. When the results are applied to BJT and FET oscillator circuits with measured large-signal properties, the profiles obtained predict excelent linearity for the FET over a 7-12-GHz frecuency range and fair linearity for the BJT circuit from 2 to 4 GHz. The profiles are reasonable and should be realizable with existing varactor fabrication technology.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Coupled TEM Microstrip Impedance Transformer for S-Band TRAPATT Amplifiers

*S.K. Sinha and K.P. Weller. "Coupled TEM Microstrip Impedance Transformer for S-Band TRAPATT Amplifiers." 1980 Transactions on Microwave Theory and Techniques 28.2 (Feb. 1980 [T-MTT]): 119-125.*

A coupled TEM microstrip line circuit suitable for use in S-band TRAPATT amplifiers has been investigated. An analytical model of the coupled-line structure has been developed which properly accounts for diode positioning on the line. This model has been used to calculate the fundamental and harmonic impedances at the device terminals for various stub terminations and device locations. Measurements made with a Hewlett-Packard network analyzer are in good agreement with the calculated results. The use of this circuit for the development of a fixed-tuned MIC circuit for the TRAPATT amplifier on Duroid Substrate is discussed. The complete circuit incorporates a bias line filter with this coupled microstrip line and appropiate harmonic tuning stubs at two of its ports. It is capable of providing at least 6-percent 1-dB bandwith with high efficiency and high peak power output over pulsewidths up to 50 µs and up to 1-percent duty cycle.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Techniques for Broad-Banding Above Resonance Circulator Junctions without the Use of External Matching Networks

*G.P. Riblet. "Techniques for Broad-Banding Above Resonance Circulator Junctions without the Use of External Matching Networks." 1980 Transactions on Microwave Theory and Techniques 28.2 (Feb. 1980 [T-MTT]): 125-129.*

By using a modification of Bosma's approach, a theoretical explanation is given for the broad-banding effect wich can be achieved by the use of three open-circuited stubs on the center conductor circumference of above resonance circulators. It is also shown that similar broad-banding can be achieved by the use of materials with very large values of 4piM/sub s/ in the above resonance state. It appears that the frequency dependence of the conductance G(omega) is a limiting factor in the bandwidth improvements that can be obtained in these ways.

# Abstracts

## A Broad-Band Model for a Coaxial-to-Stripline Transition

*A.G. Chapman and C.S. Aitchison. "A Broad-Band Model for a Coaxial-to-Stripline Transition." 1980 Transactions on Microwave Theory and Techniques 28.2 (Feb. 1980 [T-MTT]): 130-135.*

This paper investigates a significant source of error encountered when characterizing a circuit element embedded in a stripline circuit at microwave frequencies. The errors introduced by the coaxial-to-stripline transition are examined and a frequency-independent model is developed for the transition over the band 2-12 GHz. The usefulness of the model is demonstrated experimentally by measuring a known load consisting of a short length of high-impedance line terminated in a short circuit.

# Abstracts

## Scattering and Mode Conversion of Guided Modes by a Spherical Object in an Optical Fiber

*N. Morita and N. Kumagai. "Scattering and Mode Conversion of Guided Modes by a Spherical Object in an Optical Fiber." 1980 Transactions on Microwave Theory and Techniques 28.2 (Feb. 1980 [T-MTT]): 137-141.*

The scattering and the mode conversion of the guided modes due to a spherical object in a step-index optical fiber is analyzed theoretically. The incident fiber mode is expanded in terms of the spherical vector wave functions, and the scattered fields are obtained by applying the boundary conditions on the surface of the object with the aid of these expansions. The expression for the total scattered power and the mode conversion coefficients are given. As an example, the scattering and mode conversion caused by a spherical air bubble are evaluated numerically.

# Abstracts

## A Theoretical Basis for Microwave and RF Field Effects on Excitable Cellular Membranes

*C.A. Cain. "A Theoretical Basis for Microwave and RF Field Effects on Excitable Cellular Membranes." 1980 Transactions on Microwave Theory and Techniques 28.2 (Feb. 1980 [T-MTT]): 142-147.*

A model of a mechanism for nonthermal interaction of RF or microwave fields with excitable cellular membranes is presented. It may be possible for an oscillating component of membrane potential to change the conductance of the membrane to all ion species which transverse voltage-dependent membrane channels. Some specific effects on squid giant axon predicted by the model are discussed.

# Abstracts

## Easy Determination of the Characteristic Impedance of the Coaxial System Consisting of an Inner Regular Polygon Concentric with an Outer Circle (Short Paper)

*K. Tsuruta and R. Terakado. "Easy Determination of the Characteristic Impedance of the Coaxial System Consisting of an Inner Regular Polygon Concentric with an Outer Circle (Short Paper)." 1980 Transactions on Microwave Theory and Techniques 28.2 (Feb. 1980 [T-MTT]): 147-149.*

This paper gives a simple method for the determination of the characteristic impedance of an inner regular polygon concentric with an outer circle. The approach makes use of the method of superposition for plane sheets of charge which were radially disposed in the polygon. The results are in good agreemnt with those obtained by Laura and Luisoni.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## A K-Band Ruby Maser with 500-MHz Bandwidth (Short Paper)

*C.R. Moore. "A K-Band Ruby Maser with 500-MHz Bandwidth (Short Paper)." 1980 Transactions on Microwave Theory and Techniques 28.2 (Feb. 1980 [T-MTT]): 149-151.*

Engineering improvements to a previously described reflected- wave maser design have resulted in an instantaneous 3-dB band-width of 400 MHz at 19.5 GHz, increasing to 560 MHz at 24 GHz. Nominal gain is 27 to 31dB and gain flatness is ±2.5 dB over this tuning range. Noise temperature variation across the passband is less than ±1.5 K and the effective noise temperature referred to the room temperature input flange ranges from 9.5±4 K to 13.5±4 K over the 18.5- to 25-GHz tuning range.

# Abstracts

## Microstrip Characteristic Impedance (Comments)

*B. Bianco, M. Parodi and S. Ridella. "Microstrip Characteristic Impedance (Comments)." 1980 Transactions on Microwave Theory and Techniques 28.2 (Feb. 1980 [T-MTT]): 152-152.*

In a recent paper Getsinger considers some definitions of microstrip characteristic impedance which are usual in literature and which have been analyzed by us in order to show their different behavior with the frequency. In particular, Getsinger states that only one of these definitions is correct, that is, the one based on the wave-impedance concept, while the others must be neglected.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Microstrip Characteristic Impedance (Response to Comments)

*W.J. Getsinger. "Microstrip Characteristic Impedance (Response to Comments)." 1980 Transactions on Microwave Theory and Techniques 28.2 (Feb. 1980 [T-MTT]): 152-152.*

Bianco et al. have performed a service in pointing out that microstrip characteristic impedance definitions employing voltage-current-power ratios can be functionally inconsistent. The purpose of my note was to show that such definitions are also inconsistent (with one coincidental exception) with the unifying concept of wave impedance, which embraces the impedances of the modes of TEM lines, hollow waveguides, and other structures.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Slot-Line Parameters (Computer Program Description)

*H.J. Siweris. "Slot-Line Parameters (Computer Program Description)." 1980 Transactions on Microwave Theory and Techniques 28.2 (Feb. 1980 [T-MTT]): 153-153.*

The program calculates guide wavelength and characteristic impedance of a slot line as a function of physical dimensions, substrate permittivity, and frequency.

# Abstracts

## Contributors (Feb. 1980 [T-MTT])

*C.S. Aitchison, I.J. Bahl, C.A. Cain, R.-S. Chang, A.G. Chapman, W.C. Chew, D.A. Hill, P. Katechi, J.A. Kong, N. Kumagai, N. Morita, D.F. Peterson, G.P. Riblet, T.E. Rozzi, S.K. Sinha, C.E. Smith, S.S. Stuchly, N.K. Uzunoglu, G.H. in't Veld, J.R. Wait, K.P. Weller and H.A. Wheeler. "Contributors (Feb. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.2 (Feb. 1980 [T-MTT]): 154-157.*

# Abstracts

## IEEE Journals on Microfilm (Advertisement) (Feb. 1980 [T-MTT])

*"IEEE Journals on Microfilm (Advertisement) (Feb. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.2 (Feb. 1980 [T-MTT]): 158-158.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Membership Application (Feb. 1980 [T-MTT])

*"Membership Application (Feb. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.2 (Feb. 1980 [T-MTT]): 159-159.*



Contents
Publications
Issues
Papers
Authors

# Abstracts

## IEEE Standard Dictionary (Advertisement) (Feb. 1980 [T-MTT])

*"IEEE Standard Dictionary (Advertisement) (Feb. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.2 (Feb. 1980 [T-MTT]): 160-160.*

# Abstracts

## Back Cover (Feb. 1980 [T-MTT])

*"Back Cover (Feb. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.2 (Feb. 1980 [T-MTT]): b1-b1.*

# Abstracts

## Front Cover (Mar. 1980 [T-MTT])

*"Front Cover (Mar. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.3 (Mar. 1980 [T-MTT]): f1-f2.*

# Abstracts

## Pulse Regeneration in the Gigabit-Per-Second Range Using a Diode Differential Regenerator

*U. Barabas. "Pulse Regeneration in the Gigabit-Per-Second Range Using a Diode Differential Regenerator." 1980 Transactions on Microwave Theory and Techniques 28.3 (Mar. 1980 [T-MTT]): 161-171.*

A clocked pulse regenerator circuit (diode differential regenerator (DDR)) is described which employs a modified hybrid tee, step recovery diodes, and bipolar transistors. For the first time a hybrid tee is used in ultra broad-band digital applications. Signal pulses with bit rates up into the gigabit-per-second range are regenerated, the shape of the input pulses having no direct influence on the shape of the output pulses. Only the charge of the input signals determines the amplitudes of the output pulses. At a signal bit rate of 1 Gbit/s an insertion voltage gain of 20 dB was obtained. Operating the DDR in a push-pull mode the voltage gain is doubled to 26 dB. Because the output pulses of the DDR are very narrow the circuit can be used in time-division multiplexers providing output pulse streams with bit rates up to 16 Gbit/s and amplitudes of several volts across a load of 50 Omega. The internal behavior of the DDR is analyzed, among other things by the results of computer simulations. Calculations for optimizing the employed components are given.

# Abstracts

## Application of the Two-Way Balanced Amplifier Concept to Wide-Band Power Amplification Using GaAs MESFET's

*K.B. Niclas, W.T. Wilser, R.B. Gold and W.R. Hitchens. "Application of the Two-Way Balanced Amplifier Concept to Wide-Band Power Amplification Using GaAs MESFET's." 1980 Transactions on Microwave Theory and Techniques 28.3 (Mar. 1980 [T-MTT]): 172-179.*

An X-band GaAs FET power amplifier has been developed, significantly extending the bandwidth capabilities of such amplifiers reported to date. An output power of 1 W with an associated gain of 7.7 dB was achieved from 7.25 to 12.0 GHz by means of combining the power of two amplifier modules. Each of these modules consist of two balanced submodules cascaded to a two-stage unit. The transistor used in the "two-way balanced amplifier" has gate dimensions of 1000x1 µm. The technology, RF performance, and characterization of the transistor are discussed in detail, as are the design and performance of both the single-ended and two-way balanced amplifier modules.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## K-Band Integrated Double-Balanced Mixer

*H. Ogawa, M. Aikawa and K. Morita. "K-Band Integrated Double-Balanced Mixer." 1980 Transactions on Microwave Theory and Techniques 28.3 (Mar. 1980 [T-MTT]): 180-185.*

A novel microwave integrated circuit (MIC) double-balanced mixer with good isolation between the three ports is described. The mixer is fabricated using a combination of microstrip lines, slotlines, and coupled slotlines, together with four beam-lead Schottky-barrier diodes. The K-band magic-T has been developed for the double-balanced mixer. The minimum conversion loss measured at a signal frecuency of 19.6 GHz is 4.7 dB. Isolation between RF and LO ports is greater than 20 dB from 18 to 21 GHz. The mixer can be expected to have wide applications in MIC receivers and transmitters up to the millimeter-wave band.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Cryogenic Parametric Amplifier Noise Performance at 4.2 K

*W.J. Wilson, R.L. Dickman and G.G. Berry. "Cryogenic Parametric Amplifier Noise Performance at 4.2 K." 1980 Transactions on Microwave Theory and Techniques 28.3 (Mar. 1980 [T-MTT]): 186-190.*

Results of an experiment in which a 4.5- -5.0-GHZ paramp was operated at 4.2 K are reported. The measured noise temperature at 4.2 K was 12 K. This is 6 K lower than the unit's noise temperature at its normal operating point of 18 K. It is concluded that varactor heating by the pump oscillators limited the improvement in noise performance. Prospects for further improvements in paramp noise temperature using better varactors are discussed.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A Continuously Variable Coaxial-Line Attenuator

*E.G. Cristal. "A Continuously Variable Coaxial-Line Attenuator." 1980 Transactions on Microwave Theory and Techniques 28.3 (Mar. 1980 [T-MTT]): 191-199.*

This paper reports on a new continuously variable coaxial-line attenuator that utilizes a center conductor of semi-insulating material. Some general design details and data are given. Specific design details for an octave bandwidth prototype attenuator are presented and discussed, and experimental results for the prototype are given. The theory on which the attenuator is based is developed and several interesting theoretical results are described.

# Abstracts

## Analysis of Wide-Band Stripline Circulators by Integral Equation Technique

*Y. Ayasli. "Analysis of Wide-Band Stripline Circulators by Integral Equation Technique." 1980 Transactions on Microwave Theory and Techniques 28.3 (Mar. 1980 [T-MTT]): 200-209.*

The analysis of wide-band Y-junction stripline circulators using Green's function method was reported in the literature. In this paper, similar analyses are performed using an integral equation method and the results are compared. The boundary conditions used in the analyses are also discussed. A new boundary condition representing the actual fields more precisely than previously is formulated and applied to the junction. The results obtained with the new boundary conditions are examined and compared with the previous theoretical and experimental results. The current and voltage distributions that are created at the ports under the assumed boundary conditions are calculated and compared with the known stripline and junction modes. In the formulation, it is observed that the Green's function is not unique and it can be selected from a certain class of functions. This arbitrariness is introduced into the formulation by means of a complex parameter C/sub 0/. The effect of this parameter on the numerical results is investigated and it is shown that in certain regions of the complex C/sub 0/ plane, the numerical results converge on the analytical results.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## The Design of Planar Circulators for Wide-Band Operation

*T. Miyoshi and S. Miyauchi. "The Design of Planar Circulators for Wide-Band Operation." 1980 Transactions on Microwave Theory and Techniques 28.3 (Mar. 1980 [T-MTT]): 210-214.*

The stripline circulator used in microwave integrated circuits (MIC) is considered one of ferrite planar circuits (two-dimesional circuits). We investigated the optimum shape of a planar circulator for wide-band operation, perceiving the wider freedom of the planar structure in circuit design. The wide-band planar circulator, designed using the powerful contour-integral method is triangular shaped with slightly concave sides. The 20-dB isolation fractional bandwidth of the designed circulator is about 52 percent.

# Abstracts

## The Traveling Wave IMPATT Mode: Part II -- The Effective Wave Impedance and Equivalent Transmission Line

*M. Franz and J.B. Beyer. "The Traveling Wave IMPATT Mode: Part II -- The Effective Wave Impedance and Equivalent Transmission Line." 1980 Transactions on Microwave Theory and Techniques 28.3 (Mar. 1980 [T-MTT]): 215-218.*

The coupling between a microstrip and a distributed IMPATT diode was investigated in a field analysis. An effective wave impedance in the traveling wave diode can be defined as the ratio of the space-average transverse electric and magnetic fields. This impedance is related to an effective characteristic impedance by a geometry factor. Thus the coupling question is reduced to the coupling between two transmission lines. In addition the diode is modeled in an equivalent transmission line. The equivalent series impedance and shunt admittance are found. The shunt admittance is approximately equal to the admittance (per unit length) of a discrete diode of identical doping profile. The coupling analysis presented here seems applicable to microstrip interfaces to traveling wave structures other than the IMPATT diode.

# Abstracts

## Design of Loaded-Line p-i-n Diode Phase Shifter Circuits

*I.J. Bahl and K.C. Gupta. "Design of Loaded-Line p-i-n Diode Phase Shifter Circuits." 1980 Transactions on Microwave Theory and Techniques 28.3 (Mar. 1980 [T-MTT]): 219-224.*

The design of three types of loaded-line p-i-n diode digital phase shifter circuits is presented. The three configurations considered are 1) main line mounted, 2) stub mounted, and 3) switchable stub length. Expressions for various design parameters are derived. Calculations show that for the 22.5° phase bit the maximum bandwidths for three circuits are 22.7, 19.2, and 18.4 percent, respectively. Starting from the p-i-n diode parameters, optimum designs of these circuits for obtaining minimum insertion loss, maximum bandwidth, and minimum size are also discussed. It is found that the switchable stub length type configuration is suitable when nearly ideal p-i-n diodes are used while stub mounted type configuration is suitable for nonideal diodes. Experimental and theoretical performance (bandwidth and insertion loss) of stub mounted type circuits are compared and found to be in good agreement.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## High-Accuracy Wide-Range Measurement Method for Determination of Complex Permittivity in Reentrant Cavity: Part A --- Theoretical Analysis of the Method

*A. Kaczkowski and A. Milewski. "High-Accuracy Wide-Range Measurement Method for Determination of Complex Permittivity in Reentrant Cavity: Part A --- Theoretical Analysis of the Method." 1980 Transactions on Microwave Theory and Techniques 28.3 (Mar. 1980 [T-MTT]): 225-228.*

New mathematical method for calculation of complex electric permittivity (epsilon) of a wide range of materials from the direct measured parameters of a reentrant cavity containing a sample of material is presented. Condition of resonance is drawn based on analysis of electromagnetic field distribution in the cavity with a sample. Accuracy of the obtained algorithm (convergences of series) and method of shortening iterative solution is discussed in detail.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## High-Accuracy Wide-Range Measurement Method for Determination of Complex Permittivity in Reentrant Cavity: Part B -- Experimental Analysis of Measurement Errors

*A. Kaczkowski and A. Milewski. "High-Accuracy Wide-Range Measurement Method for Determination of Complex Permittivity in Reentrant Cavity: Part B -- Experimental Analysis of Measurement Errors." 1980 Transactions on Microwave Theory and Techniques 28.3 (Mar. 1980 [T-MTT]): 228-231.*

In Part A, the measurement method of epsilon was presented from the mathematical viewpoint. Experiments undertaken in this section were carried out in order to illustrate the theorical thesis of Part A, as well as to verify the postulated calculation method and analyze measurement errors.

# Abstracts

## Wave Propagation through Weakly Anisotropic Straight and Curved Rectangular Dielectric Optical Guides

*B.B. Chaudhuri. "Wave Propagation through Weakly Anisotropic Straight and Curved Rectangular Dielectric Optical Guides." 1980 Transactions on Microwave Theory and Techniques 28.3 (Mar. 1980 [T-MTT]): 231-234.*

Wave propagation through weakly anisotropic straight and curved dielectric rectangular guides is studied using a coupled mode approach. The propagation constant, thus found, can be computed very easily if Marcatili's approximate field expressions for an isotropic guide are used. The result for the uniaxial case can then be extended for the biaxial crystal to the first order of approximation.

# Abstracts

## Radiation Fields of Optical Stripline Waveguides

*M.W. Scott and J.K. Butler. "Radiation Fields of Optical Stripline Waveguides." 1980 Transactions on Microwave Theory and Techniques 28.3 (Mar. 1980 [T-MTT]): 235-238.*

Dispersion characteristics and radiation fields of an optical stripline waveguide radiating into free space are calculated. The waveguides are fabricated as multiple layers of differing dielectric materials. A top layer is etched to form a "cap" with an effective waveguide in a layer below the cap. Confinement of the fields to the waveguide is obtained in the vertical direction by dielectric discontinuities, while lateral confinement occurs because of spatial interference of a continuum of plane waves. The radiation field of the fundamental mode in a plane perpendicular to the waveguide layers is characterized by the layer widths and index discontinuities. Beamwidths of the fundamental mode in the plane parallel to the dielectric layers are developed in terms of the waveguide parameters. Values of these parameters which yield the best optical confinement under the stripe can be obtained.

# Abstracts

## Ridge-Shaped Narrow Wall Directional Coupler Using TE/sub 10/, TE/sub 20/, and TE/sub 30/ Modes

*T. Tanaka. "Ridge-Shaped Narrow Wall Directional Coupler Using TE/sub 10/, TE/sub 20/, and TE/sub 30/ Modes." 1980 Transactions on Microwave Theory and Techniques 28.3 (Mar. 1980 [T-MTT]): 239-245.*

A new type of compact narrow wall directional coupler, whose coupling region is a ridge waveguide having dimensions such that TE/sub 10/, TE/sub 20/, and TE/sub 30/ modes can exist, is proposed and analyzed. Coupling ratio and nonreflecting condition are determined by the degree of interference between TE/sub 20/ and TE/sub 30/ modes, and between TE/sub 10/ and TE/sub 30/ modes, respectively. The coupler can be used as a variable power divider by varying the coupling slot height. For 3-dB coupling over the 16.0 to 19.0-GHz frequency range, power equality within ±0.5 dB, more than 30-dB isolation and more than 30-dB return loss can be obtained. Experimental coupling results have shown good agreement with the theory.

# Abstracts

## A Design Procedure for Bandpass Channel Multiplexers Connected at a Common Junction

*J.D. Rhodes and S.A. Alseyab. "A Design Procedure for Bandpass Channel Multiplexers Connected at a Common Junction." 1980 Transactions on Microwave Theory and Techniques 28.3 (Mar. 1980 [T-MTT]): 246-253.*

A new general design procedure is presented for multiplexers having any number of Chebyshev channel filters, with arbitrary degrees, bandwidths, and interchannel spacings. The design procedure is developed for bandpass channel filters connected in series at a common junction for narrow-band applications. Commencing with the closed-form expressions for element values in Chebyshev filters, the multiplexer design process modifies all of the elements in each channel filter and preserves a match at the two points of perfect transmission closest to the band edges of each channel filter, while taking into account the frequency dependence across each channel. Examples of several multiplexer are given indicating that the design process is valid for most combinations of contiguous and noncontiguous channels.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Closed-Form Expressions for the Current or Charge Distribution on Parallel Strips or Microstrip

*E.F. Kuester and D.C. Chang. "Closed-Form Expressions for the Current or Charge Distribution on Parallel Strips or Microstrip." 1980 Transactions on Microwave Theory and Techniques 28.3 (Mar. 1980 [T-MTT]): 254-259.*

Simple but accurate closed-form expressions for the charge and current distributions on parallel-plate stripline or microstrip are given. This form is convenient for use in various applications, such as determining radiation or mode fields of the lines, or frequency dispersion of the fundamental mode of the microstrip. These expressions are used to obtain explicit expressions for the capactitance of these lines, accurate to within one percent of the actual value for any ratio of stripwidth to spacing.

# Abstracts

## Theory of Dispersion in Microstrip Arbitrary Width

*E.F. Kuester and D.C. Chang. "Theory of Dispersion in Microstrip Arbitrary Width." 1980 Transactions on Microwave Theory and Techniques 28.3 (Mar. 1980 [T-MTT]): 259-265.*

An analytic theory for the dispersion of the fundamental mode on wide open microstrip is presented. Only a single basis function is needed to accurately represent each of the change and current distributions on the strip, thus allowing more efficient determination of the propagation constant as compared to moment-method solutions requiring a larger number of basis functions. The results obtained blend smoothly into results of high-frequency (Wiener-Hopf) theories, and still retain the appealing physical interpretation in terms of capitance and inductance of the narrow strip theory previously obtained by the authors.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## An Expansion for the Fringing Capacitance (Short Paper)

*H.J. Riblet. "An Expansion for the Fringing Capacitance (Short Paper)." 1980 Transactions on Microwave Theory and Techniques 28.3 (Mar. 1980 [T-MTT]): 265-267.*

The first twelve terms in an expansion of the "approximate fringing capacitance" in powers of exp (-pi s/b) are given explicity as functions of t/b. Comparison with exact values shows agreement within 0.06 percent for s/b >= 0.2 and t/b <= 0.5. In the extreme case considered, s/b=0.1 and t/b= 0.5, the error is less than 2.3 percent.

# Abstracts

## Diathermy Applicators with Circular Aperture and Corrugated Flange (Short Paper)

*M.A. Stuchly, S.S. Stuchly and G. Kantor. "Diathermy Applicators with Circular Aperture and Corrugated Flange (Short Paper)." 1980 Transactions on Microwave Theory and Techniques 28.3 (Mar. 1980 [T-MTT]): 267-271.*

A design method and experimental results for a direct-contact circular aperture applicator are provided. The aperture is excited in the TE/sub 11/ mode; a corrugated flange surrounding the aperture improves the uniformity of the heating pattern and limits leakage. The performance of the applicators operating in the S band (2.45 GHz) and the X band (9.96 GHz) has been tested using a short monopole probe and a thermographic camera. The heating patterns obtained by the two methods are in agreement within the experimental errors. The applicators are suitable for clinical use, as they are lightweight and rugged, and capable of delivering a desired energy dose effectively, thanks to a relatively small standing-wave ratio (SWR < 2) and very low leakage.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## On Design of Coupled Microstrip Lines (Letters)

*J.H. Hinton. "On Design of Coupled Microstrip Lines (Letters)." 1980 Transactions on Microwave Theory and Techniques 28.3 (Mar. 1980 [T-MTT]): 272-272.*

The synthesis approach by Akhtarzad, Rowbotham, and Jones for coupled microstrip lines shows close agreement with the Bryant and Weiss results except for small W/H where the deviation is about 14 percent in computing Z/spl infin/. It is shown that the approach in [1] will produce close agreement with [2] for all W/H when Wheeler's formula for single microstrip line is incorporated in the synthesis procedure.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Characteristics of Coupled Microstriplines (Correction)

*R. Garg and I.J. Bahl. "Characteristics of Coupled Microstriplines (Correction)." 1980 Transactions on Microwave Theory and Techniques 28.3 (Mar. 1980 [T-MTT]): 272-272.*

In the above paper, the following typographical errors should be corrected.

# Abstracts

## Waveguide Modes in Inhomogeneous Media (Computer Program Descriptions)

*B.S. Agrawal and E. Bahar. "Waveguide Modes in Inhomogeneous Media (Computer Program Descriptions)." 1980 Transactions on Microwave Theory and Techniques 28.3 (Mar. 1980 [T-MTT]): 273-274.*

To compute the horizontally polarized (TE) and the vertically polarized (TM) mode parameters in horizontally stratified dielectric waveguides with arbitrary permittivity profiles using generalized characteristic vectors. The dispersive properties of the wave-guides are also determined.

# Abstracts

## Computation of the Shielded and Coupled Microstrip Parameters in Suspended and Conventional Form (Computer Program Descriptions)

*D. Mirshekar-Syahkal and J.B. Davies. "Computation of the Shielded and Coupled Microstrip Parameters in Suspended and Conventional Form (Computer Program Descriptions)." 1980 Transactions on Microwave Theory and Techniques 28.3 (Mar. 1980 [T-MTT]): 274-275.*

These computer programs can compute effective dielectric constant, characteristic impedance, dielectric losses, and conductor losses of shielded microstrip and coupled rnicrostrip for the two different conditions of suspended or conventional substrates.

# Abstracts

## Computer Analysis of Microwave and Millimeter-Wave Mixers (Computer Program Descriptions)

*P.H. Siegel and A.R. Kerr. "Computer Analysis of Microwave and Millimeter-Wave Mixers (Computer Program Descriptions)." 1980 Transactions on Microwave Theory and Techniques 28.3 (Mar. 1980 [T-MTT]): 275-276.*

The program analyzes the performance of single-diode microwave and millimeter-wave mixers. A Schottky-barrier diode is assumed, whose I-V and CV characteristics are known. The diode mount is taken to be lossless, but may have external loads at any number of sideband and local oscillator (LO) harmonic frequencies.

# Abstracts

## Mathieu Functions of Integral Orders and Real Arguments (Computer Program Descriptions)

*S.R. Rengarajan and J.E. Lewis. "Mathieu Functions of Integral Orders and Real Arguments (Computer Program Descriptions)." 1980 Transactions on Microwave Theory and Techniques 28.3 (Mar. 1980 [T-MTT]): 276-277.*

To compute Mathieu functions, modified Mathieu functions and related parameters for integral orders and real arguments, encountered in wave propagation involving elliptic geometries.

# Abstracts

## Contributors (Mar. 1980 [T-MTT])

*M. Aikawa, S.A. Alseyab, Y. Ayasli, I.J. Bahl, U. Barabas, G.G. Berry, J.B. Beyer, J.K. Butler, D.C. Chang, B.B. Chaudhuri, E.G. Cristal, R.L. Dickman, M. Franz, R.B. Gold, K.C. Gupta, W.R. Hitchens, A. Kaczkowski, E.F. Kuester, A. Milewski, S. Miyauchi, T. Miyoshi, K. Morita, K.B. Niclas, H. Ogawa, J.D. Rhodes, M.W. Scott, T. Tanaka, W.T. Wilser and W.J. Wilson. "Contributors (Mar. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.3 (Mar. 1980 [T-MTT]): 278-281.*

# Abstracts

## IEEE Journals on Microfilm (Advertisement) (Mar. 1980 [T-MTT])

*"IEEE Journals on Microfilm (Advertisement) (Mar. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.3 (Mar. 1980 [T-MTT]): 282-282.*

# Abstracts

## Membership Application (Mar. 1980 [T-MTT])

*"Membership Application (Mar. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.3 (Mar. 1980 [T-MTT]): 283-283.*

# Abstracts

## IEEE Standard Dictionary (Advertisement) (Mar. 1980 [T-MTT])

*"IEEE Standard Dictionary (Advertisement) (Mar. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.3 (Mar. 1980 [T-MTT]): 284-284.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Back Cover (Mar. 1980 [T-MTT])

*"Back Cover (Mar. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.3 (Mar. 1980 [T-MTT]): b1-b1.*

# Abstracts

## Front Cover (Apr. 1980 [T-MTT])

*"Front Cover (Apr. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.4 (Apr. 1980 [T-MTT]): f1-f2.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## The Matched Feedback Amplifier: Ultrawide-Band Microwave Amplification with GaAs MESFET's

*K.B. Niclas, W.T. Wilser, R.B. Gold and W.R. Hitchens. "The Matched Feedback Amplifier: Ultrawide-Band Microwave Amplification with GaAs MESFET's." 1980 Transactions on Microwave Theory and Techniques 28.4 (Apr. 1980 [T-MTT]): 285-294.*

An ultrawide-band amplifier module has been developed that covers the frequency range from 350 MHz to 14 GHz. A minimum gain of 4 dB was obtained across this 40:1 bandwidth at an output power of 13 dBm. The amplifier makes use of negative and positive feedback and incorporates a GaAs MESFET that was developed with special emphasis on low parasitics. The transistor has the gate dimensions 800 by 1 µm. The technology and RF performance of the GaAs MESFET are discussed, as are the design considerations and performance of the single-ended feedback amplifier module.

# Abstracts

## W-Band Power Combiner Design

*K. Chang and R.L. Ebert. "W-Band Power Combiner Design." 1980 Transactions on Microwave Theory and Techniques 28.4 (Apr. 1980 [T-MTT]): 295-305.*

W-band power combiners using double-drift IMPATTsilicon diodes have been developed to generate high pulsed power. The combiner design was based on a computer analysis of the cross-coupled coaxial-waveguide diode mounting structure which forms the basic module of the combiner. Peak output power of 20.5 W for a two diode combiner and 40 W for a four-diode combiner have been achieved. The diodes were operated at 100-ns pulsewidth and 0.5-percent duty cycle. The combiners demonstrated over 80-percent combining efficiency and 6-percent dc-RF conversion efficiency.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Study of the Harmonic Effects for Waveguide Gunn-Diode Oscillator Optimization

*E.M. Bastida. "Study of the Harmonic Effects for Waveguide Gunn-Diode Oscillator Optimization." 1980 Transactions on Microwave Theory and Techniques 28.4 (Apr. 1980 [T-MTT]): 305-313.*

The dependence on harmonic load conditions of waveguide Gunn oscillator performance is theoretically and experimentally studied. A simple waveguide mount is presented, which by controlling the diode harmonic load conditions, with one single adjustment permits considerable simultaneous improvement in output power, bias tuning, and varactor tuning linearities, as well as in frequency stability with the temperature. The oscillator noise level can also be minimized, though not at the same time as the other improvements. Finally, the usefulness of harmonic control in simplifying some typical thermal procedures is shown.

# Abstracts

## Theory and Simulation of the Gyrotron Traveling Wave Amplifier Operating at Cyclotron Harmonics

*K.R. Chu, A.T. Drobot, H.H. Szu and P. Sprangle. "Theory and Simulation of the Gyrotron Traveling Wave Amplifier Operating at Cyclotron Harmonics." 1980 Transactions on Microwave Theory and Techniques 28.4 (Apr. 1980 [T-MTT]): 313-317.*

An analytical expresion for the efficiency of the gyrotron traveling wave amplifier is derived for the case of nonfundamental cyclotron harmonic interaction. It scales the efficiency with respect to the modes and parameters of operation. This relation, together with a general linear dispersion relation, also derived in the present paper, gives the characteristics and optimum operation conditions of the gyrotron traveling wave amplifier.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Methods of Efficiency Enhancement and Scaling for the Gyrotron Oscillator

*K.R. Chu, M.E. Read and A.K. Ganguly. "Methods of Efficiency Enhancement and Scaling for the Gyrotron Oscillator." 1980 Transactions on Microwave Theory and Techniques 28.4 (Apr. 1980 [T-MTT]): 318-325.*

It is shown that a gyrotron oscillator operating in a slightly tapered magnetic field can attain an efficiency of ~78 percent, approximately 1.7 times higher than that obtainable in a constant magnetic field. Extensive numerical data have been tabulated and a convenient parameter is introduced to generate numerical efficiency scaling relations through which optimum operating conditions are clearly exhibited. Conditions for reaching the high efficiency operating regime are also studied and numerically illustrated.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Electromagnetic Theory of the Loosely Braided Coaxial Cable: Part II--Numerical Results

*D.A. Hill and J.R. Wait. "Electromagnetic Theory of the Loosely Braided Coaxial Cable: Part II--Numerical Results." 1980 Transactions on Microwave Theory and Techniques 28.4 (Apr. 1980 [T-MTT]): 326-331.*

The general modal equation obtained in Part I is solved numerically for the propagation constants of both the monofilar and bifilar modes. For the special case of an air-filled cable, only one mode is supported. Numerical results are also presented for the surface transfer impedance of the shield which, in general, depends on the propagation constant. The properties of the counterwound helical shield are found to be qualitatively similar to those of the unidirectional helical shield.

# Abstracts

## Improved Single and Multiaperature Waveguide Coupling Theory, Including Explanation of Mutual Interactions

*R. Levy. "Improved Single and Multiaperature Waveguide Coupling Theory, Including Explanation of Mutual Interactions." 1980 Transactions on Microwave Theory and Techniques 28.4 (Apr. 1980 [T-MTT]): 331-338.*

Bethe's small aperture coupling theory, modified by Cohn for large coupling apertures, is improved by including correction terms obtained by averaging the fields over the large aperture. Additionally, inclusion of nonempirical thickness correction factors derived previously by McDonald give coupling formulas which result in theoretical predictions for multiaperture couplers substantially in exact agreement with experiment (correcting small discrepancies previously noted by the author in a 1968 paper). This agreement is now so close that it becomes possible both to identify and explain the mutual interaction effects between closely spaced apretures in multiaperture couplers. It is shown that the mutual interaction is due to contradirectional (or backward) waves in the secondary arm, so that multiaperture interactions are manifested as elimination of the self-interactions of the individual apertures (since the high directivity of typical multiaperture couplers implies negligible backward wave amplitude).

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Electromagnetic Wave Propagating in Uniform Waveguides Containing Inhomogeneous Dielectric

*W.-G. Lin. "Electromagnetic Wave Propagating in Uniform Waveguides Containing Inhomogeneous Dielectric." 1980 Transactions on Microwave Theory and Techniques 28.4 (Apr. 1980 [T-MTT]): 339-348.*

Uniform waveguides filled with inhomogeneous dielectric whose permittivity varies along one dimension are studied. Emphasis is given to the modes of propagation and to the calculation of the propagation constants. Exact solutions are given for some special cases. In some of these only asymptotic or polynomial solutions have been available previously. No restriction is placed on the waveguide dimensions so that results developed here apply to the transmission of optical frequency waves as well as to microwaves and millimeter waves. In the waveguide problems of this paper, results obtained cannot be directly found in the existing literature and have been worked out from fundamental theory of differential equations. The theory of the confluent hypergeometric function has been of great help in our treatment of these problems.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Computer-Aided Analysis and Design of Networks Containing Commensurate and Noncommensurate Delay Lines

*M.I. Sobhy and M.H. Keriakos. "Computer-Aided Analysis and Design of Networks Containing Commensurate and Noncommensurate Delay Lines." 1980 Transactions on Microwave Theory and Techniques 28.4 (Apr. 1980 [T-MTT]): 348-358.*

Several computer programs are described for the analysis and synthesis of networks containing transmision lines, lumped resistors, voltage sources and current sources. There are no restrictions on the topology of the networks and degenerate elements can also be included. In the noncommensurate case the transmission lines could have different delays and thus the degree of freedom for each network is doubled. State-space techniques are used to formulate the solution to the problem and the high degree of generality was achieved by using topological methods to derive the state equations. Several examples are given.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## A Simple Method for Spacing the Adjacent Passbands of a Coupled-Line Filter

*G. Saulich. "A Simple Method for Spacing the Adjacent Passbands of a Coupled-Line Filter." 1980 Transactions on Microwave Theory and Techniques 28.4 (Apr. 1980 [T-MTT]): 359-362.*

A bandpass filter using two coupled transmission lines is considered. Two ports of the coupled-line four port are both short-circuited (or open-circuited); the other two ports are terminated in the characteristic impedances of the lines (e.g., 50 Omega). For a constant coupling along the coupling section l the attenuation poles are fixed at l/lambda = n/2 (n = 0,1,2,...). If, however, the coupling changes along the coupling section in three steps with the coupling factors k/sub 1/, k/sub 2/, k/sub 3/ = k/sub 1/, the stopband between two adjacent passbands can be extended for certain values of k/sub 1/ and k/sub 2/. A simple calculation method for the coupling factors k/sub 1/ and k/sub 2/ is described. A practical design example shows good agreement with theoretical results.

# Abstracts

## Design Formulas for a Quasi-Optical Diplexer or Multiplexer

*M.H. Chen. "Design Formulas for a Quasi-Optical Diplexer or Multiplexer." 1980 Transactions on Microwave Theory and Techniques 28.4 (Apr. 1980 [T-MTT]): 363-368.*

An equivalent network for a multiple screen bandpass filter with an obliquely incident plane wave has been developed. Based upon this network, the design formulation for this type of filter is derived. Such quasi-optical filter may be used as a diplexer or a multiplexer.

# Abstracts

## Conformal Transformations Combined with Numerical Techniques, with Applications to Coupled-Bar Problems

*R. Levy. "Conformal Transformations Combined with Numerical Techniques, with Applications to Coupled-Bar Problems." 1980 Transactions on Microwave Theory and Techniques 28.4 (Apr. 1980 [T-MTT]): 369-375.*

This paper describes a new approach to the solution of two-dimensional boundary value problems which eliminates the disadvantages and combines the advantages of both conformal transformations and numerical methods. The conformal transformations are used to remove potential gradient singularities, and numerical (e.g., finite difference) methods may then be applied to the resulting almost-regular field problems. Boundary value problems previously regarded as very difficult become tractable, and considerable savings in computer time and storage requirements are achieved. The method is applied to the calculation of the even and odd mode capacitances of cylindrical rods between plane parallel ground planes. Excellent agreement with results obtained previously is demonstrated.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Corner Function Analysis of Microstrip Transmission Lines

*T.K. Seshadri, S. Mahapatra and K. Rajaiah. "Corner Function Analysis of Microstrip Transmission Lines." 1980 Transactions on Microwave Theory and Techniques 28.4 (Apr. 1980 [T-MTT]): 376-380.*

A new method of analysis of microstrip transmission lines using corner functions (eigenfunctions) is presented. Assuming the TEM mode propagation for the shielded microstrip line structure, solutions are set up in a series of corner functions, which isolates the singularity at the edge of the strip. The boundary conditions are satisfied by using a method of successive integration of boundary errors. Numerical results are obtained for the charge distribution from which the microstrip line characteristic impedance is determined. Excellent agreement with published theoretical results and experimental data is obtained. The numerical results clearly bring out the power of the method.

# Abstracts

## Analysis of Elliptic and Cylindrical Striplines Using Laplace's Equation

*K.K. Joshi and B.N. Das. "Analysis of Elliptic and Cylindrical Striplines Using Laplace's Equation." 1980 Transactions on Microwave Theory and Techniques 28.4 (Apr. 1980 [T-MTT]): 381-386.*

Analysis of elliptic and cylindrical striplines based on Laplace's equation is presented. The solution of boundary value problem is obtained by an application of the modified residue calculus technique. The numerical results on the characteristic impedance are presented for a wide range of parameters. From the series solution of the Laplace's equation, the potential distribution is determined. The effect of warpage due to environmental changes on an otherwise planar structure is also estimated.

# Abstracts

## Analysis of the Dispersion Characteristic of Slot Line with Thick Metal Coating

*T. Kitazawa, Y. Hayashi and M. Suzuki. "Analysis of the Dispersion Characteristic of Slot Line with Thick Metal Coating." 1980 Transactions on Microwave Theory and Techniques 28.4 (Apr. 1980 [T-MTT]): 387-392.*

A theoretical method is presented for the analysis of the slot line employing the network analytical methods of electromagnetic fields and Galerkin's procedure. The propagation constants for the dominant and higher order mode as well as the effect of the metal-coating thickness on the propagation constant and the characteristic impedance are obtained. The numerical results are compared with other available data.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## An Approximate Dynamic Green's Function in Three Dimensions for Finite Length Microstripline

*Y.L. Chow. "An Approximate Dynamic Green's Function in Three Dimensions for Finite Length Microstripline." 1980 Transactions on Microwave Theory and Techniques 28.4 (Apr. 1980 [T-MTT]): 393-397.*

A spatial Green's function in 2-D for straight and infinite microstriplines has been shown to be accurate at frequencies that the dynamic effects cannot be neglected. It is reasonable, therefore, to expect that a similarly accurate spatial Green's function in 3-D can be constructed for finite and curved microstriplines. Based on the same image model of charges and currents as in 2-D, this paper constructs the 3-D Green's function. The Green's function is then applied, through Harrington's moment rnethod, to calculate the input impedance of a few microstriplines, viz., a matched microstripline, straight and hairpin open-ended stubs. The input impedance of a microstrip stub always has a small resistive component indicating the radiative loss. This resistive component agrees with that calculated from the Lewin's formula. Finally, as expected, the imaginary part of the input impedance agrees with that calculated from the TEM approach.

# Abstracts

## A Proposal of Low-Loss Leaky Waveguide for Submillimeter Waves Transmission

*M. Miyagi and S. Nishida. "A Proposal of Low-Loss Leaky Waveguide for Submillimeter Waves Transmission." 1980 Transactions on Microwave Theory and Techniques 28.4 (Apr. 1980 [T-MTT]): 398-401.*

A low-loss dielectric leaky waveguide which carries most of the power in air is proposed for long-distance transmission of submillimeter waves, and its guiding mechanism is fully analyzed by using a two-dimensional slab-waveguide model. It is shown that transmission losses of the guide can become several decibels per kilometer and are not significantly affected by dielectric losses of material used for practical guide parameters.

# Abstracts

## A Multilayer Fiber Guide with Rectangular Core

*V.V. Cherny, G.A. Juravlev and J.R. Whinnery. "A Multilayer Fiber Guide with Rectangular Core." 1980 Transactions on Microwave Theory and Techniques 28.4 (Apr. 1980 [T-MTT]): 401-404.*

An approximate analysis is given for multilayer dielectric waveguides with rectangular core. Dispersion curves are calculated for several modes over a range of parameters. Some comments related to the design of such guides for use with planar structures such as semiconductor lasers are given.

# Abstracts

## Quarter-Wavelength Coupled Dielectric Plate Resonators for High Selectivity TE/sub 10/-Mode Filters

*A.S. Podgorski and R.H. MacPhie. "Quarter-Wavelength Coupled Dielectric Plate Resonators for High Selectivity TE/sub 10/-Mode Filters." 1980 Transactions on Microwave Theory and Techniques 28.4 (Apr. 1980 [T-MTT]): 405-408.*

An analysis of high selectivity TE/sub 10/-mode filters with quarter-wavelength coupled resonators formed by axially spaced dielectric plates is presented and shows that high-loaded quality factors of individual resonators can be obtained by placing the resonant frequency close to the waveguide cutoff frequency and by using low-loss Iow-dielectric constant materials. Design equations for Butterworth and Chebyschev filters are presented and employed in a three-cavity Butterworth filter having 30-MHz bandwidth at resonant frequency at 7250 MHz. Experimental results show that filter performance can be well predicted.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Novel Optical Control Techniques for Solid-State Radar Transmitters

*R.A. Kiehl. "Novel Optical Control Techniques for Solid-State Radar Transmitters." 1980 Transactions on Microwave Theory and Techniques 28.4 (Apr. 1980 [T-MTT]): 409-413.*

New optical techniques for performing the RF control functions needed for such applications as short-pulse and phased-array radar transmitters are described and demonstrated. The techniques utilize optical signals to directly control the internal operation of a solid-state oscillator by the photoexitation of carriers within the active region of the oscillator. Short RF pulse generation is achieved by making use of the subnano-second optical power rise time of a laser diode to rapidly quench the RF output of a microwave oscillator. Phase control of a microwave oscillator is achieved by a phase-locked-loop (PLL) scheme wherein the loop is completed by an optical signal that directly controls the output frequency.

# Abstracts

## In Vivo Probe Measurement Technique for Determining Dielectric Properties at VHF through Microwave Frequencies

*E.C. Burdette, F.L. Cain and J. Seals. "In Vivo Probe Measurement Technique for Determining Dielectric Properties at VHF through Microwave Frequencies." 1980 Transactions on Microwave Theory and Techniques 28.4 (Apr. 1980 [T-MTT]): 414-427.*

A novel probe technique for the determination of dielectric properties of semisolid materials and living tissues in situ is described experimentally and theoretically. This method, based on an antenna modeling theorem, offers unique advantages over conventional dielectric measurements techniques including 1) an ability to perform living (in vivo) tissue dielectric measurements, 2) elimination of the need for tedious sample preparation, 3) the ability to obtain continuous dielectric property data from below 0.1 GHz to above 10 GHz, and 4) the ability to process data on a real time basis. Results of system performance evaluation via measurements of standard liquid dielectric and in vivo tissue data are presented.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Theorems on Match and Isolation in Multiport Networks (Short Papers)

*A.A.M. Saleh. "Theorems on Match and Isolation in Multiport Networks (Short Papers)." 1980 Transactions on Microwave Theory and Techniques 28.4 (Apr. 1980 [T-MTT]): 428-429.*

Two theorems on match and isolation among a number of ports of a multiport network are derived. Applications are given for n-way hybrid power dividers with matched and isolated output ports.

# Abstracts

## Schottky Barrier Impedance Measurements at UHF (Short Papers)

*G.R. Dyer, M.J. Howes and D.V. Morgan. "Schottky Barrier Impedance Measurements at UHF (Short Papers)." 1980 Transactions on Microwave Theory and Techniques 28.4 (Apr. 1980 [T-MTT]): 429-430.*

The observed frequency dependence of the real part of the small signal impedance of Schottky barrier varactor diodes has previously been explained via physical phenomena. A detailed experimental investigation shows that the frequency dependence is due to inevitable systematic errors in the measurement procedure used.

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Transmission Loss of the Double-Strip Modified H Guide at 50 GHz (Short Papers)

*M. Kawamura and Y. Kokubo. "Transmission Loss of the Double-Strip Modified H Guide at 50 GHz (Short Papers)." 1980 Transactions on Microwave Theory and Techniques 28.4 (Apr. 1980 [T-MTT]): 430-432.*

A double-strip modified H guide has been theoretically and experimentally investigated at 50 GHz. The potential applications of this guide as a low-loss transmission Iine are discussed.

Contents
Publications
Issues
Papers
Authors

# Abstracts

## A Simple Full-Band Matched 180° E Plane Waveguide Bend (Letters)

*F.C. de Ronde. "A Simple Full-Band Matched 180° E Plane Waveguide Bend (Letters)." 1980 Transactions on Microwave Theory and Techniques 28.4 (Apr. 1980 [T-MTT]): 432-433.*

A recent publication by Kashyap describes a simple 180° waveguide bend. However, a similar structure of marginally increased complexity has been used in the past to make a matched bend over a whole waveguide band.

# Abstracts

## Determination of Conductor Losses in Planar Waveguide Structures (A Comment to Some Published Results for Microstrips and Microslots) (Letters)

*R. Pregla. "Determination of Conductor Losses in Planar Waveguide Structures (A Comment to Some Published Results for Microstrips and Microslots) (Letters)." 1980 Transactions on Microwave Theory and Techniques 28.4 (Apr. 1980 [T-MTT]): 433-434.*

Waveguide conductor losses are mostly determined from the fields in the lossless case. In planar waveguide structures with sharp edges special care has to be taken, because then the fields can be quite different from those in the lossless case. This paper will explain why the calculated results are poor in some cases.

# Abstracts

## Accurate Resonant Frequencies of Dielectric Resonators (Correction)

*P. Guillon, Y. Garault and J. Citerne. "Accurate Resonant Frequencies of Dielectric Resonators (Correction)." 1980 Transactions on Microwave Theory and Techniques 28.4 (Apr. 1980 [T-MTT]): 434-434.*

After a study (ATP 2365 of the French CNRS) we have detected an error in Fig. 11 of the above paper. In fact, it is necessary to replace the curves of this figure by those presented here.

# Abstracts

## Contributors (Apr. 1980 [T-MTT])

*E.M. Bastida, E.C. Burdette, F.L. Cain, K. Chang, M.H. Chen, V.V. Cherny, Y.L. Chow, K.R. Chu, B.N. Das, A.T. Drobot, R.L. Ebert, A.K. Ganguly, R.B. Gold, Y. Hayashi, D.A. Hill, W.R. Hitchens, K.K. Joshi, G.A. Juravlev, M.H. Keriakos, R.A. Kiehl, T. Kitazawa, R. Levy, W.-G. Lin, R.H. MacPhie, S. Mahapatra, M. Miyagi, K.B. Niclas, S. Nishida, A.S. Podgorski, K. Rajaiah, M.E. Read, G. Saulich, J. Seals, T.K. Seshadri, M.I. Sobhy, P. Sprangle, M. Suzuki, H.H. Szu, J.R. Wait, W.T. Wilser and J.R. Whinnery. "Contributors (Apr. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.4 (Apr. 1980 [T-MTT]): 435-440.*

# Abstracts

## Back Cover (Apr. 1980 [T-MTT])

*"Back Cover (Apr. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.4 (Apr. 1980 [T-MTT]): b1-b1.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Front Cover (May 1980 [T-MTT])

*"Front Cover (May 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.5 (May 1980 [T-MTT] (Special Issue on Gigabit Logic for Microwave Systems)): f1-f2.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Foreword (May 1980 [T-MTT])

*P.T. Greiling. "Foreword (May 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.5 (May 1980 [T-MTT] (Special Issue on Gigabit Logic for Microwave Systems)): 441-441.*

The next generation of microwave digital systems will require much higher clock frequencies to increase computational speed. Both military and commercial electronics have applications for digital communications with multigigabit-per-second data rates, multi-phase-shift-keyed modulation/demodulation, time multiplexing, frequency division, counting, A/D converters, memories, and frequency and waveform synthesis. During the last several years, significant progress has been made in raising the operating speed of digital microcircuits above the 1-GHz/s level. Advances in silicon IC technology will generate some limited speed improvements, but GaAs IC technology offers a two- to six-times speed improvement for the immediate future and Josephson junction technology projects another two- to three-times speed improvement for the intermediate future.

# Abstracts

## Switching Characteristics of Nonlinear Field-Effect Transistors: Gallium-Arsenide Versus Silicon

*H.L. Grubin. "Switching Characteristics of Nonlinear Field-Effect Transistors: Gallium-Arsenide Versus Silicon." 1980 Transactions on Microwave Theory and Techniques 28.5 (May 1980 [T-MTT] (Special Issue on Gigabit Logic for Microwave Systems)): 442-448.*

A study of the switching properties of GaAs FET's and other nonlinear elements whose high field velocity saturates without negative differential mobility demonstrates that the high-bias swiching times of GaAs are determined by velocity saturation. Silicon switches are also studied, and situations where GaAs and Si switching properties may be similar are discussed.

# Abstracts

## A MESFET Model for Use in the Design of GaAs Integrated Circuits

*W.R. Curtice. "A MESFET Model for Use in the Design of GaAs Integrated Circuits." 1980 Transactions on Microwave Theory and Techniques 28.5 (May 1980 [T-MTT] (Special Issue on Gigabit Logic for Microwave Systems)): 448-456.*

A MESFET model is presented that is suitable for use in conventional, time-domain circuit simulation programs. The parameters of the model are evaluated either from experimental data or from more detailed device analysis. The model is shown to be more complete than earlier models, which neglect transit-time and other effects. An integrated circuit (IC) design example is discussed.

# Abstracts

## Intrinsic Response Time of Normally Off MESFET's of GaAs, Si, and InP

*M. Ino and M. Ohmori. "Intrinsic Response Time of Normally Off MESFET's of GaAs, Si, and InP." 1980 Transactions on Microwave Theory and Techniques 28.5 (May 1980 [T-MTT] (Special Issue on Gigabit Logic for Microwave Systems)): 456-459.*

A response time of normally off MESFET's for high-speed logic circuits made of GaAs, Si, and InP was calculated using a two-dimensional numerical analysis. The results indicate that GaAs is the best material among them. The step response of the InP FET is not as fast as expected from v/E characteristics due to low electric field in the channel for low-power logic operation of a normally off FET.

# Abstracts

## Determination of the Electrode Capacitance Matrix for GaAs FET's

*N.G. Alexopoulos, J.A. Maupin and P.T. Greiling. "Determination of the Electrode Capacitance Matrix for GaAs FET's." 1980 Transactions on Microwave Theory and Techniques 28.5 (May 1980 [T-MTT] (Special Issue on Gigabit Logic for Microwave Systems)): 459-466.*

In this paper, a method is presented which provides the electrode capacitance matrix for GaAs FET's. The method incorporates a Green's function, valid for conductors printed on or embedded in a grounded substrate, with the moment method technique. Although calculations for various geometries of printed conductors are considered, emphasis is placed on the computation of self- and mutual-capacitances for the source, gate, drain equivalent circuit of a GaAs FET. As an example, the speed power characteristics of a depletion-rnode GaAs FET inverter circuit are examined, as a function of device width, pad and gate length.

# Abstracts

## MSI High-Speed Low-Power GaAs Integrated Circuits Using Schottky Diode FET Logic (May 1980 [T-MTT])

*S.I. Long, F.S. Lee, R. Zucca, B.M. Welch and R.C. Eden. "MSI High-Speed Low-Power GaAs Integrated Circuits Using Schottky Diode FET Logic (May 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.5 (May 1980 [T-MTT] (Special Issue on Gigabit Logic for Microwave Systems)): 466-472.*

A new planar high-density (10/sup -3/ mm²/gate) GaAs IC technology has been used for fabricating MSI digital circuits containing up to 75 gates/chip. These digital circuits have potential application for gigabit microwave data transmission and processor systems. The circuits consist of Schottky diode FET logic NOR gates, which have provided propagation delays in the 75-200-ps range with dynamic switching energies as low as 27 fJ/gate on ring oscillator structures. Power dissipation levels are compatible with future LSI/VLSI extensions. Operation of D flip-flops (DFF) as binary ripple dividers (/spl divide/2-/spl divide/8) was achieved at 1.9-GHz clock rates, and an 8:1 full-data multiplexer and 1:8 data demultiplexer were demonstrated at 1.1-GHz clock rates. This corresponds to equivalent propagation delays in the 100-175-ps range for these MSI circuits. Finally, a 3x3 parallel multiplier containing 75 gates functioned with a propagation delay of 172 ps/gate and with average gate power dissipations of as low as 0.42 mW/gate.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## An E-Beam Fabricated GaAs D-Type Flip-Flop IC

*M. Gloanec, G. Nuzillat, C. Arnodo and M. Peltier. "An E-Beam Fabricated GaAs D-Type Flip-Flop IC." 1980 Transactions on Microwave Theory and Techniques 28.5 (May 1980 [T-MTT] (Special Issue on Gigabit Logic for Microwave Systems)): 472-478.*

A first generation of monolithic digital IC's using normally-on type GaAs MESFET's with 1.2-µm gate length was initially developed. This technology leads to logic gates with propagation delays in the range 130-170 ps. It was applied to the fabrication of an edge-triggered D-type flip-flop IC whose perfomance is presented: minimum data pulsewidth (350 ps), maximum toggle frequency (up to 1.6 GHz), data input sensitivity. An improved technology intended for higher speeds is now under development. It utilizes direct-writing E-beam lithography to delineate 0.75-µm gate length devices with extremely high alignment accuracy. This fabrication process leads to 61 ps (4 pJ) or 68 ps (2 pJ) propagation delays measured on a dual-ring oscillator test circuit. Recent advances in N/N/sup -/ epitaxial deposition techniques make these performances very uniform and satisfactorily reproducible. D-type flip-flop IC's have been fabricated with this new technology using a reduced (-1 to -1.5 V) pinchoff voltage value. Stable D-type operation up to 3-GHz clocking frequencies has been experimentally observed with a corresponding speed-power product of 2.6 pJ/gate.

# Abstracts

## High-Speed Enhancement-Mode GaAs MESFET Logic

*T. Mizutani, N. Kato, M. Ida and M. Ohmori. "High-Speed Enhancement-Mode GaAs MESFET Logic." 1980 Transactions on Microwave Theory and Techniques 28.5 (May 1980 [T-MTT] (Special Issue on Gigabit Logic for Microwave Systems)): 479-483.*

High-speed enhancement-mode GaAs MESFET Iogic circuits have been fabricated by electron beam lithography. A 15-stage ring oscillator composed of 0.8-µm gatelength and 40-µm gatewidth inverters has given a minimum propagation delay time of 77 ps at a power dissipation of 977 µW. A minimum power-delay product of 1.6 fJ has been obtained with a 20-µm gatewidth circuit at a propagation delay time of 200 ps. Liquid nitrogen temperature operation has also been performed, and a speed almost twice higher than that at room temperature has been obtained. The minimum propagation delay time was 51 ps, and the associated power dissipation was 1.9 mW.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## GaAs MOSFET High-Speed Logic

*N. Yokoyama, T. Mimura, H. Kusakawa, K. Suyama and M. Fukuta. "GaAs MOSFET High-Speed Logic." 1980 Transactions on Microwave Theory and Techniques 28.5 (May 1980 [T-MTT] (Special Issue on Gigabit Logic for Microwave Systems)): 483-486.*

Enhancement-mode GaAs MOSFET integrated logic shows superior potential for applications in low-power high-speed integrated circuits. The speed / power performance of this logic was investigated by using GaAs MOSFET ring oscillators, fabricated using a low-temperature plasma oxidation technique for gate insulation. With an enhancement-depletion (E/D)-type ring oscillator, a minimum propagation delay of 110 ps per gate is obtained, with a power/speed product of 2.0 pJ. With an enhancement-enhancement (E/E) type, a minimum power/speed product of 26 fJ is obtained, with a 385-ps delay. These performances are equal to or better than those of GaAs MESFET logic, after adjustments are made for gate size. With further refinements in device geometry and improvements in gate oxide, GaAs MOSFET logic will be of great use in high-speed very-large-scale integrated circuits.

# Abstracts

## Gallium-Arsenide FET Logic Pseudorandom Code Generator

*B.E. Dobratz, N. Ho, C.F. Krumm and P.T. Greiling. "Gallium-Arsenide FET Logic Pseudorandom Code Generator." 1980 Transactions on Microwave Theory and Techniques 28.5 (May 1980 [T-MTT] (Special Issue on Gigabit Logic for Microwave Systems)): 486-490.*

Several configurations of GaAs D flip-flops have been produced and have operated at toggle rates as high as 2790 Mbit/s with dc power consumptions of 150 mW/flip-flop. One flip-flop configuration, operating to 2170 Mbit/s has been employed in a microwave hybrid chip and wire four-stage pseudorandom code generator. This circuit operated to 1035 Mbit/s. High yields of reproducible parts have been obtained. The devices have withstood normal handling and processing steps associated with practical circuit usage.

# Abstracts

## Josephson Digital Devices and Circuits

*T. Van Duzer. "Josephson Digital Devices and Circuits." 1980 Transactions on Microwave Theory and Techniques 28.5 (May 1980 [T-MTT] (Special Issue on Gigabit Logic for Microwave Systems)): 490-500.*

A review of the progress in the field of Josephson digital devices and circuits is presented. Since the first report of measurements on the switching speed of a Josephson junction in 1966, a large variety of circuits have been developed, with one having a delay of only 13 ps. With miniaturization beyond the present 2.5-µm linewidths, this remarkable speed probably can be exceeded. It is pointed out that the high speed is combined with very low power so that the high packing density needed to make use of the speed is possible. The paper reviews the Josephson junction and its incorporation into logic gates and memory cells. References are given to larger systems using these elements.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Power Design for Gigabit Josephson Logic Systems

*P.C. Arnett and D.J. Herrell. "Power Design for Gigabit Josephson Logic Systems." 1980 Transactions on Microwave Theory and Techniques 28.5 (May 1980 [T-MTT] (Special Issue on Gigabit Logic for Microwave Systems)): 500-508.*

An ac power system design in described for powering, at near gigahertz frequencies, 16K Josephson latching logic circuits distributed uniformly over 16 chips. The power system distributes a sinusoidal current waveform from a single source to the many chip quadrants through a tree system of thin-film transformers that have branching secondaries and multiple turn primaries to maintain nearly constant current amplitudes throughout the system and small phase skews at the logic-circuit level. The sinusoidal waveform is clipped on-chip to provide the trapezoidal waveform required by the logic circuits. The ratio of the duration of the up-portion of the trapezoidal half-cycle to the half-cycle period (the logic cycle) is defined as the active duty cycle for the logic. The 16K circuit-power design is capable of providing an 80-percent duty cycle at a 1.7-ns logic cycle while keeping current levels in the system below 300 mA. An approximate expression is derived that predicts that for any power-system design of this type the product of the system size, the highest frequency of operation, and the chip-quadrant current level is a constant.

# Abstracts

## Contributors (May 1980 [T-MTT])

*N.G. Alexopoulos, P.C. Arnett, C. Arnodo, W.R. Curtice, B.E. Dobratz, R.C. Eden, M. Fukuta, M. Gloanec, P.T. Greiling, H.L. Grubin, D.J. Herrell, N. Ho, M. Ida, M. Ino, N. Kato, C.F. Krumm, H. Kusakawa, F.S. Lee, S.I. Long, J.A. Maupin, T. Mimura, T. Mizutani, G. Nuzillat, M. Ohmori, M. Peltier, K. Suyama, T. Van Duzer, B.M. Welch, N. Yokoyama and R. Zucca. "Contributors (May 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.5 (May 1980 [T-MTT] (Special Issue on Gigabit Logic for Microwave Systems)): 508-512.*

# Abstracts

## Back Cover (May 1980 [T-MTT])

*"Back Cover (May 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.5 (May 1980 [T-MTT] (Special Issue on Gigabit Logic for Microwave Systems)): b1-b1.*

# Abstracts

## Front Cover (Jun. 1980 [T-MTT])

*"Front Cover (Jun. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): f1-f2.*

# Abstracts

## Losses of Microstrip Lines

*E.J. Denlinger. "Losses of Microstrip Lines." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 513-522.*

This article summarizes state-of-the-art information on losses of single and coupled microstrip lines. Conductor loss, substrate loss (for pure dielectric or magnetic materials), and radiation loss are considered along with the effect of dispersion. Finally, a rough comparison is made between the losses of microstrip and that of several other types of lines used in microwave integrated circuits.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A New MIC Magic-T Using Coupled Slot Lines

*M. Aikawa and H. Ogawa. "A New MIC Magic-T Using Coupled Slot Lines." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 523-528.*

Novel microwave integrated circuit (MIC) 180° hybrids (magic-T's) suitable for MIC are described. They make use of the two orthogonal modes (even and odd) of the coupled slot lines, and, therefore, have special port location, which is quite different from that of the conventional 180° hybrids such as a rat-race. That is, the two-ports, which correspond to the E-arm and the H-arm of the well-known waveguide magic-T, can be located on the same side, opposite to the other two ports. This feature is of a great practical advantage when applied to an MIC, because the crossing of the transmission lines can be omitted when this type of magic-T is applied to balanced-type circuits such as balanced mixers. Satisfactory experimental results at a center frecuency of 6 GHz are given. The isolation between the E- and the H-ports is better than 30 dB over an octave band, and the frequency sensitivity of the coupling is almost flat in the frequency range from 2 to 10 GHz.

# Abstracts

## Characteristics of Inhomogeneous Broadside-Coupled Striplines

*I.J. Bahl and P. Bhartia. "Characteristics of Inhomogeneous Broadside-Coupled Striplines." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 529-535.*

A variational method for the analysis of inhomogeneous broadside-coupled striplines is described. The data for even- and odd-mode characteristic impedances, effective dielectric constants, and mode phase velocity ratios are presented. It is found that the phase velocity ratio may be varied over the range 1.14 <= (V/sub e/ / V/sub 0/) <= 3.6 for broadside-coupled suspended microstrip lines (BSML) and 0.36 <= (V/sub e/ / V/sub 0/) <= 0.93 for broadside-coupled inverted microstrip lines (BIML) using materials with dielectric constant less than 16 and S/b >= 0.05, W/b <= 2.0. The effect of nonzero strip thickness is also calculated. It is noticed that the effect of thickness is more pronounced for the odd-mode case than for the even mode. Losses are obtained using the incremental inductance rule of Wheeler. The odd-mode attenuation constant is always higher than the even-mode value.

# Abstracts

## Transmission Characteristics of Dielectric Tube Leaky Waveguide

*M. Miyagi and S. Nishida. "Transmission Characteristics of Dielectric Tube Leaky Waveguide." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 536-541.*

Loss formula of the dielectric tube leaky waveguide is derived by using a transverse transmission-line model which carries most of the transmitted power in air inside a dielectric tube. It is shown that low-loss leaky waveguide can be realized in optical through submillimiter wavelengths with moderate guide parameters and the transmission loss does not depend strongly on the material losses. It is also shown that the attenuation constant of this leaky waveguide is smaller than that of the hollow waveguide by several orders of magnitude.

# Abstracts

## Narrow-Band Stripline or Microstrip Filters with Transmission Zeros at Real and Imaginary Frequencies

*K.T. Jokela. "Narrow-Band Stripline or Microstrip Filters with Transmission Zeros at Real and Imaginary Frequencies." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 542-547.*

Simple approximate design equations are derived in this paper for an even degree (n >= 6) low-pass inverter capacitance prototype filter having single transmission zeros at both real and imaginary frecuencies. This is achieved by utilizing one or two additional couplings. The transmission zeros improve considerably the passband group delay and increase the skirt selectivity compared to those of the ordinary Chebyshev prototype. An exact and more complicated method based on the known generalized Chebyshev rational function approximation is also presented for the comparison. The prototype with one additional coupling is utilized to realize narrow-bandpass printed circuit filters consisting of half-wave resonators.

# Abstracts

## A Nonmodal Formulation for Electromagnetic Transmission through a Filled Slot of Arbitrary Cross Section in a Thick Conducting Screen

*D.T. Auckland and R.F. Harrington. "A Nonmodal Formulation for Electromagnetic Transmission through a Filled Slot of Arbitrary Cross Section in a Thick Conducting Screen." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 548-555.*

This paper considers the two-dimensional problem of electromagnetic transmission through a filled slot of arbitrary cross section in a thick perfectly conducting screen. The equivalence principle is used to divide the original problem into three isolated parts where postulated equivalent sources radiate into unbounded, homogeneous media. These equivalent electric and magnetic currents are chosen to ensure continuity of the tangential components of electric and magnetic fields at each aperture. An integral equation is written for each of the three parts with the equivalent currents as unknowns. The resulting set of coupled integral equations is solved by the method of moments. It is shown in the Appendix that this set of equations has a unique solution. The primary quantities computed are the equivalent magnetic and electric currents on each aperture and the electric current on the remaining portions of the slot cross section. These results are compared with those obtained from a modal solution, where the fields in the slot cross section are expressed in terms of parallel-plate waveguide modes.

# Abstracts

## Planar Electrically Symmetric n-Way Hybrid Power Dividers/Combiners

*A.A.M. Saleh. "Planar Electrically Symmetric n-Way Hybrid Power Dividers/Combiners." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 555-563.*

The match and isolation properties of two types of planar electrically symmetric n-way hybrid power dividers/combiners, which were recently introduced in the literature, are studied. These hybrids, which resemble the Wilkinson hybrid, are named the "radial" hybrid, and the "fork" hybrid because of their geometry. Optimum values of their isolation resistances are given to maximize the match and isolation at band center. The power dissipation requirement in the isolation resistors is also discussed. It is shown that the use of two stages of quarter-wave lines and isolation resistors, rather than only one stage as was originally proposed, improves the match and isolation considerably as well as reduces the power dissipation requirements.

# Abstracts

## Reflection Coefficient Transformations for Phase-Shift Circuits

*H.A. Atwater. "Reflection Coefficient Transformations for Phase-Shift Circuits." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 563-568.*

It is shown how switchable one-port circuits having two impedance states may be transformed so as to exhibit reflection coefficients which have a prescribed phase angle difference and equal magnitude in the two states. In reflection-type phase shifters, arbitrary phase shift may be obtained without change of signal amplitude. The reflection properties are achieved by the use of an impedance-transforming two-port network. Design equations and an example are given.

# Abstracts

## Numerical Experiments on the Determination of Cutoff Frequencies of Waveguides of Arbitrary Cross Section

*P.A.A. Laura, K. Nagaya and G.S. Sarmiento. "Numerical Experiments on the Determination of Cutoff Frequencies of Waveguides of Arbitrary Cross Section." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 568-572.*

Finding the exact mathematical solution of an electromagetic waveguide problem is only possible in a rather limited number of technological situations. The electronic engineer usually confronts a large variety of complicating factors which makes it necessary to employ an approximate method in order to predict cutoff frequencies, propagation modes, attenuation parameters, etc. The present paper considers only one case of complexity: a waveguide of "exotic" boundary shape. Undoubtedly the finite-element method is the most popular technique for dealing with such a situation. Usually the accuracy of the method is tested by applying it to simple geometric domains. The purpose of the present study is twofold: first to verify its accuracy in the case of domains of complicated geometry and second to introduce an approximate approach which is based on a Fourier expansion of the boundary condition coupled with a collocation technique which may be of interest to electronic engineers.

# Abstracts

## Spectral Domain Analysis of Elliptic Microstrip Disk Resonators

*A.K. Sharma and B. Bhat. "Spectral Domain Analysis of Elliptic Microstrip Disk Resonators." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 573-576.*

The elliptic microstrip disk resonator in an open microstrip configuration is analyzed using the spectral domain technique under quasi-static approximation. The normalized value of capacitance is presented as a function of the ratio of substrate thickness and semimajor axis of the elliptic disk resonator for different values of eccentricity. The fringing field effects associated with the structure are quantitatively assessed in terms of effective normalized semimajor axis. The resonator frequencies computed incorporating this effect are in good agreement with the experimental values reported in the literature. Results for various dielectric constants are also included.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Transmission Matrix of a Linear Double Taper in Rectangular Waveguides

*A. Chakraborty and G.S. Sanyal. "Transmission Matrix of a Linear Double Taper in Rectangular Waveguides." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 577-579.*

This paper presents a method of finding the transmission matrix parameters of a linear double taper in rectangular waveguides. The taper is divided into a number of sections of uniform length. The transmission matrix of each section is found out and they are multiplied to get the final transmission matrix. The matrix is used to find the complex reflection coefficient when the other end is terminated by a known load. The theoretical results are compared with the experimental results of Matsumaru and Johnson and they are found to be in good agreement.

# Abstracts

## A Novel Low-Loss Dielectric Waveguide for Millimeter and Submillimeter Wavelengths

*K. Yamamoto. "A Novel Low-Loss Dielectric Waveguide for Millimeter and Submillimeter Wavelengths." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 580-585.*

This paper describes a novel dielectric (gas confined) wave guide which consists of a thin dielectric tube separating an internal high-dielectric-constant gas from an external low-dielectric-constant gas. The attenuation constant, fractional power flow, and radiation Ioss of this waveguide are calculated and compared with those of a conventional O-guide (a dieletric tube waveguide). The advantage of the gas-confined guide is that the attenuation constant is decreased involving no bending loss increase due to tight field confinement within the low-loss internal gas. Experimental investigations are carried out to verify the low-loss property of the gas-confined guide. An attenuation constant less than 0.4 dB/m is obtained over the 80-200-GHz range.

# Abstracts

## Transponder Antennas in and Near a Three-Layered Body

*R.W.P. King, S. Prasad and B.H. Sandler. "Transponder Antennas in and Near a Three-Layered Body." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 586-596.*

The electric field in a three-layered half-space iluminated by an incident plane wave is reviewed and numerical data provided when the layers are skin, fat and muscle. The impedance and voltage across the load of a dipole antenna is discussed when this is located in each of the three layer and in the air near the surface. Bare and insulated antennas are considered over a frequency range up to 3 GHz with layer thicknesses of skin from 0.2 to 1.0 cm, and of fat from 0 to 1.5 cm. The transmitting problem is discussed as well as application of the results to finite bodies.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Direct Noniterative Numerical Solution of Field Theory Problems Having Irregular Boundaries Using Network Analogs

*R. Levy. "Direct Noniterative Numerical Solution of Field Theory Problems Having Irregular Boundaries Using Network Analogs." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 596-604.*

Laplace, Poisson, and more general differential equations may be solved by formulating a network analog, followed by an analytical solution using large-scale network theory. For simplicity the paper treats the Laplace equation in detail, since the network analog for this case contains only resistances. Whereas previous analytical techniques for solving the resistive mesh analog have been restricted to special cases having simple boundaries, it is shown that application of the 2n-port transfer matrix overcomes these restrictions, and results of high accuracy may be obtained without resorting to iterative techniques, i.e., relaxation. A new approach to the formation of the resistive net automatically satisfies the boundary conditions, and simplifies application to boundaries of complicated shape. In the case of simple boundaries, similar results have been obtained in other branches of physics and engineering by methods other than the network analog. These do not appear to apply to problems having arbitrary boundaries, and it is possible that the new technique, which has no restrictions on boundary shape, may be of interest to workers in other fields.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Transmission Characteristic Measurement of Two-Mode Optical Fiber with a Nearly Optimum Index-Profile

*K.-I. Kitayama, Y. Kato, S. Seikai, N. Uchida, M. Akiyama and O. Fukuda. "Transmission Characteristic Measurement of Two-Mode Optical Fiber with a Nearly Optimum Index-Profile." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 604-608.*

Two-mode optical fibers are studied experimentally and theoretically. A fiber with a nearly optimum index profile, designed for the material dispersion-free spectral region of 1.3 μm has been fabricated. The fiber core diameter is 20 μm with a 0.26 percent of relative-index difference between the core and cladding. Group delay time differences Delta tau between LP/sub 01/ and LP/sub 11/ modes are measured in the spectral region 1.06-1.44 μm by using a fiber Raman laser. As a result, the zero-modal dispersion characteristic is confirmed to occur near 1.4 μm. It is shown that a gently sloping Delta tau characteristic against V-value is obtained when the central index dip in core index profile is eliminated. In the present test fiber, Delta tau = 230 ps/km, caused by a V-value deviation of 5 percent from the optimum V/sub 0/ at which Delta tau = 0. The theory predicts 200 ps/km with an optimum index profile.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Transverse Discontinuities in Nonreciprocal Waveguides

*T.A. Enegren and M.M.Z. Kharadly. "Transverse Discontinuities in Nonreciprocal Waveguides." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 609-615.*

The mode-matching technique is used to analyze transverse discontinuities in nonreciprocal waveguides. The difficult orthogonality relations are circumvented using a Galerkin approach. The elements of an exact three-element equivalent circuit for an infinitely thin metallic diaphragm are evaluated. Each element has two values, one for each direction of propagation. The numerical results show the same trends as those obtained experimentally in a similar configuration.

# Abstracts

## Characteristics of Circulators Using Planar Triangular and Disk Resonators Symmetrically Loaded with Magnetic Ridges

*J. Helszajn, R.D. Baars and W.T. Nisbet. "Characteristics of Circulators Using Planar Triangular and Disk Resonators Symmetrically Loaded with Magnetic Ridges." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 616-621.*

Planar triangular and disk resonators may be tuned by loading them with magnetic wall ridges. This method of tuning resonators, particulary attractive at UHF due to the reduction in physical size, may be understood by invoking the duality between a planar circuit with magnetic walls and the dual waveguide problem with three metal ridges and electric walls. Measurements on stripline circulators using this type of resonator indicate good agreement between theory and experiment for both disk and triangular planar geometries. The loaded Q-factor of circulators using such circuits has been formulated using perturbation theory and found to be in good accord with experiment. Thus the paper gives a complete description of junction circulators using disk or triangular resonators loaded with magnetic wall ridges.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Characteristics of Crossed Rectangular Coaxial Structures

*L. Gruner. "Characteristics of Crossed Rectangular Coaxial Structures." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 622-627.*

The cutoff frequencies of a rectangular coaxial structure with corner ridges have been determined using the method of partial regions. The theory is complemented by a detailed study of the numerical procedure used in arriving at the results presented.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Behavior of Bleustein-Gulyaev Waves in a Periodically Corrugated Piezoelectric Crystal

*M. Tsutsumi and N. Kumagai. "Behavior of Bleustein-Gulyaev Waves in a Periodically Corrugated Piezoelectric Crystal." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 627-632.*

The propagation characteristics of Bleustein-Gulyaev waves in a periodically corrugated piezoelectric crystal is investigated theoretically and numerically. The exact couple-mode equations governing the nature of Bleustein-Gulyaev wave interactions are derived with the aid of a singular perturbation procedure, and the interesting behavior of the filtering characteristics are shown numerically. It is found that the practically important characteristics such as wide stop-bandwidth and large wave-decay in the stopband can be achieved by choosing a value of the piezoelectric constant suitably, and/or coating the crystal surface with thin conducting material.

# Abstracts

## Power Considerations on IMPATT-Diode Arrays with Incomplete Thermal Isolation

*H. Suzuki, O. Kurita, M. Ino, T. Makimura and M. Ohmori. "Power Considerations on IMPATT-Diode Arrays with Incomplete Thermal Isolation." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 632-638.*

Power output characteristics are discussed for an IMPATT-diode array in which the thermal isolation between the diodes is not complete. The degree of thermal isolation is treated by modifying the thermal resistance. The power output characteristics, calculated by the theory, agree with the characteristics obtained from experiments for a two-diode array. In this experiment, the diode arrangement is unsymmetrical with respect to the quartz standoff, in constrast to the symmetrical arrangement ordinarily used in X band. The 380-mW (70-GHz) power output obtained from an array composed of two Si DDR diodes is 1.7 times that of single diode operation.

Click on title for a complete paper.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Extension of Existing Models to Ion-Implanted MESFET's

*P. de Santis. "Extension of Existing Models to Ion-Implanted MESFET's." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 638-647.*

This work extends uniform MESFET's models to MESFET's with arbitrary doping density profiles. Numerical computations have carried out for ion-implanted devices with a Gaussian doping density profile. Good agreement is found between theory and experiment.

# Abstracts

## Electronic Modulated Beam-Steerable Silicon Waveguide Array Antenna

*R.E. Horn, H. Jacobs, E. Freibergs and K.L. Klohn. "Electronic Modulated Beam-Steerable Silicon Waveguide Array Antenna." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 647-653.*

The design and experimental findings for a low-cost easily fabricated millimeter-wave line scanner is described. This antenna consists of a 1-mm x 1-mm silicon dielectric rod with a metal grating (periodic structure) on the upper surface and p-i-n diodes mounted on the sidewall. A narrow 8° beam is radiated from the grated (perturbed) surface at an angle dependent on the guide and perturbation spacing. The beam angle is switched over a 10° angle by application of a dc forward current through the p-i-n diode modulators.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Noise Analysis of Nonlinear Feedback Oscillator with AM-PM Conversion Coefficient

*A. Takaoka and K. Ura. "Noise Analysis of Nonlinear Feedback Oscillator with AM-PM Conversion Coefficient." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 654-662.*

The noise of a microwave nonlinear feedback oscillator with AM-PM conversion coefficient is analyzed. The oscillation wave is divided into a carrier and noise sidebands. It is assumed that the noise sideband is the first-order perturbation to the carrier wave and can be superposed with each other. The amplitude and frequency of the carrier are graphically determined by the "device-load line" method, considering the nonlinearity of the amplifier. In order to take the AM-PM conversion effect of a nonlinear amplifier into account, the "transfer matrix" for the small AM and PM sideband components which has amplitude-dependent diagonal and off-diagonal terms is introduced as an extension of the incremental describing function. The spectra of the oscillator noise and their dependence on operating conditions can be easily calculated by using these transfer matrices. The AM and PM noise spectra are measured when a traveling-wave tube is used as an amplifier. The measured values well agree with the calculated ones.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## A Broad-Band Optoelectronic Microwave Switch

*E.H. Hara and R.I. MacDonald. "A Broad-Band Optoelectronic Microwave Switch." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 662-665.*

A broad-band optoelectronic switch based on an avalanche photodiode is described. The microwave signal is supplied to the switch as intensity modulation on an optical carrier wave. Switching is achieved by reverse biasing the APD for the on-state and forward biasing for the off-state. Isolation of better than 80 dB is reported over a signal frequency range of 10 MHz to 1 GHz. In the same switch, isolation greater than 60 dB is observed up to 3 GHz. A turn-on time of 400 ns was observed without special techniques for discharging the junction, the turn-off time is much shorter.

# Abstracts

## Upper Limits on the Error of an Improved Approximation for the Characteristic Impedance of Rectangular Coaxial Line (Short Papers)

*H.J. Riblet. "Upper Limits on the Error of an Improved Approximation for the Characteristic Impedance of Rectangular Coaxial Line (Short Papers)." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 666-667.*

An Improved approximation for the characteristic impedance of symmetrical rectangular coaxial line in terms of the known capacitances of related structures is given as well as curves which give upper limits on the error involved.

Click on title for a complete paper.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Plane-Wave Interaction with Structures of Thin Absorbing Films (Short Papers)

*H.L. Hartnagel. "Plane-Wave Interaction with Structures of Thin Absorbing Films (Short Papers)." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 667-669.*

Electromagnetic plane-wave absorption by resistive films of finite dimensions are considered. It is proposed that the effect of edge diffraction from a finite film causes the experimentally observed frecuency-dependent sensitivity of thin-film microwave-power monitors. Methods are outlined to prevent such frecuency dispersion. It is pointed out that the position of a microwave power source can be determined by 3 pairs of perpendicularly placed thin-film monitors.

# Abstracts

## A Fast Low-Loss Low-Drive 14-GHz Microstrip p-i-n Phase Shifter (Short Papers)

*B. Glance. "A Fast Low-Loss Low-Drive 14-GHz Microstrip p-i-n Phase Shifter (Short Papers)." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 669-671.*

A 14-GHz 4-bit p-i-n microstrip phase shifter with low RF attenuation, fast switching time, and low switching power requirements is described. The insertion loss for the 16 phase states is 1.4 dB±0.1 dB over the 14-14.5-GHz band. This insertion loss, obtained with a forward bias current of 2.5 mA/diode, is the lowest reported for comparable phase shifters. Switching time of each of the 4 cells is 1 ns. Driving power per cell is 15 mW for a switching repetition rate of 1 µs.

# Abstracts

## Computer Aided Analysis of Noise in Lossy Microwave Filters (Short Papers)

*D. Kajfez. "Computer Aided Analysis of Noise in Lossy Microwave Filters (Short Papers)." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 671-672.*

Computer programs for the analysis of cascaded two-ports, based on chain parameters, can be easily extended to incorporate computation of the noise properties of passive networks. The numerical results obtained for a five-section microstrip bandpass filter indicate that the noise factor is approximately equal to the attenuation, and no significant improvement can be obtained by a mismatch of the source.

# Abstracts

## The Design of Coupled Microstrip Lines (Correction)

*R.M. Osmani. "The Design of Coupled Microstrip Lines (Correction)." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 672-673.*

In the above paper, the authors have described a new procedure for the design of coupled rnicrostrip lines. For the even-mode case, their results differ from those of Bryant and Weiss by as much as 14 percent.

# Abstracts

## An Accurate Solution of the Cylindrical Dielectric Resonator Problem (Correction)

*M. Jaworski and M.W. Pospieszalski. "An Accurate Solution of the Cylindrical Dielectric Resonator Problem (Correction)." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 673-673.*

In the above paper, the following corrections should be made.

# Abstracts

## Contributors (Jun. 1980 [T-MTT])

*M. Aikawa, M. Akiyama, H.A. Atwater, D.T. Auckland, R.D. Baars, I.J. Bahl, P. Bhartia, B. Bhat, A. Chakraborty, E.J. Denlinger, P. de Santis, T.A. Enegren, E. Freibergs, O. Fukuda, L. Gruner, E.H. Hara, R.F. Harrington, J. Helszajn, R.E. Horn, M. Ino, H. Jacobs, K.T. Jokela, Y. Kato, M.M.Z. Kharadly, R.W.P. King, K.-I. Kitayama, K.L. Klohn, N. Kumagai, O. Kurita, P.A.A. Laura, R. Levy, R.I. MacDonald, T. Makimura, M. Miyagi, K. Nagaya, W.T. Nisbet, S. Nishida, H. Ogawa, M. Ohmori, S. Prasad, A.A.M. Saleh, B.H. Sandler, G.S. Sanyal, G.S. Sarmiento, S. Seikai, A.K. Sharma, H. Suzuki, A. Takaoka, M. Tsutsumi, N. Uchida, K. Ura and K. Yamamoto. "Contributors (Jun. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 674-681.*

# Abstracts

## IEEE Journals on Microfilm (Advertisement) (Jun. 1980 [T-MTT])

*"IEEE Journals on Microfilm (Advertisement) (Jun. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 682-682.*

# Abstracts

## Membership Application (Jun. 1980 [T-MTT])

*"Membership Application (Jun. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 683-683.*



MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## IEEE Open Order Plan for Non-Periodical Publications (Advertisement) (Jun. 1980 [T-MTT])

*"IEEE Open Order Plan for Non-Periodical Publications (Advertisement) (Jun. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): 684-684.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Back Cover (Jun. 1980 [T-MTT])

*"Back Cover (Jun. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.6 (Jun. 1980 [T-MTT]): b1-b2.*

# Abstracts

## Front Cover (Jul. 1980 [T-MTT])

*"Front Cover (Jul. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.7 (Jul. 1980 [T-MTT]): f1-f2.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A Novel Polarization-Independent Beam Splitter

*R. Watanabe. "A Novel Polarization-Independent Beam Splitter." 1980 Transactions on Microwave Theory and Techniques 28.7 (Jul. 1980 [T-MTT]): 685-689.*

This paper presents the design and experimental results of a novel broad-band quasi-optical polarization-independent beam splitter. The novel beam splitter consists of parallel metallic strips formed on a dielectric sheet. The width and spacing of the metallic strips and thickness of the dielectric sheet are optimized. This experimentally manufactured 3-dB beam splitter has a frequency bandwidth from 80 to 110 GHz, and the transmission and reflection coefficients for mutually orthogonal polarisation are within 3±0.5 dB over this entire frequency band. The insertion losses are 0.2 dB over the abovementioned frequency band. The obtained insertion losses are less than that obtained with any other quasi-optical polarisation-independent beam splitter presented in the literature to date. This type of beam splitter holds great promise as a device for constructing signal-multiplexing and demultiplexing circuits in the millimeter-wave region and above.

# Abstracts

## Generalized Fresnel Power Transmission Coefficients for Curved Graded-Index Media

*J.D. Love and C. Winkler. "Generalized Fresnel Power Transmission Coefficients for Curved Graded-Index Media." 1980 Transactions on Microwave Theory and Techniques 28.7 (Jul. 1980 [T-MTT]): 689-695.*

When a tunneling ray passes through a turning point in a graded-index medium, a fraction of its power is transmitted into the optically less dense medium beyond the turning point. We determine a generalized Fresnel coefficient to describe the fraction of power transmitted when the stratification of the medium is of arbitrary shape, defined by the two principal radii of curvature at the turning point. It is also shown how to incorporate the effect of a step discontinuity in the graded profile. The core of the bent parabolic index fiber is used to illustrate the variation of power transmitted into the cladding with curvature and depth of tunneling.

# Abstracts

## TE/sub 011/ Mode Sectorial Circular Cylindrical Cavities Filters (Jul. 1980 [T-MTT])

*P.R. Karmel. "TE/sub 011/ Mode Sectorial Circular Cylindrical Cavities Filters (Jul. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.7 (Jul. 1980 [T-MTT]): 695-699.*

This paper presents a new cavity resonator for the TE/sub 011/ circular mode which allows a compact mechanical structure for a multiple-cavity filter and retains many electrical characteristics of larger filters. Theoretical values of Q are obtained, mode separation is demonstrated, and a 4-cavity experimental model with an elliptic transfer function is described.

# Abstracts

## Toroidal Resonators for Electromagnetic Waves--II

*F. Cap and R. Deutsch. "Toroidal Resonators for Electromagnetic Waves--II." 1980 Transactions on Microwave Theory and Techniques 28.7 (Jul. 1980 [T-MTT]): 700-703.*

A series solution to Maxwell's equations for toroidal geometry has been given. Approximations of the eigenfunctions and of the dispersion relation have been obtained. The existence of two groups of electromagnetic rnodes with different symmetries has been put in evidence.

# Abstracts

## Attenuation and Radiation Characteristics of the HE/sub 11/ -Mode

*C. Dragone. "Attenuation and Radiation Characteristics of the HE/sub 11/ -Mode." 1980 Transactions on Microwave Theory and Techniques 28.7 (Jul. 1980 [T-MTT]): 704-710.*

The asymptotic properties of the fundamental mode HE /sub 11/ inside a large waveguide of finite surface impedances are discussed. The analysis applies to corrugated waveguides, certain optical fibers and wave-guides with metal walls coated by a dielectric layer. It is shown that for k-->/spl infin/ the HE/sub 11/ -mode has the following two properties: it is polarized in one direction and the field vanishes at the boundary. Because of these properties, it is useful in the design of microwave feeds, since it minimizes cross-polarization and edge illumination at the aperture. It is also useful for long distance communication because of its low attenuation constant. Both the far field of a feed and the attenuation constant are discussed. It is shown that rectangular apertures have negligible cross-polarization over wider bandwidth than circular apertures. Furthermore, if the medium inside a waveguide is lossless, so that power is lost only at the boundary, then the attenuation constant is very small, it is asymptotic to (ka)/sup -2/ for large ka, where k = 2 pi/lambda and a is a characteristic dimension of the waveguide. A rectangular waveguide consisting of four metal plates coated with thin dielectric layers is shown to be attractive for long distance communication, because of its simplicity of fabrication and its low attenuation.

# Abstracts

## Conducting Spheres in Rectangular Waveguides

*J.H. Hinken. "Conducting Spheres in Rectangular Waveguides." 1980 Transactions on Microwave Theory and Techniques 28.7 (Jul. 1980 [T-MTT]): 711-714.*

A conducting sphere on the center of the broad wall of a rectangular waveguide causes frequency independent reflections for a wide range of frequencies. This empirically found behavior is confirmed analytically here by perturbational calculations. Furthermore experimental and analytical resufts are given for a sphere located in the middle of the waveguide cross section.

# Abstracts

## On the Propagation of Leaky Waves in a Longitudinally Slotted Rectangular Waveguide

*J.M. Tranquilla and J.E. Lewis. "On the Propagation of Leaky Waves in a Longitudinally Slotted Rectangular Waveguide." 1980 Transactions on Microwave Theory and Techniques 28.7 (Jul. 1980 [T-MTT]): 714-718.*

The field theory approach is used to study leaky-wave propagation in a rectangular waveguide with long nonresonant slots in the narrow walls. Radiation from the slots is confined by parallel plates which act as transmission lines guiding the energy away from the slots. The complex dispersion equations for TE waves are examined and solved using an iterative numerical technique. Propagation characteristics both in the axial and transverse directions are presented, along with the electric field distribution and power flow. Restrictions on the analysis and on the power-handling capacity imposed by slot width also are described. Measurements of the phase characteristics of the dominant mode are in good agreement with theoretical values.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Method for Equalizing Phase Velocities of Coupled Microstrip Lines by Using Anisotropic Substrate

*M. Kobayashi and R. Terakado. "Method for Equalizing Phase Velocities of Coupled Microstrip Lines by Using Anisotropic Substrate." 1980 Transactions on Microwave Theory and Techniques 28.7 (Jul. 1980 [T-MTT]): 719-722.*

We present a method for equalizing the even- and odd-mode phase velocities of coupled microstrip lines with zero-thickness strips by using the anisotropic material cut in the appropriate direction as the substrate.

# Abstracts

## Effects of Randomization on Periodic Coupling

*C.R. Predmore. "Effects of Randomization on Periodic Coupling." 1980 Transactions on Microwave Theory and Techniques 28.7 (Jul. 1980 [T-MTT]): 722-725.*

Previous analyses of periodically coupled multimoded systems have assumed equal spacing of the coupling points. In this paper, explicit simple formulas are developed to account for randomized variations of a periodically coupled system. This analysis is useful in multimoded transmission systems utilizing circular waveguides or fiber optics and in active systems such as traveling wave tubes and surface acoustic wave devices.

# Abstracts

## Transmission-Line Identities for a Class of Interconnected Coupled-Line Sections with Application to Adjustable Microstrip and Stripline Tuners

*A.A.M. Saleh. "Transmission-Line Identities for a Class of Interconnected Coupled-Line Sections with Application to Adjustable Microstrip and Stripline Tuners." 1980 Transactions on Microwave Theory and Techniques 28.7 (Jul. 1980 [T-MTT]): 725-732.*

Transmission-line identities are developed for a class of interconnected coupled-line sections. The identities, which may be used in several applications, are employed to synthesize adjustable microstrip and stripline tuners consisting of parallel, coupled or uncoupled strips with movable bridging wires. The tuners, which are analogous to waveguide and coaxial-line multistub tuners, can be used, in principle, to match any impedance falling within the Smith Chart. An experiment on a 12-GHz adjustable microstrip tuner is described, and the results are found to agree favorably with the theory.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Spectral Domain Immitance Approach for Dispersion Characteristics of Generalized Printed Transmission Lines

*T. Itoh. "Spectral Domain Immitance Approach for Dispersion Characteristics of Generalized Printed Transmission Lines." 1980 Transactions on Microwave Theory and Techniques 28.7 (Jul. 1980 [T-MTT]): 733-736.*

A simple method for formulating the dyadic Green's functions in the spectral domain is presented for generalized printed transmission lines which contain several dielectric layers and conductors appearing at several dielectric interfaces. The method is based on the transverse equivalent transmission line for a spectral wave and on a simple coordinate transformation. This formulation process is so simple that often it is accomplished almost by inspection of the physical cross-sectional structure of the transmission line. The method is applied to a new versatile transmission line, a microstrip-slot line, and some numerical results are presented.

# Abstracts

## Millimeter-Wave Fin-Line Characteristics

*J.B. Knorr and P.M. Shayda. "Millimeter-Wave Fin-Line Characteristics." 1980 Transactions on Microwave Theory and Techniques 28.7 (Jul. 1980 [T-MTT]): 737-743.*

This paper presents an analysis of the fin line. The spectral-domain technique is used to determine both wavelength and characteristic impedance. Numerical results are compared with known data for ridged waveguide slab-loaded waveguide, and slotline. Design curves are presented for practical millimeter-wave fin line structures.

# Abstracts

## The Accuracy of TLM Analysis of Finned Rectangular Waveguides

*Y.-C. Shih and W.J.R. Hoefer. "The Accuracy of TLM Analysis of Finned Rectangular Waveguides." 1980 Transactions on Microwave Theory and Techniques 28.7 (Jul. 1980 [T-MTT]): 743-746.*

This paper investigates three sources of error affecting the Transmission Line Matrix (TLM) analysis of finned rectangular waveguides. It is shown how truncation and velocity errors can be minimized, and a diagram for maximum coarseness error affecting the TLM analysis is presented. After error correction, cutoff frequencies obtained with the TLM method are in excellent agreement with results obtained with the Transverse Resonance Method.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## A Quadriphase Fin-Line Modulator

*E. Kpodzo, K. Schunemann and G. Begemann. "A Quadriphase Fin-Line Modulator." 1980 Transactions on Microwave Theory and Techniques 28.7 (Jul. 1980 [T-MTT]): 747-752.*

A hybrid-coupled quadriphase rnodulator which has been realized in fin-line technique is described. It operates over a 15-percent frequency band around 15 GHz with an insertion loss of 1.7 dB. The circuit has been scaled to twice the operating frequency. The insertion loss then amounts to 2.2 dB. Furthermore, it is shown experimentally that the performance of the modulator does not degrade if the dimensions of the waveguide housing are altered to amounts of up to 10 percent.

# Abstracts

## Electric Probe Measurements on Microstrip

*J.S. Dahele and A.L. Cullen. "Electric Probe Measurements on Microstrip." 1980 Transactions on Microwave Theory and Techniques 28.7 (Jul. 1980 [T-MTT]): 752-755.*

The aim of the experimental investigation reported here is to measure the electric field of microstrip using a field probe. To establish the accuracy of these measurements, the probe is first calibrated against a known field which is obtained by analyzing a wire suspended axially in a rectangular metal tube. Measurements on a simple wire over ground plane circuit indicate that unshielded structures are basically unsuitable for accurate probe calibration. Finally, the theoretical results predicted by a numerical analysis program for microstrip, published recently, are verified by comparing these with the actual field distribution determined experimentally.

# Abstracts

## Efficient Power Combining (Jul. 1980 [T-MTT])

*M. Dydyk. "Efficient Power Combining (Jul. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.7 (Jul. 1980 [T-MTT]): 755-762.*

The objective of this paper is to establish understanding of the single/multimode oscillator circuits used in combiners. A model is developed with emphasis on the selection and realization of the input/output coefficients, optimum stabilizing and output loads, equalizing network synthesis, and other cogent features. The application of this theory to the highly successful and efficient design of J-band pulsed oscillators will be discussed.

# Abstracts

## An 8-18-GHz YIG-Tuned FET Oscillator

*J.C. Papp and Y.Y. Koyano. "An 8-18-GHz YIG-Tuned FET Oscillator." 1980 Transactions on Microwave Theory and Techniques 28.7 (Jul. 1980 [T-MTT]): 762-767.*

We report here on the design and construction of a YIG- tuned FET oscillator tunable over the entire 8-18-GHz frequency range. The minimum output power from this device operating into a 50-omega load is about +6 dBm. The addition of a balanced buffer amplifier increases the power to about +12-dBm minimum. When optimized for the 12-18-GHz band, the oscillator alone generates a minimum of +10 dBm. The oscillator/ amplifier combination produces at least +15 dBm. We discuss a number of difficulties inherent in the design of broad-band oscillators, especially fixed frequency resonances, linearity, and power drop outs at the low end of the frequency range.

# Abstracts

## The Design of Linearizing Networks for High-Power Varactor-Tuned Frequency Modulators

*E. Marazzi and V. Rizzoli. "The Design of Linearizing Networks for High-Power Varactor-Tuned Frequency Modulators." 1980 Transactions on Microwave Theory and Techniques 28.7 (Jul. 1980 [T-MTT]): 767-773.*

The problem of linearizing the tuning varactor of a microwave frequency rnodulator is still a hard one to solve, and actual designs must often be carried out by trial-and-error techniques. A possible systematic approach to the solution of this problem, taking advantage of modern computer-aided design methods, is presented in this paper. It is shown that a suitable use of a general-purpose optimization program makes it possible to find a tuning network providing both FM linearity and protection of the varactor junction against an excess of RF voltage. This is of considerable inportance in the case of medium- or high-power circuits, since the diode must then be prevented from being drawn into forward conduction or reverse breakdown for proper operation of the modulator.

# Abstracts

## A Low Phase Shift Step Attenuator Using p-i-n Diodes Switches

*F.G. Ananasso. "A Low Phase Shift Step Attenuator Using p-i-n Diodes Switches." 1980 Transactions on Microwave Theory and Techniques 28.7 (Jul. 1980 [T-MTT]): 774-776.*

A fast S-band MIC highdynamic ranqe (0+70 dB) step attenuator is described, with a very small phase change versus attenuation levels. To obtain this, three similar two-paths sections are cascaded, each being able, by means of a couple of SPDT p-i-n diodes switches, to attenuate 0 dB or, respectively, 10, 20, and 40 dB. Experimental results are given, referring to a circuit breadboard operating from 2 to 4 GHz, the phase change being less than ~11° over all the octave band.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Diplexer Operation of Stripline Y Circulators: Part 1--Basic Performance of Diplexer Operation

*T. Nagao and Z. Tanaka. "Diplexer Operation of Stripline Y Circulators: Part 1--Basic Performance of Diplexer Operation." 1980 Transactions on Microwave Theory and Techniques 28.7 (Jul. 1980 [T-MTT]): 776-786.*

The diplexer operation as another version of the double circulation frequency operation (DCFO) was recently performed with stripline Y-junction loaded with conductor-ferrite (CF) composites. Experimental results demonstrated that the large insertion losses appeared in association with higher order circulations. This paper treats circulation adjustments for basic performance of the diplexer operation. Theoretical analysis presents a criterion upon which to test circulation adjustments in getting an idea DCFO performance in the instances of the diplexer operation. Better combinations of circulating modes for the diplexer operation, and relevant circulation adjustments are discussed. It is concluded that the main cause to the large insertion losses insufficiency in circulation adjustments. Experimental results are also presented. In this paper, phenomenological explanation of various circulations is given in preparation for subsequent treatment of the diplexer operation. All ferrites used are treated above resonance.

# Abstracts

## An Evaluation of the Performance of the VLA Circular Waveguide System

*J.W. Archer, E.M. Caloccia and R. Serna. "An Evaluation of the Performance of the VLA Circular Waveguide System." 1980 Transactions on Microwave Theory and Techniques 28.7 (Jul. 1980 [T-MTT]): 786-791.*

A practical and theoretical evaluation of the characteristics of the unique millimeter wavelength, helix-lined, circular waveguide system installed at the Very Large Array Program in New Mexico is presented. The communication system, as installed, exhibits, performance characteristics which exceed the original specifications, indicating that carefully planned direct burial of overdimensioned circular waveguide can be a practical and cost-effective installation technique.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A Swept-Frequency Magnitude Method for the Dielectric Characterization of Chemical and Biological Systems

*M.A. Hollis, C.F. Blackman, C.M. Weil, J.W. Allis and D.J. Schaefer. "A Swept-Frequency Magnitude Method for the Dielectric Characterization of Chemical and Biological Systems." 1980 Transactions on Microwave Theory and Techniques 28.7 (Jul. 1980 [T-MTT]): 791-801.*

A swept-frequency system is described which permits the convenient evaluation of many RF parameters of biological and chemical samples. This system is capable of highly accurate magnitude measurements which can provide not only absorption information but also the complex permittivity when processed through a computerized algorithm. Data have been taken on deionized water and on an aqueous triglycine solution, and there is close agreement with the more time-consuming but precise fixed-frequency measurements of cited references. This measurement system is particularly useful for the examination of frequency- and power-specific responses over narrow ranges.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Irradiation of Prolate Spheroidal Models of Humans in the Near Field of a Short Electric Dipole

*M.F. Iskander, P.W. Barber, C.H. Durney and H. Massoudi. "Irradiation of Prolate Spheroidal Models of Humans in the Near Field of a Short Electric Dipole." 1980 Transactions on Microwave Theory and Techniques 28.7 (Jul. 1980 [T-MTT]): 801-807.*

Analysis of the near-field irradiation of prolate spheroidal models of humans and animals by a short electrical dipole is described. The method of solution involves an integral equation formulation of the problem in terms of the transverse dyadic Green's function and expanding the fields irradiated by a short dipole in terms of the vector spherical harmonics. The extended boundary condition method (EBCM) is employed to solve the integral equations. The power distribution and the average specific absorption rate (SAR) are calculated and plotted as a function of the separation distance. It is shown that for a dipole placed along the major axis of the spheroidal (k-polarization), and for a very short separation distance, d= 0.15 lambda, the relative power values at both ends of the spheroid are about 40 compared with the ratio of 15 in the planewave exposure case. Furthermore, the calculated average SAR values as a function of the separation distance were found to oscillate around the constant value obtained from the planewave irradiation case. Differences between the near-and far-field exposure cases occurred only at separation distances shorter than 0.5 lambda where the magnitudes of the electric and magnetic energy densities are higher than the time-average radiation power density.

# Abstracts

## A General Equivalent Network of the Input Impedance of Symmetric Three-Port Circulators (Short Paper)

*G. Bittar and G. Veszely. "A General Equivalent Network of the Input Impedance of Symmetric Three-Port Circulators (Short Paper)." 1980 Transactions on Microwave Theory and Techniques 28.7 (Jul. 1980 [T-MTT]): 807-808.*

Starting from the network model of ferrite-filled resonators, a general equivalent network of the input impedance of symmetric, three-port circulators is given. The main advantage of the network, that it contains the original elements of the resonator model, so the physics of operation can be clearly seen and the results of field analysis can be directly used.

# Abstracts

## Rigorous Analysis of the Step Discontinuity in a Planar Dielectric Waveguide (Correction)

*T.E. Rozzi. "Rigorous Analysis of the Step Discontinuity in a Planar Dielectric Waveguide (Correction)." 1980 Transactions on Microwave Theory and Techniques 28.7 (Jul. 1980 [T-MTT]): 809-809.*

In Fig. 7 of the above paper, the label n/sub 2/ K/sub 0/ D = 1 is incorrect.

# Abstracts

## Broad-Band Coupling to High-Q Resonant Loads (Comment)

*S.R. Borgaonkar and S.N. Rao. "Broad-Band Coupling to High-Q Resonant Loads (Comment)." 1980 Transactions on Microwave Theory and Techniques 28.7 (Jul. 1980 [T-MTT]): 809-809.*

The authors of the above paper have suggested the use of a quarter-wavelength transmission line for coupling a series resonant load to a resistive source over a wide band. In order to approximately achieve broad-band coupling, the authors have suggested a procedure wherein the insertion loss is expanded in a Taylor's series about the load-resonance frequency and the normalized characteristic impedance z/sub I/ of the line is selected by equating to zero the coefficient of the second term in the series.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Contributors (Jul. 1980 [T-MTT])

*J.W. Allis, F.G. Ananasso, J.W. Archer, P.W. Barber, G. Begemann, C.F. Blackman, E.M. Caloccia, F. Cap, A.L. Cullen, J.S. Dahele, R. Deutsch, C. Dragone, C.H. Durney, M. Dydyk, J.H. Hinken, W.J.R. Hoefer, M.A. Hollis, M.F. Iskander, T. Itoh, P.R. Karmel, J.B. Knorr, M. Kobayashi, Y.Y. Koyano, E. Kpodzo, J.E. Lewis, J.D. Love, E. Marazzi, H. Massoudi, T. Nagao, J.C. Papp, C.R. Predmore, V. Rizzoli, A.A.M. Saleh, D.J. Schaefer, K. Schunemann, R. Serna, P.M. Shayda, Y.-C. Shih, Z. Tanaka, R. Terakado, J.M. Tranquilla, R. Watanabe, C.M. Weil and C. Winkler. "Contributors (Jul. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.7 (Jul. 1980 [T-MTT]): 810-816.*

# Abstracts

## Back Cover (Jul. 1980 [T-MTT])

*"Back Cover (Jul. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.7 (Jul. 1980 [T-MTT]): b1-b2.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Front Cover (Aug. 1980 [T-MTT])

*"Front Cover (Aug. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.8 (Aug. 1980 [T-MTT]): f1-f2.*

# Abstracts

## A Highly Stabilized GaAs FET Oscillator Using a Dielectric Resonator Feedback Circuit in 9-14 GHz (Aug. 1980 [T-MTT])

*O. Ishihara, T. Mori, H. Sawano and M. Nakatani. "A Highly Stabilized GaAs FET Oscillator Using a Dielectric Resonator Feedback Circuit in 9-14 GHz (Aug. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.8 (Aug. 1980 [T-MTT]): 817-824.*

A new type of highly stabilized GaAs FET oscillator using a dielectric resonator and a stabilization resistor in the feedback circuit has been developed. The oscillator fabricated with a microwave integrated circuit has a high external quality factor Q/sub ex/ for more than 1000 with no hysteresis phenomena. The microwave characteristics of the GaAs FET oscillator has revealed 1) high efficiency of 20 percent with 70-mW output power at 11.85 GHz, 2) a wide tuning range more than1000 MHz, 3) a wide oscillation frequency from 9 to 14 GHz with same MIC pattern by using five dielectric resonators of different sizes, 4) a high-frequency stability as low as ± 150kHz in the tempature range from -20 to + 60° C, and 5) low FM noise of 0.07 Hz//spl radic/Hz at off-carrier frequency of 100kHz.

# Abstracts

## A VHF Hybrid Parametric Amplifier

*C.S. Aitchison and A. Wong. "A VHF Hybrid Parametric Amplifier." 1980 Transactions on Microwave Theory and Techniques 28.8 (Aug. 1980 [T-MTT]): 825-832.*

This paper describes the design and performance of a VHF hybrid parametric amplifier at 30 MHz. A noise temperature of 18 K coupled with a 6-dB gain and 6-MHz bandwidth is obtained.

# Abstracts

## The Hybrid Parametric Amplifier (Aug. 1980 [T-MTT])

*C.S. Aitchison and A. Wong. "The Hybrid Parametric Amplifier (Aug. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.8 (Aug. 1980 [T-MTT]): 833-839.*

This paper calculates the gain and noise performance of a new version of the parametric arnplifier in which the signal circuit is part of an artificial transmission line while the idler circuit is resonant. A particularly useful property of this type of parametric amplifier is absence of oscillation with increasing pump power.

# Abstracts

## High-Accuracy WKB Analyses of alpha-Power Graded-Core Fibers

*K. Oyamada and T. Okoshi. "High-Accuracy WKB Analyses of alpha-Power Graded-Core Fibers." 1980 Transactions on Microwave Theory and Techniques 28.8 (Aug. 1980 [T-MTT]): 839-845.*

The WKB method is an effective approach to the analyses of propagation characteristics of optical fibers. However, conventional WKB analyses can not be applied to close-to-cutoff modes because the effect of core-cladding boundary is not considered exactly. This paper proposes two improved WKB analyses which consider the above effect more exactly. Both of these methods are applicable to the close-to-cutoff modes. The first one is superior in accuracy (for example, relative error in cutoff frequencies <=10/sup -5/), but applicable only to quadratic profiles. The second one is applicable to general alpha -power profiles; the accuracy is poorer but tolerable for most practical purposes.

# Abstracts

## SAW Bandpass Filter Design for 1.6-GHz PCM Timing Tank Applications

*J. Temmyo and S. Yoshikawa. "SAW Bandpass Filter Design for 1.6-GHz PCM Timing Tank Applications." 1980 Transactions on Microwave Theory and Techniques 28.8 (Aug. 1980 [T-MTT]): 846-851.*

A 1.6-GHz surface acoustic wave (SAW) timing tank for a self-timed regenerative repeater for an ultrahigh-speed PCM optical fiber transmission system is described. A SAW narrow bandpass filter with 0.74-µm linewidth interdigital transducers with double electrode geometry and 20-nm aluminum metallization on AT-quartz substrate is realized by conventional optical photolithography. Typical performance obtained is as follows: center frequency f/sub 0/ is 1.5993 GHz; insertion loss is 22 dB; stopband attenuation is above 23 dB with respect to the passbaand; stability is |2Q/sub L//spl dot/Delta f /f/sub 0/| < 0.1, where Q/sub L/ is loaded Q value and Delta f is mistuning due to temperature effects. It is demonstrated that SAW quartz transversal filters can be made into new practical filters which have both high Q value and high stability fn the GHz range and are satisfactory from the standpoints of precise design, fabrication technique, and performance.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Simplified Equivalent Representations for Multicoupled Lines and Their Application to Filter Design

*H. Kunieda. "Simplified Equivalent Representations for Multicoupled Lines and Their Application to Filter Design." 1980 Transactions on Microwave Theory and Techniques 28.8 (Aug. 1980 [T-MTT]): 852-857.*

This paper preaents simplified lumped-type equivalent representations, which are equivalent to multiwire lines in the vicinity of a quarter-wavelength frequency. It is believed that the derived representation can easily be applied to the analysis and the design of coupled-line filters and directional couplers of narrow bandwidths composed of quarter-wavelength strips. In this paper, the general design methad for coupled-line bandpass filters is presented as one of the applications. A new bandpass filter is proposed and the design formulas of the filter are derived by using the design method. Furthermore the range of validity of the derived representations has been checked by showing numerical design examples. They have been found to give excellent results for coupled-line filters of bandwidths up to about 30 percent.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Propagation in a Rectangular Waveguide Periodically Loaded with Resonant Irises (Aug. 1980 [T-MTT])

*M.S. Navarro, T.E. Rozzi and Y.T. Lo. "Propagation in a Rectangular Waveguide Periodically Loaded with Resonant Irises (Aug. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.8 (Aug. 1980 [T-MTT]): 857-865.*

In this contribution we treat the problem of an infinite rectangular waveguide periodically loaded by means of infinitely thin resonant irises. The method of solution breaks down the problem into two separate steps: 1) the multiport network characterizstion of the resonant iris; 2) the network analysis of the equivalent periodic network. The results for the resonant iris can be used for various applications, such as the design of waveguide filters and matching networks. In the limiting cases of purely capacitive or inductive irises, the results agree exactly with existing experimental and numerical values. The size of the eigenvalue equation to be solved for the periodic structure equals half the number of ports of the network chracterization of the iris and is generally small (typically five to seven). The eigenvalues have good convergence properties with resect to the size of the matrix.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Transmission Characteristics and a Design Method of Transmission-Line Low-Pass Filters with Multiple Pairs of Coincident Zeros and Multiple Pairs of Coincident Poles

*J. Huruya and R. Sato. "Transmission Characteristics and a Design Method of Transmission-Line Low-Pass Filters with Multiple Pairs of Coincident Zeros and Multiple Pairs of Coincident Poles." 1980 Transactions on Microwave Theory and Techniques 28.8 (Aug. 1980 [T-MTT]): 865-874.*

The transmission characteristics and a design method are presented for a transmission-line low-pass filter with multiple pairs of coincident zeros in the finite frequency of the passband and multiple pairs of coincident poles in the finite frequency of the stopband and for a transmision-line low-pass filter with Butterworth characteristic in the passband and multiple pairs of coincident poles in the finite frequeney of the stopband. The former transmission-line low-pass filter shows an improved skirt attenuation performance and delay characteristic than a Chebyshev transmission-line low-pass filter in the same network degree. The latter type of transmission-line low-pass filter shows an improved skirt attenuation performance in comparison to a Butterworth transmission-line low-pass filter in the same network degree, it is positioned about in the middle between a Butterworth type and a Chebyshev type, the delay characteristic is improved considerably in comparison to the Chebyshev type, and the characteristic is close to that of the Butterworth type. With this design method, the connecting unit elements in addition to the stubs contribute to the attenuation response. The design example is shown on the basis of a concrete specification, and it is shown that the obtained attenuation strictly fulfills the specification.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Spatial and Temporal Coherence of a 35-GHz Gyromonotron Using the TE/sub 01/ Circular Mode

*M.E. Read, R.M. Gilgenbach, R.F. Lucey, Jr., K.R. Chu, A.T. Drobot and V.L. Granatstein. "Spatial and Temporal Coherence of a 35-GHz Gyromonotron Using the TE/sub 01/ Circular Mode." 1980 Transactions on Microwave Theory and Techniques 28.8 (Aug. 1980 [T-MTT]): 875-878.*

The characteristics of a 35-GHz oscillator operating with the TE/sub 01/ circular waveguide mode are described. The device produced 147 kW, with an efficiency of 31 percent at 100 kW. The total radiated energy was 2 kJ/pulse. The spectral coherence appears to be equal to those of other high-quality microwave tubes. The mode purity is greater than 95 percent.

# Abstracts

## The Variational Principle for Non-Self-Adjoint Electromagnetic Problems

*C.H. Chen and C.-D. Lien. "The Variational Principle for Non-Self-Adjoint Electromagnetic Problems." 1980 Transactions on Microwave Theory and Techniques 28.8 (Aug. 1980 [T-MTT]): 878-886.*

A systematic and intuitive procedure is proposed to derive the variational (or stationary) principle for non-seff-adjoint electromagnetic problems with various boundary conditions. Several physical interpretations of this principle in terms of generalized reactions, time-average stored energy, and reactive powers, respectively, are discussed in detail. This general variational principle which makes the generalized reactions a stationary value is actually an extension of the least action principle in physics. The applications of the principle to establish the variational expressions for a waveguide, a cavity resonator, and a Ioasy one-dimensional inhomogeneous slab are presented.

# Abstracts

## On the Design and Optimization of the Shielded-Pair Transmission Line

*G.S. Smith and J.D. Nordgard. "On the Design and Optimization of the Shielded-Pair Transmission Line." 1980 Transactions on Microwave Theory and Techniques 28.8 (Aug. 1980 [T-MTT]): 887-893.*

The electrical parameters of the shielded-pair transmission Iine are computed using a truncated harmonic expansion for the surface charge density on the conductors. The formulation includes the proximity effect due to the close spacing of the conductors. Parametric curves are given for the capacitance, resistance, and attenuation per-unit length, and the characteristic impedence of the Iine. Both the balanced and the longitudinal modes of propagation are considered and the dimensions for a line with minimum attenuation are determined for each mode. Capacitances measured on model transmission lines are shown to be in good agreement with the theory.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## The Dyadic Green's Functions for Cylindrical Waveguides and Cavities

*M. Kisliuk. "The Dyadic Green's Functions for Cylindrical Waveguides and Cavities." 1980 Transactions on Microwave Theory and Techniques 28.8 (Aug. 1980 [T-MTT]): 894-898.*

Four dyadics are derived to find the electric and magnetic fields generated by a given distribution of electric and magnetic (including aperture) currents in cylindrical waveguides and cavities of arbitrary cross sections. Two sets of vectors are used to form the dyadics: oneset is an expansion of "electric field" vectors, and the other is an expansion of "magnetic field" vectors. Explicit expressions in terms of TE and TM modes are obtained for the resulting electric and magnetic fields. Inside the source regions there are additional components proportional either to the axial components of the current demities (waveguides), or to the current densities vectors (cavities).

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Measurements of Embedding Impedance of Millimeter-Wave Diode Mounts

*C.E. Hagstrom and E.L. Kollberg. "Measurements of Embedding Impedance of Millimeter-Wave Diode Mounts." 1980 Transactions on Microwave Theory and Techniques 28.8 (Aug. 1980 [T-MTT]): 899-904.*

A method for measuring the embedding impedanee of diode mounts is presented. The method is based on the measurement of reflection coefficient magnitude only. The reflection coefficient is measured as a function of diode bias (impedance). The embedding impedance can then be obtained in a simple way from the measured data. Results obtained on a coolable 60-90-GHz waveguide mixer are presented and discussed.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## An Investigation of Nonreciprocal Periodic Structures

*T.A. Enegren and M.M.Z. Kharadly. "An Investigation of Nonreciprocal Periodic Structures." 1980 Transactions on Microwave Theory and Techniques 28.8 (Aug. 1980 [T-MTT]): 905-914.*

The properties of a nonreciprocal ferrite-loaded rectangular waveguide, which is periodically loaded by thin metallic "inductive" diaphragms, are investigated experimentally. The propagation constants of the structure are measured and are compared with predictions based on measured values of the scattering parameters of a single diaphragm in the nonreciprocal waveguide. The agreement between theory and experiment is generally good except for the smaller spacings between the loading diaphragms. This discrepancy is attributed to the effects of higher order mode interaction.

# Abstracts

## Ray Optic Approach to Magnetostatic Bulk Wave Propagation in a YIG Film Delay Line

*S.S. Gupta and N.C. Srivastava. "Ray Optic Approach to Magnetostatic Bulk Wave Propagation in a YIG Film Delay Line." 1980 Transactions on Microwave Theory and Techniques 28.8 (Aug. 1980 [T-MTT]): 915-919.*

This paper discusses a ray optic approach to the magnetostatic wave propagation in a normally magnetized YIG film. The dispersion relation is obtained using the method of transverse resonance. The lateral shift due to reflection at the boundaries has been obtained from energy flow analysis. The path of the rays has been traced from which an approximate expression for the group delay time has been obtained. It is seen that, for the first-order mode, the agreement between this approximate expression for the delay with the rigorous one is satisfactory except near the lower cutoff. In the case of higher order, modes the two compare satisfactorily throughout the frequency range of guided waves.

# Abstracts

## Surface Electromagnetic Wave Field Strength Measurements on Railroad Tracks

*B.C.H. Lai and C.A. Goben. "Surface Electromagnetic Wave Field Strength Measurements on Railroad Tracks." 1980 Transactions on Microwave Theory and Techniques 28.8 (Aug. 1980 [T-MTT]): 919-924.*

This paper reports an experimental investigation of surface electromagnetic wave (SEW) energy distribution on railroad tracks. Radial field distribution of SEW on 112-lb/yd rafts were examined utilizing a dipole diode detector. Laboratory and on site measurements were made. The field strength distribution data at frequencies 3.000, 6.000, and 9.733 GHz show that the main part of the SEW TE mode energy (almost 90 percent) is on the head of the rail. Use of dielectric augmentation on the side of raifs resulted in lower attenuation of the propagating SEW. Thick dielectric strip augmentation data shows enhancement of SEW propagation in agreement with McAulay. The intertrack coupling and the characteristic frequency response versus field strength at varied distances from the source were also examined. These data indicate propagation distances of more than 2000 m are possible using dielectric augmentation.

# Abstracts

## A Broad-Band Element for Microstrip Bias or Tuning Circuits (Short Papers)

*B.A. Syrett. "A Broad-Band Element for Microstrip Bias or Tuning Circuits (Short Papers)." 1980 Transactions on Microwave Theory and Techniques 28.8 (Aug. 1980 [T-MTT]): 925-927.*

A microstrip radial transmission line circuit element namely a 180° circular stub or "half-moon" structure, having a reflection coefficient of unity magnitude and phase which varies slowly with frequency is presented. Theoretical reflection coefficient data are shown to agree well with experimental microstrip (epsilon/sub r/=2.35, h =250 µm) data in X band. Applications of the half-moon microstrip element in the design of broad-band bias or tuning networks are discussed.

# Abstracts

## Dispersion in n Coupled Microstrip Meanders (Short Papers)

*A.K. Agrawal. "Dispersion in n Coupled Microstrip Meanders (Short Papers)." 1980 Transactions on Microwave Theory and Techniques 28.8 (Aug. 1980 [T-MTT]): 927-932.*

A meander line consisting of an even (n), or odd (n-1), number of coupled microstrips has been analyzed for its dispersion and iterative impendance characteristics. In contrast with the unit cell approximation used by other authors, this method takes all the couplings into account and enables correct determination of stopband locations, which is very important in the design of such slow-wave structures. Other periodic structures can also be analyzed by this method, and their possible future applications as filters, etc., can be predicted.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## The Bandwidth of Image Guide (Short Papers)

*R.J. Collier and R.D. Birch. "The Bandwidth of Image Guide (Short Papers)." 1980 Transactions on Microwave Theory and Techniques 28.8 (Aug. 1980 [T-MTT]): 932-935.*

The various parameters involved in the bandwidth of image guide are discussed, viz., the aspect ratio and dieletric constant. Three definitions of bandwidth are given involving dispersion, wave-guiding properties and variation of charaeteristic impedance with velocity. Theoretical values of these definitions are given and the paper concludes with a discussion about their relative inportance.

# Abstracts

## Tolerance Analysis of Cascaded Structures (Short Papers)

*J.W. Bandler and M.R.M. Rizk. "Tolerance Analysis of Cascaded Structures (Short Papers)." 1980 Transactions on Microwave Theory and Techniques 28.8 (Aug. 1980 [T-MTT]): 935-938.*

This paper presents an analysis scheme to obtain the response of a cascaded network and its first-order sensitivities wrt design variables at the vertices of the tolerance region in an efficient and systematic way. This information is needed in worst-case search algorithms to identify the worst vertex or in a general tolrance assignment. A substantial saving in computational effort is achieved by using the new approach over the basic approach of reanalyzing the circuit at every vertex.

# Abstracts

## Contributors (Aug. 1980 [T-MTT])

*C.S. Aitchison, C.H. Chen, K.R. Chu, A.T. Drobot, T.A. Enegren, R.M. Gilgenbach, C.A. Goben, V.L. Granatstein, S.S. Gupta, C.E. Hagstrom, J. Huruya, O. Ishihara, M.M.Z. Kharadly, M. Kisliuk, E.L. Kollberg, H. Kunieda, B.C.H. Lai, C.-D. Lien, Y.T. Lo, R.F. Lucey, Jr., T. Mori, M. Nakatani, M.S. Navarro, J.D. Nordgard, T. Okoshi, K. Oyamada, M.E. Read, T.E. Rozzi, R. Sato, H. Sawano, G.S. Smith, N.C. Srivastava, J. Temmyo, A. Wong and S. Yoshikawa. "Contributors (Aug. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.8 (Aug. 1980 [T-MTT]): 939-943.*

# Abstracts

## Order Form (Aug. 1980 [T-MTT])

*"Order Form (Aug. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.8 (Aug. 1980 [T-MTT]): 944-944.*

# Abstracts

## Back Cover (Aug.1980 [T-MTT])

*"Back Cover (Aug.1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.8 (Aug. 1980 [T-MTT]): b1-b1.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Front Cover (Sep. 1980 [T-MTT])

*"Front Cover (Sep. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.9 (Sep. 1980 [T-MTT]): f1-f2.*

# Abstracts

## Read-Type Varactors for Parametric Amplifier Applications

*D.F. Peterson and G.I. Haddad. "Read-Type Varactors for Parametric Amplifier Applications." 1980 Transactions on Microwave Theory and Techniques 28.9 (Sep. 1980 [T-MTT]): 945-951.*

The use of Read-type HI-LO doping profiles in varactors for pararnetric amplifier applications is shown to result in improved performance over conventional structures. Optimal diode doping Ievels layer thicknesses, and pump drive levels are derived which give specified frequency performance while minimizing pump power requirements, minimizing noise, maximizing dynamic range, and reducing amplifier sensitivity to pump power fluctuations. The optimum device design is based on environmental Iimitations such as pump power, circuit losses and impedance Ievels and the unavoidable diode series resistance level. Design examples are given for 10- and 100-GHz parametric amplifiers.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## A 40-GHz Digital Distribution Radio with a Single Oscillator

*M. Hata, A. Fukasawa, M. Bessho, S. Makino and M. Higuchi. "A 40-GHz Digital Distribution Radio with a Single Oscillator." 1980 Transactions on Microwave Theory and Techniques 28.9 (Sep. 1980 [T-MTT]): 951-962.*

New 40-GHz band digital radio equipment is described. In the equipment we adopted a new circuit configuration consisting of a single IMPATT diode oscillator which functions as both transmitter frequency converter and receiver load oscillator simultaneously. The principal system design factors, a unique IMPATT diode oscillator mount configuration and test results are described. The compact radio equipment is designed so that it ensures excellent cost performance for communication systems in local trunk service, even in short hop applications resulting from rainfall attenuation to the new band.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Practical Considerations in the Design of a High-Power 1-mm Gyromonotron

*J.D. Silverstein, M.E. Read, K.R. Chu and A.T. Drobot. "Practical Considerations in the Design of a High-Power 1-mm Gyromonotron." 1980 Transactions on Microwave Theory and Techniques 28.9 (Sep. 1980 [T-MTT]): 962-966.*

A second harmonic gyromonotron has been designed to have an output of 4 kW at a frequency of 240 GHz, and to operate with an overall efficiency of 14 percent. The design method utilized a detailed theory of the gyrotron oscillator and an electron orbit computer code. Particular attention was paid to the problem of mode competition in the oscillator cavity. Although a particular design example is considered, the method is of general interest.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Hybrid Integrated Triplers Frequency Doublers and to 300 and 450 GHz

*T. Takada, T. Makimura and M. Ohmori. "Hybrid Integrated Triplers Frequency Doublers and to 300 and 450 GHz." 1980 Transactions on Microwave Theory and Techniques 28.9 (Sep. 1980 [T-MTT]): 966-973.*

High-power wide-band submillimeter-wave frequency sources have been developed. A frequency doubler to 300 GHz has delivered an output power of 5 mW with 3-dB-down bandwidth of more than 10 GHz. A frequency tripler to 450 GHz with an output power of 0.5 mW has also been tested. These multiplier output powers are highest values in the respective frequency regions up to date. The successful performances have been achieved by use of GaAs Schottky-barrier diodes and hybrid integrated circuits which are specially designed to obtain high output power.

# Abstracts

## Design Equations for Symmetric Microstrip DC Blocks

*D. Kajfez and B.S. Vidula. "Design Equations for Symmetric Microstrip DC Blocks." 1980 Transactions on Microwave Theory and Techniques 28.9 (Sep. 1980 [T-MTT]): 974-981.*

The design formulas are presented for achieving either a rippled or a maximally flat response of the dc blocks built with symmetrical coupled microstrip lines. The selection of characteristic impedances of the odd and even modes is facilitated by the use of a universal diagram containing the equicontours of the standing wave ratio and of the band-width. The deformation of the frequency response due to a difference in wavelengths of the odd and even modes is analyzed and the design procedure is adjusted accordingly.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Spectral Domain Analysis of Dominant and Higher Order Modes in Fin-Lines (Sep. 1980 [T-MTT])

*L.-P. Schmidt and T. Itoh. "Spectral Domain Analysis of Dominant and Higher Order Modes in Fin-Lines (Sep. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.9 (Sep. 1980 [T-MTT]): 981-985.*

The spectral domain analysis is applied for deriving despersion characteristics of dominant and higher order modes in fin-line structures. In addition to the propagation constantant, the characteristic impedance is calculated based on the power-voltage definition. Numerical results are compared for different choices of basis functions and allow to estimate the accuracy of the solution.

# Abstracts

## Composite Dielectric Waveguides

*E. Yamashita, K. Atsuki and R. Kuzuya. "Composite Dielectric Waveguides." 1980 Transactions on Microwave Theory and Techniques 28.9 (Sep. 1980 [T-MTT]): 986-990.*

Composite dielectric waveguides, or a class of dielectric waveguides made of a few dielectric materials, are described. A composite circular dielectric waveguide (CCDW) is treated with the the point-matching method. Computed values of the propagation constant of the CCDW are compared with those of the homogeneous circular dielectric waveguides (HCDW). Microwave experiments carried out to comfirm the theory are discribed.

# Abstracts

## A Method for the Study of TE and TM Modes in Waveguides of Very General Cross Section

*J. Mazumdar. "A Method for the Study of TE and TM Modes in Waveguides of Very General Cross Section." 1980 Transactions on Microwave Theory and Techniques 28.9 (Sep. 1980 [T-MTT]): 991-995.*

A simple method for the study of wave propagation in uniform hollow waveguides of very general cross sections is proposed. The method is based upon the concept of contour lines of electromagnetic field components on a typical cross section of the waveguide and applies when the boundry of the cross section of the guide is a closed curve. Examples show that values of cutoff frequencies can be obtained easily to a useful degree of accuracy.

# Abstracts

## Rigorous Evanescent Wave Theory for Guided Modes in Graded Index Optical Fibers

*J.M. Arnold and L.B. Felsen. "Rigorous Evanescent Wave Theory for Guided Modes in Graded Index Optical Fibers." 1980 Transactions on Microwave Theory and Techniques 28.9 (Sep. 1980 [T-MTT]): 996-999.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Excitation of Surface Waves and the Scattered Radiation Fields by Rough Surfaces of Arbitrary Slope

*E. Bahar. "Excitation of Surface Waves and the Scattered Radiation Fields by Rough Surfaces of Arbitrary Slope." 1980 Transactions on Microwave Theory and Techniques 28.9 (Sep. 1980 [T-MTT]): 999-1006.*

Surface waves as well as lateral waves are excited when a rough surface is illuminated by the radiation fields. In view of shadowing, these terms of the complete field expansions contribute significantly to the total fields when the transmitter or receiver are near the rough surface. In this work explict expressions are derived for the coupling between the radiation fields and the surface waves which are guided at the irregular interface between two media. In the analysis, the slope of the rough surface is not restricted and the solutions for both the horizontally and vertically polarized waves are shown to satisfy reciprocity and duality relationships in electromagnetic theory. Special consideration is given to Brewster angles of incidence and scatter and stationary phase techniques. The full-wave solutions are also applied to random and periodic rough surfaces.

# Abstracts

## Comparative Testing of Leaky Coaxial Cables for Communications and Guided Radar

*D.J. Gale and J.C. Beal. "Comparative Testing of Leaky Coaxial Cables for Communications and Guided Radar." 1980 Transactions on Microwave Theory and Techniques 28.9 (Sep. 1980 [T-MTT]): 1006-1013.*

Leaky coaxial cables are finding increasing use in communications systems involving mines, tunnels, railroads, and highways, and in new obstacle detection, or guided radar, schemes for ground transportation and perimeter surveillance. This paper describes the theory and operation of a new laboratory testing technique for these leaky cables based on a novel form of cavity resonator. The technique yields highly consistent and repeatable results that usefully assist in the prediction of the performance of full-size systems, from a simple test on a small sample of cable in a laboratory setting.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## The Influence of the Energy Dissipation and of the Geometry on Toroidal Resonators with a Conducting Separating Wall

*R. Deutsch. "The Influence of the Energy Dissipation and of the Geometry on Toroidal Resonators with a Conducting Separating Wall." 1980 Transactions on Microwave Theory and Techniques 28.9 (Sep. 1980 [T-MTT]): 1014-1017.*

An exact solution of the Maxwell equations for the stationary electomagnetic wave in a toroidal resonator with a separating wall is obtained. The structure of the fields in the resonator and in the metallic toroidal wall is described analytically. The dispersion relation is formulated and the eigenfrequencies, the damping rate and the Q factor of the resonator are calculated.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## General Extracted Pole Synthesis Technique with Applications to Low-Loss TE/sub 011/ Mode Filters

*J.D. Rhodes and R.J. Cameron. "General Extracted Pole Synthesis Technique with Applications to Low-Loss TE/sub 011/ Mode Filters." 1980 Transactions on Microwave Theory and Techniques 28.9 (Sep. 1980 [T-MTT]): 1018-1028.*

A novel synthesis technique is developed for two-port networks which possess finite real frequency transmission zeros. The low-pass prototype is synthesized in the form of a network with complex conjugate symmetry where the real frequency transmission zeros are extracted from both ends and realized by simple resonators separated by phase shifters. The remaining transmission zeros are realized by the central part of the filter in the form of a cross-coupled double array. This prototype is particularly suitable for designing waveguides bandpass filters and each real frequency transmission zero is independently tunable. Furthermore, in the case of the most complex transfer function with all possible types of transmission zeros, the realization requires only one type of coupling which is necessary in the important case of TE/sub 011/ cylindrical mode cavity resonators. The general synthesis technique is given and the process illustrated by a nontrival example. Additionally, from the results of a computer program based upon the synthesis techniques, the important differences between the possible prototype forms for the same transfer function resulting from extracting the transmission zeros in different orders are cited.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## On the Design of Temperature Stabilized Delay Lines (Short Papers)

*P. de Santis. "On the Design of Temperature Stabilized Delay Lines (Short Papers)." 1980 Transactions on Microwave Theory and Techniques 28.9 (Sep. 1980 [T-MTT]): 1028-1029.*

Recently published design formulas for delay lines with transmission phase temperature stabilization are shown to be approximate. Their validity range is assessed. New exact formulas of broader validity are presented.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Periodically Loaded Transmission Lines (Short Papers)

*J. Perini. "Periodically Loaded Transmission Lines (Short Papers)." 1980 Transactions on Microwave Theory and Techniques 28.9 (Sep. 1980 [T-MTT]): 1029-1031.*

In this paper equations for the transmission parameters of a periodically loaded line are derived in closed form with no restriction on the size, type or number of discontinuities. The equations also take into consideration any attenuation that may exist on the line. Several plots of the input reflection coefficient are presented and compared with experimental results. The agreement is very good.

# Abstracts

## Resonant Frequencies of Rectangular Dielectric Resonators (Short Papers)

*J.F. Legier, P. Kennis, S. Toutain and J. Citerne. "Resonant Frequencies of Rectangular Dielectric Resonators (Short Papers)." 1980 Transactions on Microwave Theory and Techniques 28.9 (Sep. 1980 [T-MTT]): 1031-1034.*

The resonant frequencies of isolated dielectric resonators of rectangular shape are calculated using the dielectric waveguide model. The waveguide treatment of the rectangular dielectric rod is solved using the approximate semianalytical techniques of Marcatili, Knox, and Toulios. The accuracy with measured frequencies appear satisfactory with the former approach.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Numerical Calculation of Electromagnetic Energy Deposition for a Realistic Model of Man (Comment)

*K.-M. Chen. "Numerical Calculation of Electromagnetic Energy Deposition for a Realistic Model of Man (Comment)." 1980 Transactions on Microwave Theory and Techniques 28.9 (Sep. 1980 [T-MTT]): 1034-1034.*

In the above paper, Hagmann et al. compared their numencal results on the energy deposition in a model of man with ours, and indicated that our results are low compared with their numerical and experimental results. Our low SAR values were obtained because they were based on a simplified model of man which has a reasonable shape but an excessive weight of about 200 kg. We have since published a considerable amount of results based on a more realistic model of man, which has a more realistic shape and a weight of about 100 kg. Our numerical results based on the realistic model of man are quite close to the numerical and experimental results of Hagmann et al. as shown in Table I.

# Abstracts

## Upper Bound Calculations on Capacitance of Microstrip Line Using Variational Method and Spectral Domain Approach (Comments)

*K. Sachse. "Upper Bound Calculations on Capacitance of Microstrip Line Using Variational Method and Spectral Domain Approach (Comments)." 1980 Transactions on Microwave Theory and Techniques 28.9 (Sep. 1980 [T-MTT]): 1034-1035.*

The author read with interest the above paper in whkh an analytical approach based on the Fourier transformation and variational techniques have been employed; the surface potentiaf V(x) of the dielectric sheet in order to find the upper bound of the microstrip line capacitance C has been used. Thus this approach complements that of Yamashita et al, who calculated the lower bound C/sup L/) dealing with the charge density Q(x) on the surface of the conductor strip; consequently, the margins of error in the variational calculation can be estimated.

# Abstracts

## Contributors (Sep. 1980 [T-MTT])

*J.M. Arnold, K. Atsuki, E. Bahar, J.C. Beal, M. Bessho, R.J. Cameron, K.R. Chu, R. Deutsch, A.T. Drobot, L.B. Felsen, A. Fukasawa, D.J. Gale, G.I. Haddad, M. Hata, M. Higuchi, T. Itoh, D. Kajfez, R. Kuzuya, T. Makimura, S. Makino, J. Mazumdar, M. Ohmori, D.F. Peterson, M.E. Read, J.D. Rhodes, L.-P. Schmidt, J.D. Silverstein, T. Takada, B.S. Vidula and E. Yamashita. "Contributors (Sep. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.9 (Sep. 1980 [T-MTT]): 1036-1039.*

# Abstracts

## IEEE Journals on Microfilm (Advertisement) (Sep. 1980 [T-MTT])

*"IEEE Journals on Microfilm (Advertisement) (Sep. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.9 (Sep. 1980 [T-MTT]): 1040-1040.*

# Abstracts

## Back Cover (Sep. 1980 [T-MTT])

*"Back Cover (Sep. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.9 (Sep. 1980 [T-MTT]): b1-b1.*

# Abstracts

## Front Cover (Oct. 1980 [T-MTT])

*"Front Cover (Oct. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.10 (Oct. 1980 [T-MTT]): f1-f2.*

# Abstracts

## Low-Noise Cooled GASFET Amplifiers

*S. Weinreb. "Low-Noise Cooled GASFET Amplifiers." 1980 Transactions on Microwave Theory and Techniques 28.10 (Oct. 1980 [T-MTT]): 1041-1054.*

Measurements of the noise characteristics of a variety of gallium-arsenide field-effect transistors at a frequency of 5 GHz and temperatures of 300 K to 20 K are presented. For one transistor type detailed measurements of dc parameters, small-signal parameters, and all noise parameters (T/sub min/, R/sub opt/, X/sub opt/ g/sub n/) are made over this temperature range. The results are compared with the theory of Pucel, Haus and Statz modified to include the temperature variation. Several low-noise ampifiers are described including one with a noise temperature of 20 K over a 500-MHz bandwidth. A theoretical analysis of the thermal conduction at cryogenic temperatures in a typical packaged transistor is included.

# Abstracts

## Design of Broad-Band GaAs FET Power Amplifiers

*C. Rauscher and H.A. Willing. "Design of Broad-Band GaAs FET Power Amplifiers." 1980 Transactions on Microwave Theory and Techniques 28.10 (Oct. 1980 [T-MTT]): 1054-1059.*

A direct systematic approach to designing broad-band GaAS FET power amplifiers for optimum large-signal gain performance is described. Assets of this approach include its accuracy in predicting large-signal amplifier performance and its basic simplicity. The implementation of the technique is facilitated by having to measure large-signal device bebavior at only one single frequency. The practicability of the method is demonstrated through comparisons between measured and predicted results.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Power Combining Ladder Network with Many Active Devices

*K. Fukui and S. Nogi. "Power Combining Ladder Network with Many Active Devices." 1980 Transactions on Microwave Theory and Techniques 28.10 (Oct. 1980 [T-MTT]): 1059-1067.*

This paper presents a thoretical treatment of a line array of van der Pol oscillators mutually coupled by inductances and connected to a load (i.e., a multiple-deveice ladder ocillator) aiming to investigate its power-combing capability. A mode analysis approach is used, and it is shown that this system can provide output power just equal to the sum of the available powers from all active devices when it operates at the first mode. In the case where the optimum load is connected at an end of the ladder structure, some stable modes other than the first mode exist, but no stable simultaneous multimodes are found. A method for suppressing undesired modes is discussed. A distributed-line coupled ladder structure is also treated to give a thoretical basis for building a microwave multiple-device ladder oscillator.

# Abstracts

## Improving the Graceful-Degradation Performance of Combined Power Amplifiers

*A.A.M. Saleh. "Improving the Graceful-Degradation Performance of Combined Power Amplifiers." 1980 Transactions on Microwave Theory and Techniques 28.10 (Oct. 1980 [T-MTT]): 1068-1070.*

The standard method of employing n-way hybrid power divider/combiner to combine n amplifiers offers some sort of graceful-degradation performance when one or more of the amplifiers fail. Two schemes are discussed that improve that performance significantly. The first, which was proposed previously, involves replacing each failed amplifier by an equal-delay "through" connection. The second involves using a resistor-free combiner, and seperating each failed amplifier from the combiner by an appropriately placed short or open circuit.

# Abstracts

## Theoretical Investigations of TRAPATT Amplifier Operation

*R.K. Mains, N.A. Masnari and G.I. Haddad. "Theoretical Investigations of TRAPATT Amplifier Operation." 1980 Transactions on Microwave Theory and Techniques 28.10 (Oct. 1980 [T-MTT]): 1070-1076.*

A device-circiut interaction program has been developed for the study of TRAPATT amplifiers. The device is simulated using the programs developed by Bauhahn. A slug-tuned coaxial circuit is simulated with the circuit parameters chosen to model an amplifier for which experimental results have previously been published. Results including diode waveforms over the entire amplifier frequency band are presented. Seperate mechanisms have been identified as being responsible for the fall off in gain and power output above and below the center frequency. The maximum bandwidth which can be attained with TRAPATT amplifier is also estimated.

# Abstracts

## Resonant Modes of a Dielectric Rod Resonator Short-Circuited at Both Ends by Parallel Conducting Plates

*Y. Kobayashi and S. Tanaka. "Resonant Modes of a Dielectric Rod Resonator Short-Circuited at Both Ends by Parallel Conducting Plates." 1980 Transactions on Microwave Theory and Techniques 28.10 (Oct. 1980 [T-MTT]): 1077-1085.*

This paper describes a generalized study for the resonant modes of a dielectric rod resonater placed between two parallel conducting plates. Dielectric and conductor losses are ignored. It is shown that there are two resonant states in this resonator, trapped and leaky states. In order to determine the cutoff and resonat frequencies in the trapped state, numerical results are given for the cutoff conditions and dispersive characteristics of a dielectric rod waveguide. The field patterns for the hybrid modes are also presented. For the resonant modes in the leaky state, it is shown to be useful to introduce a complex angular frequency. Numerical results are given for the various modes with different values of the dielectric constant. Generalized mode charts covering both states and including the cutoff conditions are presented. The existence of both states has been verified by experiments.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Dielectric Loaded Elliptical Waveguides

*S.R. Rengarajan and J.E. Lewis. "Dielectric Loaded Elliptical Waveguides." 1980 Transactions on Microwave Theory and Techniques 28.10 (Oct. 1980 [T-MTT]): 1085-1089.*

Wave propagation in a metallic elliptic waveguide loaded with a dielectric rod or a dielectric lining is investigated theoretically. The mode spectrum for both slow and fast hybrid modes is obtained by numerical solution of the characteristic equations. Correspondence is established between the modes of the loaded and unloaded elliptical waveguides. Typical field plots for /sub e/HE/sub 01/ and /sub 0/EH/sub 01/ modes are presented. Power flow, power loss, and attenuation are obtained using a perturbation method.

# Abstracts

## The Elliptical Surface Wave Transmission Line

*S.R. Rengarajan and J.E. Lewis. "The Elliptical Surface Wave Transmission Line." 1980 Transactions on Microwave Theory and Techniques 28.10 (Oct. 1980 [T-MTT]): 1089-1095.*

Electromagnetic wave propagation on an elliptical cross-sectional surface-wave transmission line is investigated theoretically. Characteristic equations for odd and even hybrid modes are derived and solved numerically. Expressions are obtained for power flow, energy storage and power loss using a perturbation method. Numerical results on propagation characteristics of three lower order modes are presented. The /sub 0/HE/sub 11/ mode is shown to have low attenuation particulary at high eccentricities. The propagation characteristics of lines of high eccentricities are found to be slowly varying functions of dimensions.

# Abstracts

## Coupling of Degenerate Modes on Curved Dielectric Slab Sections and Application to Directional Couplers

*M.D. Abouzahra and L. Lewin. "Coupling of Degenerate Modes on Curved Dielectric Slab Sections and Application to Directional Couplers." 1980 Transactions on Microwave Theory and Techniques 28.10 (Oct. 1980 [T-MTT]): 1096-1101.*

Approximate expressions are derived for the coupling of degenerate modes on two curved dielectric slab sections. From this analysis a directional coupler is designed in which a finite length coupler is joined to terminal lengths via curved structure sections. The reverse coupling (directivity) and reflection, as well as corrections to the coupling length, are studied. The propagation characteristics and the reflection coefficient due to coupling, as well as the correct 3-dB coupling length are calculated, numerically. Second order effects, that determine the band-width as well as the coupling, have been considered and found to be very substantial. In the examples considered the reflection and directivity due to the coupling process were both more than 35 dB down, and the 3-dB outputs were exactly in quadrature, correct to the first order of approximation.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Theory of the Slotted Coaxial Cable

*P.P. Delogne and A.A. Laloux. "Theory of the Slotted Coaxial Cable." 1980 Transactions on Microwave Theory and Techniques 28.10 (Oct. 1980 [T-MTT]): 1102-1107.*

The electromagnetic problem of the coaxial cable with a continuous slot along the outer conductor is solved taking into account the dielectric constant of the cable insulation. Cylindrical harmonics expansions for the inner and outer space are used. The basic difficulty is to express boundary conditions on a part of the period in Fourier series. It appears that the singularity of the fields at the edge of the outer conductor plays a key role in the uniqueness of the result. The propagation constants of the monofilar and coaxial modes are obtained with a good accuracy. It is shown that these modes have different transfer inductances.

# Abstracts

## Wide-Band Equivalent Circuits of Microwave Planar Networks

*G. D' Inzeo, F. Giannini and R. Sorrentino. "Wide-Band Equivalent Circuits of Microwave Planar Networks." 1980 Transactions on Microwave Theory and Techniques 28.10 (Oct. 1980 [T-MTT]): 1107-1113.*

A broad-band equivalent circuit of a generic microwave planar network is derived in terms of lumped constant elements. Contrary to previously proposed equivalent circuits, whose elements are strongly frequency dependent, the elements of the new one show only a smooth dependence on the frequency, because of the dispersion properties of microstrip structures. The equivalent circuit proposed is therefore easy to handle and is shown to be a useful basis for direct synthesis of planar structures. Good agreement with the theory is demonstrated by experiments performed on structures with different geometries up to 12.5 GHz, by using equivalent circuits whose elements are assumed to be constant with the frequency.

# Abstracts

## High-Accuracy Numerical Data on Propagation Characteristics of alpha-Power Graded-Core Fibers

*K. Oyamada and T. Okoshi. "High-Accuracy Numerical Data on Propagation Characteristics of alpha-Power Graded-Core Fibers." 1980 Transactions on Microwave Theory and Techniques 28.10 (Oct. 1980 [T-MTT]): 1113-1118.*

High-accuracy data of normalized cutoff frequencis, propagation constants, and delay time of LP/sub ml/ modes for alpha-power graded-core fibers (alpha = 1, 2, 4, and 10) are obtained by using two entirely different methods: power-series expansion and finite element methods, and the results are compared. The difference between cutoff frequencies obtained by these methods is less than 0.005 percent for most of the LP modes. The obtained data are accurate enough to be used as the standard for estimating the accuracy of other various analyses.

# Abstracts

## Inductive Grids in the Region of Diffraction Anomalies: Theory, Experiment, and Applications

*P.J. Bliek, L.C. Botten, R. Deleuil, R.C. McPhedran and D. Maystre. "Inductive Grids in the Region of Diffraction Anomalies: Theory, Experiment, and Applications." 1980 Transactions on Microwave Theory and Techniques 28.10 (Oct. 1980 [T-MTT]): 1119-1125.*

We describe briefly a rigorous theory for the diffraction of a plane wave by inductive grids having circular apertures pierced in doubly periodic fashion in a thick, perfectly conducting screen. We compare the theory with measurements made at millimetric wavelengths both for normal incidence and off-axis (in the region of strong polarization effects). We discuss the conclusions to be drawn from the calculations and measurements on the use of such grids as filters which pass short wavelengths, particularly in relation to their possible application in the field of solar energy.

# Abstracts

## Differing Effects of Pulsed and CW Microwave Energy Upon Nerve Function as Detected by Birefringence Measurement

*P.V.K. Brown and L.E. Larsen. "Differing Effects of Pulsed and CW Microwave Energy Upon Nerve Function as Detected by Birefringence Measurement." 1980 Transactions on Microwave Theory and Techniques 28.10 (Oct. 1980 [T-MTT]): 1126-1133.*

The change in resting birefringence of crab nerve coincident with propagation of the action potential was used as a measure of peripheral nerve response to microwave radiation. Birefringence indicates membrane permeability changes associated with the ionic currents of the action potential. The use of an optical dependent variable has the advantage that no field perturbations are introduced by sensing electrodes. Statistical analysis of the data indicated that pulsed microwave energy degraded the birefringence amplitude a greater amount and more rapidly than did either continuous wave (CW) energy of the same average power or commensurate heating. CW energy and heating caused no changes from the control condition.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Computer-Aided Design of Stripline Ferrite Junction Circulators (Short Papers)

*Z. Uzdy. "Computer-Aided Design of Stripline Ferrite Junction Circulators (Short Papers)." 1980 Transactions on Microwave Theory and Techniques 28.10 (Oct. 1980 [T-MTT]): 1134-1136.*

A general design procedure is presented for stripline Y-junction circulators employing solid dielectric between ground planes. The resonator design and impedance matching are derived in a form suitable for computer evaluation. The procedure is applicable to cases where either the circulator bandwidth or the ground plane spacing is specified. An experimental S-band switching circulator illustrates the technique.

# Abstracts

## A Quasi-Optical Single Sideband Filter Employing a Semiconfocal Resonator (Short Papers)

*P.F. Goldsmith and H. Schlossberg. "A Quasi-Optical Single Sideband Filter Employing a Semiconfocal Resonator (Short Papers)." 1980 Transactions on Microwave Theory and Techniques 28.10 (Oct. 1980 [T-MTT]): 1136-1139.*

We describe a single sideband filter designed to have low insertion loss when used with microwave radiometer systems incorporating a feedhorn of relatively large beam divergence angle. The device we discuss is a type of Fabry-Perot interferometer employing one plane and one spherical mirror which form a near semiconfocal resonant cavity. Measurements on a prototype device operating at v~1OO GHz with a f/D~4 feedhorn and a 1.4-GHz IF frequency are presented,

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Green's Functions for Triangular Segments in Planar Microwave Circuits (Short Papers)

*R. Chadha and K.C. Gupta. "Green's Functions for Triangular Segments in Planar Microwave Circuits (Short Papers)." 1980 Transactions on Microwave Theory and Techniques 28.10 (Oct. 1980 [T-MTT]): 1139-1143.*

Green's functions are developed for the analysis of triangular segments in microwave planer circuits. Three types of triangles (30°-60° right-angle, equilateral and isosceles right-angled) are treated by placing additional image sources outside the triangular region.

# Abstracts

## Closed-Form Expressions for the Current or Charge Distribution on Parallel Strips or Microstrip (Addendum)

*E.F. Kuester and D.C. Chang. "Closed-Form Expressions for the Current or Charge Distribution on Parallel Strips or Microstrip (Addendum)." 1980 Transactions on Microwave Theory and Techniques 28.10 (Oct. 1980 [T-MTT]): 1143-1143.*

It has been called to the authors' attention that (28) in the above paper is too crudely approximated. The correct expression should read...

# Abstracts

## Contributors (Oct. 1980 [T-MTT])

*M.D. Abouzahra, P.J. Bliek, L.C. Botten, P.V.K. Brown, R. Deleuil, P.P. Delogne, G. D' Inzeo, K. Fukui, F. Giannini, G.I. Haddad, Y. Kobayashi, A.A. Laloux, L.E. Larsen, L. Lewin, J.E. Lewis, R.K. Mains, N.A. Masnari, D. Maystre, R.C. McPhedran, S. Nogi, T. Okoshi, K. Oyamada, C. Rauscher, S.R. Rengarajan, A.A.M. Saleh, R. Sorrentino, S. Tanaka, S. Weinreb and H.A. Willing. "Contributors (Oct. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.10 (Oct. 1980 [T-MTT]): 1144-1147.*

# Abstracts

## Overseas Abstracts (Oct. 1980 [T-MTT])

*"Overseas Abstracts (Oct. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.10 (Oct. 1980 [T-MTT]): 1147-1155.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## IEEE Annual Combined Index (Advertisement) (Oct. 1980 [T-MTT])

*"IEEE Annual Combined Index (Advertisement) (Oct. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.10 (Oct. 1980 [T-MTT]): 1156-1156.*

# Abstracts

## Back Cover (Oct. 1980 [T-MTT])

*"Back Cover (Oct. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.10 (Oct. 1980 [T-MTT]): b1-b1.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Front Cover (Nov. 1980, Part I [T-MTT])

*"Front Cover (Nov. 1980, Part I [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.11 (Nov. 1980, Part I [T-MTT]): f1-f2.*

# Abstracts

## Design Procedure for High-Efficiency Linear Microwave Power Amplifiers

*F.N. Sechi. "Design Procedure for High-Efficiency Linear Microwave Power Amplifiers." 1980 Transactions on Microwave Theory and Techniques 28.11 (Nov. 1980, Part I [T-MTT]): 1157-1163.*

An optimal design for a high-efficiency linear amplifier is achieved by a graphical technique, with the active device characterized by load impedance contours for constant power and constant intermodulation distortion (IMD). The use of this method is demonstrated by an example. Also described are the excellent results obtained in an amplifier operating over the frequency range from 3.7 to 4.2 GHz.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Error Considerations in the Design of Microwave Transistor Amplifiers

*S.O. Scanlan and G.P. Young. "Error Considerations in the Design of Microwave Transistor Amplifiers." 1980 Transactions on Microwave Theory and Techniques 28.11 (Nov. 1980, Part I [T-MTT]): 1163-1169.*

In the design of microwave transistor amplifiers it is frequently of value to consider an idealization where the actual device is replaced by one with the reverse transfer parameter S/sub 12/ set to zero, while other S-pammeters remain unchanged. In this communication bounds are derived on errors which may result from use of such an idealization.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Electrical Characteristics of Metal-Semiconductor Junctions

*M.V. Schneider. "Electrical Characteristics of Metal-Semiconductor Junctions." 1980 Transactions on Microwave Theory and Techniques 28.11 (Nov. 1980, Part I [T-MTT]): 1169-1173.*

The current-voltage characteristic of metal-semiconductor junctions is described by a simple equation which is the product of an exponential and a hyperbolic sine function if one includes the effect of tunneling. In the case of equal current flow via tunneling and via thermionic emission the conductance becomes a hyperbolic cosine function of the applied voltage. Devices displaying such characteristics appear attractive for use in harmonic frequency converters

# Abstracts

## Nonlinear-Linear Analysis of Microwave Mixer with Any Number of Diodes

*M.T. Faber and W.K. Gwarek. "Nonlinear-Linear Analysis of Microwave Mixer with Any Number of Diodes." 1980 Transactions on Microwave Theory and Techniques 28.11 (Nov. 1980, Part I [T-MTT]): 1174-1181.*

A theory is presented for analyzing mixers with any number of diodes. Both the nonlinear and linear steps of the analysis are included. The diodes are characterized by both nonlinear conductance and nonlinear capacitance. Any linear embedding network is allowed. It is assumed that both the parameters of the linear part of a mixer circuit and the parameters of the diodes are known. This general approach to microwave circuits with diodes, which is a qualitatively new problem in circuits analysis, allows to investigate any diode mixer with deep insight into its operation. A computer program has been developed to perform the analysis and all computations. The program has been utilized to analyzee a crossbar mixer conjuration which exhibits extremely encouraging performance. Some computed results are presented herein.

# Abstracts

## Analysis and Synthesis of Broad-Band Symmetric Power Dividing Trees

*G.L. Nystrom. "Analysis and Synthesis of Broad-Band Symmetric Power Dividing Trees." 1980 Transactions on Microwave Theory and Techniques 28.11 (Nov. 1980, Part I [T-MTT]): 1182-1187.*

A planar power divider with 2/sup m/ output ports consists of 2-way equal-power dividing sections coupled after each other to form a tree-like structure. This paper deals with the synthesis of such symmetric structures, thus forming a network that divides the incoming power into equal parts over a broad band. The analysis is done by the even and odd modes. An optimization program has been written which can optimize the total bandwidth with nearly equal-ripple response. Tables are given for synthesized power dividers with 4, 8, and 16 output ports and with a VSWR equal to 1.05, 1.1, and 1.2. The bandwidth, f/sub max// f/sub min/ of the power dividers in the tables is between 1.7 and 7. A 4-way divider with 7 transformers in the even mode and 3 isolating resistors in each odd mode has been built with the center frequency 5 GHz. The total bandwidth of the whole divider, which is theoretically 4.5, was measured to be 4.1.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Stopbands of the First-Order Bragg Interaction in a Parallel-Plate Waveguide Having Multiperiodic Wall Corrugations

*O.R. Asfar and A.H. Nayfeh. "Stopbands of the First-Order Bragg Interaction in a Parallel-Plate Waveguide Having Multiperiodic Wall Corrugations." 1980 Transactions on Microwave Theory and Techniques 28.11 (Nov. 1980, Part I [T-MTT]): 1187-1191.*

The stopbands of the first-order Bragg interaction in a parallel-plate waveguide having multiperiodic wall undulations are investigated via the perturbation method of multiple scales. For a structure having two periods, the first-order Bragg interaction involves two as well as three coupled modes. Transition curves separating passbands from stop-bands are found for all possible interactions. The effect of the multiple periodicity in the structure is found to be an increased band-width for the attenuation band as well as considerable attenuation throughout the band owing to the increased number of interactions. This is useful for the design of multichannel narrow-band microwave filters. The analysis is carried out for the first three dominant modes of the structure.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## The Resistive Bifurcated Parallel-Plate Waveguide

*H.-M. Shen. "The Resistive Bifurcated Parallel-Plate Waveguide." 1980 Transactions on Microwave Theory and Techniques 28.11 (Nov. 1980, Part I [T-MTT]): 1192-1198.*

The guided-wave problem of a parallel-plate region with a bifurcated resistive sheet of finite length is solved. After the space has been divided into three regions the series solutions in them are matched across the boundaries. Then, the eigenequation is used to determine the propagation and four sets of equations are solved for the unknown coefficients. The series solutions converge rapidly and are readily applied to obtain conditions of maximum absorption.

# Abstracts

## Low-Frequency Scattering of Dielectric Cylinders

*W.-G. Lin. "Low-Frequency Scattering of Dielectric Cylinders." 1980 Transactions on Microwave Theory and Techniques 28.11 (Nov. 1980, Part I [T-MTT]): 1199-1204.*

A previously developed method of taking the geometric mean of the upper and the lower bounds as the final answer is applied to the problem of low-frequency scattering of dielectric cylinders. Some of the results obtained agree well with those of Mei and Van Bladel and all results are checked numerically to be reasonable for practical applications. The dipole lines of linear moment p and p' for the two polarizations of the applied field on the rectangular conducting cylinder is believed to be exact; so are those for the equilateral conducting triangular cylinder and for the conducting regular pentagonal cylinder.

# Abstracts

## Leaky-Wave Antennas Using Artificial Dielectrics at Millimeter Wave Frequencies

*I.J. Bahl and P. Bhartia. "Leaky-Wave Antennas Using Artificial Dielectrics at Millimeter Wave Frequencies." 1980 Transactions on Microwave Theory and Techniques 28.11 (Nov. 1980, Part I [T-MTT]): 1205-1212.*

A novel approach for the design of leaky-wave antennas using artificial dielectrics at millimeter wave frequencies is discussed. The general radiation characteristics of leaky-wave structures of finite length are presented. The feasibility of frequency scanning and dielectric scanning (changing the direction of the beam by varying the relative permittivity of the electrically controlled liquid artificial dielectric medium) of a leaky-wave antenna using rodded artificial dielectric is investigated theoretically. Calculations shown that the beam angle changes from 20° to 50° off broadside when the frequency is changed from 31.1 to 35.4 GHz or the permittivity of the embedding medium of the artificial dielectric is changed from 1.6 to 2.04. Over a scan range of about 40º the beam width is almost constant. For large scan range the beamwidth of a dielectric-scanned antenna (DSA) is about 15 percent less than the frequency-scanned antenna (FSA). The gain of a DSA greater than the FSA and also has less variation over the scan range. The power efficiency is approximately the same for both the antenna types with worst case efficiency being about 85 percent.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Microstrip Discontinuity Capacitances and Inductances for Double Steps, Mitered Bends with Arbitrary Angle, and Asymmetric Right-Angle Bends

*P. Anders and F. Arndt. "Microstrip Discontinuity Capacitances and Inductances for Double Steps, Mitered Bends with Arbitrary Angle, and Asymmetric Right-Angle Bends." 1980 Transactions on Microwave Theory and Techniques 28.11 (Nov. 1980, Part I [T-MTT]): 1213-1217.*

The equivalent capacitances and inductances for microstrip double steps, mitered bends with arbitrary angle, and symmetric right-angle bends are calculated by the moment method. The data for the double step include the coupling effect between the two single steps. The geometry of the mitered bend with arbitrary angle is determined for minimized bend VSWR over a wide range of parameters. The equivalent circuit data of the asymmetric right-angle bend are compared with results of the frequency dependent planar waveguide model.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Electromagnetic Coupling Between a Thin-Wire Antenna and a Neighboring Biological Body: Theory and Experiment

*K. Karimullah, K.-M. Chen and D.P. Nyquist. "Electromagnetic Coupling Between a Thin-Wire Antenna and a Neighboring Biological Body: Theory and Experiment." 1980 Transactions on Microwave Theory and Techniques 28.11 (Nov. 1980, Part I [T-MTT]): 1218-1225.*

Interaction between the near-zone EM field of a radiating antenna and a neighboring biological body is analyzed by considering the antenna current and the induced electric field in the body as unknown functions. A simultaneous pair of coupled tensor integral equations is developed for these unknown functions. These equations are solved numerically by the method of moments using pulse function expansions for the unknowns and delta functions for testing. A monopole antenna coupled with a rectangular-cylindrical body model is used for the experimental verification of theoretical results. Accuracy of the numerical solution is substantiated by good agreement between the numerical and experimental results obtained for the antenna impedance and current distribution as well as the induced electric field in the body. Electromagnetic (EM) radiation effects in various computer models of the human body are investigated to make a realistic assessment of potential radiation hazard associated with the coupled antenna-body system. It is found that an operator in the immediate vicinity of high-power transmitters may be exposed to harmful levels of radiation.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## On the Odd-Mode Capacitance of the Coupled Microstriplines (Short Papers)

*S.S. Bedair. "On the Odd-Mode Capacitance of the Coupled Microstriplines (Short Papers)." 1980 Transactions on Microwave Theory and Techniques 28.11 (Nov. 1980, Part I [T-MTT]): 1225-1227.*

This short paper aims to recognize the correct decomposition for the total odd-mode capacitance of the coupled microstriplines and present an improved expression for the gap capacitances. The used procedure utilizes the results that were obtained earlier by the conformal mapping techniques.

# Abstracts

## Low Impedance Microstrip Calculations Using MSTRIP (Letters)

*J.C. Cozzie. "Low Impedance Microstrip Calculations Using MSTRIP (Letters)." 1980 Transactions on Microwave Theory and Techniques 28.11 (Nov. 1980, Part I [T-MTT]): 1228-1229.*

The program MSTRIP gives erroneous results for microstrip lines with a characteristic impedance. A modification to the program is suggested.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Contributors (Nov. 1980, Part I [T-MTT])

*P. Anders, F. Arndt, O.R. Asfar, I.J. Bahl, P. Bhartia, K.-M. Chen, M.T. Faber, W.K. Gwarek, K. Karimullah, W.-G. Lin, A.H. Nayfeh, D.P. Nyquist, G.L. Nystrom, S.O. Scanlan, M.V. Schneider, F.N. Sechi, H.-M. Shen and G.P. Young. "Contributors (Nov. 1980, Part I [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.11 (Nov. 1980, Part I [T-MTT]): 1229-1231.*

# Abstracts

## IEEE Annual Combined Index (Advertisement) (Nov. 1980, Part I [T-MTT])

*"IEEE Annual Combined Index (Advertisement) (Nov. 1980, Part I [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.11 (Nov. 1980, Part I [T-MTT]): 1232-1232.*

# Abstracts

## Inside Back Cover (Nov. 1980, Part I [T-MTT])

*"Inside Back Cover (Nov. 1980, Part I [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.11 (Nov. 1980, Part I [T-MTT]): b1-b1.*

# Abstracts

## Front Cover (Nov. 1980, Part II [T-MTT])

*"Front Cover (Nov. 1980, Part II [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.11 (Nov. 1980, Part II [T-MTT] (27-Year Cumulative Index)): f1-f2.*

# Abstracts

## Editor’s Preface (Nov 1980, Part II [T-MTT])

*H.G. Oltman, Jr.. "Editor’s Preface (Nov 1980, Part II [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.11 (Nov. 1980, Part II [T-MTT] (27-Year Cumulative Index)): 1233-1233.*

This Index Issue has been a long time in arriving. Over the last decade it has been requested by many of our members. A plan to publish it has been brought before the MTT Administrative Committee three times during my eight years of association. It failed to get Administrative Committee approval two of these three times because we simply could not afford it-five years ago our net worth was $18000 and expected to go lower.

# Abstracts

## A History of the Transactions on Microwave Theory and Techniques (Nov 1980, Part II [T-MTT])

*T.S. Saad. "A History of the Transactions on Microwave Theory and Techniques (Nov 1980, Part II [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.11 (Nov. 1980, Part II [T-MTT] (27-Year Cumulative Index)): 1234-1241.*

From the Early days of our Society, through the many changes that have taken place in Administrative Committees, names and substance, there has been one "given." That was, and is, our Transactions. From the first meeting of the Administrative Committee, May 1, 1952, through the name changes from Professional Group to Professional Technical Group to Group to Society, through twenty-seven Administrative Committees from Chairman Ben Warriner to Chairman Don Parker, from one issue per Administrative Committee term to one issue per month, this Transactions, above all else, has been our pride and our mainstay.

# Abstracts

## Special Issues Published (Nov. 1980, Part II [T-MTT])

*"Special Issues Published (Nov. 1980, Part II [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.11 (Nov. 1980, Part II [T-MTT] (27-Year Cumulative Index)): 1241-1241.*

# Abstracts

## 1953-1979 Cumulative Index - Guide to the Index (Nov. 1980, Part II [T-MTT])

*"1953-1979 Cumulative Index - Guide to the Index (Nov. 1980, Part II [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.11 (Nov. 1980, Part II [T-MTT] (27-Year Cumulative Index)): 1242-1242.*

# Abstracts

## Index of Authors, Cumulative, 1953-1979 (Nov. 1980, Part II [T-MTT])

*"Index of Authors, Cumulative, 1953-1979 (Nov. 1980, Part II [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.11 (Nov. 1980, Part II [T-MTT] (27-Year Cumulative Index)): 1243-1298.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Index of Subjects, Cumulative, 1953-1979 (Nov. 1980, Part II [T-MTT])

*"Index of Subjects, Cumulative, 1953-1979 (Nov. 1980, Part II [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.11 (Nov. 1980, Part II [T-MTT] (27-Year Cumulative Index)): 1298-1399.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Back Cover (Nov. 1980, Part II [T-MTT])

*"Back Cover (Nov. 1980, Part II [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.11 (Nov. 1980, Part II [T-MTT] (27-Year Cumulative Index)): b1-b1.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Front Cover (Dec. 1980 [T-MTT])

*"Front Cover (Dec. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.12 (Dec. 1980 [T-MTT] (1980 Symposium Issue)): f1-f2.*

# Abstracts

## Table of Contents (Dec. 1980 [T-MTT])

*"Table of Contents (Dec. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.12 (Dec. 1980 [T-MTT] (1980 Symposium Issue)): i-ii.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Editor’s Overview (Dec. 1980 [T-MTT])

*B.E. Spielman. "Editor’s Overview (Dec. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.12 (Dec. 1980 [T-MTT] (1980 Symposium Issue)): 1401-1401.*

This issue presents a collection of papers from the 1980 International Microwave Symposium which were expanded to provide even more substantial contributions to the technical literature than those which appeared in the Symposium Digest. Also included are summaries of the Symposium functions, including the technical program, exhibits, social programs, and members of the Steering and Program Committees. Special attention is given to those who were honored at the awards ceremony.

# Abstracts

## The 1980 MTT-S International Microwave Symposium (Dec. 1980 [T-MTT])

*L.R. Whicker. "The 1980 MTT-S International Microwave Symposium (Dec. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.12 (Dec. 1980 [T-MTT] (1980 Symposium Issue)): 1402-1410.*

The 1980 International Microwave Symposium, related workshops, and exhibitions were held at the Shoreham Hotel, Washington, DC, during the week of May 26-May 30, 1980. As has been the case in the past few years, the Symposium is continuing to grow. Approximately 1000 people attended the Symposium and workshops while an additional 450 people registered for the exhibitions.

# Abstracts

## 1979 MTT Awards (Dec. 1980 [T-MTT])

*"1979 MTT Awards (Dec. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.12 (Dec. 1980 [T-MTT] (1980 Symposium Issue)): 1410-1412.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Bandpass Filters Using Parallel Coupled Stripline Stepped Impedance Resonators

*M. Makimoto and S. Yamashita. "Bandpass Filters Using Parallel Coupled Stripline Stepped Impedance Resonators." 1980 Transactions on Microwave Theory and Techniques 28.12 (Dec. 1980 [T-MTT] (1980 Symposium Issue)): 1413-1417.*

Approximate design formulas for bandpass filters using parallel coupled stripling stepped impedance resonators (SIR) are derived. The formulas take into account the arbitrary coupling length as well as quarter-wavelength coupling. Some advantages of this filter are its abilities to control spurious response and insertion loss by changing the structure of the resonator. Using the design formulas two experimental filters were designed and fabricated and their performances closely matched design data.

# Abstracts

## A 2450-MHz Slab-Loaded Direct Contact Applicator with Choke (Dec. 1980 [T-MTT])

*G. Kantor and D.M. Witters, Jr.. "A 2450-MHz Slab-Loaded Direct Contact Applicator with Choke (Dec. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.12 (Dec. 1980 [T-MTT] (1980 Symposium Issue)): 1418-1422.*

A Teflon-slab-loaded direct contact microwave diathermy applicator has been developed. It produces minimal leakage radiation during effective heating of simulated planar tissue models. The use of TEM mode excitation results in heating patterns which are more uniform than the patterms of comparable waveguide applicators without dielectric loading.

# Abstracts

## A Novel Approach to the Design of Multiple-Probe High-Power Microwave Automatic Impedance Measuring Schemes

*C.-L.J. Hu. "A Novel Approach to the Design of Multiple-Probe High-Power Microwave Automatic Impedance Measuring Schemes." 1980 Transactions on Microwave Theory and Techniques 28.12 (Dec. 1980 [T-MTT] (1980 Symposium Issue)): 1422-1428.*

Starting with a modified look at the phasor diagram of a multiple-probe system on a lossless waveguide, one can attain a geometrical method for designing various direct-reading microwave impedance-measuring schemes using fixed probes. This geometrical method will bypass a significant amount of algebraic complexity as encountered in classical algebraic methods. Hence it allows one to visualize the physical picture more clearly and guides one to modify the design more effectively to meet higher performance demands. This article reports a trend of design developments derived from this new point of view. It starts with the analysis of a two-probe system for measuring an unknown impedance /bar z/. This is followed by modifications on the design guided by the new geometrical technique. Finally, two practical designs are derived for measuring an unknown microwave impedance automaticaly. One is to be used under fixed-frequency, swept-power conditions, and the other, under swept-frequency, swept-power conditions. These systems require only inexpensive low-frequency signal processors (either analog or digital) and fixed multiple probes. The output can be either analog with polar display or digital with accurate readouts. To the author's knowledge these designs have not been derived in the past using multiple probes. A critical review on all multiple-probe systems reported in the literature is also discussed with their comparison to the present system.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Corporate and Tandem Structures for Combining Power from 3/sup N/ and 2N+1 Oscillators

*S. Mizushina, H. Kondoh and M. Ashiki. "Corporate and Tandem Structures for Combining Power from 3/sup N/ and 2N+1 Oscillators." 1980 Transactions on Microwave Theory and Techniques 28.12 (Dec. 1980 [T-MTT] (1980 Symposium Issue)): 1428-1432.*

The output power from three Gunn oscillators was combined using a short-slot coupler in conjunction with high-level injection locking with the power combining efficiency of ahout 100 percent at 9.7 GHz. Using the 3-oscillator structure as the building block, we constructed ($3^2$ = 9-oscillator corporate structure and (2X4+1=)9- and (2X6+1=)13-oscillator tandem structures to demonstrate power combining efficiencies of 92, 95, and 93 percent, respectively, at 9.6 GHz.

# Abstracts

## Trapped Image Guide For Millimeter-Wave Circuits (Dec. 1980 [T-MTT])

*T. Itoh and B. Adelseck. "Trapped Image Guide For Millimeter-Wave Circuits (Dec. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.12 (Dec. 1980 [T-MTT] (1980 Symposium Issue)): 1433-1436.*

A novel dielectric waveguide is proposed for use in millimeter-wave integrated circuits, and a simple analysis for dispersion characteristics is developed. Numerical results agree reasonably with measured data. Radiation loss of this waveguide at curved sections are proven to be considerably Iess than those of the image guide. As an application of this waveguide, a leaky-wave radiator has been tested.

# Abstracts

## Use of Microstrip Impedance- Measurement Technique in the Design of a BARITT Diplex Doppler Sensor

*B.M. Armstrong, R. Brown, F. Rix and J.A.C. Stewart. "Use of Microstrip Impedance-Measurement Technique in the Design of a BARITT Diplex Doppler Sensor." 1980 Transactions on Microwave Theory and Techniques 28.12 (Dec. 1980 [T-MTT] (1980 Symposium Issue)): 1437-1442.*

A computer-aided microstrip impedance-measurement technique, which yields information on microstrip-material properties, is described. The technique is used to investigate the impedence of microstrip-mounted BARITT diodes and of microstrip pad antennas. A Doppler sensor is designed, incorporating the BARITT diode into a microstrip circuit, used in diplex Doppler range-measuring radar.

# Abstracts

## Dominant and Second-Order Mode Cutoff Frequencies in Fin Lines Calculated with a Two-Dimensional TLM Program

*Y.-C. Shih and W.J.R. Hoefer. "Dominant and Second-Order Mode Cutoff Frequencies in Fin Lines Calculated with a Two-Dimensional TLM Program." 1980 Transactions on Microwave Theory and Techniques 28.12 (Dec. 1980 [T-MTT] (1980 Symposium Issue)): 1443-1448.*

This paper presents the dominant and second-order mode cutoff frequencies in unilateral, bilateral, and insulated fin lines as calculated with a two-dimensional TLM program. Through careful correction of errors associated with this method, an overall accuracy better than ±1 percent has heen achieved. This TLM program therefore provides an excellent reference for verifying other existing methods.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Density-Independent Moisture Metering in Fibrous Materials Using a Double-Cutoff Gunn Oscillator (Dec. 1980 [T-MTT])

*W. Hoppe, W. Meyer and W.M. Schilz. "Density-Independent Moisture Metering in Fibrous Materials Using a Double-Cutoff Gunn Oscillator (Dec. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.12 (Dec. 1980 [T-MTT] (1980 Symposium Issue)): 1449-1452.*

A new method of density-independent moisture determination with microwaves operating at one single frequeney is developed. It is based on the two-parameter measurement of the complex dielectric constant being composed to a density-independent calibration factor A(psi) which is a function of moisture content psi. As a first application, a double-cutoff Gunn oscllator was built, stabilized by adjacent modes of a single measuring cavity containing the moist fibrous specimen. The technique removes the need for density and sample-size corrections.

# Abstracts

## Electromagnetic-Energy Deposition in an Inhomogeneous Block Model of Man for Near-Field Irradiation Conditions

*I. Chatterjee, M.J. Hagmann and O.P. Gandhi. "Electromagnetic-Energy Deposition in an Inhomogeneous Block Model of Man for Near-Field Irradiation Conditions." 1980 Transactions on Microwave Theory and Techniques 28.12 (Dec. 1980 [T-MTT] (1980 Symposium Issue)): 1452-1460.*

The plane-wave spectrum approach is used to calculate the electromagnetic-energy deposition and its distribution in a 180-cell, inhomogeneous block model of man for a prescribed two-dimensional leakage electric field generated by RF sealers and other electronic equipment. The whole-body-averaged energy dose increases approximately as (Delta²/sub 1/Delta²/sub 2//Lamda/sup 4/) to the asymptotic plane-wave value, where Delta /sub1//Lamda and Delta/sub2//Lamda are the vertical and horizontal widths (in wavelengths) of the best fit half-cycle cosine functions to the prescribed leakage fields. The effect of phase variations shows that the worst case (maximum deposition) is always obtained for constant phase in the prescribed fields. The need for exact phase measurements is, therefore, obviated since the upper bound on the deposited energy is often the desired quantity.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## 1-W Millimeter-Wave Gunn Diode Combiner

*Y.-E. Ma and C. Sun. "1-W Millimeter-Wave Gunn Diode Combiner." 1980 Transactions on Microwave Theory and Techniques 28.12 (Dec. 1980 [T-MTT] (1980 Symposium Issue)): 1460-1463.*

A simple modular approach for combining many Gunn devices has been developed. By cascading the two diode wafer modules, output power of 1 W was achieved in the 45-GHz range from eight Gunn devices with combining efficiency greater than 90 percent. The overall dc-to-RF conversion efficiency of the eight-diode combiner was about 2 percent. The circuit adjustment was easy and no spurious oscillations were observed during the experiment.

# Abstracts

## A New Microstrip Radiator For Medical Applications

*I.J. Bahl, S.S. Stuchly and M.A. Stuchly. "A New Microstrip Radiator For Medical Applications." 1980 Transactions on Microwave Theory and Techniques 28.12 (Dec. 1980 [T-MTT] (1980 Symposium Issue)): 1464-1469.*

Ring-type microstrip antennas appear to offer important advantages in medical therapy when used for local tissue heating. In designing these radiators, the properties of a microstrip covered with layers of lossy dielectric representing various tissue layers have to be taken into account. This paper provides basic information on design of ring-type radiators for tissue heating and the experimental results for a unit designed to operate in the TM modes at 2.45 GHz. The radiator is well matched when spaced 1.3-3 mm from muscle tissue or muscle tissue covered by a thin layer of fat tissue. A limited volume of muscle tissue is heated at a greater rate than the fat layer as shown by a thermographic technique.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## The Traveling-Wave Divider/Combiner

*A.G. Bert and D. Kaminsky. "The Traveling-Wave Divider/Combiner." 1980 Transactions on Microwave Theory and Techniques 28.12 (Dec. 1980 [T-MTT] (1980 Symposium Issue)): 1468-1473.*

A new kind of distributed power divider/combiner circuit for use in octave (or more) bandwidth microstrip power transistor amplifiers is presented. The design, characteristics and advantages are discussed. Experimental results on a four-way divider and divider/combiner are presented and compared with theory. First experimental results on a six-way traveling-wave divider (TWD) are also presented.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A Least Squares Solution for Use in the Six-Port Measurement Technique (Dec. 1980 [T-MTT])

*G.F. Engen. "A Least Squares Solution for Use in the Six-Port Measurement Technique (Dec. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.12 (Dec. 1980 [T-MTT] (1980 Symposium Issue)): 1473-1477.*

Although based on the use of simple amplitude detectors, it is possible to obtain complex values of reflection coefficient, via the six-port technique, from the intersection of three circles in the complex plane. In a typical case, the circle centers are detemined primarily by the six-port design and are nominally constant, while the radii are proportional to the square root of the ratio of the output of three of the detectors to a fourth one. As a practical matter, however, these circles will not intersect in a point because of noise or other errors in the detectors.This paper develops a presedure for choosing Gamma in this context. Moreover, the question of what may be inferred about the system performance from the extent of this intersection failue is briefly considered.

# Abstracts

## Circular-Electric Mode Waveguide Couplers and Junctions for Use in Gyrotron Traveling-Wave Amplifiers (Dec. 1980 [T-MTT])

*L.R. Barnett, J.M. Baird, A.W. Fliflet and V.L. Granatstein. "Circular-Electric Mode Waveguide Couplers and Junctions for Use in Gyrotron Traveling-Wave Amplifiers (Dec. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.12 (Dec. 1980 [T-MTT] (1980 Symposium Issue)): 1477-1481.*

Recent gyotron traveling-wave amplifier experiments in the TE° /sub 01/ mode have led to the developing of 2-port and 4-port devices potentially useful as input couplers, severs, and beam-RF separators for colletor designs.The couplers are moderately wide-band, have high transmission efficiencies and low reflection coefficients. In addition, they are relatively easy to construct. We present analytical and experimental results.

# Abstracts

## Mode Coupling and Power Transfer in a Coaxial Sector Waveguide with a Sector Angle Taper (Dec. 1980 [T-MTT])

*A.W. Fliflet, L.R. Barnett and J.M. Baird. "Mode Coupling and Power Transfer in a Coaxial Sector Waveguide with a Sector Angle Taper (Dec. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.12 (Dec. 1980 [T-MTT] (1980 Symposium Issue)): 1482-1486.*

We report a theoretical study of mode coupling and power transfer in a coaxial sector taper. The power transferred from the desired TE /sub 01/ mode into other propagating modes is calculated as a function of taper length and operating frequency. Power transfer via mode coupling involves at least three other modes: TE/sub 21/, TE/sub22/, and TM/sub21/. Power transfer as a function of final sector angle is also shown. At sector angles greater than 180° the taper is highly over-moded. This type of waveguide taper is utilized to feed a wide-band input coupler for gyrotron traveling wave amplifiers.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Contributors (Dec. 1980 [T-MTT])

*B. Adelseck, B.M. Armstrong, M. Ashiki, I.J. Bahl, J.M. Baird, L.R. Barnett, A.G. Bert, R. Brown, I. Chatterjee, G.F. Engen, A.W. Fliflet, O.P. Gandhi, V.L. Granatstein, M.J. Hagmann, W.J.R. Hoefer, W. Hoppe, C.-L.J. Hu, T. Itoh, D. Kaminsky, G. Kantor, H. Kondoh, Y.-E. Ma, M. Makimoto, W. Meyer, S. Mizushina, F. Rix, W.M. Schilz, Y.-C. Shih, J.A.C. Stewart, M.A. Stuchly, S.S. Stuchly, C. Sun, D.M. Witters, Jr. and S. Yamashita. "Contributors (Dec. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.12 (Dec. 1980 [T-MTT] (1980 Symposium Issue)): 1487-1491.*

# Abstracts

## Index, IEEE Transactions on Microwave Theory and Techniques, Volume MTT-28, 1980

*"Index, IEEE Transactions on Microwave Theory and Techniques, Volume MTT-28, 1980." 1980 Transactions on Microwave Theory and Techniques 28.12 (Dec. 1980 [T-MTT] (1980 Symposium Issue)): i1-i16.*

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Back Cover (Dec. 1980 [T-MTT])

*"Back Cover (Dec. 1980 [T-MTT])." 1980 Transactions on Microwave Theory and Techniques 28.12 (Dec. 1980 [T-MTT] (1980 Symposium Issue)): b1-b1.*

# Abstracts

## Front Cover (Jan. 1981 [T-MTT])

*"Front Cover (Jan. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.1 (Jan. 1981 [T-MTT]): f1-f2.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## 20-GHz Band Monolithic GaAs FET Low-Noise Amplifier

*A. Higashisaka and T. Mizuta. "20-GHz Band Monolithic GaAs FET Low-Noise Amplifier." 1981 Transactions on Microwave Theory and Techniques 29.1 (Jan. 1981 [T-MTT]): 1-6.*

A 20-GHz band monolithic GaAs FET low-noise amplifier has been developed. Design and fabrication were performed by obtaining the transmission properties of the microstrip lines on a semi-insulating GaAs substrate. The developed monolithic amplifier consists of a submicron gate GaAs MESFET and the input and output distributed matching circuits on a semi-insulating GaAs substrate measuring 2.75 mm x 1.45 mm. A noise figure of 6.2dB and an associated gain of 7.5 dB were obtained at 21 GHz without any additional tuning adjustments.

# Abstracts

## Frequency Tuning of Microstrip TRAPATT Oscillators

*P.L. Booth, S.R. Longley and B.H. Newton. "Frequency Tuning of Microstrip TRAPATT Oscillators." 1981 Transactions on Microwave Theory and Techniques 29.1 (Jan. 1981 [T-MTT]): 6-10.*

This paper describes two methods of magnetically tuning the frequency of a microstrip TRAPATT oscillator. Tuning ranges in excess of 100 MHz at a center frequency of 2 GHz have been obtained at peak output power levels of typically 40 W with variations in output power of ±0.2 dB. In one of the methods the harmonics of the oscillator are separated which may enable additional diagnostic information to be obtained for the TRAPATT oscillator.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Slots in Dielectric Image Line as Mode Launchers and Circuit Elements

*K. Solbach. "Slots in Dielectric Image Line as Mode Launchers and Circuit Elements." 1981 Transactions on Microwave Theory and Techniques 29.1 (Jan. 1981 [T-MTT]): 10-16.*

Slots in the ground plane of dielectric image lines are investigated using a planar resonator model. An equivalent circuit representation of the slot discontinuity is derived and the launching efficiency of the slot as a mode launcher is discussed. Slots are also demonstrated to be useful in the realization of dielectric image line array antennas.

# Abstracts

## Propagation Properties of a Planar Dielectric Waveguide with Periodic Metallic Strips

*K. Ogusu. "Propagation Properties of a Planar Dielectric Waveguide with Periodic Metallic Strips." 1981 Transactions on Microwave Theory and Techniques 29.1 (Jan. 1981 [T-MTT]): 16-21.*

A dielectric waveguide with periodic metallic strips suitable for millimeter-wave and submillimeter-wave integrated circuits is analyzed by a rigorous formulation. The accuracy of the solution of our analysis can be systematically improved by increasing the size of the matrix associated with the eigenvalue equation. Stopband properties are numerically presented as a function of the spacing and width of metallic strips and dielectric profile. It is found that there is a difference in the stopband properties of TM and TE modes. Experimental results for the band reject filter are also presented to verify the validity of our analysis.

# Abstracts

## The Scattering Parameters and Directional Coupler Analysis of Characteristically Terminated Three-Line Structures in an Inhomogeneous Medium

*V.K. Tripathi. "The Scattering Parameters and Directional Coupler Analysis of Characteristically Terminated Three-Line Structures in an Inhomogeneous Medium." 1981 Transactions on Microwave Theory and Techniques 29.1 (Jan. 1981 [T-MTT]): 22-26.*

The scattering parameters of coupled-symmetrical three-line structures in an inhomogeneous medium, e.g., microstrip lines, are derived in terms of the normal mode parameters of the system. The structure is terminated in a set of impedances which allow for the excitation of the individual normal modes of the system. The scattering parameters are used to study directional coupler properties including possible matching and isolation conditions for six-port and interdigitated-four-port couple consisting of symmetrical three-line structures. It is shown that the solutions obtained reduce to known results for the case of four-port couplers in a homogeneous medium.

# Abstracts

## Self-Consistent Solutions for IMPATT Diode Networks

*T.J. Brazil and S.O. Scanlan. "Self-Consistent Solutions for IMPATT Diode Networks." 1981 Transactions on Microwave Theory and Techniques 29.1 (Jan. 1981 [T-MTT]): 26-32.*

Self-consistent solutions are presented for IMPATT diodes of the Si flat-profile, and GaAs Read types. Particular attention is paid to the onset of subharmonic instability and bias-block oscillations, and the results include numerical verification of a recent analytical theory of subharmonic instability. In addition, a lumped-element realization of the circuit conditions necessary to obtain maximum output power with second-harmonic tuning is described, and its performance is checked by means of self-consistent solution.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Sensitivity of the Total Power Radiometer with Periodic Absolute Calibration

*M.S. Hersman and G.A. Poe. "Sensitivity of the Total Power Radiometer with Periodic Absolute Calibration." 1981 Transactions on Microwave Theory and Techniques 29.1 (Jan. 1981 [T-MTT]): 32-40.*

The total power radiometer is an attractive choice for imaging applications due to its high sensitivity and simple configuration. However, available theoretical results are inadequate to allow an accurate radiometer performance prediction in the presence of receiver gain fluctuations and other receiver characteristics with nonuniform fluctuation power spectra. An improved analysis of the total power radiometer Delta T is presented in terms of the receiver output fluctuation power spectral density and a transfer function due to postdetection filtering and periodic calibration. Verification of this analysis is obtained by measuring the fluctuation power spectrum of a 94-GHz receiver and comparing the predicted Delta T with a direct measurement. Numerical results including application to an example radiometer system are presented. These results indicate that the total power radiometer should function well in short integration time, periodically calibrated radiometer systems.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A Variational Expression for the Scattering Matrix of a Double-Step Discontinuity in a Coaxial Line and its Application to a TEM Cell

*I. Sreenivasiah and D.C. Chang. "A Variational Expression for the Scattering Matrix of a Double-Step Discontinuity in a Coaxial Line and its Application to a TEM Cell." 1981 Transactions on Microwave Theory and Techniques 29.1 (Jan. 1981 [T-MTT]): 41-47.*

A variational expression for the scattering matrix of a double-step discontinuity in a two-mode coaxial transmission line is obtained and generalized to the case of a multimode coaxial transmission fine. The result is used to analyze the transmission characteristics of a two-mode coaxial TEM cell.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Eigenvalue Spectrum of Rectangular Waveguide with Two Symmetrically Placed Double Ridges

*D. Dasgupta and P.K. Saha. "Eigenvalue Spectrum of Rectangular Waveguide with Two Symmetrically Placed Double Ridges." 1981 Transactions on Microwave Theory and Techniques 29.1 (Jan. 1981 [T-MTT]): 48-51.*

The eigenvalue spectrum of rectangular waveguide with two symmetrically placed double ridges has been determined by formulating an integral eigenvalue problem and solving by Ritz-Galerkin method. The bandwidth characteristic is found to be adequate for varactor-tuned solid-state microwave oscillator applications requiring ridge structure for resonator. There remains some ambiguity in the designation of trough modes.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Asymmetric Realizations for Dual-Mode Bandpass Filters

*R.J. Cameron and J.D. Rhodes. "Asymmetric Realizations for Dual-Mode Bandpass Filters." 1981 Transactions on Microwave Theory and Techniques 29.1 (Jan. 1981 [T-MTT]): 51-58.*

Two analytic synthesis techniques are presented for even-degree dual-mode in-line prototype networks up to degree 14. Commencing with the coupling matrix for the double cross-coupled array, rotational transformations are applied to transform the matrix into the form required for the dual-mode in-line asymmetric structure. "Asymmetric" here means that the coupling elements (irises, screws) are unequal in value about the physical center of the filter. The necessity for these asymmetric solutions arose when it was discovered that it was impossible to realize certain useful transmission characteristics with the symmetric in-line structure, on account of their transmission zero pattern in the complex-plane representation of the transfer function. Furthermore, because the full coupling matrix is used instead of the even-mode matrix as with the symmetric solution, the asymmetric in-line realization process may be applied to electrically asymmetric matrices, such as those for single ended filters for multiplexer applications. To demonstrate the validity of the theory, a practical model of each type of realization has been constructed.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Dispersion Characteristics of Microstrip Lines

*H. Cory. "Dispersion Characteristics of Microstrip Lines." 1981 Transactions on Microwave Theory and Techniques 29.1 (Jan. 1981 [T-MTT]): 59-61.*

A coupled-line analysis is used in conjunction with Carlin's model in order to find the frequency dependence of the propagation constant and of the characteristic impedance of dispersive microstrip lines. The characteristic impedance of the coupled lines decreases with frequency.

# Abstracts

## Microwave Measurement of Conductivity and Permittivity of Semiconductor Spheres by Cavity Perturbation Technique

*A. Mansingh and A. Parkash. "Microwave Measurement of Conductivity and Permittivity of Semiconductor Spheres by Cavity Perturbation Technique." 1981 Transactions on Microwave Theory and Techniques 29.1 (Jan. 1981 [T-MTT]): 62-65.*

Simple analytical relations for evaluating the components of complex relative permittivity of semiconductors using a cavity perturbation technique for spherical samples are presented. The relations although derived under a simplifying approximation yield remits of almost the same accuracy obtained by computer solutions of a transcendental equation for samples with resistivity up to about 1 Omega-cm.

# Abstracts

## Permittivity Measurement of Modified Infinite Samples by a Directional Coupler and a Sliding Load (Short Papers)

*D.K. Misra. "Permittivity Measurement of Modified Infinite Samples by a Directional Coupler and a Sliding Load (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.1 (Jan. 1981 [T-MTT]): 65-67.*

A cross coupler and waveguide sliding short technique for measuring the permittivity of an infinite sample is described in this paper. The experimental results obtained for commercially available cement, wheat flour, magnesium oxide, potassium bromide, glycerin, and water are given together with the estimated error. In view of the growing industrial use of microwaves, moisture dependent epsilon-values for cement and wheat flour are also reported.

# Abstracts

## Impedance Transformation Equations for Exponential, Cosine-Squared, and Parabolic Tapered Transmission Lines (Short Papers)

*M.J. Ahmed. "Impedance Transformation Equations for Exponential, Cosine-Squared, and Parabolic Tapered Transmission Lines (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.1 (Jan. 1981 [T-MTT]): 67-68.*

Closed-form equations that give the value of an arbitrary complex impedance transformed through a length of dissipationless, nonuniform transmission line with exponential cosine-squared, and parabolic taper are presented. These equations are obtained by a second order nonlinear differential (Riccati) equation relating impedance, the nonuniform line impedance and the line length. The results presented should be useful in solving impedance matching problems.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Green's Functions for Circular Sectors, Annular Rings, and Annular Sectors in Planar Microwave Circuits (Short Papers)

*R. Chadha and K.C. Gupta. "Green's Functions for Circular Sectors, Annular Rings, and Annular Sectors in Planar Microwave Circuits (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.1 (Jan. 1981 [T-MTT]): 68-71.*

Green's functions for circular sector, annular ring, and annular sector shaped segments, in microwave planar circuits and microstrip antennas, have been derived in closed form.

# Abstracts

## Segmentation Method Using Impedance Matrices for Analysis of Planar Microwave Circuits (Short Papers)

*R. Chadha and K.C. Gupta. "Segmentation Method Using Impedance Matrices for Analysis of Planar Microwave Circuits (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.1 (Jan. 1981 [T-MTT]): 71-74.*

Segmentation method for the analysis of two-dimensional microwave planar circuits is modified by using Z-matrices for the individual planar segments. The proposed method is compared with the previously reported method using S-matrices and is shown to be computationally more efficient.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Dispersion Relations for Comb-Type Slow-Wave Structures (Correction)

*I.L. Verbitskii. "Dispersion Relations for Comb-Type Slow-Wave Structures (Correction)." 1981 Transactions on Microwave Theory and Techniques 29.1 (Jan. 1981 [T-MTT]): 74-74.*

The following corrections should be made to the original paper.

# Abstracts

## A Theoretical Basis for Microwave and RF Field Effects on Excitable Cellular Membranes (Correction)

*C.A. Cain. "A Theoretical Basis for Microwave and RF Field Effects on Excitable Cellular Membranes (Correction)." 1981 Transactions on Microwave Theory and Techniques 29.1 (Jan. 1981 [T-MTT]): 74-74.*

In the above paper, the following corrections should be made.

# Abstracts

## Contributors (Jan. 1981 [T-MTT])

*P.L. Booth, T.J. Brazil, R.J. Cameron, D.C. Chang, H. Cory, D. Dasgupta, M.S. Hersman, A. Higashisaka, S.R. Longley, A. Mansingh, T. Mizuta, B.H. Newton, K. Ogusu, A. Parkash, G.A. Poe, J.D. Rhodes, P.K. Saha, S.O. Scanlan, K. Solbach, I. Sreenivasiah and V.K. Tripathi. "Contributors (Jan. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.1 (Jan. 1981 [T-MTT]): 75-77.*

# Abstracts

## IEEE Copyright Form (Jan. 1981 [T-MTT])

*"IEEE Copyright Form (Jan. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.1 (Jan. 1981 [T-MTT]): 79-80.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Inside Back Cover (Jan. 1981 [T-MTT])

*"Inside Back Cover (Jan. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.1 (Jan. 1981 [T-MTT]): b1-b1.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Front Cover (Feb. 1981 [T-MTT])

*"Front Cover (Feb. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.2 (Feb. 1981 [T-MTT]): f1-f2.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Kuroda’s Identity for Mixed Lumped and Distributed Circuits and Their Application to Nonuniform Transmission Lines

*K. Kobayashi, Y. Nemoto and R. Sato. "Kuroda’s Identity for Mixed Lumped and Distributed Circuits and Their Application to Nonuniform Transmission Lines." 1981 Transactions on Microwave Theory and Techniques 29.2 (Feb. 1981 [T-MTT]): 81-86.*

Kuroda's identities, which are used in analysis and synthesis of distributed transmision line circuits, may be applied to mixed lumped and distributed circuits. It is shown that circuits consisting of cascade connections of lumped reactances and uniform transmission lines are equivalent to circuits consisting of a cascade connection of nonuniform transmission lines, lumped reactances, and ideal transformers. Moreover, by using these equivalent transformations, network functions of some nonuniform transmisssion lines can be derived exactly.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Superconducting Tunnel Junctions as Mixers at 115 GHz

*G.J. Dolan, R.A. Linke, T.C.L.G. Sollner, D.P. Woody and T.G. Phillips. "Superconducting Tunnel Junctions as Mixers at 115 GHz." 1981 Transactions on Microwave Theory and Techniques 29.2 (Feb. 1981 [T-MTT]): 87-91.*

Superconducting tunnel junctions have been used as the nonlinear element for mixing at a signal frequency of 115 GHz. The experimental results are compared with predictions of a theoretical analysis based on the quantum theory of mixing of J. R. Tucker. Qualitative agreement is obtained and suggestions are made for quantitative reconciliation. The junctions were small area (/spl equiv/0.4μm²) with normal resistances of 60 to 100 omega and capacitance approximately 20 fF. Measured sensitivity (T/ sup SSB/sub MXR/=62 K, L/sub c/=7.6 dB) implies receiver noise temperatures superior to the best receivers now in use at this frequency.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Mode Analysis in Multimode Waveguides Using Voltage Traveling Wave Ratios

*D.S. Stone. "Mode Analysis in Multimode Waveguides Using Voltage Traveling Wave Ratios." 1981 Transactions on Microwave Theory and Techniques 29.2 (Feb. 1981 [T-MTT]): 91-95.*

The voltage traveling were ratio (VTWR) equations are disscussed in general and the specific case of guided traveling waves in multimode circular waveguides is addressed in detail. An experimental technique for measuring VTWR's is described and sample experimental results are analyzed. Measurements of the VTWR's can be easily related to the fractions of total power propagating in each waveguide mode. This information may be used, for example, to examine the mode conversion properties of multimode waveguide components.

# Abstracts

## Magnetic Waves Guided by a Linearly Tapered YIG Film

*S.R. Seshadri and M.-C. Tsai. "Magnetic Waves Guided by a Linearly Tapered YIG Film." 1981 Transactions on Microwave Theory and Techniques 29.2 (Feb. 1981 [T-MTT]): 96-101.*

A quasi-optical treatment is given for the dispersion relation and the group delay time of a magnetic wave guided by a YIG film having a weak linear taper in its thickness in the propagation direction of the guided magnetic wave. This treatment has 1) confirmed the intuitive results in which the local value of the thickness is used for the tapered film, 2) indicated the frequency regions of validity of the intuitive results, and 3) revealed interesting features of the wavenormal and ray directions inside a YIG film.

# Abstracts

## Metallized Dielectric Horn and Waveguide Structures for Millimeter-Wave Oscillator/Mixer Systems

*M.J. Lazarus, F.R. Pantoja and M.G. Somekh. "Metallized Dielectric Horn and Waveguide Structures for Millimeter-Wave Oscillator/Mixer Systems." 1981 Transactions on Microwave Theory and Techniques 29.2 (Feb. 1981 [T-MTT]): 102-106.*

A new method of producing millimeter-wave oscillator/mixers and associated antenna horns has been developed. This uses the technique of metal coating of dielectric body, and hence avoids the expensive and difficult machining of conventional metal cavities. A sensitive self-oscillating mixer has been tested in this structure and shown to be free from the unstable operation associated with surface radiation of unshielded dielectric waveguide. Low epsilon/sub r/ dielectric was used, thus facilitating ease of matching in contrast with the high epsilon/sub r/ necessary with the unshielded guide.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Rigorous Analysis of the Scattering of Surface Waves in an Abruptly Ended Slab Dielectric Waveguide

*P. Gelin, M. Petenzi and J. Citerne. "Rigorous Analysis of the Scattering of Surface Waves in an Abruptly Ended Slab Dielectric Waveguide." 1981 Transactions on Microwave Theory and Techniques 29.2 (Feb. 1981 [T-MTT]): 107-114.*

The reflection and the scattering properties of even TE and TM surface waves incident in an abruptly ended dielectric slab waveguide are analyzed. The discontinuity is regarded as a junction between two open waveguides namely the dielectric slab waveguide and the free space waveguide. The boundary conditions acting together with the orthogonality provide singular coupled integral equations on the discrete and the continuous wave amplitudes at the discontinuity. These singular coupled intergral equations with Cauchy kernels and infinite limits of integration are solved by iteration via the Neuman series. Numerical results are presented for the reflectivity of the even TE/sub 0/ and TM/sub 0/ fundamental modes, together with their mode conversion on even TE/sub 2/ and TM/sub 2/ in a slab where two guided modes can propagate. Reflectivity and mode conversion of higher order excitations are also investigated

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## An Analysis of Log Periodic Antenna with Printed Dipoles

*A. Paul and I. Gupta. "An Analysis of Log Periodic Antenna with Printed Dipoles." 1981 Transactions on Microwave Theory and Techniques 29.2 (Feb. 1981 [T-MTT]): 114-117.*

An analysis of Log Periodic Antenna with Printed Dioples is presented here. In this analysis, the wave equation for Hertz potential is solved in Cartesian coordinates applying the boundary conditions of a flat strip diople. Using this model, the input currents to the antenna elements, the current distribution of the antenna elements, and the radiation pattern are computed. The computed results are compared with experimental results.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Digital Frequency Multipliers Using Multisection Two-Strip Coupled Line

*I. Sakagami, N. Miki, N. Nagai and K. Hatori. "Digital Frequency Multipliers Using Multisection Two-Strip Coupled Line." 1981 Transactions on Microwave Theory and Techniques 29.2 (Feb. 1981 [T-MTT]): 118-122.*

This paper describes new networks which acts as digital frequency multipliers such as doubler, tripler, and so on for input clock frequency. The networks consist of cascaded sections of uniform lossless commensurate coupled-transmission-lines and three resistors of II-structure, and the proposed multipliers are quite new in the sense of being built without using active or nonlinear circuit elements. The theoretical and experimental results for a coupled-line digital frequency doubler are compared and found to be in good agreement.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Accurate Analysis of Tapered Planar Transmission Lines for Microwave Integrated Circuits

*D. Mirshekar-Syahkal and J.B. Davies. "Accurate Analysis of Tapered Planar Transmission Lines for Microwave Integrated Circuits." 1981 Transactions on Microwave Theory and Techniques 29.2 (Feb. 1981 [T-MTT]): 123-128.*

A broad class of nonuniform transmission lines is analyzed through the method of coupled modes accompanied by the spectral domain solution of uniform lines. This combination offers efficient computation of the coupling coefficients. Small coupling allows the rigorous field theory of the spectral domain approach to give explicitly the scattering matrix of the taper. Several structures, including microstrip to coplanar waveguide taper and waveguide to fin-line taper, are successfully analyzed. The computed values of reflection coefficients are compared with the values derived by a simple impedance method and with the measured values. Results from the experimentally investigated tapers show that the theory is in good agreement.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Maximum Q-Factor of Microstrip Resonators

*A. Gopinath. "Maximum Q-Factor of Microstrip Resonators." 1981 Transactions on Microwave Theory and Techniques 29.2 (Feb. 1981 [T-MTT]): 128-131.*

The quality factors of microstrip half-wavelength resonators have been calculated as a function of substrate thickness for frequencies in the range 8-96 GHz, for different epsilon/sub r/. Conductor, dielectric, and radiation losses have been included. The optimum substrate thickness for the maximum Q-factor for 50-omega microstrip resonators has been derived as a function of frequency for different dielectric constants.

# Abstracts

## A New Approach in the Computation of Ultrahigh Degree Equal-Ripple Polynomials for 90°-Coupler Synthesis

*G. Saulich. "A New Approach in the Computation of Ultrahigh Degree Equal-Ripple Polynomials for 90°-Coupler Synthesis." 1981 Transactions on Microwave Theory and Techniques 29.2 (Feb. 1981 [T-MTT]): 132-135.*

An improved efficient numerical method for the computation of ultrahigh degree equal-ripple polynomials, necessary for the synthesis of multielement 90° coupler, is presented. The highest degree computed was N=201 with an accuracy better than 10/sup -20/. For the calculation of the impedances of the equivalent stepped impedance filter an optimization procedure is also described. Finally, based on the N coupling factors k/sub i/ of the sections, the continuous coupling curve is achieved using spline interpolation. Experimental results of a continuously tapered 8.34-dB coupler constructed in three-layer polyolefin stripline are presented.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Approximate Formulas for Line Capacitance and Characteristic Impedance of Microstrip Line

*S.Y. Poh, W.C. Chew and J.A. Kong. "Approximate Formulas for Line Capacitance and Characteristic Impedance of Microstrip Line." 1981 Transactions on Microwave Theory and Techniques 29.2 (Feb. 1981 [T-MTT]): 135-142.*

A numerically efficient and accurate method for the derivation of line capacitance and characteristic impedance of a thin microstrip line is discussed. Galerkin's method is found to give highly accurate results when only one or two basis functions are used. We use three methods to derive approximate formulas for microstrip line capacitance and characteristic impedance. Asymptotic lower bounds derived through the variational method and matched asymptotic expansion methods give expressions which reveal the functional forms of these approximate formulas. Seminumerical approximation gives rise to formulas usable on a desk calculator. It is found that there is excellent agreement between the seminumerical formulas, the asymptotic formula derived through matched asymptotic expansions and numerically derived results.

# Abstracts

## Bloch-Wave Analysis of Stripline- and Microstrip-Array Slow-Wave Structures

*V. Rizzoli and A. Lipparini. "Bloch-Wave Analysis of Stripline- and Microstrip-Array Slow-Wave Structures." 1981 Transactions on Microwave Theory and Techniques 29.2 (Feb. 1981 [T-MTT]): 143-150.*

The paper discusses a general approach to the analysis of periodic structures essentially consisting of an array of coupled striplines or microstrips. It is shown that any such structure can be represented as a cascade of identical multiport networks of known topology, thus allowing a straightforward analysis in terms of Bloch waves. The method is equally applicable to homogeneous and nonhomogeneous dielectric (i.e., MIC) devices.

# Abstracts

## Analysis of Small Aperture Coupling Between Rectangular Waveguide and Microstrip Line

*J.S. Rao, K.K. Joshi and B.N. Das. "Analysis of Small Aperture Coupling Between Rectangular Waveguide and Microstrip Line." 1981 Transactions on Microwave Theory and Techniques 29.2 (Feb. 1981 [T-MTT]): 150-154.*

This paper presents a generalized analysis on aperture coupling between a microstripline and a rectangular waveguide. The orthonormalized modal functions for the microstrip line required for the determination of the equivalent diopole moment are found from its equivalent parallel plate configuration. Expressions for coupling are obtained for transmissions lines with their axes parallel, the lines forming a T-junction and also for cross-guide couplers. Theoretical results show good agreement with the experimental data for all cases under investigation.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## A Compact Waveguide "Resolver" for the Accurate Measurement of Complex Reflection and Transmission Coefficients Using the 6-Port Measurement Concept

*G.P. Riblet. "A Compact Waveguide "Resolver" for the Accurate Measurement of Complex Reflection and Transmission Coefficients Using the 6-Port Measurement Concept." 1981 Transactions on Microwave Theory and Techniques 29.2 (Feb. 1981 [T-MTT]): 155-162.*

The theory of an optimum 5-port network for measuring complex reflection and transmission coefficients is developed. A compact realization in waveguide is described which allows these quantities to be determined over waveguide bandwidths from the measurements of two referenced power levels.

# Abstracts

## Suspended Coupled Slotline Using Double Layer Dielectric (Short Papers)

*R.N. Simons. "Suspended Coupled Slotline Using Double Layer Dielectric (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.2 (Feb. 1981 [T-MTT]): 162-165.*

This paper presents a rigorous analysis of coupled slotline a) on a double-layer dielectric substrate, and b) sandwiched between two dielectric substrates. The dielectric substrates are of arbitrary thickness and permittivity and the structure is assumed to be suspended inside a conducting enclosure of arbitrary dimensions. The odd- and even-mode dispersion and characteristics impedance, along with the effect of shielding on these, are illustrated. These structures should find extensive applications in the fabrication of MIC components, such as directional couplers, phase shifters, and mixers.

# Abstracts

## The Design of Broadside-Coupled Stripline Circuits (Short Papers)

*I.J. Bahl and P. Bhartia. "The Design of Broadside-Coupled Stripline Circuits (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.2 (Feb. 1981 [T-MTT]): 165-168.*

Accurate design expressions for broadside-coupled striplines are presented. The expressions have general validity as long as W/S>0.35. Uncertainty analysis is described to calculate the effect of tolerances in parameters on coupling coefficient and input VSWR. The effect of tolerances in parameters on these characteristics increase as the coupling becomes tighter and tighter.

# Abstracts

## Synthesis of Lange Couplers (Short Papers)

*R.M. Osmani. "Synthesis of Lange Couplers (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.2 (Feb. 1981 [T-MTT]): 168-170.*

This paper shows that it is possible to synthesize Lange couplers directly and thereby save considerable computing time. The procedure outlined is essentially based on two available techniques: Ou's analysis of the Lange coupler and Akhtarzad's design method for a pair of coupled microstrip lines. Including a correction in the latter for a single strip shape ratios less than unity, is significant. The described approach compares favorably with existing iterative methods and was used to obtain reasonably good performances on a low dielectric constant laminate.

# Abstracts

## A Universal Overlay for Surface Impedance Calculations for Composite Conductors (Short Papers)

*F.W. Schoti. "A Universal Overlay for Surface Impedance Calculations for Composite Conductors (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.2 (Feb. 1981 [T-MTT]): 171-172.*

Surface impedance calculations for composite conducting surfaces made of two different metals can be made amenable to a universal graphical solution. This is in the form of an overlay to be superimposed on the reflection coefficient plane and is therefore useful in conjunction with either the Smith Chart or the "Zeta-Theta" Chart. An example is given of a composite conductor consisting of a thin nickel interfacing layer underlying a thick layer of gold, such as might be found in the construction of microstrip circuit elements.

# Abstracts

## A Time Domain Reflectometer Using a Semiautomatic Network Analyzer and the Fast Fourier Transform (Short Papers)

*B. Ulriksson. "A Time Domain Reflectometer Using a Semiautomatic Network Analyzer and the Fast Fourier Transform (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.2 (Feb. 1981 [T-MTT]): 172-174.*

A time domain reflectometer system is simulated by measuring the reflection coefficient in the frequency domain and then computing the time domain signal by the Fourier transform. The program has been written for the Hewlett-Packard 8409A Semiautomatic Network Analyzer. The computation time has been minimized by using the fast Fourier transform. The problems imposed by the difficulty of switching the HP 8409A between low- and high-frequency ranges are also discussed.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Extension of Existing Models to Ion-Implanted MESFET's (Correction)

*P. de Santis. "Extension of Existing Models to Ion-Implanted MESFET's (Correction)." 1981 Transactions on Microwave Theory and Techniques 29.2 (Feb. 1981 [T-MTT]): 174-174.*

A list of the most important corrections to the above paper is reported below.

# Abstracts

## Contributors (Feb. 1981 [T-MTT])

*W.C. Chew, J. Citerne, B.N. Das, J.B. Davies, G.J. Dolan, P. Gelin, A. Gopinath, I. Gupta, K. Hatori, K.K. Joshi, K. Kobayashi, J.A. Kong, M.J. Lazarus, R.A. Linke, A. Lipparini, N. Miki, D. Mirshekar-Syahkal, N. Nagai, Y. Nemoto, F.R. Pantoja, A. Paul, M. Petenzi, S.R. Seshadri, S.Y. Poh, J.S. Rao, G.P. Riblet, V. Rizzoli, I. Sakagami, R. Sato, G. Saulich, T.C.L.G. SoIlner, M.G. Somekh, D.S. Stone, M.-C. Tsai and D.P. Woody. "Contributors (Feb. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.2 (Feb. 1981 [T-MTT]): 175-179.*

# Abstracts

## IEEE Annual Combined Index (Advertisement) (Feb. 1981 [T-MTT])

*"IEEE Annual Combined Index (Advertisement) (Feb. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.2 (Feb. 1981 [T-MTT]): 180-180.*

# Abstracts

## Back Cover (Feb. 1981 [T-MTT])

*"Back Cover (Feb. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.2 (Feb. 1981 [T-MTT]): b1-b1.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Front Cover (Mar. 1981 [T-MTT])

*"Front Cover (Mar. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.3 (Mar. 1981 [T-MTT]): f1-f2.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## An Experimental Gyro-TWT

*R.S. Symons, H.R. Jory, S.J. Hegji and P.E. Ferguson. "An Experimental Gyro-TWT." 1981 Transactions on Microwave Theory and Techniques 29.3 (Mar. 1981 [T-MTT]): 181-184.*

Three experimental gyro traveling wave tubes (TWT'S) have been built and tested. All tubes used a fundamental cyclotron resonance interaction with the circularly polarized TE/sup 0/sub 11/ dominant waveguide mode. The tubes differed in the length of the single circuit section and in the amount of distributed loss used. The experiments were conducted at 5 GHz, with the object of producing a design that could be scaled to 94 GHz. Results on the third experiment include measurements of stable gain as high as 24 dB small signal and 18 dB saturated. A saturated power output of 120 kW at a total beam efficiency of 26 percent was measured with a 3-dB saturated power output bandwidth of 6 percent. The design features of the tubes and the experimental results are described fully.

# Abstracts

## Dual-Gate MESFET Variable-Gain Constant-Output Power Amplifier

*M. Kumar and H.-C. Huang. "Dual-Gate MESFET Variable-Gain Constant-Output Power Amplifier." 1981 Transactions on Microwave Theory and Techniques 29.3 (Mar. 1981 [T-MTT]): 185-189.*

The use of a dual-gate GaAs FET as a broad-band variable gain and constant output power amplifier is described. A five-stage variable gain-constant output power amplifier has been realized which provides a constant output power of 3 dBm (±2 dB) for a large dynamic range of input power of -45 dBm to 0 dBm over the 4-8-GHz band. The amplifier uses a feed-forward AGC circuit for preadjusting the gain of the amplifier stages depending upon the strength of the signal at the output of preceding stages. The amplifier has the capability of detecting two or more simultaneous RF pulses having different amplitudes and separated by more than 15-ns time intervals. Also it preserves any amplitude modulation of the individual pulse.

# Abstracts

## Synthesis of Broad-Band 3-dB Hybrids Based on the 2-Way Power Divider

*G.L. Nystrom. "Synthesis of Broad-Band 3-dB Hybrids Based on the 2-Way Power Divider." 1981 Transactions on Microwave Theory and Techniques 29.3 (Mar. 1981 [T-MTT]): 189-194.*

The synthesis of broad-band 2-way Wilkinson hybrids is well known. The even- and odd-mode analysis results in two equivalent circuits where the synthesis of the odd mode is done by computer optimization. This paper shows an exact synthesis of 2-way Wilkinson power dividers having one isolation resistor, but an arbitrary number of quarter-wave transformers. A large number of circuits have been synthesized with up to 6 quarter-wave transformers. The 2-way Wilkinson hybrid can be extended to a 4-port component. This 4-port component can operate as a 180° or 90° 3-dB hybrid depending on the input port. The hybrid has a high directivity independent of frequency when used as a 180° hybrid. Experimental results are given for a 2-way divider and a 3-dB hybrid built in microstrip with a center frequency of 5 GHz.

# Abstracts

## Computer-Oriented Synthesis of Optimum Circuit Pattern of 3-dB Hybrid Ring by the Planar Circuit Approach

*T. Okoshi, T. Imai and K. Ito. "Computer-Oriented Synthesis of Optimum Circuit Pattern of 3-dB Hybrid Ring by the Planar Circuit Approach." 1981 Transactions on Microwave Theory and Techniques 29.3 (Mar. 1981 [T-MTT]): 194-202.*

A fully computer-oriented synthesis of the optimum circuit pattern of a 3-dB hybrid ring based upon the planar circuit concept is described. In the synthesis process, the contour-integral method, and Powell's method are used for the circuit analysis, the optimization, respectively. The synthesized optimum patterns are given in normalized curves, parameters which can directly be used in practical circuit design. The validity of the theory is confirmed by experiment. It is shown both theoretically, experimentally that the planar circuit approach can, not only prevent the deterioration of the hybrid characteristics due to the widening of the circuit, but bring forth hybrid characteristics somewhat better than the distributed constant model. It is also shown that the obtained optimized characteristics can further be improved by addition of simple external circuits.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## The Sector Coupler -- Theory and Performance

*J.W. Archer, M. Ogai and E.M. Caloccia. "The Sector Coupler -- Theory and Performance." 1981 Transactions on Microwave Theory and Techniques 29.3 (Mar. 1981 [T-MTT]): 202-208.*

The "sector coupler" is a practical, broad-band power divider for overdimensioned, millimeter-wavelength, TE/sub [01]/ mode circular wave-guide communications systems. The simple mechanical construction of the device, together with its very low insertion loss, high return loss, and low higher order TE/sub [0n]/ mode coupling in the main line, make it ideally suited to applications where many devices must be installed in a long waveguide run.

# Abstracts

## Planar Meanderline Ferrite-Dielectric Phase Shifter

*E.R.B. Hansson, S. Aditya and M.A. Larsson. "Planar Meanderline Ferrite-Dielectric Phase Shifter." 1981 Transactions on Microwave Theory and Techniques 29.3 (Mar. 1981 [T-MTT]): 209-215.*

This paper presents the design of meanderline circuits with multilayer ferrite-dielectric embedding. New expressions are developed for the even- and the odd-mode admittances for an infinite meanderline in such a structure. It is shown that the effective dielectric constants and the effective relative permeabilities for some of the multilayer structures are simply related. An efficient synthesis routine for the design of meanderline circuits is described. Effect of different parameters on the phase shift has been studied experimentally. It is indicated that the present structure can result in a compact phase shifter with an improved figure of merit, peak power-handling capability, and temperature stability.

# Abstracts

## Printed Circuit Coupled-Line Filters for Bandwidths Up to and Greater Than an Octave

*B.J. Minnis. "Printed Circuit Coupled-Line Filters for Bandwidths Up to and Greater Than an Octave." 1981 Transactions on Microwave Theory and Techniques 29.3 (Mar. 1981 [T-MTT]): 215-222.*

The realization of edge-coupled-line filters as printed circuits has generally been assumed to be confined to filters with fractional bandwidths of 30 percent or less. However, the design technique described herein has eliminated the 30-percent restriction and such filters may now be constructed for fractional bandwidths up to approximately 100 percent. Instead of constraining the physical realization to be a cascade of coupled lines, the technique allows the realization to consist of coupled lines and simple lengths of line cascaded in such a way that resultant circuit dimensions are practicable for the bandwidth specified. Practical examples are specified.

# Abstracts

## Electromagnetic Fields in an Axial Symmetric Waveguide with Variable Cross Section

*S.A. Kheifets. "Electromagnetic Fields in an Axial Symmetric Waveguide with Variable Cross Section." 1981 Transactions on Microwave Theory and Techniques 29.3 (Mar. 1981 [T-MTT]): 222-229.*

A new class of separable variables is found which allows one to find an approximate analytical solution of the Maxwell equations for axial symmetric waveguides with slow (but not necessarily small) varying boundary surfaces. Two examples of the solution are given. Possible applications and limitations of this approach are discussed.

# Abstracts

## Impedance Transformations For The Generalized Reflection Modulator

*H.A. Atwater. "Impedance Transformations For The Generalized Reflection Modulator." 1981 Transactions on Microwave Theory and Techniques 29.3 (Mar. 1981 [T-MTT]): 229-234.*

A procedure is given for obtaining the impedance transformer which will produce a prescribed pair of phasor reflection coefficients by transformation from a given pair of impedance states terminating the transformer. The transformer may be used in a general two-state reflection modulator: as a phase shifter with phase change at constant amplitude or as an amplitude modulator with level shift at constant or variable phase. The condition governing the reflection coefficients available from a given pair of impedance states is given. Examples and limitations are discussed.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Analysis of Open-Type Dielectric Waveguides by the Finite-Element Iterative Method

*M. Ikeuchi, H. Sawami and H. Niki. "Analysis of Open-Type Dielectric Waveguides by the Finite-Element Iterative Method." 1981 Transactions on Microwave Theory and Techniques 29.3 (Mar. 1981 [T-MTT]): 234-240.*

Dispersion characteristics for open-typed dielectric waveguide structures operated at millimeter- and submillimeter-wave frequencies are calculated by a finite-element iterative procedure with a given criterion on the maximum field strength at the virtual boundary. Numerical results for a rectangular dielectric image guide are presented and compared with results from other methods. The strip dielectric guide and the insulated image guide with finite- or infinite-width substrates are also analyzed.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Helical Resonators for Measuring Dielectric Properties of Materials

*W. Meyer. "Helical Resonators for Measuring Dielectric Properties of Materials." 1981 Transactions on Microwave Theory and Techniques 29.3 (Mar. 1981 [T-MTT]): 240-247.*

A theoretical and practical investigation is given of superconducting helical resonators with quality factors greater than 10/sup 8/ which allow the determination of dielectric loss tangents in the frequency range of 0.1 to 5 GHz and below 15 K with high accuracy. The underlying measurement theory is an extension of perturbation theory. They are evaluated for the fields in a shielded multiple quarter-wave helical resonator with a cylindrical dielectric specimen inside the helix. Measurement results on optimized resonators made from superconducting Nb and Nb/sub 3/Sn are reported as well as further applications.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Measurement of Losses in Noise-Matching Networks

*E.W. Strid. "Measurement of Losses in Noise-Matching Networks." 1981 Transactions on Microwave Theory and Techniques 29.3 (Mar. 1981 [T-MTT]): 247-252.*

The noise contribution of an input-matching network to a low-noise amplifier is equal to the inverse of the network's available gain. The available gain of various networks at 4 GHz was computed from high-accuracy S-parameter measurements. The available gain of a typical tuner was experimentally found to be a strong function of its tuning, which shows that "back-to-back" measurements of two tuners to obtain the loss of each tuner can be inaccurate. Measurement of the available gain of an amplifier's input-matching circuit is shown to give quick insight into its minimum noise contribution before the actual amplifier stage is built.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Dependence of Electromagnetic Energy Deposition Upon Angle of Incidence for an Inhomogeneous Block Model of Man Under Plane-Wave Irradiation

*M.J. Hagmann, I. Chatterjee and O.P. Gandhi. "Dependence of Electromagnetic Energy Deposition Upon Angle of Incidence for an Inhomogeneous Block Model of Man Under Plane-Wave Irradiation." 1981 Transactions on Microwave Theory and Techniques 29.3 (Mar. 1981 [T-MTT]): 252-255.*

Whole-body and part-body energy deposition in a realistic inhomogeneous block model of man is presented as a function of angle of incidence for plane-wave irradiation for two cases: E arm-to-arm, with man in free space, H arm-to-arm, with man in free space, and also with man standing on a conducting plane. At the frequencies considered (27.12 and 77 MHz), the variation with angle is smooth and extrema occur at or near angles corresponding to the standard polarizations considered earlier by others. Part-body energy deposition and some of the fine structure in the angular dependence would not be seen with less realistic modes of man.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Dual-Mode Microwave System to Enhance Early Detection of Cancer

*K.L. Carr, A.M. El-Mahdi and J. Shaeffer. "Dual-Mode Microwave System to Enhance Early Detection of Cancer." 1981 Transactions on Microwave Theory and Techniques 29.3 (Mar. 1981 [T-MTT]): 256-260.*

A dual-mode microwave system has been developed that will permit early detection of cancer. The system combines the use of the passive microwave radiometer with an active transmitter. The active transmitter will provide localized heating to enhance early detection by taking advantage of the differential heating (i.e., tumor temperature with respect to surrounding tissue) associated with thermal characteristics of tumors.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Performance and Design of Microwave FET Harmonic Generators (Short Papers)

*M.S. Gupta, R.W. Laton and T.T. Lee. "Performance and Design of Microwave FET Harmonic Generators (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.3 (Mar. 1981 [T-MTT]): 261-262.*

Experimental measurements of the power gain of a 4- to 8-GHz frequency doubler, employing a single-gate GaAs MESFET device and a microstrip circuit, are reported. The measured performance provides design guidelines, and is explained in terms of FET characteristics. In particular, the multiplication gain is largest when the FET is biased near pinchoff.

# Abstracts

## On the Design of Transitions Between a Metal and Inverted Strip Dielectric Waveguide for Millimeter Waves (Short Papers)

*S. Bhooshan and R. Mittra. "On the Design of Transitions Between a Metal and Inverted Strip Dielectric Waveguide for Millimeter Waves (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.3 (Mar. 1981 [T-MTT]): 263-265.*

The results of a study of three types of transitions between the rectangular metal waveguide and the inverted strip guide are reported. Reflected power measurements from each type of transition and insertion-loss measurements for configurations involving the three transitions have also been carried out. The procedure of determining the optimum parameters for the transition is quite general, and has the potential for being extended to other dielectric structures.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## A Coaxial Waveguide Commutator Feed for a Scanning Circular Phased Array Antenna (Short Papers)

*E.P. Irzinski. "A Coaxial Waveguide Commutator Feed for a Scanning Circular Phased Array Antenna (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.3 (Mar. 1981 [T-MTT]): 266-270.*

A coaxial waveguide amplitude commutation feed system has been developed for application to the scanning circular array antenna problem. A dominant TEM mode and a pair of orthogonal TE/sub 11/ modes suitably excited at the input of a coaxial waveguide feed are employed to generate a simply commutatable low-sidelobe discrete amplitude distribution at the peripheral output ports of the coaxial circular array feed. The major advantages of the coaxial commutator feed compared to other circular array feed types are the broad bandwidth and small insertion loss simultaneously achieved with a simple feed geometry. The design and measured performance capability of a 30-percent RF bandwidth low-sidelobe coaxial commutator feed are described in detail.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Coupling Between Two Collinear Parallel-Plate Waveguides of Unequal Widths (Short Papers)

*Y.E. Elmoazzen and L. Shafai. "Coupling Between Two Collinear Parallel-Plate Waveguides of Unequal Widths (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.3 (Mar. 1981 [T-MTT]): 270-273.*

The problem of coupling between two collinear parallel-plate waveguides of unequal widths is investigated using the moment methods. The exciting mode of the waveguide is assumed as the incident field and an integral equation for the induced currents is expressed in terms of the reflected, the transmitted, and the evanescent currents on the walls of the waveguides. This integral equation is solved numerically and the results for the reflections and the transmission coefficients and the radiated field are obtained. The effect of varying the coupled waveguide width and the separation distance of the waveguides is investigated.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Slotted and Loose Braid Cables: Brief Conclusions of a Comparative Study (Short Papers)

*A.S. De Carvalho Fernandes. "Slotted and Loose Braid Cables: Brief Conclusions of a Comparative Study (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.3 (Mar. 1981 [T-MTT]): 273-275.*

An analytical comparison is made of the electromagnetic characteristics of the coaxial mode of longitudinally slotted coaxial cables and loose braid coaxial cables in free space. Four aspects are considered: radial decay of the fields, percentage of power that travels outside the coaxial structure, characteristic impedance, and conductor loss.

# Abstracts

## Contributors (Mar. 1981 [T-MTT])

*S. Aditya, J.W. Archer, H.A. Atwater, K.L. Carr, E.M. Caloccia, I. Chatterjee, A.M. El-Mahdi, P.E. Ferguson, O.P. Gandhi, M.J. Hagmann, E.R.B. Hansson, S.J. Hegji, H.-C. Huang, M. Ikeuchi, T. Imai, K. Ito, H.R. Jory, S.A. Kheifets, M. Kumar, M.A. Larsson, W. Meyer, B.J. Minnis, H. Niki, G.L. Nystrom, M. Ogai, T. Okoshi, H. Sawami, J. Shaeffer, E.W. Strid and R.S. Symons. "Contributors (Mar. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.3 (Mar. 1981 [T-MTT]): 276-280.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Inside Back Cover (Mar. 1981 [T-MTT])

*"Inside Back Cover (Mar. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.3 (Mar. 1981 [T-MTT]): b1-b1.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Front Cover (Apr. 1981 [T-MTT])

*"Front Cover (Apr. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.4 (Apr. 1981 [T-MTT]): f1-f2.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Inherent Signal Losses in Resistive-Diode Mixers

*M.E. Hines. "Inherent Signal Losses in Resistive-Diode Mixers." 1981 Transactions on Microwave Theory and Techniques 29.4 (Apr. 1981 [T-MTT]): 281-292.*

A new time-domain method is presented for the characterization and analysis of resistive-diode mixers. The method has been found to be helpful in evaluating experimental models of new mixer designs. From an analytical viewpoint, this method has provided some new insights into mixer behavior and the fundamental limits to mixer performance. In analyzing equivalent mixer models, the method has been found to be in agreement with the classical frequency-domain approach. In using the time-domain method to determine the minimum available loss, theoretical studies were made using an "ideal-diode" model which is presumed to have zero forward-bias resistance and infinite reverse-bias impedance. Significant signal losses were found to occur, even in this "lossless" condition, when reactive filtering was used to suppress unwanted frequency responses. The lost signal power was not reflected and it did not appear at other signal-related frequencies. This result has also been found in a frequency-domain analysis using a new formulation suggested to the author in private correspondence. This loss is explained in two different ways, depending upon the model used and the method of analysis. In one example, using the time-domain approach, it was found that signal energy is converted into dc in the rectified current. In the frequency domain analysis, the loss is explained as the result of frequency conversions into a large number of high-order modulation products. The paper includes some newly formulated conjectures concerning the ultimate limits on conversion loss in single-diode mixers.

# Abstracts

## Large-Signal Technique for Designing Single-Frequency and Voltage-Controlled GaAs FET Oscillators

*C. Rauscher. "Large-Signal Technique for Designing Single-Frequency and Voltage-Controlled GaAs FET Oscillators." 1981 Transactions on Microwave Theory and Techniques 29.4 (Apr. 1981 [T-MTT]): 293-304.*

A systematic procedure is described for designing fixed-frequency and voltage-tuned GaAs FET oscillators for optimum large-signal performance. The approach is based on the use of a large-signal FET model for de-embedding dominant device nonlinearities, leading to a method which is both accurate and simple to apply. The viability of the technique is demonstrated with a 17-GHz fixed-frequency oscillator and a 7.4 to 13.1-GHz varactor-tuned oscillator. Design considerations as well measured performance characteristics are discussed in detail.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## 10-GHz 10-W Internally Matched Flip-Chip GaAs Power FET's (Apr. 1981 [T-MTT])

*Y. Mitsui, M. Kobiki, M. Wataze, K. Segawa, M. Otsubu and T. Ishii. "10-GHz 10-W Internally Matched Flip-Chip GaAs Power FET's (Apr. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.4 (Apr. 1981 [T-MTT]): 304-309.*

A newly developed internally matched configuration for a flip-chip GaAs power field effect transistor is presented. In this structure, gate and drain electrodes of the FET chips are directly connected to the lumped dielectric capacitors in the matching networks by thermocompression bonding using no wire. A power output of 10 W with 3-dB gain and a power added efficiency as high as 14 percent has been realized at 10 GHz.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## K-Band High-Power GaAs FET Amplifiers

*J. Sone and Y. Takayama. "K-Band High-Power GaAs FET Amplifiers." 1981 Transactions on Microwave Theory and Techniques 29.4 (Apr. 1981 [T-MTT]): 309-313.*

Lumped-element internal matching techniques were successfully adopted for K-band power GaAs FET amplifiers. The developed 18-GHz band two-stage amplifier provides 1.05-W power output at 1-dB gain compression and 1.26-W saturated power output with 8.1-dB small-signal gain. The 20-GHz band single-stage amplifier has 1.04-W power output with 3-dB associated gain. Lumped-element internal matching circuit design as well as amplifier fabrication are described. Intermodulation distortion and AM-to-PM conversion characteristics are also presented.

# Abstracts

## Dielectric Resonator in a Waveguide Below Cutoff

*J. Van Bladel. "Dielectric Resonator in a Waveguide Below Cutoff." 1981 Transactions on Microwave Theory and Techniques 29.4 (Apr. 1981 [T-MTT]): 314-322.*

A structure is considered consisting of a waveguide 2 below cutoff, connected to waveguides above cutoff, 1 and 3, by means of suitable junctions. A dielectric resonator is introduced in waveguide 2. Its effect on the transmission curve of the structure is evaluated in the limit epsilon/sub r/ --> /spl infin/. Theoretical results are compared with experiment.

# Abstracts

## Design of Cylindrical Dielectric Resonators in Inhomogeneous Media

*R.R. Bonetti and A.E. Atia. "Design of Cylindrical Dielectric Resonators in Inhomogeneous Media." 1981 Transactions on Microwave Theory and Techniques 29.4 (Apr. 1981 [T-MTT]): 323-326.*

An iterative analytical method is presented for computing resonant frequencies of dielectric cylindrical resonators in inhomogeneous media. Normalized design charts are presented including a wide range of practical geometrical and physical parameters. Numerical results, when compared to three independent sets of experimental data, show an accuracy of better than 1 percent.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Transmission-Line Transformers

*E. Rotholz. "Transmission-Line Transformers." 1981 Transactions on Microwave Theory and Techniques 29.4 (Apr. 1981 [T-MTT]): 327-331.*

The radio-frequency transformers described in this paper consist of matched transmission lines of equal length and characteristic impedance. The lines are connected according to rules given in the text. These transformers exhibit a very broad frequency response which can be readily estimated; two methods of analysis are presented. The computations agree well with the test results.

# Abstracts

## Planar Multiport Quadrature-Like Power Dividers/Combiners

*A.A.M. Saleh. "Planar Multiport Quadrature-Like Power Dividers/Combiners." 1981 Transactions on Microwave Theory and Techniques 29.4 (Apr. 1981 [T-MTT]): 332-337.*

A new class of planar, multiport power dividers/combiners is presented that is a generalization of the branch-line four-port 3-dB quadrature hybrid. They are suitable for combining an arbitrary number of identical reflection-type or transmission-type devices while maintaining a match at the input port. Experimental results are included for a four-way hybrid power divider/combiner.

# Abstracts

## On Solving Waveguide Junction Scattering Problems by the Conservation of Complex Power Technique

*R. Safavi-Naini and R.H. MacPhie. "On Solving Waveguide Junction Scattering Problems by the Conservation of Complex Power Technique." 1981 Transactions on Microwave Theory and Techniques 29.4 (Apr. 1981 [T-MTT]): 337-343.*

Normal mode expansions are used to mode match the tangential electric field at the transverse junction of two cylindrical waveguides. Instead of mode matching the tangential magnetic field the principle of conservation of complex power is invoked and leads, without a matrix inversion, to an expression for the junction's input admittance matrix, as seen from the smaller guide. Simple matrix algebra and the reciprocity theorem then provide the generalized scattering matrix of the two-port (with higher order modes included). It is also shown that the solution satisfies the continuity condition for tangential magnetic field in the junction's aperture. Numerical results are given for parallel plate waveguides with TEM, TE/sub 1/, and TM/sub 1/ incident fields, numerical convergence being achieved with about ten modes in the smaller waveguide.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## An Active "Cold" Noise Source

*R.H. Frater and D.R. Williams. "An Active "Cold" Noise Source." 1981 Transactions on Microwave Theory and Techniques 29.4 (Apr. 1981 [T-MTT]): 344-347.*

An active circuit which behaves like a "cold" noise source is described. The circuit which uses a gallium arsenide FET is given the name COLFET. The appropriate theory is developed and practical circuits described using the circuit. Equivalent noise temperatures of less than 50 K have been measured for a 50-omega source at 1400 MHz.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Numerical Analysis of Pulse Broadening in Graded Index Optical Fibers

*K. Morishita. "Numerical Analysis of Pulse Broadening in Graded Index Optical Fibers." 1981 Transactions on Microwave Theory and Techniques 29.4 (Apr. 1981 [T-MTT]): 348-352.*

A scalar multilayer approximation method for calculating the impulse response of multimode optical fibers from measured refractive-index profiles is described. A comparison is made between shapes of measured pulses and calculated pulses.

# Abstracts

## Characteristics of Unilateral Fin-Line Structures with Arbitrarily Located Slots (Apr. 1981 [T-MTT])

*L.P. Schmidt, T. Itoh and H. Hofmann. "Characteristics of Unilateral Fin-Line Structures with Arbitrarily Located Slots (Apr. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.4 (Apr. 1981 [T-MTT]): 352-355.*

Generalized unilateral fin-line configurations for extended millimeter-wave applications are analyzed using the equivalent transmission-line concept in the spectral domain. Numerical results for the frequency-dependent propagation constants and characteristic impedances of various stuctures are presented.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Variable Bandpass Filters Using Varactor Diodes

*S. Toyoda. "Variable Bandpass Filters Using Varactor Diodes." 1981 Transactions on Microwave Theory and Techniques 29.4 (Apr. 1981 [T-MTT]): -363.*

A rectangular waveguide type variable bandpass filter for the 4-GHz bandpass has been proposed and tested. The bandpass width varies from 260 MHz to 1.02 GHz for a filter using varactor diodes. Two microstrip variable bandpass filters for the 6-GHz and 4-GHz bands are also proposed and tested. The passband width varies from 310 MHz to1.24 GHz for a varactor-diode coupled filter, and it varies from 380 MHz to 2.18 GHz for a filter which is composed of low-pass and high pass filters connected in cascade. The center frequency of the three filters can be changed arbitrarily.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Stepped-Ferrite Tunable Evanescent Filters

*R.V. Snyder. "Stepped-Ferrite Tunable Evanescent Filters." 1981 Transactions on Microwave Theory and Techniques 29.4 (Apr. 1981 [T-MTT]): 364-371.*

A new technique is described for the design of magnetically tunable filters. With this approach, the resonant sections tune at the same rate enabling maintenance of response shape as center frequency is varied. The filters are minimum-phase structures, realizable with as many poles as required. The design is capable of handling much greater power than single-crystal YIG designs, although the tuning bandwidth is much less.

# Abstracts

## A Dual Six-Port Automatic Network Analyzer (Apr. 1981 [T-MTT])

*H.M. Cronson and L. Susman. "A Dual Six-Port Automatic Network Analyzer (Apr. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.4 (Apr. 1981 [T-MTT]): 372-378.*

A 2- to 18-GHz dual six-port automatic network analyzer using diode power detectors is described. An analysis of the calibration technique is discussed in detail. Measurement accuracies of better than 0.1-dB up to 40-dB insertion loss from 2 to 7 GHz are reported. Possible causes of the errors observed at higher frequencies are given.

# Abstracts

## Mode and Energy Guidance Properties of a Slab of Inhomogeneous Medium with Transverse Variations of the Gain Only

*L. Ronchi Abbozzo and R. Pratesi. "Mode and Energy Guidance Properties of a Slab of Inhomogeneous Medium with Transverse Variations of the Gain Only." 1981 Transactions on Microwave Theory and Techniques 29.4 (Apr. 1981 [T-MTT]): 378-383.*

The mode and energy guidance properties of a planar slab of parabolic graded index medium are examined when there are transverse variations of the gain or of the losses only. Mode configurations and propagation constants are evaluated of the first four even modes. The results are presented and discussed. In particular it is found that a gain decreasing away from the symmetry plane does not favor the existence of guided modes, as happens when the graded index medium is not limited to a slab. Evidence is found that the presence of the boundaries affects the mode proagation even when the caustic surface is well inside the lab.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Two Simple Methods for the Measurement of the Dielectric Permittivity of Low-Loss Microstrip Substrates (Short Papers)

*R.M. Pannell and B.W. Jervis. "Two Simple Methods for the Measurement of the Dielectric Permittivity of Low-Loss Microstrip Substrates (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.4 (Apr. 1981 [T-MTT]): 383-386.*

Two simple methods are presented for the measurement of the dielectric permittivity of low-loss microstrip substrates. The permittivity associated with a specific length of microstrip may be obtained. The methods are not wasteful of substrate material.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Empirical Relations for Capacitive and Inductive Coupling Coefficients of Coupled Microstrip Lines (Short Papers)

*S. Kal, D. Bhattacharya and N.B. Chakraborti. "Empirical Relations for Capacitive and Inductive Coupling Coefficients of Coupled Microstrip Lines (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.4 (Apr. 1981 [T-MTT]): 386-388.*

Empirical relations for inductive and capacitive coupling coefficients are proposed. The functional relationships are based on the physical mechanism of coupling in microstrip lines. Values of coupling coefficients computed from even- and odd-mode impedances and phase velocities, available in the literature, are compared with those computed from the proposed relations. Microstrip couplers have been designed on the basis of coupling coefficients to meet the desired coupling and isolation.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Contributors (Apr. 1981[T-MTT])

*A.E. Atia, R.R. Bonetti, H.M. Cronson, R.H. Frater, M.E. Hines, H. Hofmann, T. Ishii, T. Itoh, M. Kobiki, R.H. MacPhie, Y. Mitsui, K. Morishita, M. Otsubu, R. Pratesi, C. Rauscher, L. Ronchi Abbozzo, E. Rotholz, R. Safavi-Naini, A.A.M. Saleh, L.P. Schmidt, K. Segawa, R.V. Snyder, J. Sone, L. Susman, Y. Takayama, S. Toyoda, J. Van Bladel, M. Wataze and D.R. Williams. "Contributors (Apr. 1981[T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.4 (Apr. 1981 [T-MTT]): 389-392.*

# Abstracts

## Back Cover (Apr. 1981 [T-MTT])

*"Back Cover (Apr. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.4 (Apr. 1981 [T-MTT]): b1-b1.*

# Abstracts

## Front Cover (May 1981 [T-MTT])

*"Front Cover (May 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.5 (May 1981 [T-MTT] (Joint Special Issue on Surface-Acoustic-Wave Device Applications)): f1-f2.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Foreword (May 1981 [T-MTT])

*R.C. Williamson and T.W. Bristol. "Foreword (May 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.5 (May 1981 [T-MTT] (Joint Special Issue on Surface-Acoustic-Wave Device Applications)): 393-394.*

The "applications" theme of this Issue is a reflection of the rapid progress in the surface-acoustic-wave (SAW) field since its beginnings in the late 1960's. Twelve years have elapsed since the first Special Issue on microwave acoustics including SAW's was published jointly by the Microwave Theory and Techniques Society and the Sonics and Ultrasonics Group. In November 1969, the SAW field was quite new, and a large fraction of the SAW papers published during 1969 were contained in that one Special Issue. Much of the Issue was devoted to speculations on the configuration and operation of future devices. By the time of the second joint Special Issue in April 1973, several types of SAW devices had been developed to the point of achieving very attractive levels of performance, and a few papers outlining the potential impact of these devices on systems applications were included the Issue. Increasingly sophisticated and high-performance SAW devices were the major theme of the May 1976 Special Issue of the Proceedings of the IEEE. By the end of the 1970's, SAW devices found increased acceptance as practical, high-performance components for signal generation and processing in electronic systems. Accordingly, the goal of this Special Issue is to emphasize the fact that SAW devices "have arrived" by providing a number of specific examples of how the devices are being effectively and profitably used in many different systems. Engineers and systems designers will find interest in the variety of complex signal-processing functions that can be performed with SAW devices in compact and simple configurations.

# Abstracts

## A Review of Current and Future Components for Electronic Warfare Receivers

*J.H. Collins and P.M. Grant. "A Review of Current and Future Components for Electronic Warfare Receivers." 1981 Transactions on Microwave Theory and Techniques 29.5 (May 1981 [T-MTT] (Joint Special Issue on Surface-Acoustic-Wave Device Applications)): 395-403.*

This paper addresses the role of conventional and new components in passive electronic warfare (EW) receivers. The various areas of EW are defined before restricting the discussion predominantly to the radar intercept problem at microwave frequencies. The operational parameters of conventional components are then reviewed including the multiplexer; crystal video, instantaneous frequency measurement (IFM), and scanning superheterodyne receivers. The significance of modularity, digital control, and hybrid combinations of components is highlighted. A brief description follows of the operational Cutlass EW equipment. New components based on surface-acoustic waves (SAW) and acoustooptic (AO) Bragg cells are then presented and their particular importance in channelized receivers, IFM's and microscan receivers noted. Finally, a number of conclusions are drawn covering likely trends in EW receivers and the need for continuing development of large-scale integrated (LSI) circuits for signal sorting and overall digital management.

# Abstracts

## Very Fast Signal Processors as a Result of the Coupling of Surface Acoustic Wave and Digital Technologies

*H. Gautier and P. Tournois. "Very Fast Signal Processors as a Result of the Coupling of Surface Acoustic Wave and Digital Technologies." 1981 Transactions on Microwave Theory and Techniques 29.5 (May 1981 [T-MTT] (Joint Special Issue on Surface-Acoustic-Wave Device Applications)): 404-409.*

The recent progress of the digital and the surface acoustic wave (SAW) technologies have made them compatible; and it is now possible to design signal-processing modules which benefit from the flexibility of the digital techniques and the very high computation speed of the SAW techniques. Very fast signal processors can now be built which are able to process several tens of megasamples per second and whose volume and power consumption are limited. This paper shows the compatibility of these technologies and the advantages yielded by their joint use. Several examples are described which relate to one- and two-dimensional Fourier and correlation processors.

# Abstracts

## SAW Quadraphase Code Generator

*C.R. Vale. "SAW Quadraphase Code Generator." 1981 Transactions on Microwave Theory and Techniques 29.5 (May 1981 [T-MTT] (Joint Special Issue on Surface-Acoustic-Wave Device Applications)): 410-414.*

Radar emissions are now subject to regulation that limits their spectral splatter. Quadraphase codes are used to make an MSK-like pulse that has a narrower spectrum than a biphase pulse, and furthermore, it is tolerant of filtering. The design of a SAW pattern is described which yields a device that is both an encoder and filter. When it is energized by an impulse a valuable, spectral limited radar pulse is generated. The performance of this pulse is shown to meet certain desirable criteria. The correlator for the pulse is simply derived from the code generator and its performance is shown. Comparison with non-SAW methods of performing the same functions is given.

# Abstracts

## Precision SAW Filters for a Large Phased-Array Radar System

*W.H. Haydl, W. Sander and W.-D. Wirth. "Precision SAW Filters for a Large Phased-Array Radar System." 1981 Transactions on Microwave Theory and Techniques 29.5 (May 1981 [T-MTT] (Joint Special Issue on Surface-Acoustic-Wave Device Applications)): 414-419.*

The electronically steerable radar (ELRA) at the Forschungsinstitut fur Funk und Mathematik is an experimental S-band phased-array radar system consisting of separate transmitting and receiving arrays employing several coherent and incoherent signal-processing and data-handling techniques, incorporating multiple beam and multifunction operation for target search and tracking, adaptive interference suppression, and target resolution. This paper deals with the development and application of two types of SAW filters for the IF amplifier channel of the receiving array. Compared to conventional filters with lumped elements, these filters have some important merits. By making use of a special tuning technique, the center frequencies of all filters were adjusted, resulting in an rms deviation of less than 1 kHz. One type of the SAW filters represents an almost ideal approach of realizing a matched filter for rectangular shaped pulses. The conformity of the frequency responses of several hundred filters improved the noise suppression capability of the system. The use of the filters described represents one of the applications where high-quality mass-produced SAW devices have been applied to improve system reliability and performance.

# Abstracts

## Use of an SAW Multiplexer in FMCW Radar System

*L.P. Solie and M.D. Wohlers. "Use of an SAW Multiplexer in FMCW Radar System." 1981 Transactions on Microwave Theory and Techniques 29.5 (May 1981 [T-MTT] (Joint Special Issue on Surface-Acoustic-Wave Device Applications)): 419-423.*

This paper describes the application of a SAW multiplexer to develop range line resolution in FMCW millimeter-wave radar systems. The basic system design concept as well as test results are presented describing the function of the SAW multiplexer in developing the multiple-range cells in the millimeter-wave terminal guidance seeker. The SAW multiplexer has 16 channels and uses the offset multistrip coupler technique for sorting the acoustic beans into various acoustic tracks according to frequency.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## A Radar System Application of an 840-MHz SAW Resonator Stabilized Oscillator

*W.J. Tanski, R.A. St. Cyr, P.G. Dragonetti and E.G. Kosco. "A Radar System Application of an 840-MHz SAW Resonator Stabilized Oscillator." 1981 Transactions on Microwave Theory and Techniques 29.5 (May 1981 [T-MTT] (Joint Special Issue on Surface-Acoustic-Wave Device Applications)): 424-428.*

An 840-MHz SAW resonator stabilized oscillator has been developed and is being manufactured for incorporation into a radar system. This stable fundamental-mode frequency source is simple and compact (1 $in^3$ in volume) and delivers a relatively high output power of +25 dBm. These advantageous characteristics are made possible by the high-frequency low-loss distortion-free/linear-phase response of the two-port SAW resonator filter incorporated in the design. Details of the device and circuit design and oscillator performance are presented.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## SAW Vestigial Sideband Filter for TV Broadcasting Transmitter

*T. Kodama, K. Sato and Y. Uemura. "SAW Vestigial Sideband Filter for TV Broadcasting Transmitter." 1981 Transactions on Microwave Theory and Techniques 29.5 (May 1981 [T-MTT] (Joint Special Issue on Surface-Acoustic-Wave Device Applications)): 429-433.*

This paper reports the application of an SAW vestigial sideband (VSB) filter to a TV broadcasting transmitter. The filter requires steep cutoff characteristics and large fractional bandwidth. The X-112° Y · LiTaO/sub 3/ is one of the most suitable substrates for this filter, because it is possible to satisfy specifications without any compensation for typical temperature variations. The first application of LiTaO/sub 3/ substrates to a VSB filter is discussed in this paper. The filter is designed by a new optimization method using nonlinear programming. Because of the lack of a microstrip coupler and due to a large number of fingers, various second-order effects had to be compensated for. Experimental results are presented, when the filter is installed in a 10-kW TV transmitter.

# Abstracts

## TV Tuning Systems with SAW Comb Filter

*S. Matsu-Ura, K. Hazama and T. Murata. "TV Tuning Systems with SAW Comb Filter." 1981 Transactions on Microwave Theory and Techniques 29.5 (May 1981 [T-MTT] (Joint Special Issue on Surface-Acoustic-Wave Device Applications)): 434-439.*

We have successfully developed two TV tuning systems which apply a SAW comb filter device in a new way. One is an automatic channel indicating system and the other is a frequency synthesizer. The SAW comb filter has comb peaks at the frequencies where channels are allocated. A channel number is recognized by counting the number of comb peaks which the local oscillator signal of a tuner goes through. The SAW comb filter has a minimum electrode width of 1 µm. It has four sets of IDT's to cover all TV channels, fabricated on a single chip.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Implementation of Satellite Communication Systems Using Surface Acoustic Waves

*J. Henaff and P.C. Brossard. "Implementation of Satellite Communication Systems Using Surface Acoustic Waves." 1981 Transactions on Microwave Theory and Techniques 29.5 (May 1981 [T-MTT] (Joint Special Issue on Surface-Acoustic-Wave Device Applications)): 439-450.*

Current performance of surface-acoustic-wave (SAW) devices offers several advantages in the construction of digital communication networks. Experimental examples of delay lines, filters, oscillators, etc., used for the modulation, the frequency conversion, and the demodulation of n-phase-shift-keyed (PSK) digital signals are described and present results are reported. These devices, especially designed for satellite communication systems, operate in the range 70 MHz to 1 GHz where the surface wave technology allows reduction in size and weight combined with ruggedness and reliability.

# Abstracts

## Optimized SAW Spectral Control Filters for Digital Satellite Communications System

*N.G. Jones, R.A. Moore and C.J. Huber. "Optimized SAW Spectral Control Filters for Digital Satellite Communications System." 1981 Transactions on Microwave Theory and Techniques 29.5 (May 1981 [T-MTT] (Joint Special Issue on Surface-Acoustic-Wave Device Applications)): 451-456.*

A series of SAW filters with bandpass characteristics optimized for digital transmission has been developed for use in the Defense Satellite Communication System (DSCS). Features of the SAW filters, then implementations into the system, and results of system tests are described. A spectrum efficiency 30 percent greater than by competing techniques is achieved.

# Abstracts

## Programmable Frequency-Hop Synthesizers Based on Chirp Mixing

*B.J. Darby and J.M. Hannah. "Programmable Frequency-Hop Synthesizers Based on Chirp Mixing." 1981 Transactions on Microwave Theory and Techniques 29.5 (May 1981 [T-MTT] (Joint Special Issue on Surface-Acoustic-Wave Device Applications)): 456-463.*

Frequency-hopped communication equipment require synthesizers capable of providing a large number (N) of discrete frequencies over a wide band. In typical systems N lies in the range of 50 to 10000 and the required bandwidth ranges from 10 to 500 MHz. One technique for implementing a synthesizer is based on mixing chirp signals generated by impulsing SAW filters. Potentially, this method allows fast frequency hop generation over wide bandwidth (<500 MHz) with large numbers of selectable hop frequencies (N< 4000). Furthermore, the hardware can occupy a small volume and dissipate low power compared with conventional synthesizers. This paper examines the techniques and establishes likely parameter and performance bounds. Deleterious mechanisms are identified and their effects on CW spectral purity and fast frequency-hopped link error rate performance is discussed. Experimental results are presented for both a high performance modem, with N equal to 480 across a 96-MHz band and a recent development comprising the basic chirp synthesizer plus phased locked loop (PLL) to provide enhanced slow frequency hop and continuous-wave (CW) spectral purity.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Acoustoelectric Convolver Technology for Spread-Spectrum Communications

*S.A. Reible. "Acoustoelectric Convolver Technology for Spread-Spectrum Communications." 1981 Transactions on Microwave Theory and Techniques 29.5 (May 1981 [T-MTT] (Joint Special Issue on Surface-Acoustic-Wave Device Applications)): 463-474.*

Acoustoelectric (AE) convolvers for spread-spectrum communication applications are described with input bandwidth capacities to 200 MHz. These devices offer a unique combination of large processing gain, high dynamic range, small size and weight, and low drive power requirements. The programmable feature of convolvers allows the encoding waveform to be changed from bit-to-bit, thereby providing resistance to repeat jamming and enabling secure communications. The basic concepts of a convolver-based spread-spectrum communications system are reviewed, current convolver capabilities are discussed, and projections are made for future device performance. Deviations from nonideal convolver performance are considered. Special techniques which must be used in the system implementation and evaluation of convolvers are described, and the performance level achieved in a state-of-art convolver subsystem is given.

# Abstracts

## An Application of SAW Convolves to High Bandwidth Spread Spectrum Communications

*J.H. Goll and D.C. Malocha. "An Application of SAW Convolves to High Bandwidth Spread Spectrum Communications." 1981 Transactions on Microwave Theory and Techniques 29.5 (May 1981 [T-MTT] (Joint Special Issue on Surface-Acoustic-Wave Device Applications)): 473-483.*

A spread spectrum communications subsystem that is based on the separated medium acoustoelectric convolver is described. The subsystem generates minimum-shift-keyed (MSK) waveforms with the aid of SAW filters and performs differential-phase-shift-keyed (DPSK) data demodulation with acoustoelectric convolvers. The convolver provides a BT product of 2200 with a 3-dB bandwidth of 100 MHz. The signals processed by the subsystem have a BT product of 1100. In this paper, the subsystem, the generation of MSK waveforms, and the use of acoustoelectric convolvers are described. Important subsystem performance characteristics, including dynamic range (/spl cong/50 dB), contribution to implementation loss (/spl cong/1 dB), DPSK demodulation, and distortion levels are illustrated and discussed.

# Abstracts

## Wide-Band Signal Processing Using the Two-Beam Surface Acoustic Wave Acoustooptic Time Integrating Correlator

*M.W. Casseday, N.J. Berg, I.J. Abramovitz and J.N. Lee. "Wide-Band Signal Processing Using the Two-Beam Surface Acoustic Wave Acoustooptic Time Integrating Correlator." 1981 Transactions on Microwave Theory and Techniques 29.5 (May 1981 [T-MTT] (Joint Special Issue on Surface-Acoustic-Wave Device Applications)): 483-490.*

A new acoustooptic architecture for performing real-time correlation of high-frequency wide-band signals has been developed. It uses a surface-acoustic-wave (SAW) delay line, and features the optical interference of two coherent light beams which have been Bragg-diffracted by SAW's propagating in the line. The signal multiplication, and subsequent time integration of the product formed, is performed by a photodiode array which detects the diffracted light. This architecture has achieved time-bandwidths products exceeding 10/sup 6/ (34 MHz X 30 ms), and has several attributes which make it particularly well suited for use as a spread-spectrum signal processor. These include linearity of operation, large dynamic range, a large time aperture over which the correlation can be observed, and the ability to determine the center frequency and bandwidth of the signals. A correlator with this architecture has been used to detect a number of wide-band spread-spectrum signals. Its suitability for use as a signal processor in several spread-spectrum systems is considered.

Click on title for a complete paper.

# Abstracts

## Adaptive Deconvolution Using a SAW Storage Correlator

*J.E. Bowers, G.S. Kino, D. Behar and H. Olaisen. "Adaptive Deconvolution Using a SAW Storage Correlator." 1981 Transactions on Microwave Theory and Techniques 29.5 (May 1981 [T-MTT] (Joint Special Issue on Surface-Acoustic-Wave Device Applications)): 491-498.*

A new analog adaptive filter for deconvolving distorted signals is described in this paper. The filter uses a storage correlator which implements a clipped version of the least mean squared (LMS) algorithm and uses a special iterative technique to achieve fast convergence. The new filter has a potential bandwidth of 100 MHz and would eventually handle pulsed signals of 10-μs width. For signals with time-bandwidth products of less than 100, the adaptation time is less than 1 ms, which allows operation in real time for most applications, including resolution of radar signals in a cluttered environment, removal of echoes from television signals, deconvolution of distorted signals in nondestructive evaluation, and also in telephony. The filter is particularly suited for radar and communications, as it processes signals directly in the VHF range. Two experiments related to ghost suppression of a pulse and to the field of NDE are described in this paper. The results are in good agreement with computer simulations and show a ghost suppression of 15 dB for the first example and a sidelobe suppression of 8 dB for a transducer signal. The adaptation time is less than 450 μs.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Surface-Acoustic-Wave Random-Access Memories

*G.F. Manes. "Surface-Acoustic-Wave Random-Access Memories." 1981 Transactions on Microwave Theory and Techniques 29.5 (May 1981 [T-MTT] (Joint Special Issue on Surface-Acoustic-Wave Device Applications)): 498-507.*

An acoustic tapped-delay line (TDL) undermultiplexer control exhibits random-access-memory (RAM) capability; programmable time compression/expansion is achieved by controlling the difference between tap switching interval and intertap delay. A serial-in/parallel-out configuration can perform spectral compression of high input bandwidths, while requiring a single sampling operation to be performed, at the output data rate; dual properties are demonstrated by a parallel-in/serial-out organized RAM used for time compression. A new powerful N-phase configuration is discussed, which allows the intrinsic switching capability of multiplexers employed to be increased by N, while offering high dynamic range capability. The basic operation of the new technique is discussed, some theoretical aspects are investigated, and various effective configurations are described. In particular, the natural format of the time contracted/segmented output from a nonlinear convolver, asynchronously operated, is recovered; a clock-programmable bandpass filter is demonstrated, based on complementary time compression expansion. Extension to read-only memory (ROM) is briefly outlighted, with reference to frequency synthesis. Finally, processing of signals in basel and format is demonstrated using acoustic TDL's, via a simple modulation technique, which increases flexibility and the potential attraction of the new technique.

# Abstracts

## Contributors (May 1981 [T-MTT])

*I.J. Abramovitz, D. Behar, N.J. Berg, J.E. Bowers, P.C. Brossard, M.W. Casseday, J.H. Collins, B.J. Darby, P.G. Dragonetti, H. Gautier, J.H. Goll, P.M. Grant, J.M. Hannah, W.H. Haydl, K. Hazama, J. Henaff, C.J. Huber, N.G. Jones, G.S. Kino, T. Kodama, E.G. Kosco, J.N. Lee, D.C. Malocha, G.F. Manes, S. Matsu-Ura, R.A. Moore, T. Murata, H. Olaisen, S.A. Reible, W. Sander, K. Sato, L.P. Solie, R.A. St. Cyr, W.J. Tanski, P. Tournois, Y. Uemura, C.R. Vale, W.-D. Wirth and M.D. Wohlers. "Contributors (May 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.5 (May 1981 [T-MTT] (Joint Special Issue on Surface-Acoustic-Wave Device Applications)): 507-512.*

# Abstracts

## Inside Back Cover (May 1981 [T-MTT])

*"Inside Back Cover (May 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.5 (May 1981 [T-MTT] (Joint Special Issue on Surface-Acoustic-Wave Device Applications)): b1-b1.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Front Cover (Jun. 1981, Part I [T-MTT])

*"Front Cover (Jun. 1981, Part I [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part I [T-MTT]): f1-f2.*

# Abstracts

## Design Considerations for Monolithic Microwave Circuits

*R.A. Pucel. "Design Considerations for Monolithic Microwave Circuits." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part I [T-MTT]): 513-534.*

Monolithic microwave integrated circuits based on silicon-on-sapphire (SOS) and gallium arsenide technologies are being considered seriously as viable candidates for satellite communication systems, airborne radar, and other applications. The low-loss properties of sapphire and semi-insulating GaAs substrates, combined with the excellent microwave performance of metal-semiconductor FET's (MESFET's), allows, for the first time, a truly monolithic approach to microwave integrated circuits. By monolithic we mean an approach wherein all passive and active circuit elements and interconnections are formed into the bulk, or onto the surface of the substrate by some deposition scheme, such as epitaxy, ion implantation, sputtering, evaporation, and other methods. The importance of this development is that microwave applications such as airborne phased-array systems based on a large number of identical circuits and requiring small physical volume and/or light weight, may, finally, become cost effective. The paper covers in some detail the design considerations that must be applied to monolithic microwave circuits in general, and to gallium arsenide circuits in particular. The important role being played by computer-aided design techniques is stressed. Numerous examples of monolithic circuits and components which illustrate the design principles are described. These provide a cross section of the world-wide effort in this field. A glimpse into the future prospects of monolithic microwave circuits is made.

# Abstracts

## Airborne Imaging System Using a Cryogenic 90-GHz Receiver

*B. Vowinkel, J.K. Peltonen, W. Reinert, K. Gruner and B. Aumiller. "Airborne Imaging System Using a Cryogenic 90-GHz Receiver." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part I [T-MTT]): 535-541.*

A cryogenic 90-GHz receiver has heen developed with a noise figure of 2.36 dB ((double sideband) (DSB)) and an instantaneous band-width of 1.2 GHz. The cooled front-end consists of a Schottky-barrier mixer followed by a GaAs FET IF amplifier. The radiometer is small in size and weighs only 52 kg, including the refrigerator system. It is part of an airborne imaging system, that has been fight-tested aboard a Dornier Do 28 aircraft. First test results are presented.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Y Dielectric Waveguide for Millimeter- and Submillimeter-Wave

*H. Shinonaga and S. Kurazono. "Y Dielectric Waveguide for Millimeter- and Submillimeter-Wave." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part I [T-MTT]): 542-546.*

A new type of waveguide structure having Y cross section is presented and investigated theoretically. This waveguide is suitable for millimeter- and submillimeter-wave and facilitates supporting the waveguide with little field disturbance. Numerical results are presented for the dispersion characteristics, the transmission losses, and the power distributions using the generalized telegraphist's equations. The transmission characters of a triangular dielectric waveguide are also investigated as a special case.

# Abstracts

## Submillimeter Guided-Wave Experiments with Dielectric Rib Waveguides

*M. Tsuji, S. Suhara, H. Shigesawa and K. Takiyama. "Submillimeter Guided-Wave Experiments with Dielectric Rib Waveguides." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part I [T-MTT]): 547-552.*

The transmission characteristics of rib waveguides are examined in the submillimeter-wave region at Lambda/sub 0/ =337 µm. A number of miniature polyethylene rib waveguides are fabricated by means of a die-cast technique. The mode launching into such a waveguide is performed by focusing a laser beam directly on the end face of the waveguide, while the transmitted power is detected at any point on a waveguide through a movable grating coupler which can couple selectively with one of propagating modes. The measured phase constants show good agreement with the theoretical ones calculated by our analytical method, while the attenuation constants, typicafly alpha lambda /sub 0/ = 4.5 X 10/sup -3/ are found to be about 1.8 times as much as theoretical ones. Finally, the good confinement of fields in the rib portion is proved by means of two simple methods.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Millimeter Wavelength Frequency Multipliers

*J.W. Archer. "Millimeter Wavelength Frequency Multipliers." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part I [T-MTT]): 552-557.*

Mechanically tuneable millimeter wavelength frequency doublers typically exhibiting 10-percent conversion efficiency at any output frequency in the range 100-260 GHz have been fabricated. Output power varies from 10 mW at 100 GHz to 6 mW at 260 GHz, with a fixed tuned instantaneous 1-dB bandwidth typically 5 percent of the center frequency. A frequency tripler to 215-GHz output frequency is also described. For this device, a mechanically tuneable 3-dB bandwidth of 210 to 240 GHz was obtained, with a peak conversion efficiency of 6 percent at 4.8-mW output power.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A 200-350-GHz Heterodyne Receiver

*N.R. Erickson. "A 200-350-GHz Heterodyne Receiver." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part I [T-MTT]): 557-561.*

A low-noise heterodyne receiver for the 200-350-GHz region has been developed and used in astronomical observations. Two-room temperature mixers cover this range, with local oscillator (LO) power provided by frequency multiplied klystrons. A single crossed waveguide multiplier design covers the entire range, and is found to provide adequate output power by either doubling or tripling. Signal-LO diplexing is done with a quasioptical diplexer based on a Martin-Puplett interferometer. The best system sensitivities obtained with the two mixers have been 2100 K SSB at 242 GHz and 2900 K at 285 GHz.

# Abstracts

## Standing Wave Solutions of Planar Irregular Hexagonal and Wye Resonators

*J. Helszajn. "Standing Wave Solutions of Planar Irregular Hexagonal and Wye Resonators." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part I [T-MTT]): 562-567.*

Suitable planar resonators for the design of three-port symmetrical junction circulators are the irregular hexagonal resonator and the wye resonator consisting of the junction of three open-circuited stubs. This paper describes the equipotential standing wave solutions and cutoff numbers of some lower order modes in such resonators using a finite element program. Circulator standing wave solutions in magnetized hexagonal and wye resonators are obtained by taking suitable combinations of those of the demagnetized resonators. The paper also includes the solution of planar resonators formed by the junction of four open-circuited stubs.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Parallel Component μ /sub z/ of Partially Magnetized Microwave Ferrites

*M. Igarashi and Y. Naito. "Parallel Component μ /sub z/ of Partially Magnetized Microwave Ferrites." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part I [T-MTT]): 568-571.*

A formula for the parallel component μ /sub z/ of the microwave permeability tensor in the partially magnetized state is derived. The theory is in good agreement with the experimental results.

# Abstracts

## Low-Loss High-Peak-Power Microstrip Circulators

*J. Helszajn and M.E. Powlesland. "Low-Loss High-Peak-Power Microstrip Circulators." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part I [T-MTT]): 572-578.*

Smalll-signal magnetic losses due to coupling of the microwave signal to the spinwave manifold in a ferrite circuit under perpendicular pumping may be suppressed by biasing it between the subsidiary and main resonances. This paper describes the realization of two microstrip circulators biased in such a way. These magnetic conditions also coincide with those required to suppress spinwave instability at large-signal level. A device, using a triangular resonator, exhibited no nonlinear loss up to 1500-W peak at which power level thermal breakdown of the circuit metalization occurred both at the impedance step of the quarter-wave transformer and at the apex of the triangular resonator. A similar device using a disk resonator exhibited no nonlinear loss up to 2200-W peak at which power level breakdown of the circuit metalization again took place. A circulator using a disk resonator with a similar material but biased at magnetic saturation displayed nonlinear loss at 80-W peak.

# Abstracts

## A 25-W 5-GHz GaAs FET Amplifier for a Microwave Landing System

*K. Honjo and Y. Takayama. "A 25-W 5-GHz GaAs FET Amplifier for a Microwave Landing System." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part I [T-MTT]): 579-582.*

A 25-W 29-dB gain 5-GHz GaAs FET amplifier has been developed which can be used for a transmitter in the Microwave Landing System. By using 10-W class practical internally matched GaAs FET's hermetically sealed in ceramic packages, the four-stage amplifier has been constructed simply. The amplifier provides 30-W power output with 18.5 percent power efficiency at 17-dBm power input level. It also exhibited an exceffent AM/PM conversion of approximately 1°/dB, compared to 6°/dB for TWT amplifiers.

# Abstracts

## A New Technique for Magnetostatic Wave Delay Lines

*M. Tsutsumi, Y. Masaoka, T. Ohira and N. Kumagai. "A New Technique for Magnetostatic Wave Delay Lines." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part I [T-MTT]): 583-587.*

A new technique for magnetostatic volume wave delay lines has been proposed where an inhomogeneous bias field is applied normal to the YIG slab surface and at transverse direction to the propagation of waves. Assuming an internal dc magnetic field in the raised cosine profile, theoretical time delay characteristics have been derived by a variational technique, and they have been confirmed with experiments by using a YIG slab oriented in a (110) plane. The large reductions on dispersion and loss have been highly significant.

# Abstracts

## Near-Field Absorption in Prolate Spheroidal Models of Humans Exposed to a Small Loop Antenna of Arbitrary Orientation

*A. Lakhtakia, M.F. Iskander, C.H. Durney and H. Massoudi. "Near-Field Absorption in Prolate Spheroidal Models of Humans Exposed to a Small Loop Antenna of Arbitrary Orientation." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part I [T-MTT]): 588-594.*

The power absorption characteristics of the prolate spheroidal model of an average man have been studied when the model is exposed to the near fields of an arbitrarily located small loop antenna. An integral equation is formulated and the fields radiated by the loop are expanded in terms of the vector spherical harmonics. This equation is then solved using the extended boundary condition method (EBCM). For three different loop-spheroid configurations, the power distribution and the average SAR have been calculated as a function of the frequency and the separation distance. It is shown that the results obtained for separation distances larger than lambda/2 agree well with those obtained from the plane wave exposure case. Furthermore, the average SAR value calculated as a function of separation distance for the case where the magnetic dipole moment is aligned parallel to the major axis of the spheroid are found to oscillate around the constant value obtained from the H-polarized plane wave exposure case. On the other hand, the average SAR values for the E-polarization case (magnetic dipole is parallel to the spheroidal minor axis) are found to increase monotonically with the decrease in separation distance. It is also shown that despite the complicated nature of the near fields, the absorption characteristics can still be explained in terms of the variations of the incident radiation. These loop results, together with those obtained from other simple soures, can be used as building blocks in arriving at a qualitative understanding of the near-field absorption characteristics for more general exposure cases.

# Abstracts

## Reflection by a Sinusoidally Modulated Surface Reactance at Oblique Incidence

*S.R. Seshadri. "Reflection by a Sinusoidally Modulated Surface Reactance at Oblique Incidence." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part I [T-MTT]): 594-600.*

The reflection characteristics of the TM and the TE surface waves by a weak sinusoidal modulation of the surface reactance are investigated for the oblique incidence in which the wavevectors are not aligned with the grating vector. A superposition of TM and TE wave fields is needed for the fulfillment of the required boundary conditions. For both the TM and the TE surface waves, the Brewster phenomenon of total transmission occurs at the angle of incidence theta=theta/sub B/ = 45°. A modulation in the surface reactance, in general, causes the TE surface waves to be more efficiently reflected than the TM surface waves.

# Abstracts

## Finite Element Analysis of Optical Waveguides (Jun. 1981, Part I [T-MTT])

*N. Mabaya, P.E. Lagasse and P. Vandenbulcke. "Finite Element Analysis of Optical Waveguides (Jun. 1981, Part I [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part I [T-MTT]): 600-605.*

A finite element program for the analysis of anisotropic optical waveguides is described. The appearance of spurious numerical modes, due to the fact that the functional is nonpositive definite is discussed and a possible solution to the problem is presented. For isotropic waveguides it is shown that both EH- and HE-type modes can be very accurately approximated by two different scalar finite element programs. Finally, a method for calculating the attenuation of leaky modes in a single material integrated optic waveguide using this scalar finite element method is proposed.

# Abstracts

## Microwave Oscillator Analysis (Short Papers)

*A.P.S. Khanna and J. Obregon. "Microwave Oscillator Analysis (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part I [T-MTT]): 606-607.*

In this paper a generalized oscillation condition for an n-port active device has been presented in terms of its S-parameter matrix and that of the embedding network of the oscillator circuit. The corresponding condition using Z or Y matrices has also been shown. Verification of the proposed theory for a typical two-port and a three-port oscillator network is presented.

# Abstracts

## A Simple Numerical Method for the Cutoff Frequency of a Single-Mode Fiber with an Arbitrary Index-Profile (Short Papers)

*A. Sharma and A.K. Ghatak. "A Simple Numerical Method for the Cutoff Frequency of a Single-Mode Fiber with an Arbitrary Index-Profile (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part I [T-MTT]): 607-610.*

A simple numerical method for calculating the cutoff frequency of single-mode operation in optical fibers with an arbitrary index-profile is presented. The method does not involve any approximation other than the scalar approximation and is applicable even to numerical data from index-profile measurements. The calculations are simple and can be carried out even on a programmable calculator.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Microstrip Dispersion in a Wide-Frequency Range (Short Papers)

*E. Yamashita, K. Atsuki and T. Hirahata. "Microstrip Dispersion in a Wide-Frequency Range (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part I [T-MTT]): 610-611.*

The dispersion property of microstrip lines was measured in a frequency range from 2 to 50 GHz and compared with that estimated by an approximate formula in a previous paper.

# Abstracts

## Characteristic Impedances of Four-Conductor Transmission Line (Short Papers)

*S.A. Ivanov. "Characteristic Impedances of Four-Conductor Transmission Line (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part I [T-MTT]): 611-615.*

A general formula for calculation of the characteristic impedance of four conductor transmission line in a rectangular shield is derived. A number of coupled and single strip transmission lines are considered by simplifying the general formula. Numerical results for a line in a square shield are presented graphically.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## On the Orthogonality of Approximate Waveguide Mode Functions (Short Papers)

*H. Steyskal. "On the Orthogonality of Approximate Waveguide Mode Functions (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part I [T-MTT]): 615-617.*

For many waveguides, only approximate solutions for the mode functions are available and in such cases the question arises, whether the orthogonality property of the exact modes can be preserved. This problem is addressed in the present paper. A fairly general method of solution is considered and it is shown that in spite of two consecutive approximations the resultant mode functions are indeed orthogonal. Examples that have been analyzed include a rectangular waveguide with a septum, a rectangular waveguide with an axial, conducting strip and a (phased array) unit cell waveguide with one or more axial, conducting strips.

# Abstracts

## Conformal Transformations Combined with Numerical Techniques, with Applications to Coupled-Bar Problems (Comments)

*P.A.A. Laura. "Conformal Transformations Combined with Numerical Techniques, with Applications to Coupled-Bar Problems (Comments)." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part I [T-MTT]): 618-619.*

The writer lists additional references on recent developments on the conformal mapping method which may be of interest to microwave specialists.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## The Matched Feedback Amplifier: Ultrawide-Band Microwave Amplification with GaAs MESFET's (Comments)

*D.J.H. MaClean. "The Matched Feedback Amplifier: Ultrawide-Band Microwave Amplification with GaAs MESFET's (Comments)." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part I [T-MTT]): 619-621.*

In the above paper, the bandwidth of a single GaAs MESFET was extended by means of series inductances (L/sub D/ and LFB/sub FB) in the feedback path.

# Abstracts

## Contributors (Jun. 1981, Part I [T-MTT])

*J.W. Archer, B. Aumiller, C.H. Durney, N.R. Erickson, K. Gruner, J. Helszajn, K. Honjo, M. Igarashi, M.F. Iskander, N. Kumagai, S. Kurazono, P.E. Lagasse, A. Lakhtakia, N. Mabaya, Y. Masaoka, H. Massoudi, Y. Naito, T. Ohira, J.K. Peltonen, M.E. Powlesland, R.A. Pucel, W. Reinert, S.R. Seshadri, H. Shigesawa, H. Shinonaga, S. Suhara, Y. Takayama, K. Takiyama, M. Tsuji, M. Tsutsumi, P. Vandenbulcke and B. Vowinkel. "Contributors (Jun. 1981, Part I [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part I [T-MTT]): 622-626.*

# Abstracts

## IEEE Conference Records (Advertisement) (Jun. 1981, Part I [T-MTT])

*"IEEE Conference Records (Advertisement) (Jun. 1981, Part I [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part I [T-MTT]): 627-627.*

# Abstracts

## Membership Application (Jun. 1981, Part I [T-MTT])

*"Membership Application (Jun. 1981, Part I [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part I [T-MTT]): 628-628.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Back Cover (Jun. 1981, Part I [T-MTT])

*"Back Cover (Jun. 1981, Part I [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part I [T-MTT]): b1-b1.*

# Abstracts

## Front Cover (Jun. 1981, Part II [T-MTT])

*"Front Cover (Jun. 1981, Part II [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part II [T-MTT] (28-Year Cumulative Index)): f1-f2.*

# Abstracts

## Editor’s Preface (Jun. 1981, Part II [T-MTT])

*H.G. Oltman, Jr.. "Editor’s Preface (Jun. 1981, Part II [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part II [T-MTT] (28-Year Cumulative Index)): 1-1.*

This 28-year index replaces the recently published 27-year index. After its receipt, a dozen or more authors reported to our editor that citations of some of their publications were missing. An investigation revealed that a number of citations had in fact been dropped due to a bug in the computer program. As a result, the IEEE Publishing Services Department graciously offered to republish the index at no cost to the MTT-S except for the cost of adding the 1980 citations, which were included to increase the usefulness of the index and to clearly identify the corrected version. It is suggested that upon receipt of this corrected enlarged index, the 27year index (Part II of the November 1980 issue) be discarded.

# Abstracts

## A History of the Transactions on Microwave Theory and Techniques (Jun. 1981, Part II [T-MTT])

*T.S. Saad. "A History of the Transactions on Microwave Theory and Techniques (Jun. 1981, Part II [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part II [T-MTT] (28-Year Cumulative Index)): 2-9.*

From the early days of our Society, through the many changes that have taken place in Administrative Committees, names and substance, there has been one "given." That was, and is, our Transactions, From the first meeting of the Administrative Committee, May 1, 1952, through the name changes from Professional Group to Professional Technical Group to Group to Society, through twenty-eight Administrative Committees from Chairman Ben Warriner to Chairman Steve Adam, from one issue per Administrative Committee term to one issue per month, this Transactions, above all else, has been our pride and our mainstay.

# Abstracts

## Special Issues Published (Jun. 1981, Part II [T-MTT])

*"Special Issues Published (Jun. 1981, Part II [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part II [T-MTT] (28-Year Cumulative Index)): 10-10.*

In addition to the subject-oriented special issues listed in the Table, there was one special issue each year--normally the year-end issue--which consisted primarily of papers presented at the annual Microwave Theory and Techniques Symposium.

# 1953-1980 Cumulative Index - Guide to the Index (Jun. 1981, Part II [T-MTT])

*"1953-1980 Cumulative Index - Guide to the Index (Jun. 1981, Part II [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part II [T-MTT] (28-Year Cumulative Index)): 11-11.*

This index covers all papers, short papers, editorials, and correspondence items that appeared in the IEEE Transactions on Microwave Theory and Techniques and predecessor publications from the inception of the journal in 1953 through 1980 (Vols. MTT-1 through MTT-28). For simplicity, the journal code T-MTT is used consistently to identify the publication, although its formal title changed twice during the period covered by this index. The correct full title for various issues and periods is as follows.

# Abstracts

## Index of Authors, Cumulative, 1953-1980 (Jun. 1981, Part II [T-MTT])

*"Index of Authors, Cumulative, 1953-1980 (Jun. 1981, Part II [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part II [T-MTT] (28-Year Cumulative Index)): 12-79.*

# Abstracts

## Index of Subjects, Cumulative, 1953-1980 (Jun. 1981, Part II [T-MTT])

*"Index of Subjects, Cumulative, 1953-1980 (Jun. 1981, Part II [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part II [T-MTT] (28-Year Cumulative Index)): 80-207.*

# Abstracts

## Back Cover (Jun. 1981, Part II [T-MTT])

*"Back Cover (Jun. 1981, Part II [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.6 (Jun. 1981, Part II [T-MTT] (28-Year Cumulative Index)): b1-b1.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Front Cover (Jul. 1981 [T-MTT])

*"Front Cover (Jul. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.7 (Jul. 1981 [T-MTT]): f1-f2.*

# Abstracts

## GaAs FET Ultrabroad-Band Amplifiers for Gbit/s Data Rate Systems

*K. Honjo and Y. Takayama. "GaAs FET Ultrabroad-Band Amplifiers for Gbit/s Data Rate Systems." 1981 Transactions on Microwave Theory and Techniques 29.7 (Jul. 1981 [T-MTT]): 629-636.*

A novel ultrabroad-band amplifier configuration suitable for GaAs FET's has been developed. The developed amplifier circuit operates as a capacitor-resistor (C-R) coupled mnpfifier circuit in the low-frequency range in which |S/sub 21/| for the GaAs FET's is constant. It also operates as a lossless impedance matching circuit in the microwave frequency range in which |S/sub 21/| for the GaAs FET has a slop of approximately -6 dB/octave. Using this configuration technique, 800-kHz 9.5-GHz band (13.5 octaves), 8.6-dB gain GaAs FET amplifier modules have been realized. The amplifier module has 40-ps step response rise time. It also has low input and output VSWR. By cascading two-amplifier modules, 19-dB gain over the 800-kHz to 8.5-GHz range and 50-ps step response rise time were obtained. NF is lower than 8 dB over the 50-MHz to 6-GHz range.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Reliability of Power GaAs FET's--Au Gates and Al-Au Linked Gates

*E.D. Cohen, A.C. Macpherson and A. Christou. "Reliability of Power GaAs FET's--Au Gates and Al-Au Linked Gates." 1981 Transactions on Microwave Theory and Techniques 29.7 (Jul. 1981 [T-MTT]): 636-642.*

An investigation of the reliability of two types of commercial microwave power GaAs FET's has been carried out. Mean-time-to-failure data for a device mounted face-up with Al gates but without an Al-Au couple is presented and similar data for a "flip-chip" mounted Au-refractory gate device is reviewed. The failure mechanisms for both devices are described.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Single-Frequency Analysis of Radial and Planar Amplifier Combiner Circuits

*Z. Galani, J.L. Lampen and S.J. Temple. "Single-Frequency Analysis of Radial and Planar Amplifier Combiner Circuits." 1981 Transactions on Microwave Theory and Techniques 29.7 (Jul. 1981 [T-MTT]): 642-654.*

A single-frequency analysis of radial and planar amplifier combiner circuits is presented and expresses the dependence of amplifier combiner performance on the scattering parameters of the amplifiers and combiner/divider networks. The analysis results in useful design guidelines to achieve optimum performance for small variations in amplifier parameters and graceful degradation under the condition of amplifier failure. Several examples are presented to verify the accuracy of the derived expressions. The scattering matrices of radial and planar combiner/divider networks are derived in the Appendix.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## A Resonance Method for the Broad-Band Characterization of General Two-Port Microstrip Discontinuities

*V. Rizzoli and A. Lipparini. "A Resonance Method for the Broad-Band Characterization of General Two-Port Microstrip Discontinuities." 1981 Transactions on Microwave Theory and Techniques 29.7 (Jul. 1981 [T-MTT]): 655-660.*

The paper describes an experimental procedure suitable for broad-band characterization of two-port microstrip discontinuities of any topology. The resonance frequencies of a transmission-type cavity embedding the discontinuity under test and of a set of reference lines are measured and computer processed to obtain the scattering parameters the discontinuity itself. This method features extreme ease of application thanks to the limited number and simple topology of the required microstrip samples, as well as highly accurate and repeatable results. Furthermore, the scattering matrices obtained from the measurement are automatically normalized with respect to the wave impedances of the quasi-TEM modes in the outgoing microstrips. This makes possible an analysis and design approach not requiring the knowledge or calculation of microstrip characteristic impedances.

# Abstracts

## Two Limiting Values of the Capacitance of Symmetrical Rectangular Coaxial Strip Transmission Line (Jul. 1981 [T-MTT])

*H.J. Riblet. "Two Limiting Values of the Capacitance of Symmetrical Rectangular Coaxial Strip Transmission Line (Jul. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.7 (Jul. 1981 [T-MTT]): 661-666.*

This paper determines the first two terms in two different expansions for the total capacitance of rectangular coaxial strip transmission line which are of interest in an improved approximation for the characteristic impedance of rectangular coaxial line. For this purpose, expansions which express the total capacitance of the rectangular coaxial strip transmission line exactly and explicitly in terms of it's dimensions are introduced. As a by-product, it is shown how these expansions may be terminated after a few terms to obtain approximations of sufficient accuracy for most purposes. In the Appendix, certain results from the theory of elliptic functions, that are required in this paper but are not presented in the literature on this problem, are reviewed and in some cases extended.

# Abstracts

## On the Radiation from Microstrip Discontinuities

*M.D. Abouzahra. "On the Radiation from Microstrip Discontinuities." 1981 Transactions on Microwave Theory and Techniques 29.7 (Jul. 1981 [T-MTT]): 666-668.*

The method of an earlier paper by Lewin is used to calculate, more accurately, the radiated power from a microstrip termination. The substrate dielectric constant epsilon is used instead of the effective dielectric constant epsilon/sub e/ in the polarization term. The open-circuit, short-circuit, and matched coaxial terminations are deduced as particular cases of the general termination. On comparison with Lewin's results, differences of up to 30 percent have been found, but the differences are much smaller for the larger values of the actual relative dielectric constant epsilon. Curves show that the short-circuit termination radiates less than a quarter that of the open circuit, and can be considered as a means of reducing losses in microstip resonators. The parallel post configuration is also considered.

# Abstracts

## Exact Analysis of Shielded Microstrip Lines and Bilateral Fin Lines (Jul. 1981 [T-MTT])

*A.-M.A. El-Sherbiny. "Exact Analysis of Shielded Microstrip Lines and Bilateral Fin Lines (Jul. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.7 (Jul. 1981 [T-MTT]): 669-675.*

An exact analysis is presented for shielded microstrip and bilateral fin lines. The method of analysis is based on function-theoretic approach to solve a set of functional equations in the Fourier transform domain, representing the independent excitation of LSE and LSM modes in the systems without strip or fin conductors. The solution is obtained in the form of highly convergent systems of algebraic equations, which allow the accurate calculation of fields and the electrical parameters of these lines at arbitrary frequencies.

# Abstracts

## Analysis of the Characteristics of an Earthed Fin Line

*A. Beyer. "Analysis of the Characteristics of an Earthed Fin Line." 1981 Transactions on Microwave Theory and Techniques 29.7 (Jul. 1981 [T-MTT]): 676-680.*

This paper presents a theoretical and experimental investigation of the effective permittivity and the characteristic impedance of the earthed unilateral fin line. Using the Ritz-Galerkin method, the eigenvalue equation for a fin line with finite metallization thickness as well as a longitudinal slit in the metal waveguide mount is derived. The numerical solution converges very rapidly in all the cases investigated. Experimental checks are reported, which verify the results of this method and stress the importance of the effects of the finite metallization thickness and longitudinal slit in the mount at higher frequencies. The theoretical results are compared with results by Hofmann, and they are found to correspond closely.

# Abstracts

## Microstrip Spiral Directional Coupler

*K. Shibata, K. Hatori, Y. Tokumitsu and H. Komizo. "Microstrip Spiral Directional Coupler." 1981 Transactions on Microwave Theory and Techniques 29.7 (Jul. 1981 [T-MTT]): 680-689.*

A new microwave directional coupler with a spiral-shaped construction is described. This coupler is named the spiral coupler and is formed by coiling two edge-coupled lines. Therefore, the size of the coupler can be greatly miniaturized. Furthermore, this coupler can achieve tight coupling much easier than the conventional coupler with edge-coupled lines on account of the multiconductor structure. The spiral couplers with a total length of a quarter-wave were fabricated on alumina ceramic substrates and resulted in 3.5-dB maximum conpling for a 40-μm strip spacing. The size of the coupler was about one-sixth of the conventional one. The spiral coupler with a total length of three quarter-waves theoretically showed 2.5-dB coupling for a 95-μm strip spacing on an alumina substrate. The achieved coupling is due to the skillful construction of the spiral. An experimental coupler fabricated on a Teflon substrate confirmed the usefulness of this approach.

# Abstracts

## Circulators Using Planar WYE Resonators

*J. Helszajn and W.T. Nisbet. "Circulators Using Planar WYE Resonators." 1981 Transactions on Microwave Theory and Techniques 29.7 (Jul. 1981 [T-MTT]): 689-699.*

An important class of commercial three-port circulator relies for its operation on a junction resonator consisting of the symmetrical connection of three open-circuited transmission lines. A feature of this resonator is that it may be quarter-wave coupled to form a circulator with a moderate specification (25-percent bandwidth to 25-dB return loss points) and physical dimensions of the order of directly coupled conventional circulators (using a disk resonator). For circulators for which the in-phase eigennetwork may be represented by an ideal short-circuit, the equivalent circuit is a one-port network which may be formed from a characterization of the constituent resonator. This feature is used in this paper to study the equivalent circuit of junction circulators using planar WYE resonators. The derivation of the equivalent circuit parameters is supported with the design of a 4-GHz quarter-wave-coupled stripline circulator.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Operation of Tracking Circulators

*J. Helszajn. "Operation of Tracking Circulators." 1981 Transactions on Microwave Theory and Techniques 29.7 (Jul. 1981 [T-MTT]): 700-707.*

The classic two circulation conditions of a junction circulator obtained by setting the imaginary part of the complex gyrator impedance to zero and evaluating the real part does not ensure that the in-phase and counter-rotating eigennetworks are separately idealized. This paper indicates that the physical and magnetic variables of the tracking circulator described by Wu and Rosenbaum coincides with these special boundary conditions. Specifically, the gyrator resistance for this circulator may be calculated at the frequency for which the in-phase eigennetwork exhibits a short-circuit boundary condtion (using the n=0 and ±3 modes) and the counter-rotating eigennetwork modes exhibit complex conjugate immittances (using the n= -1, +2 and n = +1, -2 modes). The paper includes a new formulation for the Q-factor of this type of circulator which is used to calculate that of the tracking circulator.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Propagation Constant Below Cutoff Frequency in a Circular Waveguide with Conducting Medium

*T. Abe and Y. Yamaguchi. "Propagation Constant Below Cutoff Frequency in a Circular Waveguide with Conducting Medium." 1981 Transactions on Microwave Theory and Techniques 29.7 (Jul. 1981 [T-MTT]): 707-712.*

Exact and approximate propagation characteristics of normal modes in the cutoff region of a circular waveguide surrounded by a medium of finite conductivity are discussed. An exact solution is obtained by numerical analysis, and an approximate one is derived by expanding the characteristic equation considering the finite conductivity of the cylinder wall. The computed values are compared with experimental ones. It is shown that the attenuation of TM/sub 01/ mode at frequencies that are much lower than the cutoff frequency is constant, i.e., independent of frequency and the material constants of the external medium, and this mode is the most suitable one for realizing a precision circular piston attenuator.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Scattering of the TE/sub 01/ and TM/sub 01/ Modes on Transverse Discontinuities in a Rod Dielectric Waveguide -- Application to the Dielectric Resonators

*P. Gelin, S. Toutain, P. Kennis and J. Citerne. "Scattering of the TE/sub 01/ and TM/sub 01/ Modes on Transverse Discontinuities in a Rod Dielectric Waveguide -- Application to the Dielectric Resonators." 1981 Transactions on Microwave Theory and Techniques 29.7 (Jul. 1981 [T-MTT]): 712-719.*

Our purpose is to determine the resonance frequency together with the radiation quality factor of dielectric resonators. To do that, the reflection and the scattering properties of the TE/sub 01/ and TM/sub 01/ modes, incident on an abruptly ended dielectric rod, are analyzed. After the building of the complete mode spectrum on each side of the discontinuity, the continuity relations in the discontinuity plane associated with the orthogonality properties lead to a coupled integral equation system. That one is solved by means of an iterative procedure, providing all the characteristics of the discontinuity (reflection or coupling coefficients, radiation losses). Then, these solutions are used to determine the resonant frequency and the radiation quality factor of cylindrical resonators which are considered as waveguide lengths between two interacting discontinuities.

# Abstracts

## Analysis and Sensitivity Evaluation of 2p-Port Cascaded Networks (Jul. 1981 [T-MTT])

*J.W. Bandler and M.R.M. Rizk. "Analysis and Sensitivity Evaluation of 2p-Port Cascaded Networks (Jul. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.7 (Jul. 1981 [T-MTT]): 719-723.*

An exact analysis approach for efficiently evaluating the response and its sensitivities with respect to all design parameters for cascaded 2p-port networks is presented for any value of p. It is illustrated via a quasi-optical bandpass filter.

# Abstracts

## Microwave Phase Detectors for PSK Demodulators

*G. Ohm and M. Alberty. "Microwave Phase Detectors for PSK Demodulators." 1981 Transactions on Microwave Theory and Techniques 29.7 (Jul. 1981 [T-MTT]): 724-731.*

The simplest circuits for microwave phase detectors and their operation are described. Approximate analytical expressions for the output characteristic of the various circuits are given. Accurate prediction of detector performance is achieved with a large-signal nonlinear analysis using simultaneously the time- and frequency-domain approach. Applying the theory developed, the effects which cause deformation of the detector characteristic are investigated. Results of practical circuits operating in the 14-GHz range are given and compared with regard to phase-demodulator applications. A low-level phase detector is presented which permits 20-dB level variation with less than 2° phase error.

# Abstracts

## Feasibility Study of Density-Independent Moisture Measurement with Microwaves

*W. Meyer and W.M. Schilz. "Feasibility Study of Density-Independent Moisture Measurement with Microwaves." 1981 Transactions on Microwave Theory and Techniques 29.7 (Jul. 1981 [T-MTT]): 732-739.*

A new method of density-independent moisture determination with microwaves operating at one single frequency is developed. It is based on the two-parameter measurement of the complex dielectric constant being composed to a density-independent calibration factor A(psi) which is a function of the moisture content psi. The principle is demonstrated for practical applications of the wool-water system, and a complete error analysis is given. The results confirm the promising prospects of the method which opens up a new class of density-independent moisture meters particularly suited for on-line process control.

# Abstracts

## The Stability of Magnetrons Under Short Pulse Conditions (Short Papers)

*B. Vyse and H. Levinson. "The Stability of Magnetrons Under Short Pulse Conditions (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.7 (Jul. 1981 [T-MTT]): 739-745.*

The relationship between missing pulses, front edge jitter, and video inter-spectral noise is discussed for magnetrons operating under short pulse conditions. The measurement of missing pulse count can determine the rate of RF power growth at the start of oscillation.

# Abstracts

## Guided Magnetostatic Waves of the YIG Plate Magnetized Nonuniformly (Short Papers)

*K. Yashiro and S. Ohkawa. "Guided Magnetostatic Waves of the YIG Plate Magnetized Nonuniformly (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.7 (Jul. 1981 [T-MTT]): 745-747.*

It is shown that magnetostatic waves may propagate along a discontinuity of the internal dc magnetic field when its strength is made nonuniform such as a step. Backward waves may also propagate in this magnetic field configuration.

# Abstracts

## Contributors (Jul. 1981 [T-MTT])

*T. Abe, M.D. Abouzahra, M. Alberty, J.W. Bandler, A. Beyer, A. Christou, J. Citerne, E.D. Cohen, A.-M.A. El-Sherbiny, Z. Galani, P. Gelin, K. Hatori, J. Helszajn, K. Honjo, P. Kennis, H. Komizo, J.L. Lampen, A. Lipparini, A.C. Macpherson, W. Meyer, W.T. Nisbet, G. Ohm, H.J. Riblet, M.R.M. Rizk, V. Rizzoli, W.M. Schilz, K. Shibata, Y. Takayama, S.J. Temple, Y. Tokumitsu, S. Toutain and Y. Yamaguchi. "Contributors (Jul. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.7 (Jul. 1981 [T-MTT]): 747-751.*

# Abstracts

## IEEE on Microfilm (Advertisement) (Jul. 1981 [T-MTT])

*"IEEE on Microfilm (Advertisement) (Jul. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.7 (Jul. 1981 [T-MTT]): 752-752.*



Contents
Publications
Issues
Papers
Authors

# Abstracts

## Back Cover (Jul. 1981 [T-MTT])

*"Back Cover (Jul. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.7 (Jul. 1981 [T-MTT]): b1-b1.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Front Cover (Aug. 1981 [T-MTT])

*"Front Cover (Aug. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.8 (Aug. 1981 [T-MTT]): f1-f2.*

# Abstracts

## Editorial (Aug. 1981 [T-MTT])

*R.H. Knerr. "Editorial (Aug. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.8 (Aug. 1981 [T-MTT]): 753-753.*

The Microwave Theory and Techniques Society is trying to improve its Transactions as part of an ongoing effort to better serve our membership. In this spirit, AdCom approved at our January 1981 meeting, my proposal to provide patent coverage in the Transactions. Patents, in my experience, have proven to be a very important source of information which is often neglected, because they are not easily accessible to many workers in the field. In this Issue you will find our first collection of Patent Abstracts, which was put together by our new Associate Editor for Patents, Mr. N. R. Dietrich of Bell Laboratories Inc., Allentown, PA 18103.

# Abstracts

## Application of Dielectric Resonators in Microwave Components

*J.K. Plourde and C.-L. Ren. "Application of Dielectric Resonators in Microwave Components." 1981 Transactions on Microwave Theory and Techniques 29.8 (Aug. 1981 [T-MTT]): 754-770.*

Dielectric resonators are being used in microwave filters and oscillators now that high-dielectric-constant, high-Q, temperature-stable ceramics have been developed. This paper reviews dielectric resonators with emphasis on applications, contains tutorial material, deseribes new 2-, 4-, and 6-GHz bandpass filters, and presents several examples of oscillator applications. A complete bibliography to English language publications on dielectric resonators is included.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A Reflection Coefficient Approach to the Design of One-Port Negative Impedance Oscillators

*D.J. Esdale and M.J. Howes. "A Reflection Coefficient Approach to the Design of One-Port Negative Impedance Oscillators." 1981 Transactions on Microwave Theory and Techniques 29.8 (Aug. 1981 [T-MTT]): 770-776.*

A technique for analyzing microwave oscillators is presented which utilizes readily available device and circuit reflection coefficient information to predict oscillation conditions, stability, and noise performance. The flowgraph approach used yields simple equations which maybe readily applied in practice. A graphical interpretation is presented which emphasizes the ease of application of the method proposed.

# Abstracts

## RF Characterization of Microwave Power FET's

*R.S. Tucker. "RF Characterization of Microwave Power FET's." 1981 Transactions on Microwave Theory and Techniques 29.8 (Aug. 1981 [T-MTT]): 776-781.*

The large-signal S-parameter S/sub 22/ and the optimum load for maximum output power are two parameters commonly used in the RF characterization of microwave power FET's. Using a nonlinear circuit model of the device, the dependence on RF power of each of these parameters is investigated. A method is given for computing the optimum load from the large-signal S/sub 22/. Equivalent load-pull data can thus be obtained without the need for load-pull measurements. The gain compression characteristics of the transistor for arbitrary load can be computed from large-signal S/sub 21/, and S/sub 22/ data.

# Abstracts

## A Large-Signal Model for the GaAs MESFET

*A. Madjar and F.J. Rosenbaum. "A Large-Signal Model for the GaAs MESFET." 1981 Transactions on Microwave Theory and Techniques 29.8 (Aug. 1981 [T-MTT]): 781-788.*

An analytic Iarge-signal model for the GaAs FET is described which relates the terminal currents to the instantaneous terminal voltages and their time derivatives. It incorporates the device geometry and semiconductor parameters as well as the device parasitic circuit elements. The model is fast and efficient when implemented on a computer and is in a form suitable for large-signal circuit design and optimization.

# Abstracts

## Super-Schottky Mixer Performance at 92 GHz

*R.L. Dickman, W.J. Wilson and G.G. Berry. "Super-Schottky Mixer Performance at 92 GHz." 1981 Transactions on Microwave Theory and Techniques 29.8 (Aug. 1981 [T-MTT]): 788-793.*

As part of a program to explore the behavior of superconducting Schottky mixers at high frequencies (nu/sub RF/ >= 90 GHz), the mixing and video performance of several super-Schottky diodes have been tested at 92 GHz. The diodes used (~3-μm active diameter, doping concentration ~2x 10/sup 19/ cm/sup -3/) were identical to those recently developed at Aerospace for use in a 31-GHz mixer. The WR-10 mixer mount, designed specifically for this experiment, utilizes a quartz stripline assembly for the diode, whisker, and IF choke, suspended across quarter-height RF wavegnide. At 92 GHz, video responsivities were typically ~80 A/W (corrected for RF mismatch). Conversion loss (corrected for both RF and IF mismatches) was typically measured to he /spl gsim/18 dB. As expected, T/sub diode/ was small (< 5K). Video responsivity and conversion loss were also measured at an RF frequency of 3.95 GHz. These data were used with the measured I- V characteristics of the diodes to compare theoretical predictions of diode performance at 92 GHz in both the video and mixing modes, with the high-frequency data.

# Abstracts

## Gyrotron-TWT Operating Characteristics

*P.E. Ferguson, G. Valier and R.S. Symons. "Gyrotron-TWT Operating Characteristics." 1981 Transactions on Microwave Theory and Techniques 29.8 (Aug. 1981 [T-MTT]): 794-799.*

The gyrotron traveling-wave tube (gyro-TWT) is a new type of millimeter amplifier which employs the electron cyclotron maser instability as a basis for the electron-electromagnetic wave interaction. A C-band gyro-TWT, employing the fundarnental cyclotron resonance interaction with the circularly polarized TE/sub 11/ dominant waveguide mode, has been constructed and tested. Initial power measurements yielded an output power of 50 kW at 60-kV beam voltage with 16.6-percent efficiency and 6-percent bandwidth. These measurements were recorded with a flat magnetic field. Subsequent experimental testing yieIded, for a magnetic field increasing in magnitude towards the output portion of the tube, 128-kW and 65-kV beam voltage at 24-percent electronic efficiency. The maximum efficiency was 26 percent at 120.5-kW peak power, with an instantaneous bandwidth of 7.25 percent as measured in a high-beam power mode (65 kV, 7 A). In the low-beam power mode (40 kV, 4 A), the efficiency was 9.8 percent at 18.8-kW peak power at 9.3-percent instantaneous bandwidth. Additional experimental results of AM and PM modulation coefficients, spectral purity, phase Iinearity, and noise figure are presented.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Modeling and Characterization of Microstrip-to-Coaxial Transitions

*M.L. Majewski, R.W. Rose and J.R. Scott. "Modeling and Characterization of Microstrip-to-Coaxial Transitions." 1981 Transactions on Microwave Theory and Techniques 29.8 (Aug. 1981 [T-MTT]): 799-805.*

A simple circuit model for the transition from a lossy microstrip to coaxial line has been developed on an experimental basis. The proposed model can be used to predict accurately the insertion loss and insertion phase over a wide frequency range. Since explicit formulas for the model element values are given, these elements, representing the parasitic of the transitions, can be taken into account very easify when the microstrip is used as a test fixture for measuring the parameters of solid-state devices. The practical use of the model has been examined for several Z/sub 0/=50-omega lines on both Epsilam-10 and 99-percent alumina substrates with standard SMA coaxial connectors.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A Variational Theory for Wave Propagation in Inhomogeneous Dielectric Slab Loaded Waveguides

*C.-T. Liu and C.H. Chen. "A Variational Theory for Wave Propagation in Inhomogeneous Dielectric Slab Loaded Waveguides." 1981 Transactions on Microwave Theory and Techniques 29.8 (Aug. 1981 [T-MTT]): 805-812.*

A novel numerical technique based on the variational formulation defined only in the slab is developed to study the loaded rectangular waveguide with an inhomogeneous dielectric slab. The variational equation for the boundary value problem is formulated and solved numerically, using the finite element method with piecewise quadratic trial functions. A comparison of this new technique with the conventional variational ones is presented. Various propagation characteristics, such as the phase constant, useful bandwidth, power handling capacity, and attenuation constants due to conductor and dielectric losses, are investigated for the waveguide centrally loaded with a slab of parabolic dielectric profile. The effects of changes in dielectric profiles are discussed by examining the results for the slabs with constant and parabolic profiles.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## On the Quasi-TEM Modes in Inhomogeneous Multiconductor Transmission Lines

*I.V. Lindell. "On the Quasi-TEM Modes in Inhomogeneous Multiconductor Transmission Lines." 1981 Transactions on Microwave Theory and Techniques 29.8 (Aug. 1981 [T-MTT]): 812-817.*

We consider the general inhomogeneous shielded N-conductor transmission line and derive several properties for the quasi-TEM modes. The concept of quasi-TEM is deduced through an asymptotic series expansion of the fields and conditions for the propagation constant as well as the construction of the field are presented. It is seen that the problem is reduced to two static two-dimensional boundary value problems. The concepts of propagating modes and impedance modes are introduced and it is shown, that in the general case, these are not the same. The special cases of propagating impedance modes are finally discussed and are seen to exist under certain symmetry conditions of the multiconductor line.

# Abstracts

## Equivalent Circuits of Binomial Form Nonuniform Coupled Transmission Lines

*K. Kobayashi, Y. Nemoto and R. Sato. "Equivalent Circuits of Binomial Form Nonuniform Coupled Transmission Lines." 1981 Transactions on Microwave Theory and Techniques 29.8 (Aug. 1981 [T-MTT]): 817-824.*

Equivalent circuits of nonuniform coupled transmission lines whose self and mutual characteristic admittance distributions obey binomial form are presented. Telegrapher's equations of these nonuniform coupled transmission lines can he solved exactly rising Bessel functions of fractional order. By decomposing the chain matrix, it is shown that equivalent circuits of these nonuniform conpled transmission lines consist of cascade connections of lumped reactance elements, uncoupled uniform transmission lines and ideal transformers.

# Abstracts

## Time-Dependent Microwave Heating and Surface Cooling of Simulated Living Tissues

*F. Bardati. "Time-Dependent Microwave Heating and Surface Cooling of Simulated Living Tissues." 1981 Transactions on Microwave Theory and Techniques 29.8 (Aug. 1981 [T-MTT]): 825-828.*

The equation of conduction of heat in a model of living tissues is solved in the case of time-dependent electromagnetic heating and surface cooling. This approach allows thermal transient phenomena in the tissue to be treated as the dynamic behavior of a linear infinite-dimension system. This approach is appropriate when the tissue temperature increase must he controlled. Some results are given in a numerical simulation.

# Abstracts

## Graph Design of p-i-n Diode Phase Shifters (Short Papers)

*K. Watanabe, M. Arima and T. Yamamoto. "Graph Design of p-i-n Diode Phase Shifters (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.8 (Aug. 1981 [T-MTT]): 829-831.*

A synthesis procedure of the impedance-transforming network in a p-i-n diode phase shifter is given. A representation of a reflection performance on the impedance plane is used successfully to determine the impedance matrix of the network. The procedure is straightforward and its validity is demonstrated by a prototype 90° phase shifter at 10 GHz.

# Abstracts

## Transmission Line Identities for a Class of Interconnected Coupled-Line Sections with Application to Adjustable Microstrip and Stripline Tuners (Comment)

*R.G. Rogers. "Transmission Line Identities for a Class of Interconnected Coupled-Line Sections with Application to Adjustable Microstrip and Stripline Tuners (Comment)." 1981 Transactions on Microwave Theory and Techniques 29.8 (Aug. 1981 [T-MTT]): 832-832.*

Some years ago I considered a class of tuners the author discussed in the above paper, and all but the two forms of Fig. 6 were discarded as being unsuitable to practical tuning methods.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## High-Accuracy Numerical Data on Propagation Characteristics of alpha-Power Graded-Core Fibers (Correction)

*K. Oyamada and T. Okoshi. "High-Accuracy Numerical Data on Propagation Characteristics of alpha-Power Graded-Core Fibers (Correction)." 1981 Transactions on Microwave Theory and Techniques 29.8 (Aug. 1981 [T-MTT]): 832-832.*

In the above paper, the following typographical errors occurred:

# Abstracts

## Patent Abstracts (Aug. 1981 [T-MTT])

*"Patent Abstracts (Aug. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.8 (Aug. 1981 [T-MTT]): 833-835.*

# Abstracts

## Contributors (Aug. 1981 [T-MTT])

*F. Bardati, G.G. Berry, C.H. Chen, R.L. Dickman, D.J. Esdale, P.E. Ferguson, M.J. Howes, K. Kobayashi, I.V. Lindell, C.-T. Liu, A. Madjar, M.L. Majewski, Y. Nemoto, J.K. Plourde, C.-L. Ren, R.W. Rose, F.J. Rosenbaum, R. Sato, J.R. Scott, R.S. Symons, R.S. Tucker, G. Valier and W.J. Wilson. "Contributors (Aug. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.8 (Aug. 1981 [T-MTT]): 836-838.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## IEEE Conference Records (Advertisement) (Aug. 1981 [T-MTT])

*"IEEE Conference Records (Advertisement) (Aug. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.8 (Aug. 1981 [T-MTT]): 839-839.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## IEEE on Microfilm (Advertisement) (Aug. 1981 [T-MTT])

*"IEEE on Microfilm (Advertisement) (Aug. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.8 (Aug. 1981 [T-MTT]): 840-840.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Back Cover (Aug. 1981 [T-MTT])

*"Back Cover (Aug. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.8 (Aug. 1981 [T-MTT]): b1-b1.*

# Abstracts

## Front Cover (Sep. 1981 [T-MTT])

*"Front Cover (Sep. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.9 (Sep. 1981 [T-MTT] (Special Issue on Open Guided Wave Structures)): f1-f2.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Foreword (Sep. 1981 [T-MTT])

*T. Itoh and D.C. Chang. "Foreword (Sep. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.9 (Sep. 1981 [T-MTT] (Special Issue on Open Guided Wave Structures)): 841-842.*

Electromagnetic wave guiding and transmission are an integral part of microwave, rnillimeter-wave, and optical systems. Passive components can be made with particular waveguide or transmission-line configurations and active components can be realized by installing solid-state devices in them. To design passive and active components, characteristics of related waveguiding structures must be clearly understood.

# Abstracts

## Guidance and Leakage Properties of a Class of Open Dielectric Waveguides: Part I--Mathematical Formulations

*S.-T. Peng and A.A. Oliner. "Guidance and Leakage Properties of a Class of Open Dielectric Waveguides: Part I--Mathematical Formulations." 1981 Transactions on Microwave Theory and Techniques 29.9 (Sep. 1981 [T-MTT] (Special Issue on Open Guided Wave Structures)): 843-855.*

A class of open dielectric waveguides is discussed which is of direct importance to the areas of integrated optics and millimeter-wave integrated circuits. An accurate analysis of the properties of these waveguides reveals that interesting new physical phenomena, such as leakage and sharp cancellation or resonance effects, may occur under appropriate circumstances. The resulting leaky modes form a new class of such modes since the leakage, in the form of an exiting surface wave, has a polarization opposite to that which dominates in the bound portion of the leaky mode. These new effects are caused by TE-TM mode coupling, which was neglected in earlier approximate treatments. Part I presents the mathematical formulation based on a rigorous mode-matching procedure.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Guidance and Leakage Properties of a Class of Open Dielectric Waveguides: Part II--New Physical Effects

*A.A. Oliner, S.-T. Peng, T.-I. Hsu and A. Sanchez. "Guidance and Leakage Properties of a Class of Open Dielectric Waveguides: Part II--New Physical Effects." 1981 Transactions on Microwave Theory and Techniques 29.9 (Sep. 1981 [T-MTT] (Special Issue on Open Guided Wave Structures)): 855-869.*

A class of open dielectric waveguides is discussed which is of direct importance to the areas of integrated optics and millimeter-wave integrated circuits. An accurate analysis of the properties of these waveguides reveals that interesting new physical phenomena, such as leakage and sharp cancellation or resonance effects, may occur under appropriate circumstances. The resulting leaky modes form a new class of such modes since the leakage, in the form of an exiting surface wave, has a polarization opposite to that which dominates in the bound portion of the leaky mode. These new effects are caused by TE-TM mode coupling, which was neglected in earlier approximate treatments. Part II describes the new physical effects and includes numerical results on various waveguiding structures to illustrate the new effects quantitatively.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Analysis of Single and Coupled Rectangular Dielectric Waveguides

*U. Crombach. "Analysis of Single and Coupled Rectangular Dielectric Waveguides." 1981 Transactions on Microwave Theory and Techniques 29.9 (Sep. 1981 [T-MTT] (Special Issue on Open Guided Wave Structures)): 870-874.*

Single and coupled rectangular dielectric waveguides are analyzed by means of the mode-matching technique. Dispersion characteristics are given for dominant modes of the inverted stripline and rib waveguides. The propagation constant for E/sup y//sub 11/-mode of the inverted strip line is found to become less than the lowest limit for guidance above a certain frequency. Influence of frequency and dielectric constant of the rib on the normalized coupling length of two coupled rib waveguides is investigated.

# Abstracts

## Coupling Characteristics of Planar Dielectric Waveguides of Rectangular Cross Section

*T. Trinh and R. Mittra. "Coupling Characteristics of Planar Dielectric Waveguides of Rectangular Cross Section." 1981 Transactions on Microwave Theory and Techniques 29.9 (Sep. 1981 [T-MTT] (Special Issue on Open Guided Wave Structures)): 875-880.*

An approximate analytical method based on experimental results for predicting the coupling characteristics of various coupling structures is described. Expressions for the propagation constants were derived using the generalized effective dielectric constant method. For nonsymmetric coupling structures, the theoretical coupling coefficients were modified by a correction factor. Comparisons between experimental and theoretical results are presented.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## A Generalized Two-Dimensional Coupled-Mode Analysis of Curved and Chirped Periodic Structures in Open Dielectric Waveguides (Sep. 1981 [T-MTT])

*Z.-Q. Lin, S.-T. Zhou, W.S.C. Chang, S. Forouhar and J.-M. Delavaux. "A Generalized Two-Dimensional Coupled-Mode Analysis of Curved and Chirped Periodic Structures in Open Dielectric Waveguides (Sep. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.9 (Sep. 1981 [T-MTT] (Special Issue on Open Guided Wave Structures)): 881-891.*

A generalized two-dimensional coupled mode analysis of curved and chirped quasi-periodic structures in planar dielectric waveguides has been formulated. This analysis can be used to design curved and chirped quasi-periodic stuctures for obtaining phase matched interaction between two specific guided-wave beams. Alternatively, it can be used to calculate the amplitude and the phase of the diffracted guided-wave beam for a given quasi-periodic structure and for a specific incident beam, including the effect of the phase mismatch. The numerical example of linear chirped grating lenses with F = 10, f = 20 mm, Lambda/sub min/ = 2µm, Lambda/sub max/ = 4.1µm, and grating grooved length = 65µm is presented.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Aperture Coupling Between Dielectric Image Lines

*I.J. Bahl and P. Bhartia. "Aperture Coupling Between Dielectric Image Lines." 1981 Transactions on Microwave Theory and Techniques 29.9 (Sep. 1981 [T-MTT] (Special Issue on Open Guided Wave Structures)): 891-896.*

Aperture coupling between dielectric image lines is used develop a design technique for directional couplers at millimeter-wave frequencies. Expressions for coupling coefficients and directivity, employing coupling between image lines through apertures in the common ground plane are developed. The design procedure is illustrated by application 10-, 20-, and 30-dB directional couplers in rectangular image lines with circular aperture coupling.

# Abstracts

## A Quasioptical Circuit Technology for Shortmillimeter-Wavelength Multiplexer

*N. Nakajima and R. Watanabe. "A Quasioptical Circuit Technology for Shortmillimeter-Wavelength Multiplexer." 1981 Transactions on Microwave Theory and Techniques 29.9 (Sep. 1981 [T-MTT] (Special Issue on Open Guided Wave Structures)): 897-905.*

This paper describes constructions and electrical performances of shortmillimeter-wavelength quasioptical passive circuits using the Gaussian beam mode, i.e., beam mode launchers, polarization-independent beam splitters, circular polarization duplexers, filters, diplexers, and multiplexer. The diplexers were devised to handle wide bandwidths with fairly low loss and to have a sharp cutoff response so that they can be applied to telecommunications systems. Experiments on these components including frequency multiplexers and antenna feed systems were carried out in the 100-GHz band. It is shown that quasioptical circuits are particular useful in reducing insertion loss of multiplexing systems for shortmillimeter wavelengths.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Irregular Magneto-Optical Waveguides

*A. Bentsionovich Manenkov. "Irregular Magneto-Optical Waveguides." 1981 Transactions on Microwave Theory and Techniques 29.9 (Sep. 1981 [T-MTT] (Special Issue on Open Guided Wave Structures)): 906-910.*

The theory of wave propagation along irregolar anisotropic guides (fibers) is discussed in brief. The problem in question is considered by spectral expansion, which is constructed, in turn, with the help of the scattering operator of conical waves. The general relations are illustrated by example of a round gyrotropic waveguide of a small cross section.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Analysis of Periodic Ferrite Slab Waveguides by Means of Improved Perturbation Method

*K. Araki and T. Itoh. "Analysis of Periodic Ferrite Slab Waveguides by Means of Improved Perturbation Method." 1981 Transactions on Microwave Theory and Techniques 29.9 (Sep. 1981 [T-MTT] (Special Issue on Open Guided Wave Structures)): 911-916.*

Periodic ferrite slab waveguides are analyzed by means of an improved perturbation method, and nonreciprocal leakage phenomena are shown theoretically. As an application of these phenomena, new planar isolators and circulators are proposed. Numerical examples are also provided.

# Abstracts

## Fundamental Considerations in Millimeter and Near-Millimeter Component Design Employing Magnetoplasmons

*D.M. Bolle and S.H. Talisa. "Fundamental Considerations in Millimeter and Near-Millimeter Component Design Employing Magnetoplasmons." 1981 Transactions on Microwave Theory and Techniques 29.9 (Sep. 1981 [T-MTT] (Special Issue on Open Guided Wave Structures)): 916-923.*

The feasibility of using surface magnetoplasmons on semiconducting substrates to obtain circuit functions which match those of ferrite loaded devices at lower frequencies, is investigated. This article describes some initial results obtained in our study of performance characteristics using the best loss parameters available for GaAs materials. Canonical models are considered which relate directly to proposed configurations for differential phase shifters and isolators in the millimeter and near-millimeter ranges.

# Abstracts

## A Hybrid Method for Paraxial Beam Propagation in Multimode Optical Waveguides

*D.C. Chang and E.F. Kuester. "A Hybrid Method for Paraxial Beam Propagation in Multimode Optical Waveguides." 1981 Transactions on Microwave Theory and Techniques 29.9 (Sep. 1981 [T-MTT] (Special Issue on Open Guided Wave Structures)): 923-933.*

A hybrid (nonray, nonmodal) method for computing the fields of a paraxial beam propagating in a multimode waveguide (parallel-plate or dielectric slab) at large axial distances is presented. The method is based on the Fourier and Fresnel self-imaging properties of these waveguides, and is capable of high accuracy. The method is much more efficient than ray or mode approaches, while giving complete field information which coupled-power equations do not provide.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Asymptotic Eigenequations and Analytic Formulas for the Dispersion Characteristics of Open Wide Microstrip Lines

*W.C. Chew and J.A. Kong. "Asymptotic Eigenequations and Analytic Formulas for the Dispersion Characteristics of Open Wide Microstrip Lines." 1981 Transactions on Microwave Theory and Techniques 29.9 (Sep. 1981 [T-MTT] (Special Issue on Open Guided Wave Structures)): 933-941.*

Through the matched asymptotic expansions technique, asymptotic eigenequations for the even and odd modes of an open wide microstrip transmission line are derived. The eigenequations, and simplifications thereof which do not involve integration, can he solved easily for the effective permittivity. Even though d/W is assumed to be small, the solutions are good even if d/ W/spl cong/0.8 when compared with the numerical results of Jansen. From these eigenequations, asymptotic formulas for the effective permittivity can be derived which are excellent when d/ W/spl cong/0.2. When the frequency goes to zero, we reproduced the asymptotic formula derived under the quasi-TEM approximation in [8]. The asymptotic analysis provides good physical insight into the problem, otherwise unavailable from numerical analysis.

# Abstracts

## Method of Analysis of Planar Networks Including Radiation Loss

*R. Sorrentino and S. Pileri. "Method of Analysis of Planar Networks Including Radiation Loss." 1981 Transactions on Microwave Theory and Techniques 29.9 (Sep. 1981 [T-MTT] (Special Issue on Open Guided Wave Structures)): 942-948.*

A general approach to the analysis of microwave planar structures, specifically intended to account for radiation loss is presented. By expanding the internal electromagnetic (EM) field in terms of resonant modes, also the external field is obtained in the form of a series, each term of which corresponds to the field radiated by a resonant mode excited in the structure. Neglecting the effect of the thin dielectric substrate on the power radiated and the coupling between the modes, occurring at the lateral surface of the structure, a simplified formulation is obtained which is shown to be in very good agreement with experiments, performed in the frequency range 2-12.4 GHz, which could not be explained on the basis of a lossless model.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Millimeter-Wave Passive Components and Six-Port Network Analyzer in Dielectric Waveguide

*J.A. Paul and P.C.H. Yen. "Millimeter-Wave Passive Components and Six-Port Network Analyzer in Dielectric Waveguide." 1981 Transactions on Microwave Theory and Techniques 29.9 (Sep. 1981 [T-MTT] (Special Issue on Open Guided Wave Structures)): 948-953.*

A cost effective scheme of fabricating millimeter-wave passive components in dielectric waveguide has been conceived and a computer program has been written for analyzing their frequency responses. By inlaying Teflon guides in the properly designed contours cut in a low dielectric constant foam material, passive components such as quadrature hybrids, in-phase power dividers, and six-port network analyzers have been developed. Design and performance data are presented.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Millimeter-Wave Dielectric Image Line Detector-Circuit Employing Etched Slot Structure

*K. Solbach. "Millimeter-Wave Dielectric Image Line Detector-Circuit Employing Etched Slot Structure." 1981 Transactions on Microwave Theory and Techniques 29.9 (Sep. 1981 [T-MTT] (Special Issue on Open Guided Wave Structures)): 953-957.*

In an earlier paper, slots in the ground plane are investigated as new circuit elements in dielectric image lines. In this paper slots in dielectric image lines employing metallized dielectric substrates as the ground plane are investigated. It is shown that this configuration can be used to realize truly integrated dielectric image line semiconductor circuits. As an example the design and performance of a detector circuit for 26 to 40 GHz is presented.

# Abstracts

## Millimeter-Wave InP Image Line Self-Mixing Gunn Oscillator

*S. Dixon, Jr. and H. Jacobs. "Millimeter-Wave InP Image Line Self-Mixing Gunn Oscillator." 1981 Transactions on Microwave Theory and Techniques 29.9 (Sep. 1981 [T-MTT] (Special Issue on Open Guided Wave Structures)): 958-961.*

Indium Phosphide Gunn Diodes have been used to develop self -mixing oscillators in the 60-GHz region using dielectric image line techniques. Experiments have been performed to measure conversion characteristics and minimum detectable signal. Applications are suggested based on minimum detectable signal for systems requiring small size and low cost.

# Abstracts

## Metal Walls in Close Proximity to a Dielectric Waveguide Antenna

*K.L. Klohn. "Metal Walls in Close Proximity to a Dielectric Waveguide Antenna." 1981 Transactions on Microwave Theory and Techniques 29.9 (Sep. 1981 [T-MTT] (Special Issue on Open Guided Wave Structures)): 962-966.*

The effect of placing metal walls in close proximity to a dielectric antenna has been examined theoretically. When these walls are less than one millimeter away from a silicon dielectric waveguide operating nominally at 60 GHz, they affect the wavelength of the electromagnetic radiation within the guide. As the guide wavelength changes, the angle of radiated energy emanating from the metal stripe perturbations on the upper surface of the dielectric guide also changes. A line scanning antenna can be realized by varying the change in guide wavelength in a controlled manner. Theoretical calculations were made to determine the physical parameters such as waveguide size, spacing of metal stripe perturbations and location of metal walls with respect to the silicon waveguide which can produce a large angular scan. Design curves are presented which can be used to examine tradeoffs between the initial radiation angle and range of angular scan as a function of frequency and perturbation spacing. A means of electronically controlling the simulated absence or presence of metal walls by current biasing distributed p-i-n diodes attached to the side of the dielectric guide from a nonconducting state into a high conductivity state is discussed.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Circularly Polarized Linear Array Antenna Using a Dielectric Image Line

*T. Hori and T. Itanami. "Circularly Polarized Linear Array Antenna Using a Dielectric Image Line." 1981 Transactions on Microwave Theory and Techniques 29.9 (Sep. 1981 [T-MTT] (Special Issue on Open Guided Wave Structures)): 967-970.*

A new circularly polarized antenna using a dielectric image line is proposed. This antenna is composed of a slotted conductive plane and a rectangular dielectric rod. This paper describes the design of and experimental results achieved with the circularly polarized array antenna fed by a dielectric image line. The fundemental characteristics of the image line are also presented. Since this line's losses are far lower than the microstrip line losses in the millimeter wavebands, antenna feed line losses expect to be also very low. Bandwidth within the 2-dB axial ratio was more than 7 percent, and the angle range within the same ratio was more than ±7.8 degrees at 29.5 GHz. This antenna is far superior to the microstrip line feed array antenna in the millimeter wavebands.

# Abstracts

## A Periodic Branching Filter for Millimeter-Wave Integrated Circuits

*T. Itanami. "A Periodic Branching Filter for Millimeter-Wave Integrated Circuits." 1981 Transactions on Microwave Theory and Techniques 29.9 (Sep. 1981 [T-MTT] (Special Issue on Open Guided Wave Structures)): 971-978.*

A number of passive and active devices using dielectric waveguides have been developed and find various applications in integrated circuits at the millimeter optical-frequency range. The design, theoretical considerations and experimental findings of a periodic branching filter using rectangular dielectric waveguides are described in this paper. Low insertion loss for the periodic branching filter with 850-MHz 3-dB bandwidth, less than 1.0 dB, is achieved in the frequency range from 77 to 85 GHz. Measured results are in good agreement with theoretical calculations.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Microwave Modeling of Optical Periodic Waveguides (Short Papers)

*T. Tamir. "Microwave Modeling of Optical Periodic Waveguides (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.9 (Sep. 1981 [T-MTT] (Special Issue on Open Guided Wave Structures)): 979-983.*

A design procedure and experimental method is presented for modeling optical periodic waveguides by means of more convenient parallel plate microwave configurations. These models are suitable for verifying the beam-coupling properties of dielectric gratings that operate in the fundamental TE/sub 0/ surface-wave mode. In particular, blazed gratings with high coupling efficiencies have been constructed and their characteristics have been measured. The results have shown that previously developed design criteria, which are based on a simple Bragg-scattering approach, can yield highly efficient broad-band beam couplers that are not subject to critical fabrication tolerances.

# Abstracts

## Anomalous Low-Loss Transmission in a Gas-Confined Dielectric Waveguide for Millimeter and Submillimeter Wavelengths (Short Papers)

*K. Yamamoto. "Anomalous Low-Loss Transmission in a Gas-Confined Dielectric Waveguide for Millimeter and Submillimeter Wavelengths (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.9 (Sep. 1981 [T-MTT] (Special Issue on Open Guided Wave Structures)): 983-987.*

A novel low-loss (gas-confined) dielectric waveguide for millimeter and submillimeter wavelengths was previously reported by the author. The waveguide consists of a thin dielectric tube separating an internal high-dielectric-constant gas from an external low-dielectric-constant gas. The attenuation constant of this form of waveguide usually increases with increasing tube thickness. The thick tube is indispensable for a mechanically stable waveguide. In this paper, anomalous low-loss transmission characteristics in a gas-confined dielectric waveguide with a thick tube are described. Some condtions are theoretically found where the attenuation constant of the waveguide with a thick tube is extremely low, due to tight field confinement within the internal gas. A qualitative explanation of the operation mechanism is also given.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Composite Dielectric Waveguides with Two Elliptic-Cylinder Boundaries (Short Papers)

*E. Yamashita, K. Atsuki and Y. Nishino. "Composite Dielectric Waveguides with Two Elliptic-Cylinder Boundaries (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.9 (Sep. 1981 [T-MTT] (Special Issue on Open Guided Wave Structures)): 987-990.*

It is shown that the propagation constants of composite dielectric waveguides with two different elliptic-cylinder boundaries, such as the recent single-polarization optical fibers, are computable by the point-matching method. Numerical results are shown for various combinations of the dielectric constants.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Patent Abstracts (Sep. 1981 [T-MTT])

*"Patent Abstracts (Sep. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.9 (Sep. 1981 [T-MTT] (Special Issue on Open Guided Wave Structures)): 990-996.*

# Abstracts

## Back Cover (Sep. 1981 [T-MTT])

*"Back Cover (Sep. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.9 (Sep. 1981 [T-MTT] (Special Issue on Open Guided Wave Structures)): b1-b1.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Front Cover (Oct. 1981 [T-MTT])

*"Front Cover (Oct. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.10 (Oct. 1981 [T-MTT]): f1-f2.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Analysis of Linear Noisy Two-Ports Using Scattering Waves

*R.P. Hecken. "Analysis of Linear Noisy Two-Ports Using Scattering Waves." 1981 Transactions on Microwave Theory and Techniques 29.10 (Oct. 1981 [T-MTT]): 997-1004.*

This paper proposes a new approach to the use of scattering waves for spot noise analysis of linear N-ports. Noise as a stationary, stochastic process is approximated by an infinite series of partial noise waves. This allows the use of the scattering matrix formalism and signal flowgraph theory. The noise waves lead to a new set of three dimensionless, characteristic noise parameters. Methods to determine these parameters are simple. With these parameters, the theory of noise minimization is straightforward and the definition of constant noise circles uncomplicated. The effect of losses in noise matching networks is shown to be more significant in very low noise amplifiers than usually assumed.

# Abstracts

## Performance of Optically Coupled Microwave Switching Devices

*R.A. Kiehl and D.M. Drury. "Performance of Optically Coupled Microwave Switching Devices." 1981 Transactions on Microwave Theory and Techniques 29.10 (Oct. 1981 [T-MTT]): 1004-1010.*

The performance of optically coupled microwave switching devices for pulse generation or other applications is detailed. The bias dependence of the RF power transfer is presented for a range of operating frequencies, thereby establishing the bias conditions required for a given ON/OFF ratio and insertion loss. Limits on peak RF power level and pulse repetition rate, as well as limitations arising from harmonic distortion and shot noise, are also examined.

# Abstracts

## Optoelectronic Microwave Switching via Laser-Induced Plasma Tapers in GaAs Microstrip Sections

*W. Platte. "Optoelectronic Microwave Switching via Laser-Induced Plasma Tapers in GaAs Microstrip Sections." 1981 Transactions on Microwave Theory and Techniques 29.10 (Oct. 1981 [T-MTT]): 1010-1018.*

This paper presents a new type of high-speed optoelectronic GaAs microstrip switch controlled by a pulse-operated laser diode via substrate-edge excitation. The exponential decay of photoconductivity across a longitudinal section of the microstrip forms a laser-induced electron-hole plasma wedge that works as a lossy tapered transmission line. The dynamics of carrier generation and recombination as well as the overall performance of the switch are quantitatively analyzed and optimized. This device is capable of switching with subnanosecond precision as well as with optical pule energies in the order of 1 µJ. Theoretical and experimental results were found to be in good agreement.

# Abstracts

## A Graphical Method for the Design of Feedback Networks for Microwave Transistor Amplifiers: Theory and Applications

*F. Perez and V. Ortega. "A Graphical Method for the Design of Feedback Networks for Microwave Transistor Amplifiers: Theory and Applications." 1981 Transactions on Microwave Theory and Techniques 29.10 (Oct. 1981 [T-MTT]): 1019-1028.*

A new theory is presented that is very useful for the design of feedback transistor amplifiers, including considerations on stability, gain equalization, and matching. The theory is based on graphical feedback diagrams whose construction rides and practical circuit design techniques are described. The method provides insight into the effects of the feedback network elements and saves computer time and money. Three applications are presented: a tuned neutralized bipolar transistor amplifier; a broad-band medium power MESFET amplifier in the 3.7-4.2-GHz range; and a ultrawide-band matched MESFET amplifier covering the 0.1-12-GHz frequency range.

# Abstracts

## Matching Network Design Studies for Microwave Transistor Amplifiers

*G.P. Young and S.O. Scanlan. "Matching Network Design Studies for Microwave Transistor Amplifiers." 1981 Transactions on Microwave Theory and Techniques 29.10 (Oct. 1981 [T-MTT]): 1027-1035.*

Several techniques for design of microwave amplifiers using lumped-element and distributed matching networks are discussed. An extension to the Remez-algorithm design approaches is proposed, whereby gain and ripple quantities may be adjusted using a numerical optimization procedure in order to achieve complete absorption of device model elements and also impedance transformation.

# Abstracts

## Coupled Slots on an Anisotropic Sapphire Substrate

*T. Kitazawa and Y. Hayashi. "Coupled Slots on an Anisotropic Sapphire Substrate." 1981 Transactions on Microwave Theory and Techniques 29.10 (Oct. 1981 [T-MTT]): 1035-1040.*

Two analytical approaches are presented for coupled slots on an anisotropic sapphire substrate using the network analytical methods of electromagnetic fields. One is based on the quasi-static approximation and it derives the transformation from the case with the anisotropic substrate to the case with the isotropic substrate. The other is based on the hybrid mode formulation and it gives the dispersion characteristics.

# Abstracts

## Precise Calculations and Measurements on the Complex Dielectric Constant of Lossy Materials Using TM/sub 010/ Cavity Perturbation Techniques

*S. Li, C. Akyel and R.G. Bosisio. "Precise Calculations and Measurements on the Complex Dielectric Constant of Lossy Materials Using TM/sub 010/ Cavity Perturbation Techniques." 1981 Transactions on Microwave Theory and Techniques 29.10 (Oct. 1981 [T-MTT]): 1041-1048.*

An exact field theory solution for the cylindrical TM/sub 010/ cavity with a coaxial lossy dielectric cylinder is given. The error in the calculated field solutions is estimated to be less than 1 percent of the true values. Correction for the cavity holes used to introduce the sample is taken into account. The exact solution shows that the real part of the permittivity (epsilon') is a complex function of both the frequency shift and the change in the loaded Q-factor (Q/sub L/). On the other hand the imaginary part (epsilon") is nearly proportional to delta(1/Q/sub L/) and it has different slopes for varying frequencies. By means of active cavity techniques already reported, experimental measurements on epslion' and epsilon" taken at 2.2 GHz on a number of materials (water, teflon, n-proponal, methanol, etc.) agree with published data within 1 percent even when rising large samples.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Resonant Frequency Stability of the Dielectric Resonator on a Dielectric Substrate

*T. Higashi and T. Makino. "Resonant Frequency Stability of the Dielectric Resonator on a Dielectric Substrate." 1981 Transactions on Microwave Theory and Techniques 29.10 (Oct. 1981 [T-MTT]): 1048-1052.*

A simple approximate method for predicting the resonant frequencies of TE modes of dielectric resonators is developed. By using this method, an analytical expression is derived for the resonant frequency stability of the dielectric resonator on a dielectric substrate, and the effect of the substrate on the stability is studied. The result is useful when the high-frequency stability is required.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Toroidal Resonators and Waveguides of Arbitrary Cross Section

*F. Cap. "Toroidal Resonators and Waveguides of Arbitrary Cross Section." 1981 Transactions on Microwave Theory and Techniques 29.10 (Oct. 1981 [T-MTT]): 1053-1059.*

After introducing a new method to solve Maxwell's equations using a complex electromagnetic field vector F, a rotational coordinate system xi, Theta, psi is introduced. In this coordinate system, the field vector components F/sub xi/, F/sub Theta/ may be expressed by F/sub psi/. This component can be obtained from a two-dimensional Hehlmholtz equation. Specifying xi, Theta by cylindrical coordinates r, z the complex Maxwell equation curl F= gamma F is solved for the axisymmetric case (/spl part///spl part/psi = 0) and for the nonsymmetric case. The differential equations for magnetic field lines are solved and surfaces on which the normal component of B and the tangential components of E vanish are recognized as metallic walls of toroidal resonators of various arbitrary cross sections. In the Appendix the results of the new method are compared with well known results for circular cylindrical waveguides.

# Abstracts

## Analysis and Design of TE/sub 11/-to-HE/sub 11/ Corrugated Cylindrical Waveguide Mode Converters

*G.L. James. "Analysis and Design of TE/sub 11/-to-HE/sub 11/ Corrugated Cylindrical Waveguide Mode Converters." 1981 Transactions on Microwave Theory and Techniques 29.10 (Oct. 1981 [T-MTT]): 1059-1066.*

A theoretical parametric study is given of a TE/sub 11/-to-HE/sub 11/ mode converter consisting of a section of cylindrical corrugated waveguide with varying slot depth. The analysis makes use of modal field-matching techniques to determine the scatter marks of the mode converter from which we deduce its propagation properties. It is shown that a mode converter consisting of only five slots achieves a return loss better than 30dB over the band 2.7<ka<3.8 (where a is the internal radius of the waveguide) with the HE/sub 11/ mode in the balanced conditions at ka=2.9. The predicted results are in very good agreement with experimental data.

# Abstracts

## Surface Waves and Their Relation to the Eigenfrequencies of a Circular-Cylindrical Cavity

*J.V. Subrahmanyam, G.A.H. Cowhart, M. Keskin, H. Uberall, G.C. Gaunaurd and E. Tanglis. "Surface Waves and Their Relation to the Eigenfrequencies of a Circular-Cylindrical Cavity." 1981 Transactions on Microwave Theory and Techniques 29.10 (Oct. 1981 [T-MTT]): 1066-1072.*

The eigenfrequencies of a finite-length cylindrical cavity may be interpreted as the resonances caused by the phase-matching of circumferential waves that circumnavigate the cavity along certain helical paths, and that get reflected back and forth from its top and bottom flat surfaces. In this paper, we obtain the dispersion curves of these circumferential waves that correspond to a series of well-defined pitch angles of their helix for different values of the cylindrical cavity's length-to-radius ratio.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## The Modeling of Singularities in the Finite-Difference Approximation of the Time-Domain Electromagnetic-Field Equations

*G. Mur. "The Modeling of Singularities in the Finite-Difference Approximation of the Time-Domain Electromagnetic-Field Equations." 1981 Transactions on Microwave Theory and Techniques 29.10 (Oct. 1981 [T-MTT]): 1073-1077.*

When the electromagnetic-field equations are solved in a region with a corner, singularities in the field or in its spatial derivatives will be present at these corners. These singularities cause the load truncation error in a finite-difference approximation of the field equations to be unbounded. In this paper it is shown that failing to take these singularities into account leads to large errors in the finite-difference solution of the time-domain electromagnetic-field equations. A simple method is described to account for these singularities while retaining the simplicity of the finite-difference formulation. Numerical results are given that demonstrate the accuracy obtained when our technique is used.

# Abstracts

## Coupled-Mode Theory Analysis of Distributed Nonreciprocal Structures

*I. Awai and T. Itoh. "Coupled-Mode Theory Analysis of Distributed Nonreciprocal Structures." 1981 Transactions on Microwave Theory and Techniques 29.10 (Oct. 1981 [T-MTT]): 1077-1087.*

A general coupled-mode theory is developed for dielectric waveguide structured containing a gyrotropic layer. The theory applied is to several specific structures. Based on qualitative and numerical analysis, we studied the feasibility of such structures as the new type of nonreciprocal devices for millimeter-wave applications. A number of considerations for practical design are included.

# Abstracts

## Asymptotic High-Frequency Modes of Homogeneous Waveguide Structures with Impedance Boundaries

*I.V. Lindell. "Asymptotic High-Frequency Modes of Homogeneous Waveguide Structures with Impedance Boundaries." 1981 Transactions on Microwave Theory and Techniques 29.10 (Oct. 1981 [T-MTT]): 1087-1093.*

Homogeneous waveguides with both isotropic and anisotropic impedance boundaries are considered and asymptotic high-frequency mode properties are systematically derived. Among the new results are orthogonality properties of the asymptotic HF fields, existence of self-dual solutions, construction of stationary functionals, and an explicit formula for the calculation of the asymptotic attenuation coefficient for the general waveguide.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Desegmentation Method for Analysis of Two-Dimensional Microwave Circuits

*P.C. Sharma and K.C. Gupta. "Desegmentation Method for Analysis of Two-Dimensional Microwave Circuits." 1981 Transactions on Microwave Theory and Techniques 29.10 (Oct. 1981 [T-MTT]): 1094-1098.*

A new method for the analysis of two-dimensional planar circuits called the "desegmentation" method is proposed. This method is applicable to configurations which can be converted into regular shapes (for which Green's functions are known) by adding one or more regular shaped segments to them. Two examples of planar circuits, chosen such that the results could be verified by the previously known segmentation technique, illustrate the validity of the method.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Broad-Band Active Phase Shifter Using Dual-Gate MESFET (Short Papers)

*M. Kumar, R.J. Menna and H.-C. Huang. "Broad-Band Active Phase Shifter Using Dual-Gate MESFET (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.10 (Oct. 1981 [T-MTT]): 1098-1102.*

This paper describes a broad-band, dual-gate MESFET phase shifter (vector generator), operating over the 4- 8-GHz frequency band and capable of a continuous phase shift and multiplicity of modulations including digital phase shift and amplitude modulation directly, and indirectly (with additional information processing circuits), single sideband modulation, frequency modulation, and phase modulation, etc. A dual-gate FET is used as a variable gain amplifier and phase shift is obtained by complex addition of two orthogonal variable vectors. The principle of the phase shifter and the experimental results are presented.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Suspended Slot Line Using Double Layer Dielectric (Short Papers)

*R. Simons. "Suspended Slot Line Using Double Layer Dielectric (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.10 (Oct. 1981 [T-MTT]): 1102-1107.*

This paper presents a rigorous analysis of a) slot line on a double layer dielectric substrate, and b) slot line sandwiched between two dielectric substrates. The structure is assumed to be suspended inside a conducting enclosure of arbitrary dimensions. The dielectric substrates are assumed to be isotropic and homogeneous and are of arbitrary thickness and relative permittivity. The conducting enclosure and the zero thickness metallization on the substrate, are assumed to have infinite conductivity. The effect of shielding on the dispersion, characteristic impedance, and the effective dielectric constant are illustrated. These results should find application in the design and fabrication of MIC components and subsystems.

# Abstracts

## Open-End Discontinuity in Shielded Mlcrostrip Circuits (Short Papers)

*S.S. Bedair and M.I. Sobhy. "Open-End Discontinuity in Shielded Mlcrostrip Circuits (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.10 (Oct. 1981 [T-MTT]): 1107-1109.*

This short paper gives closed-form expressions for the open-end discontinuity in shielded microstrip circuits. These expressions consider the effect of dispersion at very high frequencies and are based on the results obtained earlier for the stripline configuration. The test of validity of these expressions is performed by comparison with the limit case of the unshielded microstrip.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Extension of an Old Circulator Model (Short Papers)

*G. Veszely. "Extension of an Old Circulator Model (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.10 (Oct. 1981 [T-MTT]): 1109-1111.*

An old circulator model consists of an ideal circulator with parallel-coupled resonant circuits. This paper determines the parameters of this model at frequencies different from the resonant one. As a consequence a unified treatment of the stripline and the lumped element circulators is possible.

# Abstracts

## First-Order Bragg Interactions in a Gyromagnetic-Dielectric Waveguide (Short Papers)

*M. Tsutsumi. "First-Order Bragg Interactions in a Gyromagnetic-Dielectric Waveguide (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.10 (Oct. 1981 [T-MTT]): 1111-1114.*

First-order Bragg interactions in a gyromagnetic-dielectric waveguide are investigated theoretically. With the aid of a singular perturbation procedure the coupled mode equations governing the nature of transverse electric wave interactions are derived. Bragg reflection characteristics are shown numerically as a function of the magnetic field.

# Abstracts

## Microwave Pulse-Induced Acoustic Resonances in Spherical Head Models (Short Papers)

*R.G. Olsen and J.C. Lin. "Microwave Pulse-Induced Acoustic Resonances in Spherical Head Models (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.10 (Oct. 1981 [T-MTT]): 1114-1117.*

Microwave-induced acoustic pressures in the spherical models of human and animal heads are measured using a small hydrophone transducer. The measured acoustic frequencies that correspond to mechanical resonance of the head model agree with those predicted by the thermoelastic theory of interaction. Further, a three-pulse burst applied at the appropriate pulse repetition frequencies could effectively drive the model to respond in such a manner that the microwave-induced pressure amplitude would be increased by threefold or more.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Proposal for an Electrically Tunable Surface Plasmon Light Emitter (Letters)

*A. Singh, H.L. Hartnagel and D.C. Tiwari. "Proposal for an Electrically Tunable Surface Plasmon Light Emitter (Letters)." 1981 Transactions on Microwave Theory and Techniques 29.10 (Oct. 1981 [T-MTT]): 1117-1119.*

A new scheme is proposed to generate infrared waves by exciting thin-slab plasmon waves by hot-electron injection via a tunneling thin insulator. These plasmon waves are coupled out by a periodic structure, and, by way of example, this is demonstrated for a Karp structure. The calculated numerical values of the example at a wavelength of 15 -µm, show that standard semiconductor technology can be used to fabricate the device.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Design of Microwave GaAs MESFET's for Broad-Band Low-Noise Amplifiers (Addendum)

*H. Fukui. "Design of Microwave GaAs MESFET's for Broad-Band Low-Noise Amplifiers (Addendum)." 1981 Transactions on Microwave Theory and Techniques 29.10 (Oct. 1981 [T-MTT]): 1119-1119.*

It has been called to the author's attention that (3) in the above paper appears to be inadequate, especially for scaling.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Cylindrical Dielectric Resonators and Their Applications in TEM Line Microwave Circuits (Correction)

*M.W. Pospieszalski. "Cylindrical Dielectric Resonators and Their Applications in TEM Line Microwave Circuits (Correction)." 1981 Transactions on Microwave Theory and Techniques 29.10 (Oct. 1981 [T-MTT]): 1119-1119.*

In the above paper the following correction should be made.

# Abstracts

## Approximate Formulas for Line Capacitance and Characteristic Impedance of Microstrip Line (Erratum)

*S.Y. Poh, W.C. Chew and J.A. Kong. "Approximate Formulas for Line Capacitance and Characteristic Impedance of Microstrip Line (Erratum)." 1981 Transactions on Microwave Theory and Techniques 29.10 (Oct. 1981 [T-MTT]): 1119-1119.*

In the above paper, the approximate formula for the characteristic impedance Z of a microstrip line, with substrate dielectric constant epsi, and thickness to width ratio h/W, should be Z cong 377/radic epsi/sub r/ {1-2 /pi epsi/sub r/ (h /w) [(1+ epsi/sub r/) ln (2h / W) - 2.230 - 4.554 epsi/sub r/ - (4.464 + 3.89 epsi /sub r/) h / W]} /sup - 1/2/, for h/W small.

Contents
Publications
Issues
Papers
Authors

Click on title for a complete paper.

# Abstracts

## Patent Abstracts (Oct. 1981 [T-MTT])

*"Patent Abstracts (Oct. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.10 (Oct. 1981 [T-MTT]): 1120-1125.*

# Abstracts

## Overseas Abstracts (Oct. 1981 [T-MTT])

*"Overseas Abstracts (Oct. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.10 (Oct. 1981 [T-MTT]): 1125-1133.*

# Abstracts

## Call for Papers - Special Issue on Millimeter Waves (Oct. 1981 [T-MTT])

*"Call for Papers - Special Issue on Millimeter Waves (Oct. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.10 (Oct. 1981 [T-MTT]): 1134-1134.*

# Abstracts

## Call for Papers - 1982 IEEE MTT-S International Microwave Symposium (Oct. 1981 [T-MTT])

*"Call for Papers - 1982 IEEE MTT-S International Microwave Symposium (Oct. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.10 (Oct. 1981 [T-MTT]): 1135-1135.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Call for Papers - Joint Special Issue on GaAs IC's (Oct. 1981 [T-MTT])

*"Call for Papers - Joint Special Issue on GaAs IC's (Oct. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.10 (Oct. 1981 [T-MTT]): 1136-1136.*

# Abstracts

## Inside Back Cover (Oct. 1981 [T-MTT])

*"Inside Back Cover (Oct. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.10 (Oct. 1981 [T-MTT]): b1-b1.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Front Cover (Nov. 1981 [T-MTT])

*"Front Cover (Nov. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.11 (Nov. 1981 [T-MTT]): f1-f2.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Stability Analysis of Injection-Locked Oscillators in Their Fundamental Mode of Operation

*E.F. Calandra and A.M. Sommariva. "Stability Analysis of Injection-Locked Oscillators in Their Fundamental Mode of Operation." 1981 Transactions on Microwave Theory and Techniques 29.11 (Nov. 1981 [T-MTT]): 1137-1144.*

Phase-lock stability of fundamental-wave injection-synchronized oscillators is investigated on the basis of a new time-domain approach. Starting from a quite general oscillator modeling and assuming single-frequency quasi-static operation, both exact and first-order approximate stability criteria are derived in a fully analytical form suitable for computer implementation. The examples worked out demonstrate good agreement of this theory with experimental observations available in the literature on multiple-tuned oscillators, whose behavior under large-signal injection was so far predictable only through graphical methods.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Analysis of Schottky-Barrier Millimetric Varactor Doublers

*E. Bava, G.P. Bava, A. Godone and G. Rietto. "Analysis of Schottky-Barrier Millimetric Varactor Doublers." 1981 Transactions on Microwave Theory and Techniques 29.11 (Nov. 1981 [T-MTT]): 1145-1149.*

An analysis of abrupt-junction millimetric varactor doublers using Schottky diodes is performed and numerically implemented to evaluate conditions of maximum output power. This power level, the efficiency, and the circuit parameters have been derived as a function of the geometrical and physical parameters of the junction. Physical phenomena which allow the application of the model up to the plasma resonance frequency in epilayer are taken into account. Comparison of available experimental data with the theory developed is reported.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## 94-GHz Beam-Lead Balanced Mixer

*P.T. Parrish, A.G. Cardiasmenos and I. Galin. "94-GHz Beam-Lead Balanced Mixer." 1981 Transactions on Microwave Theory and Techniques 29.11 (Nov. 1981 [T-MTT]): 1150-1157.*

Using a newly developed GaAs beam-lead diode, we have developed and evaluated a balanced mixer at 94 GHz. The various components of the mixer were separately optimized using carefully designed low-frequency model studies as our primary design aid. These studies included the determination of guide impedance and guide wavelength for suspended stripline, and optimization of a waveguide to suspended stripline transition, low-pass filters, and diode location. This 94-GHz mixer exhibits an average single sideband (SSB) conversion loss of 6.2 dB over a 6-GHz RF bandwidth. Together with a bipolar IF amplifier, the system exhibits a 4.5-5.1-dB double sideband (DSB) noise figure over a 50-700-MHz IF bandpass. LO-to-RF isolation was greater that 27 dB over this range of operating frequencies. Finally, severe environmental test were successfully performed on the mixer between sucessive electrical characterization.

# Abstracts

## Investigations of Broad-Band, Linear Phase Shifters Using Optimum Varactor Diode Doping Profiles

*R.K. Mains, G.I. Haddad and D.F. Peterson. "Investigations of Broad-Band, Linear Phase Shifters Using Optimum Varactor Diode Doping Profiles." 1981 Transactions on Microwave Theory and Techniques 29.11 (Nov. 1981 [T-MTT]): 1158-1164.*

The problem of obtaining linear phase shift of microwave signals over a broad frequency range and its dependence on varactor properties is addressed. An important application of the linear phase shifter, the microwave frequency translator, is investigated in detail and various circuit configurations and varactor doping profiles are examined relative to their performance including suppression of undesired frequency components and bandwidth. Hyperabrupt or Read-type varactor diodes are found to be very useful in this application.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Synthesis of Transformer Coupled Multiple Frequency Circulators with Chebyshev Characteristics

*E.R.B. Hansson and K.G. Filipsson. "Synthesis of Transformer Coupled Multiple Frequency Circulators with Chebyshev Characteristics." 1981 Transactions on Microwave Theory and Techniques 29.11 (Nov. 1981 [T-MTT]): 1165-1173.*

This paper presents a theory for broad-band matching of stripline junction circulators for operation in two or more frequency bands. In this theory it is assumed that the matching network is composed of cascaded transmission line transformers each of which is an odd multiple of a quarter-wavelength at the center frequencies. The conditions for simultaneous Chebyshev response in multiple frequency bands are determined, and it is investigated to what extent these conditions can be satisfied by stripline circulator junctions. Thus by using a first-order theory, it is shown that if a circulator junction, adjusted for double frequency operation, is matched for Chebyshev response by a transformer of proper length around one of the circulation frequencies then it is also matched for Chebyshev response around the other circulation frequency, provided that the same operation mode is used above and below material resonance. A routine for broad-band multiple frequency matching is proposed for junctions where Chebyshev response is not obtainable. Finally the properties of some externally matched circulators designed according to the theories are shown.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A Laser-Induced Traveling-Wave Device for Generating Millimeter Waves

*J. Soohoo, S.-K. Yao, J.E. Miller, R.R. Shurtz, II, Y. Taur and RA. Gudmundsen. "A Laser-Induced Traveling-Wave Device for Generating Millimeter Waves." 1981 Transactions on Microwave Theory and Techniques 29.11 (Nov. 1981 [T-MTT]): 1174-1182.*

We have investigated a novel device concept for generating CW millimeter waves with output power in the multiwatt range. The concept involves the utilization of modulated laser radiation to induce in a distributed Schottky-diode structure a traveling-wave current which, in turn, synchronously excites the dominant mode of a waveguide structure to generate millimeter power. The induced traveling-wave current is directly proportional to the laser modulation generated by the interference of two overlapping laser beams of millimeter beat frequency. Detailed analysis indicates that the device has both high-output and frequency-tunable characteristics.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## A Method for Diminishing Total Transmission Losses in Curved Dielectric Optical Waveguides

*M. Geshiro and S. Sawa. "A Method for Diminishing Total Transmission Losses in Curved Dielectric Optical Waveguides." 1981 Transactions on Microwave Theory and Techniques 29.11 (Nov. 1981 [T-MTT]): 1182-1187.*

A practical method for diminishing total transmission losses in curved dielectric optical slab waveguides is proposed. Asymmetric structures are introduced into curved sections. It is found that there exists an optimum asymmetric structure for the curved section which makes the total transmission loss minimum. And it is also found that the characteristics of total transmission loss do not critically depend upon the asymmetry of waveguide structure, so that some displacement from the optimum structure does not increase the loss in an appreciable amount.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Nonradiative Dielectric Waveguide for Millimeter-Wave Integrated Circuits

*T. Yoneyama and S. Nishida. "Nonradiative Dielectric Waveguide for Millimeter-Wave Integrated Circuits." 1981 Transactions on Microwave Theory and Techniques 29.11 (Nov. 1981 [T-MTT]): 1188-1192.*

A nonradiative dielectric waveguide is proposed in which dielectic strips are sandwiched between two parallel metal plates separated by a distance smaller than half a wavelength. Though the structure is substantially the same as that of the H-guide, it is based on a quite different principle of operation. This dielectric guide is particularly applicable in millimeter-wave integrated circuits, since it is not only small in size, but also allows bends and junctions to be incorporated into the circuits with very little radiation and interference. A design diagram is given. Losses and coupling coefficients of the strips are calculated, as well. Some basic circuit components, such as 90° and 180° bends and T-junctions, made of polystyrene strips, are measured to confirm their usefulness in millimeter-wave integrated circuits.

# Abstracts

## Spurious Resonances in Asymmetrical Fin-Line Junctions

*K. Solbach, H. Callsen and W. Menzel. "Spurious Resonances in Asymmetrical Fin-Line Junctions." 1981 Transactions on Microwave Theory and Techniques 29.11 (Nov. 1981 [T-MTT]): 1193-1195.*

Spurious resonances which occur in asymmetrical fin-line junctions are investigated. The field distribution and the resonant frequency are computed using a field matching technique. Looking at the field distribution, methods for resonance suppression are discussed.

# Abstracts

## Equivalent Reactance of a Shorting Septum in a Fin-Line: Theory and Experiment

*J.B. Knorr. "Equivalent Reactance of a Shorting Septum in a Fin-Line: Theory and Experiment." 1981 Transactions on Microwave Theory and Techniques 29.11 (Nov. 1981 [T-MTT]): 1196-1202.*

This paper presents the results of theoretical and experimental investigations of the equivalent reactance of a shorting septum in a fin-line. Numerical and experimental data showing septum reactance for several different fin-lines are presented and compared. Some design curves are included for millimeter-wave fin-lines with this type of discontinuity.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Energy Absorption from Small Radiating Coaxial Probes in Lossy Media

*M.L. Swicord and C.C. Davis. "Energy Absorption from Small Radiating Coaxial Probes in Lossy Media." 1981 Transactions on Microwave Theory and Techniques 29.11 (Nov. 1981 [T-MTT]): 1202-1209.*

This paper describes the calculation of energy deposition around small open-ended coaxial antenna probes in lossy media. Two theoretical methods, a small monopole approximation (I) and an equivalent magnetic current source (II), are evaluated and compared. Method I is shown to be inappropriate for determining near field energy deposition. Power contour plots determined by method II in the vicinity of the open-ended coaxial antenna are presented as well as calculations of total power absorbed as a function of distance from the antenna center for various antenna dimensions and media dielectric properties. Our calculations of absorbed power distributions near the antenna are consistent with the limited experimental data which is available for comparison. A frequency of 2.45 GHz was selected for these calculations so that the results will be of value to workers interested in the application of own-ended coaxial antennas for invasive treatment of cancer by microwave hyperthermia.

# Abstracts

## Dielectric Loss in Biogenic Steroids at Microwave Frequencies

*R. Aruna and J. Behari. "Dielectric Loss in Biogenic Steroids at Microwave Frequencies." 1981 Transactions on Microwave Theory and Techniques 29.11 (Nov. 1981 [T-MTT]): 1209-1213.*

Dielectric loss in steroids has been measured in solid format 9.4 GHz and in nonaqueous solutions at 3.3 and 9.4 GHz. The method for solutions consists of measurement on standing-wave pattern in front of a column of liquid of varying length and concentration, contained in a short-circuited dielectric cell. Keeping the concentration within the limits of dilute solutions, dipole moment and relaxation time of Cholesterol, Progesterone, and Testosterone have been evaluated. Mechanisms responsible for dielectric loss and its trend of variation in the three steroids are presented. The solid phase measurements were carried out by cavity perturbation technique on powders and crystal values, for epsilon' and epsilon" were evaluated. The difference in epsilon" values of the three steroids in the two phases is attributed to the difference in the mechanism of microwave absorption. However, identical values of epsilon' are obtained.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Analysis of Miniature Electric Field Probes with Resistive Transmission Lines

*G.S. Smith. "Analysis of Miniature Electric Field Probes with Resistive Transmission Lines." 1981 Transactions on Microwave Theory and Techniques 29.11 (Nov. 1981 [T-MTT]): 1213-1224.*

The miniature dipole probe is a useful tool for measuring the electric field at high radio and microwave frequencies. A common design for the probe consists of an electrically short dipole antenna with a diode across its terminals; a resistive, parallel-wire transmission line transmits the detected signal from the diode to the monitoring instrumentation. The high resistance per unit length of the transmission line reduces the direct reception of the incident field by the line and also reduces the scattering of the incident field by the line. In addition, the resistive transmission line serves as a low-pass filter in the detection process. In this paper, the effect of the resistive transmission line on the operation of the miniature field probe is analyzed. Specifically, the reception of the incident signal by the transmission line is compared with that of the dipole. The scattering of the incident signal by the transmission line is studied by means of the scattering cross section, and the limitation imposed on the measurement of amplitude-modulated signals by the low-pass filtering by the resistive line is examined. The results of the theoretical analyses are presented as simple formulas which are useful in the design and optimization of the probe. The theoretical results are shown to be in good agreement with measurements.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Probing Amplitude, Phase, and Polarization of Microwave Field Distributions in Real Time

*R.J. King and Y.H. Yen. "Probing Amplitude, Phase, and Polarization of Microwave Field Distributions in Real Time." 1981 Transactions on Microwave Theory and Techniques 29.11 (Nov. 1981 [T-MTT]): 1225-1231.*

A coherent (homodyne) detection system is used to map field distributions in real time. A key feature is the use of an electrically modulated (10-kHz) dipole scatterer which is also mechanically spun (150 Hz) to create an amplitude- and phase-modulated backscattered field. The system is monostatic. The backscattered field is coherently detected by mixing with the CW reference. A phase-insensitive detector is used, comprised of two balanced mixers which are fed in quadrature phase by one of the RF inputs followed by a phase quadrature combiner. The resulting amplitude and phase of the 10-kHz output are proportional to the square of the RF field component along the instantaneous axis of the spinning dipole. Both are measured simultaneously and independently in real time. From these, the polarization properties can also be found, so the field is uniquely described. The system's application to scanning the E-field transmitted through lossy, nonhomogeneous and anisotropic media (e.g., wood) is demonstrated. Other applications besides nondestructive testing are microwave vector holography, nearfield antenna measurements, and inverse scattering.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## The Thermal Dielectric Quotient for Characterizing Dielectric Heat Conductors (Short Papers)

*H.A. Wheeler and R.A. Lodwig. "The Thermal Dielectric Quotient for Characterizing Dielectric Heat Conductors (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.11 (Nov. 1981 [T-MTT]): 1231-1233.*

If a piece of dielectric is mounted between two conductors, the resulting thermal conductance and electrical capacitance are related by their quotient which is a property of the material, independent of the size and shape. This quotient is expressed in watts per (picofarad X kelvin). It is helpful in the selection of a material for conducting heat while adding least capacitance. For example, a beryllia ceramic block of 1 pF can conduct about 4 W/K. The highest is a diamond of unusual perfection, about 40 W/K. A table and a nomogram give these properties for a variety of materials.

# Abstracts

## Planar Broad-Band 180° Hybrid Power Divider/Combiner Circuit (Short Papers)

*M. Kumar, R.J. Menna and H.-C. Huang. "Planar Broad-Band 180° Hybrid Power Divider/Combiner Circuit (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.11 (Nov. 1981 [T-MTT]): 1233-1235.*

A planar broad-band 180° hybrid is presented. The hybrid is realized using a 3-dB 90° hybrid and a 0-dB 90° tandem hybrid. An interdigitated version of the hybrid fabricated on alumina substrate performed well over the 4-8-GHz band. The hybrid has an insertion loss of 0.5 dB, phase imbalance of ±7°, and an isolation of better than 18 dB over the band.

# Abstracts

## An Empirical Relationship for Electromagnetic Energy Absorption in Man for Near-Field Exposure Conditions (Short Papers)

*I. Chatterjee, M.J. Hagmann and O.P. Gandhi. "An Empirical Relationship for Electromagnetic Energy Absorption in Man for Near-Field Exposure Conditions (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.11 (Nov. 1981 [T-MTT]): 1235-1238.*

An empircal relationship is presented for the whole-body-average electromagnetic energy absorption in a 180-cell block model of man for near-field exposure conditions. Consideration is restricted to near fields with P polarization (no component of E directed arm-to-arm) in which the magnitude of the incident electric field is maximum immediately in front of the abdominal region. A highlight of this work is the considerably reduced whole-body average energy absorption for near-field partial-body exposures as compared to that obtained under plane-wave irradiation conditions.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## An Easy Tunable Stepped Coupled Lines Filter (Short Papers)

*G. Saulich. "An Easy Tunable Stepped Coupled Lines Filter (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.11 (Nov. 1981 [T-MTT]): 1238-1240.*

A stripline bandpass filter setup consisting of two stepped coupled lines is presented, with special emphasis being given to practical realization. The theoretical design of the filter is based on the known synthesis of directional couplers and is outlined briefly. Practical setup of the filter, together with a simple tuning mechanism, is described in detail. Measurements performed show good agreement with theoretical results.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Boundary Integral Equation Analysis of Transmission-Line Singularities (Short Papers)

*D.B. Ingham, P.J. Heggs and M. Manzoor. "Boundary Integral Equation Analysis of Transmission-Line Singularities (Short Papers)." 1981 Transactions on Microwave Theory and Techniques 29.11 (Nov. 1981 [T-MTT]): 1240-1243.*

The TEM line analysis of microstrips and coaxial lines generally involves boundary singularities which cause slow convergence of solutions computed by standard numencal techniques. In this study, the singularities occurring at the ends of the inner conductor in an unsymmetric closed microstrip containing a dielectric substrate, are treated by a modified boundary integral equation method. This method is shown to be successful in reducing the error due to the presence of the singularities.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Design of Cylindrical Dielectric Resonators in Inhomogeneous Media (Corrections)

*R.R. Bonetti. "Design of Cylindrical Dielectric Resonators in Inhomogeneous Media (Corrections)." 1981 Transactions on Microwave Theory and Techniques 29.11 (Nov. 1981 [T-MTT]): 1243-1243.*

In the above-referenced paper, the following corrections should be made.

# Abstracts

## Patent Abstracts (Nov. 1981 [T-MTT])

*"Patent Abstracts (Nov. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.11 (Nov. 1981 [T-MTT]): 1244-1247.*

# Abstracts

## Special Issue on Guided Wave Technology (Announcement) (Nov. 1981 [T-MTT])

*"Special Issue on Guided Wave Technology (Announcement) (Nov. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.11 (Nov. 1981 [T-MTT]): 1248-1248.*

# Abstracts

## Back Cover (Nov. 1981 [T-MTT])

*"Back Cover (Nov. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.11 (Nov. 1981 [T-MTT]): b1-b1.*

# Abstracts

## Front Cover (Dec. 1981 [T-MTT])

*"Front Cover (Dec. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.12 (Dec. 1981 [T-MTT] (1981 Symposium Issue)): fc1-fc2.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Table of Contents (Dec. 1981 [T-MTT])

*"Table of Contents (Dec. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.12 (Dec. 1981 [T-MTT] (1981 Symposium Issue)): 1249-1250.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Editor’s Overview (Dec. 1981 [T-MTT])

*R.L. Eisenhart. "Editor’s Overview (Dec. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.12 (Dec. 1981 [T-MTT] (1981 Symposium Issue)): 1251-1251.*

The beautiful picture on the cover will remind many of us of the setting for the 1981 International Microwave Symposium. Following on the next several pages are a few other bits and pieces of nontechnical information which should jog the memory as well. This Symposium Issue is devoted to recording these events, acknowledging the volunteers, and providing an opportunity for expanded presentation of appropriate Symposium papers.

# Abstracts

## The 1981 MTT-S International Microwave Symposium (Dec. 1981 [T-MTT])

*A. Clavin. "The 1981 MTT-S International Microwave Symposium (Dec. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.12 (Dec. 1981 [T-MTT] (1981 Symposium Issue)): 1252-1258.*

The 1981 International Microwave Symposium, Exhibition, and Workshops were held at the Bonaventure Hotel, Los Angeles, CA, during the week June 15-June 19, 1981. This year the Symposium was held jointly with the IEEE Antennas and Propagation Society (AP-S) and the International Union of Radio Science (URSI). The Symposium continues to grow and this year was no exception. Records were broken in all areas of attendance. The Steering Committee decided to inaugurate a new one day only registration to help reduce costs for local Symposium attendees. Approximately 1500 people registered for MIT-S (including 200 one-day people) with a total joint registra-tion including AP-S and URSI of 2050. Over 1000 people registered for the exhibit only. Workshops registration was 450. Including exhibitors, it was estimated that approximately 4000 Microwave and Antenna people were at the Bonaventure during the week.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## 1980 MTT Awards (Dec. 1981 [T-MTT])

*"1980 MTT Awards (Dec. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.12 (Dec. 1981 [T-MTT] (1981 Symposium Issue)): 1259-1260.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Hybrid Mode Analysis of Microstrip Lines on Anisotropic Substrates (Dec. 1981 [T-MTT])

*A.-M.A. El-Sherbiny. "Hybrid Mode Analysis of Microstrip Lines on Anisotropic Substrates (Dec. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.12 (Dec. 1981 [T-MTT] (1981 Symposium Issue)): 1261-1266.*

A rigorous hybrid mode analysis is applied to microstrip lines on anisotropic substrates to determine its high-frequency performance. The analysis is based on a general formulation of the problem of planar transmission lines on multilayered substrates with uniaxial anisotropy, of which the microstrip line is a special case. Exact solution is obtained using a functional equation technique which was previously developed and applied to microstrip and bilateral finlines. The results were used to check the validity of the concept of equivalent isotropic substrate, suggested by some authors to simplify the calculation of the parameters of these lines. Certain approximations are introduced to allow the efficient calculation of the characteristics of microstrips on anisotropic substrates at relatively high frequencies or for wide strips. Numerical results are given for some values of the parameters of microstrip lines on sapphire and include the regions of excitation of higher modes.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Chip Level IMPATT Combining at 40 GHz (Dec. 1981 [T-MTT])

*C.T. Rucker, J.W. Amoss and G.N. Hill. "Chip Level IMPATT Combining at 40 GHz (Dec. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.12 (Dec. 1981 [T-MTT] (1981 Symposium Issue)): 1266-1271.*

Results with series and series-parallel connections of CW 40-GHz IMPATT diodes on diamond are discussed. The effects of device and circuit losses on the efficiency are treated. Device loss associated with the stabilizing capacitors appears likely as the major factor limiting the combining efficiency. Maximum combining efficiency of 82 percent has been demonstrated for two diodes connected in series. The multichip geometries utilize Raytheon gallium arsenide CW double-drift diode chips and are essentially scaled versions of successful X-band geometries previously reported by the authors.

# Abstracts

## The Effects of High Power Microwave Pulses on Red Blood Cells and the Relationship to Transmembrane Thermal Gradients (Dec.1981 [T-MTT])

*A.W. Friend, Jr., S.L. Gartner, K.R. Foster and H. Howe, Jr.. "The Effects of High Power Microwave Pulses on Red Blood Cells and the Relationship to Transmembrane Thermal Gradients (Dec.1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.12 (Dec. 1981 [T-MTT] (1981 Symposium Issue)): 1271-1277.*

Calculations based on an idealized sphericaf model show that the relaxation times of transmembrane thermal gradients in red blood cells, and cells in general, are much less than 1 µs. Heat cannot be stored across the membrane during microwave pulses and only intense pulses can cause substantial transmembrane temperature gradients. Experiments show no hemolysis in red blood cells exposed in vitro to large microwave pulses with peak SAR's of more than 1 kW/g.

# Abstracts

## Millimeter-Wave Silicon IMPATT Sources and Combiners for the 110-260-GHz Range (Dec. 1981 [T-MTT])

*K. Chang, W.F. Thrower and G.M. Hayashibara. "Millimeter-Wave Silicon IMPATT Sources and Combiners for the 110-260-GHz Range (Dec. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.12 (Dec. 1981 [T-MTT] (1981 Symposium Issue)): 1278-1284.*

This paper reports recent progress in CW and pulsed silicon IMPATT sources in the 110-260-GHz frequency range. Pulsed output power levels of 3, 1.3, and 0.7 W, and CW output power levels of 110, 60, and 25 mW have been consistently achieved from single-drift IMPATT diodes at 140, 170, and 217 GHz, respectively. A Read-type IMPATT diode that generated good output power over a wide frequency range was fabricated. A bridged double-quartz standoff package was developed and successfully used for the entire frequency range. Power combiners at center frequencies of 140 and 217 GHz were developed with peak output power of 9.2 and 1 W, respectively.

# Abstracts

## An Analysis of Minimally Perturbing Temperature Probe and Thermographic Measurements in Microwave Diathermy

*C.U. Hochuli and G. Kantor. "An Analysis of Minimally Perturbing Temperature Probe and Thermographic Measurements in Microwave Diathermy." 1981 Transactions on Microwave Theory and Techniques 29.12 (Dec. 1981 [T-MTT] (1981 Symposium Issue)): 1285-1291.*

Temperature measurements in fat-muscle phantoms using thermography and a minimally perturbing temperature probe were investigated. Two microwave applicators (915- and 2450-MHz) were used to induce the heating in the phantom. Discrepancies between data taken with the thermographic camera versus the probe were measured. These discrepancies were shown to be primarily caused by a 40-s time delay in performing temperature measurements with the thermographic camera, which resulted in additional thermal diffusion in the phantom.

# Abstracts

## A 63-W W-Band Injection-Locked Pulsed Solid-State Transmitter (Dec. 1981 [T-MTT])

*H.-C. Yen and K. Chang. "A 63-W W-Band Injection-Locked Pulsed Solid-State Transmitter (Dec. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.12 (Dec. 1981 [T-MTT] (1981 Symposium Issue)): 1292-1297.*

A high-power three-stage W-band injection-locked pulsed solid-state transmitter using four hybrid-coupled two-diode IMPATT power combiners as the final stage has been developed. Coherent peak output power of 63 W and 92.6 GHz was achieved. The transmitter was operated at 100-ns pulsewidth and 0.5-percent duty cycle. This transmitter development was directed at achieving a high-power output that would be useful for future miltimeter-wave system applications.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## A Study of High Power Pulsed Characteristics of Low-Noise GaAs MESFET's (Dec. 1981 [T-MTT])

*D.S. James and L. Dormer. "A Study of High Power Pulsed Characteristics of Low-Noise GaAs MESFET's (Dec. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.12 (Dec. 1981 [T-MTT] (1981 Symposium Issue)): 1298-1310.*

Low-noise GaAs MESFET's of various types have been investigated for short-term catastrophic burnout ratings when exposed to pulses from an X -band radar transmitter 6 = T/R cell combination. Failure modes have been categorized, and SEM, EDAX and optical techniques employed in the associated failure analyses. A limited number of longer term tests at lower pulse levels are also described. Post-dosage, interpulse RF performance has been studied by use of a special test set described, the initial results obtained are presented.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Horn Image-Guide Leaky-Wave Antenna (Dec. 1981 [T-MTT])

*T.N. Trinh, R. Mittra and R.J. Paleta, Jr.. "Horn Image-Guide Leaky-Wave Antenna (Dec. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.12 (Dec. 1981 [T-MTT] (1981 Symposium Issue)): 1310-1314.*

A novel structure for a frequency-scanning millimeter-wave antenna is described. The antenna is constructed by embedding a dielectric leaky-wave antenna in a long trough with metal flares attached along both sides. The optimum flare angle for achieving maximum gain is theoretically predicted. The design of the leaky-wave antenna, which is comprised of metallic-strip perturbations on top of the dielectric guide, is also discussed.

# Abstracts

## Field Profile in a Single-Mode Curved Dielectric Waveguide of Rectangular Cross Section

*T.N. Trinh and R. Mittra. "Field Profile in a Single-Mode Curved Dielectric Waveguide of Rectangular Cross Section." 1981 Transactions on Microwave Theory and Techniques 29.12 (Dec. 1981 [T-MTT] (1981 Symposium Issue)): 1315-1318.*

An approximate and simple method for predicting the field profile in a curved dielectric waveguide of rectangular cross section is described. For a single-mode propagation, it is shown that the transverse field can be approximated inside the dielectric guide by the Airy function of the first kind and that the radial attenuation constant is a function of the bending radius outside the guide. Experimental verification of the theoretical results is included.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Status of the Microwave Power Transmission Components for the Solar Power Satellite (Dec. 1981 [T-MTT])

*W.C. Brown. "Status of the Microwave Power Transmission Components for the Solar Power Satellite (Dec. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.12 (Dec. 1981 [T-MTT] (1981 Symposium Issue)): 1319-1327.*

During the 1970-1980 time period a substantial advance has heen made in developing all portions of a microwave power transmission system for the solar power satellite (SPS). The most recent advances pertain to the transmitting portion of the system in the satellite and are based upon experimental observations of the use of the magnetron combined with a passive directional device to convert it into a highly efficient directional amplifier with excellent low-noise properties and potentially very long life. The ability of its microwave output to track a phase reference makes it possible to combine it with many other radiating units to provide a highfy coherent microwave beam. The ability of its output to track an amplitude reference while operating from a dc power source with varying voltage makes it possible to eliminate most of the power conditioning equipment that would otherwise be necessary.

# Abstracts

## SAW Oscillators in UHF Transit Satellite Links (Dec. 1981 [T-MTT])

*B.Y. Lao, N.J. Schneier, D.A. Rowe, R.E. Dietterle, J.S. Schoenwald, E.J. Staples and J. Wise. "SAW Oscillators in UHF Transit Satellite Links (Dec. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.12 (Dec. 1981 [T-MTT] (1981 Symposium Issue)): 1327-1333.*

A 375-MHz surface-acoustic-wave (SAW) resonator controlled oscillator was developed for application in the Transit satellite marine navigation system. The SAW oscillator, in a 2-in$^3$ hybrid package, contains a heater, voltage regulator, and divider and is a direct replacement for a bulk wave oscillator and its multiplier chain. A short term stability of 2E - 10 and an aging rate of 3E - 8/day were achieved at 75°C. Comparison tests showed that the accuracy of the navigation system with the SAW oscillator was equivalent to the accuracy using the bulk oscillator.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Analysis of Microstrip Circuits Coupled to Dielectric Resonators

*R.R. Bonetti and A.E. Atia. "Analysis of Microstrip Circuits Coupled to Dielectric Resonators." 1981 Transactions on Microwave Theory and Techniques 29.12 (Dec. 1981 [T-MTT] (1981 Symposium Issue)): 1333-1337.*

A lumped element circuit model is introduced to represent coupling between a cylindrical dielectric resonator and a microstrip line. The external Q of the structure is computed and compared to experimental data obtained with three different resonators.

# Abstracts

## Performance Predictions for Isolators and Differential Phase Shifters for the Near-Millimeter Wave Range

*S.H. Talisa and D.M. Bolle. "Performance Predictions for Isolators and Differential Phase Shifters for the Near-Millimeter Wave Range." 1981 Transactions on Microwave Theory and Techniques 29.12 (Dec. 1981 [T-MTT] (1981 Symposium Issue)): 1338-1343.*

An analytical and numerical study is presented for a five region planar canonical structure modeling quasi-optical integrated surface magnetoplasmon based nonreciprocal devices for the near-millimeter wave range. The model includes a slab of a high quality semiconducting material, such as n-GaAs, magnetized parallel to its surfaces and perpendicular to the direction of propagation. The analysis performed is exact. Sample results show the possibility of acceptable performance for isolators over a bandwidth of 45 GHz in the 500-GHz range and of differential phase shifter design over a bandwidth of 65 GHz in the 380-GHz range.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## A New Fin-Line Ferrite Isolator for Integrated Millimeter-Wave Circuits

*A. Beyer and K. Solbach. "A New Fin-Line Ferrite Isolator for Integrated Millimeter-Wave Circuits." 1981 Transactions on Microwave Theory and Techniques 29.12 (Dec. 1981 [T-MTT] (1981 Symposium Issue)): 1344-1348.*

A ferrite isolator in fin-line technique is investigated both theoretically and experimentally. Since fin-line field distributions exhibit similar properties, the realilzation of a field displacement isolator is possible applying the principles of operation known from metal waveguide isolators. A field expansion method for a simplified isolator model is presented for the investigation of the field theoretical problem. Furthermore the feasibility of the fin-line field displacement approach for the realization of an isolator is demonstrated experimentally at the model frequency of 11 GHz.

# Integrated Circuit Compatible Surface Acoustic Wave Devices on Gallium Arsenide

*T.W. Grudkowski, G.K. Montress, M. Gilden and J.F. Black. "Integrated Circuit Compatible Surface Acoustic Wave Devices on Gallium Arsenide." 1981 Transactions on Microwave Theory and Techniques 29.12 (Dec. 1981 [T-MTT] (1981 Symposium Issue)): 1348-1356.*

Improvements in gallium arsenide materials technology have led to the rapid development of GaAs MIC, CCD, and digital IC technologies in the last several years. In this paper we consider the additional capabilities afforded by the inherent piezoelectric properties of GaAs. The primary emphasis of the work is on surface acoustic wave (SAW) device configurations using MESFET and Schottky-barrier diode fabrication techniques which are compatible with the eventual monolithic integration of electronic devices on the same substrate. The GaAs SAW technology described here provides a means for achieving electronically variable delay, high-Q resonator structures for VHF/UHF oscillator frequency control, and real-time signal processing operations such as convolution and correlation. Prototype device designs and performance are described, includlng two-port GaAs SAW resonators with Q's as large as 13 000 at 118 MHz and a programmable GaAs SAW PSK correlator capable of signal correlation at 10-MHz chip rates. Further GaAs SAW device development required for increasing the operating frequency range to 500 MHz and processing bandwidth to 100 MHz is indicated.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A High-Power Dual Six-Port Automatic Network Analyzer Used in Determining Biological Effects of RF and Microwave Radiation

*C.A. Hoer. "A High-Power Dual Six-Port Automatic Network Analyzer Used in Determining Biological Effects of RF and Microwave Radiation." 1981 Transactions on Microwave Theory and Techniques 29.12 (Dec. 1981 [T-MTT] (1981 Symposium Issue)): 1356-1364.*

The design, calibration, and performance of a high-power (1-1000 W) automatic network analyzer based on the six-port concept are described for the 10-100-MHz range. Calibration is performed with a length of transmission line as the only impedence standard needed. A 10-mW thermistor mount is the standard of power. Imprecision in measuring reflection coefficient Gamma is 0.0001 in magnitude and 0.005/|Gamma| degrees in phase. Corresponding estimated systematic errors are 0.001 and 0.1/|Gamma| degrees. Imprecision in measuring power is 0.01 percent of range (20 W, 200 W, or 1000 W) with an estimated systematic error of 1.25 percent of reading.

# Abstracts

## Propagation Parameters of Coupled Microstrip-Like Transmission Lines for Millimeter-Wave Applications (Dec. 1981 [T-MTT])

*S.K. Koul and B. Bhat. "Propagation Parameters of Coupled Microstrip-Like Transmission Lines for Millimeter-Wave Applications (Dec. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.12 (Dec. 1981 [T-MTT] (1981 Symposium Issue)): 1364-1370.*

A variational expression is derived for the propagation parameters of coupled microstrip-like transmission lines for millimeter-wave applications using the "transverse transmission line" method. Numerical results are presented for the coupled inverted microstrip lines, and for the coupled suspended microstrip lines. The effects of the top and sidewalls and also of the finite thickness of strip conductors on the even- and odd-mode impedances are studied. The use of a dielectric overlay in equalizing the even- and odd-mode phase velocities is investigated.

# Abstracts

## Patent Abstracts (Dec. 1981 [T-MTT])

*"Patent Abstracts (Dec. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.12 (Dec. 1981 [T-MTT] (1981 Symposium Issue)): 1370-1375.*

# Abstracts

## Special Issue on Guided Wave Technology (Announcement) (Dec. 1981 [T-MTT])

*"Special Issue on Guided Wave Technology (Announcement) (Dec. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.12 (Dec. 1981 [T-MTT] (1981 Symposium Issue)): 1376-1376.*

# Abstracts

## Call for Papers - 1982 IEEE Microwave and Millimeter-Wave Monolithic Circuits Symposium (Dec. 1981 [T-MTT])

*"Call for Papers - 1982 IEEE Microwave and Millimeter-Wave Monolithic Circuits Symposium (Dec. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.12 (Dec. 1981 [T-MTT] (1981 Symposium Issue)): 1377-1377.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Index, IEEE Transactions on Microwave Theory and Techniques, Volume MTT-29, 1981

*"Index, IEEE Transactions on Microwave Theory and Techniques, Volume MTT-29, 1981." 1981 Transactions on Microwave Theory and Techniques 29.12 (Dec. 1981 [T-MTT] (1981 Symposium Issue)): i1-i16.*

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Back Cover (Dec. 1981 [T-MTT])

*"Back Cover (Dec. 1981 [T-MTT])." 1981 Transactions on Microwave Theory and Techniques 29.12 (Dec. 1981 [T-MTT] (1981 Symposium Issue)): b1-b2.*

# Abstracts

## Front Cover (1981 [MWSYM])

*"Front Cover (1981 [MWSYM])." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): f1-f1.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Copyright (1981 [MWSYM])

*"Copyright (1981 [MWSYM])." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): i-ii.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Welcome (1981 [MWSYM])

*"Welcome (1981 [MWSYM])." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): iii-iii.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Committees (1981 [MWSYM])

*"Committees (1981 [MWSYM])." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): v-xi.*

# Abstracts

## Awards (1981 [MWSYM])

*"Awards (1981 [MWSYM])." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): xiii-xv.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Technical Program (1981 [MWSYM])

*"Technical Program (1981 [MWSYM])." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): xvi-xxvii.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Session A -- Millimeter Wave Integrated Circuits - Dielectric and Image Guide

*"Session A -- Millimeter Wave Integrated Circuits - Dielectric and Image Guide." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 1-1.*



MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Open Guided Wave Structures for Millimeter-Wave Circuits

*T. Itoh. "Open Guided Wave Structures for Millimeter-Wave Circuits." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 3-4.*

Open guided wave structures for millimeter-wave integrated circuit applications are reviewed. Analytical and design techniques for various functional circuits are discussed. Some of the important problems to be solved are identified.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Directive Planar Excitation of an Image-Guide

*Y. Shih, J. Rivers and T. Itoh. "Directive Planar Excitation of an Image-Guide." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 5-7.*

An image-guide is excited by a Slot Yagi-Uda array created in the ground plane so that the majority of the energy travels in a specified direction. The method is useful for implementing planar devices for image-guide structures.

# Abstracts

## Slots as New Circuit-Elements in Dielectric Image Line

*K. Solbach and I. Wolff. "Slots as New Circuit-Elements in Dielectric Image Line." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 8-10.*

Slots in the ground plane of dielectric image lines are investigated as new circuit elements. This configuration has attrated attention for two applications: The dielectric image line above the slot can be designed to act as a shielding, thus reducing radiation losses if a diode is mounted above the slot e.g. in a detector- or mixer-circuit. On the other hand, similar to slots in metal waveguides, slots in the ground plane of dielectric image lines can be designed for antenna applications and even for nonradiating filter-structures.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Coupler Design in Open Dielectric Waveguide with Web Registration

*G.M. Lindgren. "Coupler Design in Open Dielectric Waveguide with Web Registration." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 11-13.*

The design and evaluation of an open dielectric waveguide 3 dB coupler with web registration is described. The design includes the selection of waveguide permittivity, size and shape. This design achieved 3 percent bandwidth with 0.7 dB insertion loss, and greater than 22 dB isolation.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Mode Conversion Effects in Bragg Reflection from Periodic Grooves in Rectangular Dielectric Image Guide

*M.J. Shiau, H. Shigesawa, S.T. Peng and A.A. Oliner. "Mode Conversion Effects in Bragg Reflection from Periodic Grooves in Rectangular Dielectric Image Guide." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 14-16.*

Periodic gratings on rectangular dielectric image guide operating in their first stop bands [Bragg reflection) have been proposed as millimeter-wave filter components which produce strong reflections with negligible radiation. We show that mode conversion effects occur which produce additional stop bands that may affect device performance.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Field Profile in a Single-Mode Curved Dielectric Waveguide

*T.N. Trinh and R. Mittra. "Field Profile in a Single-Mode Curved Dielectric Waveguide." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 17-19.*

An approximate and simple method for predicting the field profile in a curved dielectric waveguide is described. It is shown that the field can be approximated inside the dielectric guide by the Airy function of the first kind and that the field decay coefficient assumes an integral form outside the guide. Experimental verification of the theoretical results is included.

# Abstracts

## Horn Image Guide Leaky-Wave Antenna (1981 [MWSYM])

*T.N. Trinh, R. Mittra and R.J. Paleta, Jr.. "Horn Image Guide Leaky-Wave Antenna (1981 [MWSYM])." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 20-22.*

A novel approach for designing a frequency-scanning millimeter-wave antenna is described. The antenna is constructed by using an image wide leaky-wave antenna embedded in a long trough with metal flares along both sides. The optimum flare angle for achieving maximum gain is theoretically predicted. The design of the leaky-wave antenna, which is comprised of metallic-strip perturbations on top of a dielectric guide, is also discussed.

# Abstracts

## Session B -- Microwave FET Devices

*"Session B -- Microwave FET Devices." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 23-23.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Sub-Half-Micron GaAs FETs for Applications Through K Band

*C. Huang, A. Herbig and R. Anderson. "Sub-Half-Micron GaAs FETs for Applications Through K Band." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 25-27.*

Sub-half-micron gate GaAs FETs fabricated on high quality VPE buffer material have achieved state-of-the-art low noise performances. Best noise figures of 0.58 dB at 4 GHz and 1.29 dB at 12 GHz have been observed. Power added efficiency of 35% at Ku band is also reported.

# Abstracts

## K-Band Power GaAs FETs

*L.S. Rosenheck, D. Herstein and I. Drukier. "K-Band Power GaAs FETs." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 28-30.*

This paper will report on the structure and performance of GaAs FETs developed for K-band applications. A power output of 27dBm was obtained with 5dB gain at 21GHz. A novel low loss waveguide to microstrip transition was used in the measurement. Its design will be described.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## 2-18 GHz, High-Efficiency, Medium-Power GaAs FET Amplifiers

*H.Q. Tserng, S.R. Nelson and H.M. Macksey. "2-18 GHz, High-Efficiency, Medium-Power GaAs FET Amplifiers." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 31-33.*

A GaAs FET amplifier using a 600 µm gate width device has achieved ~ 300 mW output with 20-25% power-added efficiency across 2 to 18 GHz. With a 1350 µm FET, 0.5 W output power was obtained from 7 to 16.5 GHz. Extending its large-signal performance to 2 GHz appears feasible.

# Abstracts

## Plated Source Bridge (PSB) GaAs Power FET with Improved Reliability

*T. Suzuki, M. Kobiki, M. Wataze, K. Segawa and M. Irie. "Plated Source Bridge (PSB) GaAs Power FET with Improved Reliability." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 34-36.*

Flip chip type GaAs power FET having a plated source bridge (PSB) structure has been developed. Thermal resistance is improved by 2° C/W for a device with total gate width of 2400µ. This improvement results in 2 times increase of the device MTTF. At the channel temperature of 150°C, MTTF more than 10 /sup 7/ hours is estimated by accelerated operation life tests.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Silicon-On-Sapphire (SOS) Monolithic Transceiver Module Components for L- and S-Band

*D. Laighton, J. Sasonoff and J. Selin. "Silicon-On-Sapphire (SOS) Monolithic Transceiver Module Components for L- and S-Band." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 37-39.*

Phase-shifter and power amplifier functional sub-assemblies have been built using monolithic circuit techniques. Silicon-on-sapphire (S0S) material is used with active devices made directly in the silicon epi layer, with lumped thin-film components used as passive elements.

# Abstracts

## Optical Tuning in GaAs MESFET Oscillators

*H.J. Sun, R.J. Gutmann and J.M. Borrego. "Optical Tuning in GaAs MESFET Oscillators." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 40-42.*

Optical tuning in GaAs MESFET oscillators indicate that the tuning range is an order of magnitude greater in common-source and common-gate mode oscillators compared to common-drain mode circuits. Tuning ranges of 2 to 3% at C and X band have been demonstrated with an incandescent source illumination intensity of approximately 1mW/mm/sup2/. The optical tuning sensitivity is attributed to C/sub gs/ variations with light, resulting from an increase in the effective space charge density in the gate depletion layer (attributed to hole trapping). Analysis of the oscillator starting condition for the three oscillator circuits is in qualitative agreement with the measured frequency sensitivity, using C/sub gs/ variations with light measured at 1MHz.

# Abstracts

## A Microwave Model for the Dual-Gate GaAs MESFET

*G.S.F. Mau. "A Microwave Model for the Dual-Gate GaAs MESFET." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 43-45.*

A simplified dual-gate GaAs FET microwave model consisting of a cascode connection of single-gate FET's is developed, tested for validity, and discussed herein. Computer generated S-parameters of the model are compared to those measured for an actual device in the 2 to 9 GHz frequency range.

# Abstracts

## Ion-Implanted K-Band GaAs Power FET

*G.C. Taylor, S.G. Liu and D. Bechtle. "Ion-Implanted K-Band GaAs Power FET." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 46-48.*

This paper reports the performance up to 26 GHz from a GaAs power FET produced by ion implantation. At 15 GHz, an output power of 250 mW at 3 dB gain with 27.4% power-added efficiency was obtained. At 26 GHz, 55 mW at 3 dB gain with 5% power-added efficiency was demonstrated. Capless annealing and a novel lift-off gate fabrication scheme was employed.

# Abstracts

## Session C -- Computer Aided Design and Measurements

*"Session C -- Computer Aided Design and Measurements." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 49-49.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Computer-Aided Design for the 1980's

*L. Besser, C. Holmes, M. Ball, M. Medley and S. March. "Computer-Aided Design for the 1980's." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 51-53.*

This paper describes a new, third generation computer program called SUPER-COMPACT, that opens a new era in automated microwave circuit design. Although the program is moderately large (approximately 50,000 FORTRAN statements), it can be run efficiently on midi-computers, as well as on most of the large-scale computer systems. The program combines analysis, optimization, and synthesis with interactive graphics for maximum user convenience and efficiency. Databanks, which provide scattering and noise parameters for transistors, dielectric information for substrate materials, and a library of available circuit topologies are integral to the program. While SUPER-COMPACT retains all of the previous capabilities of its first and second generation predecessors, it uses a completely new approach to analyze and optimize microwave circuits. The program utilizes a novel interconnection scheme based upon scattering parameters without requiring the manipulation of large matrices. Both the inputting and outputting of data are handled through interactive graphic terminals.

# Abstracts

## Computer-Aided Design of Microstrip Couplers with Accurate Discontinuity Models

*E. Hammerstad. "Computer-Aided Design of Microstrip Couplers with Accurate Discontinuity Models." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 54-56.*

Accurate and simple models are presented for the microstrip open end, the gap, the compensated right-angle bend, and the T-junction, both symmetric and non-symmetric. Their importance in computer-aided design is illustrated with a computer program optimizing the physical lay-out of microstrip branch-guide couplers.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Microwave Filter Design in the Time Domain

*N.I. Sobhy and E.A. Hosny. "Microwave Filter Design in the Time Domain." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 57-59.*

Commensurate transmission-line networks are designed in the time domain using state-space techniques with no restrictions on the network topology. Computer-aided procedures are used to optimise the time domain responses. Several examples are given of microwave networks designed using this technique.

# Abstracts

## Microwave Analysis Using Time-Domain Plots Created from Frequency-Domain Reflections

*H.E. Stinehelfer, Jr. and H.E. Stinehelfer, Sr.. "Microwave Analysis Using Time-Domain Plots Created from Frequency-Domain Reflections." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 60-62.*

Using reflection data, an oscillographic display is created to separate parasitic inductive parameters at junctions from impedance changes. The reactance and resistive changes occurring at the same point in time are separated using subtraction techniques.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## An Interactive Optimal Postproduction Tuning Technique Utilizing Simulated Sensitivities and Response Measurements

*J.W. Bandler, M.R.M. Rizk and A.E. Salama. "An Interactive Optimal Postproduction Tuning Technique Utilizing Simulated Sensitivities and Response Measurements." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 63-65.*

An interactive postproduction tuning technique is presented. The technique uses linear programming iteratively for estimating necessary tuning amounts. It is completely general and is applicable to reversible and irreversible tuning processes. By eliminating completely the common trial and error approach it optimally exploits network response measurements.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## A Novel Harmonic Balancing Bridge for Characterizing Microwave Modules for Phased Array Antenna Service

*D.W. Griffin. "A Novel Harmonic Balancing Bridge for Characterizing Microwave Modules for Phased Array Antenna Service." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 66-68.*

A novel microwave bridge incorporating fundamental and harmonic balancing has been developed for measuring amplitude and phase characteristics of items, such as phased array antenna amplifiers, that exhibit small but significant nonlinear behaviour. Measured characteristics relate to the output traveling waves from the item which may, however, be terminated in any safe load. Successful bridge design and operation in a fundamental range of 2 to 4 GHz, a second harmonic range 4 to 8 GHz and a third harmonic range 6 to 12 GHz has been achieved. Sensitivity and resolution are such that it is possible to differentiate between leading and trailing edge phase characteristics of pulse operated microwave amplifiers. Results obtained with various load impedances can be used to plot equi-amplitude and equi-phase contours on a Smith chart at fundamental and harmonic frequencies.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## A Dual Four-Port for Automatic Network Analysis

*H.G. Oltman and H.A. Leach. "A Dual Four-Port for Automatic Network Analysis." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 69-72.*

The concept, hardware, software, calibration and preliminary performance of a dual four-port automatic network analyzer is described.

# Abstracts

## Session D -- Latin American Session

*"Session D -- Latin American Session." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 73-73.*

Contents
Publications
Issues
Papers
Authors

Click on title for a complete paper.

# Abstracts

## Finite-Difference Method for the Arbitrary Cross-Section Waveguide Problem Using the Best-Fit Boundary Approximation

*P. Rozenfeld, L.A.C. Mello and A.B. Filho. "Finite-Difference Method for the Arbitrary Cross-Section Waveguide Problem Using the Best-Fit Boundary Approximation." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 75-76.*

The finite-difference method is a numerical technique which accuracy strongly depends on the precision of the reconstruction of the boundary of a waveguide. Usually the figure is reconstructed either by an outside or an inside approximation, or by using a much more complex method of unequal-arm finite-difference operator. This paper describes a computer program which maintains the simplicity of the usual finite-difference method and which uses the best-fit approximation to the cross-section of a waveguide. As a result a better precision is obtained and smaller computer time is used in the solution of the dominant mode of the hollow homogeneous waveguide problem. Computed values of the cutoff frequencies for several waveguides are presented.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## A Model of the Coupling Between Posts in Waveguides Using Equivalent Transmission Lines

*E. Acosta C. and H.O. Nava J.. "A Model of the Coupling Between Posts in Waveguides Using Equivalent Transmission Lines." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 77-79.*

In this paper we show that the model for the coupling between posts in waveguides orignally proposed by Joshi and Cornick, has an equivalent version that uses transmission lines for each mode pair. With this model, the problem is solved based on traveling waves and may be useful for the solution of problems with multiple posts without the necessity of having to obtain a Green's function that would include all boundaries. We also show that we may reduce by one half the number of terms of the expansion of the current density induced in the post, as suggested by Eisenhart and Khan.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Slotline-Microstrip Transition on Iso/Anisotropic Substrate: Broadband Design

*A. Podcameni and M.L. Coimbra. "Slotline-Microstrip Transition on Iso/Anisotropic Substrate: Broadband Design." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 80-82.*

The two-stub transition design is analysed on isotropic and anisotropic substrates. Broadband design is made by optimizing the slotline and the stub lengths. Sensibility analysis of the behaviour of the whole structure with these parameters shows the slotline length and impedance to be the dominant factors. An extended-octave design can easily be achieved, with VWSR less than 1.5, for double-transitions.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Analysis of Single and Coupled Striplines with Anisotropic Substrates

*A.G. D'Assuncao, A.J. Giarola and D.A. Rogers. "Analysis of Single and Coupled Striplines with Anisotropic Substrates." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 83-85.*

The characteristic impedances and the normalized phase velocities of single and parallel-coupled striplines using anisotropic substrates were obtained by means of an integral-equation approach and a mapping method. A quasi-TEM approximation based on Laplace's equation was used. Calculated values for sapphire and pyrolytic boron nitride are given.

# Abstracts

## A New Method of Pulse Dispersion Analysis for Simple-Mode Optical Fibers

*P.S.M. Pires, D.A. Rogers, E.J. Bochove and R.F. Souza. "A New Method of Pulse Dispersion Analysis for Simple-Mode Optical Fibers." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 86-88.*

Numerical methods of differentiation and interpolation were used to develop a method for the analysis of pulse dispersion in single-mode optical fibers based on solutions of the exact characteristic equation. Exact formulas for the necessary parameters are developed up to the point were computational procedures were recommended due to analytical complexity. Curves showing comparisons between our method and those showing the best asymptotic approaches are presented. This method permits greater precision in prediction of the ideal laser wavelength for use with a given single-mode optical fiber.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## A Resonator Method for Permittivity Measurements

*A.O.M. Andrade, J.J. Senise and S.S. Stuchly. "A Resonator Method for Permittivity Measurements." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 89-89.*

Text of paper not available at time of publication.

# Abstracts

## Microwave Modelling of H. F. Antennas Over Lossy Earth

*J.H. Benjamin and G.G. Gerardo. "Microwave Modelling of H. F. Antennas Over Lossy Earth." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 90-92.*

The dielectric constant and loss tangent values of several mixtures of sand, water and salt are measured at 9.3 GHz, in order to investigate the feasibility of microwave modelling of H.F. antennas which operate over imperfectly conducting ground. A particular mixture is used for modelling a monopole antenna over a circular metal disk which is lying on a lossy half-space. Good agreement between theoretical and experimental results is obtained for both input impedance and radiation pattern as a function of the radius of the ground system.

# Abstracts

## The Development of Microwave Components for Earth Station Receiver

*J.K.C. Pinto, E. Camargo, M.A. Luqueze, F.S. Correra, C.A. Finardi and E.I. Ynoue. "The Development of Microwave Components for Earth Station Receiver." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 93-95.*

This paper outlines the Microwave Group activities at the Microelectronics Laboratory (LME-University of Sao Paulo) the development of microwave devices for a Satelite Earth Station Receiver over the 3.7 to 4.2 GHz band.

Click on title for a complete paper.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Session E -- Millimeter Wave Integrated Circuits - Printed Circuits

*"Session E -- Millimeter Wave Integrated Circuits - Printed Circuits." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 97-97.*

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Shielded Microstrip: Transmission Media for MM-Wave Integrated Circuits

*M. Dydyk. "Shielded Microstrip: Transmission Media for MM-Wave Integrated Circuits." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 99-101.*

This paper will address the use of thin, flexible and low relative dielectric constant material as substrate material for shielded microstrip to realize cost effective millimeter wave integrated circuits. W-band experimental results will be reported on many of the necessary transfer functions needed for system applications.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Empirical Analytical Expressions for Fin Line Design

*A.K. Sharma and W.J.R. Hoefer. "Empirical Analytical Expressions for Fin Line Design." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 102-104.*

This paper presents empirical expressions in closed form for the design of unilateral and bilateral fin lines. The guided wavelength and the characteristic impedance calculated with these expressions are accurate within typically ± 2 percent of the values obtained using the spectral domain technique in the normalized frequency range: 0.35 <= b/lambda <= 0.70.

# Abstracts

## Experimental Assessment of Bilateral Fin-Line Impedance for Device Matching

*H.A. Willing and B.E. Spielman. "Experimental Assessment of Bilateral Fin-Line Impedance for Device Matching." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 105-107.*

This paper describes the results of an experimental investigation of bilateral fin-line impedance characteristics for matching to small-chip devices. The results from two different experimental approaches are presented and compared with computed results.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Experimental Characterization of Fin Line Discontinuities Using Resonant Techniques

*E. Pic and W.J.R. Hoefer. "Experimental Characterization of Fin Line Discontinuities Using Resonant Techniques." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 108-110.*

The equivalent circuit parameters of inductive strips and of impedance steps in unilateral fin line are presented. They have been obtained from the measured resonant frequencies of a rectangular cavity containing these circuit elements.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A Broad-Band, Low-Noise Receiver at W-Band

*C.P. Hu and A. Denning. "A Broad-Band, Low-Noise Receiver at W-Band." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 111-113.*

This paper describes a W-band, fixed tuned receiver that achieves double side-band noise figure less than 5.5 dB over 10 GHz bandwidth for both LO and RF ports. This low DSB noise figure includes a 1.6 dB contribution from an amplifier with 1000 MHz bandwidth. Only three milliwatts of LO power, obtained through a broadband frequency doubler, are required for receiver's optimum performance without biasing the mixer diodes.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Millimeter-Wave Planar Slot Antennas with Dielectric Feeds

*P. Yen, J.A. Paul and T. Itoh. "Millimeter-Wave Planar Slot Antennas with Dielectric Feeds." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 114-116.*

Measurements have been made on various antenna configurations suitable for monolithic integration at millimeter-wave frequencies. The basic structure consists of a single slot dipole radiator etched on a dielectric substrate and combined with a beam lead detector diode. Enhancement of the antenna directivity has been achieved through the use of dielectric rods oriented over the slot area. Addition of these rods has improved directivity up to 10 dB at 60 GHz.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## 94 GHz Subharmonic Mixer Using Beam Lead Diodes

*J.A. Paul and P. Yen. "94 GHz Subharmonic Mixer Using Beam Lead Diodes." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 117-119.*

As part of a diode and mixer development effort, a low cost subharmonically pumped millimeter-wave mixer design using GaAs beam lead diodes has been developed. It adopts a configuration which incorporates both waveguide and suspended stripline using a low cost Duroid substrate. A DSB noise figure of 8.5 dB has been achieved-using a 47 GHz Gunn local oscillator and 5- to 500-MHz IF amplifier with a 1.5-dB noise figure.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Session F -- FET Applications

*"Session F -- FET Applications." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 121-121.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## 4-8 GHz High Power Cascadable Packaged GaAs FET Amplifier

*S. Yamamura, M. Shigaki, N. Hidaka, H. Ishikawa, M. Takase and M. Fukuta. "4-8 GHz High Power Cascadable Packaged GaAs FET Amplifier." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 123-125.*

A 4-8 GHz 1 W GaAs FET amplifier module in a 6 x 16 x 3.5 mm ceramic package with 6 terminals has been developed. The modules can be directly cascaded quite easily since they have standardized interfaces.

# Abstracts

## Broadband Lumped-Element GaAs FET Power Amplifiers

*R.L. Camisa, J.B. Klatskin and A. Mikelsons. "Broadband Lumped-Element GaAs FET Power Amplifiers." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 126-128.*

Very small (1.5 mm x 2.25 mm) lumped-element matched amplifiers have been developed which cover the 6-12 GHz with 0.3 W and 0.6 W minimum output power levels. Using these matched carriers as building blocks, a 1 W, 7-12 GHz, four-stage amplifier has been demonstrated.

# Abstracts

## A 4.5 W, 26 dB Gain FET Power Amplifier at Ku-Band

*V. Sokolov and R.C. Bennett. "A 4.5 W, 26 dB Gain FET Power Amplifier at Ku-Band." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 129-131.*

Recent results are presented in the development of multi-stage GaAs FET power amplifiers operating in the 12 to 16 GHz frequency band. Microstrip circuit level power combining is used to achieve 4.5 W output power with 26 dB gain at 13.3 GHz with an efficiency of 15.8%, and a 1 dB bandwidth of 1.7 GHz.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Compact Multi-Stage Single-Ended Amplifiers for S-C Band Operation

*K.B. Niclas. "Compact Multi-Stage Single-Ended Amplifiers for S-C Band Operation." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 132-134.*

Design and fabrication of compact multi-stage single-ended feedback amplifiers operating from 2- 8 GHz are discussed. The nominal gains are 22 dB in the three-stage unit and 30 dB in the four-stage unit. Measured maximum VSWR's do not exceed 1.9:1. Noise figures, although not optimized, were below 7.6 dB and 8.4 dB, respectively.

Click on title for a complete paper.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## A Power FET Octave Bandwidth Traveling Wave Combiner Amplifier

*D. Kaminsky, A.G. Bert and A. Dottin. "A Power FET Octave Bandwidth Traveling Wave Combiner Amplifier." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 135-137.*

Theoretical and experimental performances of the traveling wave divider/combiner were presented at the 1980 MTT Symposium. Its application as a combiner circuit for wide bandwidth power amplifiers is experimented, resulting in a small dimensions, planar 2-stage 9 dB gain, 1.5 watts, 6-12 GHz MIC amplifier.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Wideband Cavity Tuned GaAs FET Oscillator

*R. Joly, W.W. Heinz and E.G. Cristal. "Wideband Cavity Tuned GaAs FET Oscillator." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 138-140.*

The design and performance of a cavity tuned GaAs FET oscillator operating from 5.35 to 12.75 GHz with FM capability is described. Experimental data of power, FM frequency response, FM linearity, and SSB phase noise are presented.

# Abstracts

## Decade Bandwidth FET Functions

*J. Obregon, Y. Le Tron, R. Funck and S. Barvet. "Decade Bandwidth FET Functions." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 141-142.*

Decade bandwidth FET functions have been designed, using an analytical approach followed by a computer optimization. Two experimental functions have been built using commercially available FETs.

# Abstracts

## Balanced Dual Gate GaAs FET Frequency Doublers

*R. Stancliff. "Balanced Dual Gate GaAs FET Frequency Doublers." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 143-145.*

A new technique for broadband microwave power generation is presented: The balanced dual gate MESFET frequency doubler. Design and results for 18-26.5 GHz and 4-23 GHz doublers are presented.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Session G1 -- The Six-Port and Its Applications

*"Session G1 -- The Six-Port and Its Applications." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 147-147.*

# Abstracts

## Singularities in the Calibration of Six-Port Network Analyzers

*H.F. Ebbeson and G.F. Engen. "Singularities in the Calibration of Six-Port Network Analyzers." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 149-150.*

Numerical difficulties may be encountered when applying the TRL calibration algorithm to dual six-port analyzers. The possible occurrence of singularities is explained, and means of avoiding these are proposed.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## The Use of a Matched Symmetrical Five-Port Junction to Make Six-Port Measurements

*G.P. Riblet and E.R.B. Hansson. "The Use of a Matched Symmetrical Five-Port Junction to Make Six-Port Measurements." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 151-153.*

A new configuration for six-port measurements is proposed. It consists of a symmetrical five-port junction and a directional coupler. Assuming the components to be ideal, it is shown that the proposed six-port has optimal properties for accurate determination of complex reflection coefficients. An experimental coaxial five-port junction has been designed and used in a six-port measurement system. After calibration, using five impedance standards, measurements on precision loads indicate good measurement accuracy over the frequency band where the five-port is well matched.

# Abstracts

## A Broad Band Stripline or Coaxial 'Resolver' for the Accurate Measurement of Complex Reflection Coefficients Using the 6 Port Measurement Concept

*G.P. Riblet. "A Broad Band Stripline or Coaxial 'Resolver' for the Accurate Measurement of Complex Reflection Coefficients Using the 6 Port Measurement Concept." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 154-156.*

A broad band stripline or coaxial network is described which allows for the accurate determination of complex reflection coefficients over multi-octave bandwidths from the measurement of two referenced power levels.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A High-Power Dual Six-Port Automatic Network Analyzer for Determining Biological Effects of RF and Microwave Radiation

*C.A. Hoer. "A High-Power Dual Six-Port Automatic Network Analyzer for Determining Biological Effects of RF and Microwave Radiation." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 157-159.*

The design, calibration and performance of a high-power (1 to 1000W) automatic network analyzer based on the six-port concept are described for the 10 to 100 MHz range. Imprecision in measuring reflection coefficient Gamma is 0.0001 in magnitude and 0.005/ |Gamma| degrees in phase. Corresponding estimated systematic errors are 0.001 and 0.1/ |Gamma| degrees. Imprecision in measuring power is 0. 01% of range (20W, 200W, or 1000W) with an estimated systematic error of 1.25% of reading.

# Abstracts

## Session G2 -- Dielectric Resonators

*"Session G2 -- Dielectric Resonators." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 161-161.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## TM/sub 01p/ Tubular and Cylindrical Dielectric Resonator Mode

*P. Guillon, J.P. Balabaud and Y. Garault. "TM/sub 01p/ Tubular and Cylindrical Dielectric Resonator Mode." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 163-166.*

The electric dipole resonance of a cylindrical and a tubular dielectric resonator is investigated. Data are given about the resonant frequencies and the structure of the field surrounding the resonator. The data agree well with experimental results.

# Abstracts

## Coupling of Cylindrical Dielectric Resonators to Microstrip Lines

*R. Bonetti and A. Atia. "Coupling of Cylindrical Dielectric Resonators to Microstrip Lines." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 167-169.*

A lumped element circuit model is introduced to represent coupling between a cylindrical dielectric resonator and a microstrip line. The external Q of the structure is computed and compared to experimental data obtained with three different resonators.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## A Dielectric Resonator Bandstop Filter

*P. Guillon, S. Mekerta and Y. Garault. "A Dielectric Resonator Bandstop Filter." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 170-173.*

This paper presents a new analysis predicting accurately the external quality factor and scattering matrix parameters S/sub ij/ of the TE/sub 01p/ cylindrical resonator mode, coupled with a microstrip line for arbitrary locations of the resonator and the line, The results obtained are used to realize a Tchebyscheff bandstop filter. Experimental and theoretical results are also included.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Session H -- Japanese Session

*"Session H -- Japanese Session." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 175-175.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Progress of Microwave Semiconductor Devices in Japan

*K. Sekido. "Progress of Microwave Semiconductor Devices in Japan." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 177-178.*

This paper reviews recent progress and development status of microwave semiconductor devices in Japan. Since in Japan, major development efforts have been concentrated to the GaAs MESFET devices developments, the paper provides particular emphasis to the introduction of GaAs MESFET device progress in Japan. Progress status in other semiconductor device area is also reviewed briefly.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Millimeterwave Integrated Circuits

*H. Komizo and Y. Tokumitsu. "Millimeterwave Integrated Circuits." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 179-181.*

This paper describes a compact, low cost 50 GHz-band integrated doppler radar module for an automobile ground speed sensor in which a copper embedded Fine Grained Alumina (FGA) substrate is successfully used for good heat-sinking and grounding. Results of an initial study on oscillator stabilization by a dielectric resonator in the millimeterwave region is also described.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Advanced RF Circuit Miniaturization for 800 MHz Land Mobile Radio Unit

*S. Seki, N. Kanmuri and S. Yuki. "Advanced RF Circuit Miniaturization for 800 MHz Land Mobile Radio Unit." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 182-184.*

Advanced RF circuits for a mobile radio unit are presented. A new compact mobile radio unit has been successfully developed having an 800MHz frequency synthesizer, a thick-film MIC up to 900MHz frequency region and a SAW device. The size and weight of this unit are 1,500 $cm^3$ and 2.4 kg. Respectively, and it possesses 1,000 radio channels.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Miniaturized Diplexer for Land Mobile Communication Using High Dielectric Ceramics

*K. Wakino, T. Nishikawa and Y. Ishikawa. "Miniaturized Diplexer for Land Mobile Communication Using High Dielectric Ceramics." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 185-187.*

Miniaturized Diplexer for 800 MHz land mobile communication system has been developed using dielectric quarter wavelength resonator having high permittivity of 37 and 90. The physical volume of diplexer is about 48 cc. The Spurious responses of quarter wavelength resonator were shifted to the higher frequencies by stepping the effective permittivity of the resonator material.

# Abstracts

## Very Low Power Gigabit Logic Circuits with Enhancement-Mode GaAs MESFETs

*M. Ohmori, T. Mizutani and N. Kato. "Very Low Power Gigabit Logic Circuits with Enhancement-Mode GaAs MESFETs." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 188-190.*

Ultra high-speed enhemcement-mode GaAs MESFET integrated circuits, 0.6 µm in gate length, were fabricated using electron beam direct writing and employing recessed gate structure. The minimum delay time was 28.7 ps per gate with 2.3 mW power dissipation. At liquid nitrogen temperature, 77 K, the delay time was reduced to 17.5 ps with 9.2 mW power dissipation. A divide-by-eight counter was successfully demonstrated at 3.8 GHz with a power consumption of 23.6 mW per chip or 1.2 mW per gate.

# Abstracts

## CH/sub 3/F Submillimeter Laser Using New Type of Resonator

*Y. Kokubo and M. Kawamura. "CH/sub 3/F Submillimeter Laser Using New Type of Resonator." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 191-193.*

A new type of resonator consisting of two metallic circular disks and a cylinder was applied as a guided cavity to the CH/sub 3/F laser with successful operation.

# Abstracts

## Recent Development on Fiber Optic Devices

*K. Shirahata, W. Susaki and H. Namizaki. "Recent Development on Fiber Optic Devices." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 194-197.*

The advent of the fundamental transverse mode laser diodes and low loss optical fibers has extended the wavelength range for communication systems into the optical spectrum region. The indispensable elements for the optical communication systems are oscillator, transmission medium, and detector. Recent development in this area, with particular emphasis on the fundamental transverse mode laser diode and low loss quartz optical fiber, is reviewed.

# Abstracts

## Optical Fiber Communication Systems in Japan

*S. Shimada and M. Koyama. "Optical Fiber Communication Systems in Japan." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 198-200.*

A dream of telecommunication engineers has long been a development of practical transmission media for large capacity transmission systems. In accordance with various microwave and millimeter-wave technologies, coaxial, rectangular and circular waveguides were extensively studied for baseband signal through millimeterwave signal transmission. The research on optical fibers was motivated by this background with a more ambitious program of attempting to use the entire electromagnetic spectrum for communication. The invention of the laser stimulated the development of optical fibers.

# Abstracts

## Session I -- Passive Components and Networks

*"Session I -- Passive Components and Networks." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 201-201.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Problems in Microstrip Filter Design

*R.J. Wenzel and W.G. Erlinger. "Problems in Microstrip Filter Design." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 203-205.*

Accurate microstrip filter design is complicated by the presence of parasitic elements, physical constraints, and the inhomogeneous nature of the medium. This paper describes the design problem, surveys commonly used design methods, and shows typical errors obained using these design approaches. A computer-aided design procedure is then described that yields precise bandwidth with exact equal ripple passband response.

# Abstracts

## Design of Filters with Ideal Amplitude and Any Prescribed Phase

*S.A. Mohammed. "Design of Filters with Ideal Amplitude and Any Prescribed Phase." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 206-208.*

The transfer function of a lowpass non-minimum-phase network with characteristics approximating a constant passband amplitude and any prescribed phase can be expressed in a closed form. This procedure can be used to approximate pre-distorted lowpass characteristics such that application of non-linear frequency transformation produces the desired bandpass ones. Network synthesis leads to a lowpass cross-coupled structure with diagonal cross-couplings. The method is used to design a six-cavity waveguide filter with linear phase characteristic.

# Abstracts

## Miniaturized Microwave Filter Construction with Dielectric-Loaded Resonator and Space Coupling

*A. Fukasawa, T. Sato and K. Hosoda. "Miniaturized Microwave Filter Construction with Dielectric-Loaded Resonator and Space Coupling." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 209-211.*

A new filter construction is proposed in this paper to realize a highly miniaturized microwave band-pass filter. An element of resonator filter is composed of a square dielectric post and a round inner conductor. Each element of resonator is allocated in a housing similar to conventional combline filter, however, the length of a resonator is basically a quarter-wavelength long. The higher unloaded Q and a larger inter-resonator coupling were brought through two factors: open-boundary condition on the periphery along the dielectric post and the air spacing between resonators. Five-stages Tschebyshev response band-pass filters were developed at 800 MHz band to have 20~30 MHz pass-band and 0.8~1.0 dB insertion loss at the temperature range: -35~+80°C, The volume and the weight of the filters are about 25 $cm^3$ and 60 gramms.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## A New Diplexer - Realized in Stripline

*I. Galin. "A New Diplexer - Realized in Stripline." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 212-214.*

Diplexers usually have a three-way common junction whose rather complex discontinuity imposes severe restrictions on attempts to control the different impedances presented by channels of different frequency. A new type of stripline diplexer has been developed that employs series-connected distributed elements emerging from its common junction to yield a compact structure free of these discontinuity problems. The concept was implemented in a printed-circuit diplexer built as part of a C-band varactor-tripler circuit, and was verified by test.

# Abstracts

## Contiguous Broadband Matching of Multiple Resonant Loads

*J.D. Rhodes and M.J. Thornton. "Contiguous Broadband Matching of Multiple Resonant Loads." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 215-217.*

The design theory for combining a number of loaded resonators to yield a prescribed return loss characteristic is presented with explicit formulae for the maximally flat case. Prototype element values are given for the equiripple case and the design of a broadband multi-channel frequency discriminator is used to demonstrate an application. Other applications include antenna arrays and broadband microwave amplifiers.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Inhomogeneous Broadside-Coupled Striplines

*A.G. D'Assuncao, A.J. Giarola and D.A. Rogers. "Inhomogeneous Broadside-Coupled Striplines." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 218-220.*

The integral-equation method was used in the analysis of inhomogeneous broadside-coupled striplines. The method is general and may also account for dielectric anisotropy. Curves to characterize suspended broadside-coupled microstrip lines with isotropic and anisotropic substrates are shown as examples.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Rectangular, Coaxial-Line, Split-Tee Power Dividers

*L.H. Yorinks. "Rectangular, Coaxial-Line, Split-Tee Power Dividers." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 221-222.*

This paper describes a family of high power, low VSWR, S-band split-tee power dividers with coupling values from 3 dB to 5 dB. The power dividers use rectangular coaxial transmission line and employ a unique self-compensated isolation resistor.

# Abstracts

## New Differential Phase Shift Networks Combining All-Pass and Band-Pass Elements

*J.K. Hunton. "New Differential Phase Shift Networks Combining All-Pass and Band-Pass Elements." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 223-225.*

Networks capable of producing differential phase shifts of any value up to 180° with bandwidths as large as 3:1 have been investigated by using computer optimization techniques. A new class of networks that combine band-pass (lines and stubs in ladder form) and all-pass (C-sections) has evolved with performance comparable to that of the cascaded C-section networks described by Schiffman and others. In most cases the new networks are more easily realized, more easily adjusted or tuned, and require less reference-line length.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Session J1 -- Solid State Circuits and Devices

*"Session J1 -- Solid State Circuits and Devices." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 227-227.*

Contents
Publications
Issues
Papers
Authors

Click on title for a complete paper.

# Abstracts

## Computer-Aided Design of Microwave Parametric Frequency Dividers

*A. Lipparini, E. Marazzi and V. Rizzoli. "Computer-Aided Design of Microwave Parametric Frequency Dividers." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 229-231.*

A straightforward computer approach to the design of parametric frequency dividers using microwave diodes is presented. A detailed characterization of the nonlinear element together with a new optimization philosophy make an accurate nonlinear design of MIC dividers directly affordable.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Analysis of Waveguide IMPATT Oscillator Circuits

*B.D. Bates and P.J. Khan. "Analysis of Waveguide IMPATT Oscillator Circuits." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 232-234.*

The Kurokawa oscillator theory is applied to IMPATT oscillator circuits using an accurate non-linear diode equivalent circuit and broadband circuit representations of both rectangular and coaxial waveguiding structures. The analysis considers the influence of harmonic components in the oscillator output.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Coaxially Coupled Ridge Waveguide Tunable Oscillator

*R.S. Robertson and R.L. Eisenhart. "Coaxially Coupled Ridge Waveguide Tunable Oscillator." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 235-237.*

A coaxially coupled ridged waveguide oscillator circuit using a pulsed IMPATT diode is described. Mechanical tuning bandwidths of 800 MHz (8%) at X-band, instantaneous locking bandwidths greater than 5 percent at 10 dB gain, and a circuit efficiency of 95 to 100 percent have been realized with a silicon pulsed double drift IMPATT diode under large signal conditions.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## High Efficiency Mode Characterization in a 20 GHz MBE GaAs IMPATT Diode Amplifier

*H. Kondoh, J. Berenz, T. Hierl, G.C. Dalman and C.A. Lee. "High Efficiency Mode Characterization in a 20 GHz MBE GaAs IMPATT Diode Amplifier." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 238-240.*

A high efficiency mode in a 20 GHz MBE-grown single drift GaAs Read-type IMPATT diode has been observed by using a computer-aided characterization system. The intrinsic diode is estimated to have 2 W power capability with 26% efficiency at 22 GHz. The diode was tested in a modified top-hat amplifier circuit to demonstrate 3.1 GHz bandwidth at 3.7 dB gain with 3 W maximum output power.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Session J2 -- Chinese Session

*"Session J2 -- Chinese Session." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 241-241.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## A 12 GHz TV Receiver for Direct Satellite Broadcasting

*C. Changyan, S. Bogeng and R. Binglin. "A 12 GHz TV Receiver for Direct Satellite Broadcasting." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 243-244.*

The design and performance of 12 GHz TV receiver for direct Satellite broadcasting is described. The receiver consists of an image recovery low-noise mixer, a high-stability Gunn oscillator, a broad bandwidth IF pre-amplifier and a home-available cheap demodulation unit.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## V-Band GaAs Gunn Diode

*C. Xiaojian, D. Yanmao and H. Zhenqi. "V-Band GaAs Gunn Diode." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 245-245.*

The contradictions between the thermal parameters and microwave parasitic parameters in mm-wave Gunn diodes can be released by reasonable assumption for the thermal-conducting model of devices and practical analysis of microwave parasitic parameters. The corresponding formulas and curves are derived to carefully design the configuration parameters of the V-band device and its package.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Status of Microwave Semiconductor Devices in China

*L. Jinting. "Status of Microwave Semiconductor Devices in China." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 246-246.*

In this paper the recent development of microwave semiconductor devices in China is reviewed. The special emphasis are laid on GaAs MESFETS millimeter wave devices, microwave diodes and some microwave integration. China has been contributing to the development of microwave semiconductor devices and their applications like other countries. Nanjing Solid State Devices Research Institute (NSR) is a main research organization in the field of solid state microwave devices in China; it has already accomplished a lot of significant projects, including mixer diodes, dual FETs, noise diodes, millimeter wave Gunn devices and IMPATTs, and so on. Some microwave devices have been produced in factories. In laboratories the Gunn diodes have a CW output power of 100-500 milliwatts in 50-60 GHz, and silicon IMPATTs of 60-120 milliwatts in 60-120 GHz. The noise figure of GaAs dual FETs packaged is 1.8 dB at 4 GHz and 2.8 dB at 8 GHz, having an associated gain of 20 dB. A non-packaged PIN diode with high reliability can be used for tunable attenuator from X to Ku band. Other devices will be introduced in this paper.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Session K -- High Power Circuits and Systems

*"Session K -- High Power Circuits and Systems." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 247-247.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## A 100-kW Solid-State Coaxial Limiter for L-Band

*S.D. Patel and H. Goldie. "A 100-kW Solid-State Coaxial Limiter for L-Band." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 249-251.*

This paper concerns the development of a 100-kW peak power, self-biased, pulsed limiter covering the 1250 to 1350 MHz band. The limiter requires no external power sources and uses four 70 µm PIN diodes as the active elements in a power-sharing, axially symmetric, shunt-loaded arrangement in a 50-ohm, 7/8-inch OD, coaxial transmission line. Two shorting stubs used for zero-bias tuning and dc returns are in the same electrical plane as the PIN diodes. Four symmetric Schottky-barrier, high-voltage detector diodes decoupled from the main transmission line provide fast leading edge, high-amplitude current biasing pulses to each PIN diode. The one-stage limiter demonstrated a spike leakage of 2.8 kW/65 ns, a flat leakage of 32 watts peak, and a 1-dB recovery period of 17 µs for an incident power level of 100 kW/2.8 µs. Passive zero-bias loss was under 0.5 dB.

# Abstracts

## A 2000 Watt CW MIC 20-500 MHz SPDT PIN Diode Switch Module

*R. Tenenholtz. "A 2000 Watt CW MIC 20-500 MHz SPDT PIN Diode Switch Module." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 252-254.*

An MIC 0.75 inch diameter VHF/UHF switch module employing packageless diodes has been developed that operates over two octaves in the 20-500 MHz range. It has been tested up to 2.0 KW CW!! This represents a factor of 10 in power greater than previously reported. Several switch assemblies employing this module design are described and test results presented.

# Abstracts

## The Development of High-Power, Low-Frequency PIN Diodes

*M. Caulton, A. Rosen, P. Stabile and A. Gombar. "The Development of High-Power, Low-Frequency PIN Diodes." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 255-257.*

The application of PIN diodes in high-power systems at frequencies as low as 500 kHz requires the use of diodes with intrinsic layers of long carrier lifetimes, operation at low rf-to-bias current ratios, and large reverse bias voltages. The development of suitable diodes, operating conditions, and test results in actual circuits are described.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A Study of High Power Pulsed Characteristics of Low-Noise GaAs MESFETs (1981 [MWSYM])

*L. Dormer and D.S. James. "A Study of High Power Pulsed Characteristics of Low-Noise GaAs MESFETs (1981 [MWSYM])." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 258-260.*

Low-noise GaAs MESFET's have been investigated for catastrophic burn-out ratings when exposed to representative pulses from an X-band transmitter/T-R cell combination. Also reported are failure analyses, non-catastrophic but recoverable effects and longer term tests.

# Abstracts

## Design of Single-Anode, MIG-Type Gyrotron Gun for a 35 GHz Gyro-TWT

*J.M. Baird and A.C. Attard. "Design of Single-Anode, MIG-Type Gyrotron Gun for a 35 GHz Gyro-TWT." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 261-263.*

The design of a diode-like, low velocity spread electron gun for a gyrotron amplifier is described. The total longitudinal velocity spread is calculated to be on the order of ±2.5% in a 70 kV, 9 A beam with a v/spl perp//vz velocity ratio of 1.5. Less than ±0.5% spread is attributed to electron ray optics effects. Gyrotron gun design approaches are discussed.

# Abstracts

## Design of a High Power Earth Station Transmitter for the Band 7.9 to 8.4 GHz

*R.A. Gough. "Design of a High Power Earth Station Transmitter for the Band 7.9 to 8.4 GHz." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 264-266.*

Three 10 KW klystrons are combined to cover the full 7.9 to 8.4 GHz band using a triplexer with less than 0.5 dB loss. A novel asymmetrical notch filter allows the severe IM specification to be met.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Design and Operation of an Orotron-A Tunable Source of Coherent Millimeter Wave Radiation

*H. Dropkin, R.P. Leavitt and D.E. Wortman. "Design and Operation of an Orotron-A Tunable Source of Coherent Millimeter Wave Radiation." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 267-269.*

Results are given that describe our experimental observations of orotron oscillation and the physical principles which govern the design of this device, a Smith-Purcell free-electron laser for the millimeter and submillimeter wavelength regions.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Status of the Microwave Power Transmission Components for the Solar Power Satellite (SPS) (1981 [MWSYM])

*W.C. Brown. "Status of the Microwave Power Transmission Components for the Solar Power Satellite (SPS) (1981 [MWSYM])." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 270-272.*

The status of key microwave components in the transmitter and reception portion of the solar satellite (SPS are reviewed.

# Abstracts

## A High Power Gyrotron Operating in the TE/sub 041/ Mode

*B. Arfin and M.E. Read. "A High Power Gyrotron Operating in the TE/sub 041/ Mode." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 273-275.*

The design and test results of a 35 GHz gyrotron oscillator, operating in the TE/sub041/ mode, will be presented. Output powers of 300 kW have been achieved. These results will be compared to computer simulation predictions.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A Nonlinear Gyro-Device Theory

*G.E. Thomas. "A Nonlinear Gyro-Device Theory." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 276-278.*

A new approach to nonlinear gyro-deivce theory is presented. This approach is based upon the soliton concept. The general gyro-device equation is derived and solved for its soliton solutions. Two different amplification regimes are analyzed and comparisons are made with linear theory.

# Abstracts

## Session L -- Ferrite Applications

*"Session L -- Ferrite Applications." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 279-279.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Coupled-Mode Theory Analysis of Distributed Nonreciprocal Devices

*I. Awai and T. Itoh. "Coupled-Mode Theory Analysis of Distributed Nonreciprocal Devices." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 281-283.*

A coupled dielectric-ferrite waveguide is analyzed by a coupled-mode theory, and numerical studies are performed for designing new distributed nonreciprocal devices for millimeter-waves. A number of practical considerations are included.

# Abstracts

## Analysis of Wide-Band Microstrip Circulators by Point-Matching Technique

*A.M. Khilla. "Analysis of Wide-Band Microstrip Circulators by Point-Matching Technique." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 284-286.*

An exact field theory treatment of microstrip Y-junction circulators for wideband operation is presented. Field expressions are written in each region of the junction in form of infinite summation of the corresponding region modes. Matching of the fields at the common boundaries, taking fringing fields in microstrip structures into account, leads to a set of infinite non-homogeneous equations in these mode-amplitudes. A wideband microstrip circulator, designed using the point-matching technique, is observed. The 20-dB isolation bandwidth is about 62% without using any external tuning elements.

# Abstracts

## Performance Characteristics of Magnetoplasmon Based Submillimeter Wave Nonreciprocal Devices

*S.H. Talisa and D.M. Bolle. "Performance Characteristics of Magnetoplasmon Based Submillimeter Wave Nonreciprocal Devices." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 287-289.*

Results will be presented for nonreciprocal devices in the submillimeter range using magnetoplasmons on high quality n-type GaAs materials. Performance predictions are based on multi-layer canonical structures yielding both loss and dispersion data.

# Abstracts

## A Ferrimagnetic Resonance Thermometer for Microwave Power Environment

*J.A. Weiss, D.A. Hawks and G.F. Dionne. "A Ferrimagnetic Resonance Thermometer for Microwave Power Environment." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 290-292.*

A thermometric technique employing microwave observation of temperature-dependent magnetic resonance of a small ferromagnetic sensing element is described. This device is suitable for use in enclosures in which microwave power is used for research or in industrial processing.

# Abstracts

## A K-Band High Power Low Loss Latching Switch

*M.J. Mlinar, W.S. Piotrowski and J.E. Raue. "A K-Band High Power Low Loss Latching Switch." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 293-295.*

A development effort is described that resulted in a rugged 19 GHz ferrite component with 1.4 GHz of bandwidth and 0.25 dB insertion loss and a capability to switch 100W CW power.

# Abstracts

## Fin Line Ferrite Isolator for Integrated Millimeterwave Circuits

*A. Beyer and K. Solbach. "Fin Line Ferrite Isolator for Integrated Millimeterwave Circuits." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 296-298.*

The realisation of a field displacement isolator in fin line technique is described. Fin line distributions allow application of the principle of operation known from rectangular metal waveguide isolators. Encouraging first experimental results are reported.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Session M -- Microwave Integrated Circuits

*"Session M -- Microwave Integrated Circuits." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 299-299.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Asymmetric Microstrip DC Blocks with Rippled Response

*D. Kajfez, S. Bokka and C.E. Smith. "Asymmetric Microstrip DC Blocks with Rippled Response." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 301-303.*

A design procedure is described for dc blocks using asymmetric coupled microstrip which exhibit a rippled frequency response, while at the same time acting as impedance transformers. Lumped capacitances are added in order to compensate for the difference in propagation constants of two quasi TEM modes.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Simple Balun-Coupled Mixers

*B.R. Hallford. "Simple Balun-Coupled Mixers." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 304-306.*

Economical double-sideband (two diode) and single-sideband (four diode) double-balanced broadband mixers use balun-coupled planar circuits suitable for any dielectric constant substrate, since slot line or coplanar waveguide is not used.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Computer-Aided Design of Semiconductor Mounts in Fin-Line Technology

*H. El Hennawy and K. Schunemann. "Computer-Aided Design of Semiconductor Mounts in Fin-Line Technology." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 307-309.*

Based on both a rigorous eigenmode calculation and a modal analysis of discontinuities, a computer-aided design of some diode mounts in fin-line technology has been performed. Theoretical results on a detector with Schottky-diode, a reflection-type phase modulator with pin-diode, a switch with two pin-diodes, and a Gunn oscillator show good agreement with measurements. Finally, some design rules are outlined for mounting semi-conductor devices in a fin-line.

# Abstracts

## A Measurement Method for Accurate Characterization and Modeling of MESFET Chips

*D.E. Peck and D.F. Peterson. "A Measurement Method for Accurate Characterization and Modeling of MESFET Chips." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 310-312.*

A straightforward measurement procedure based on a deembedding method and FET unbiased drain RF measurements is presented that produces accurate chip MESFET characteristics. Usefulness of the data is shown by inexpensively obtained MESFET model parameters.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A Frequency-Stabilized MIC Oscillator Using a Newly-Developed Dielectric Resonator

*Y. Komatsu, Y. Murakami, T. Yamaguchi, T. Otobe and M. Hirabayashi. "A Frequency-Stabilized MIC Oscillator Using a Newly-Developed Dielectric Resonator." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 313-315.*

A GaAs FET MIC oscillator with very high frequency stability has been developed using a newly-developed dielectric resonator. The key to designing the dielectric resonator was to make the temperature dependence of the resonance frequency linear. This characteristic was realized in a stacking-type dielectric resonator with zirconate ceramics. The obtained frequency stability of ±85 kHz in temperatures -20 to +60°C is sufficient for AM SHF TV receivers.

Click on title for a complete paper.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## A 1.75 - 6 GHz Miniaturized GaAs FET Amplifier Using Quasi-Lumped Element Impedance Matching Networks

*S.B. Moghe, R.E. Gray and W.C. Tsai. "A 1.75 - 6 GHz Miniaturized GaAs FET Amplifier Using Quasi-Lumped Element Impedance Matching Networks." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 316-318.*

A quasi-lumped element impedance matching technique was developed for a multi-octave bandwidth FET amplifier. The lumped elements were realized by parallel capacitors, high impedance band wires and etched lines on a 0.170 x 0.085 x 0.010 inch alumina substrate. A two-stage amplifier has been constructed using this method and yields 17± dB gain and 3.5 dB maximum noise figure over 1.75 to 6.0 GHz band.

# Abstracts

## A 10.5 GHz MIC Direction Sensitive Doppler Module Using a GaAs Fet and a Ag/Pd Thick Film

*T. Mori, H. Sawano, K. Kusunoki and O. Ishihara. "A 10.5 GHz MIC Direction Sensitive Doppler Module Using a GaAs Fet and a Ag/Pd Thick Film." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 319-321.*

A MIC direction sensitive doppler module with a GaAs FET oscillator stabilized by a dielectric resonator has been developed by means of a Ag/Pd thick film technique. A module with 17 mW output power at 10.5 GHz has about -90 dBm minimum detectable signal for the bandwidth of 1KHz at the bias condition of 6.5 V, 44 mA.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Session N -- Millimeter Wave Solid State Devices

*"Session N -- Millimeter Wave Solid State Devices." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 323-323.*

Click on title for a complete paper.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A 30 GHz - 100 mW GaAs FET

*O. Ishihara, Y. Kadowaki, M. Nakatani, A. Nara and K. Shirahata. "A 30 GHz - 100 mW GaAs FET." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 325-327.*

Power output of 100 mW and linear power gain of 5 dB have been realized at 30 GHz for the GaAs FET fabricated by optimizing physical parameters of the channel for high power end.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## A 69 GHz FET Oscillator

*J.M. Schellenberg, H. Yamasaki and D.W. Maki. "A 69 GHz FET Oscillator." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 328-330.*

An FET oscillator operating at V-band frequencies is presented. It has demonstrated a maximum frequency of oscillation of 69.1 GHz and an output power of 2.5 mw at 57.3 GHz.

# Abstracts

## Beam-Lead Schottky-Barrier Planar Mixer Diodes for Millimeter Wave Applications

*S. Jamison, A. Contolatis, P. Bauhahn, J. Abrokwah, T. Peck, M. Helix and C. Chao. "Beam-Lead Schottky-Barrier Planar Mixer Diodes for Millimeter Wave Applications." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 331-333.*

Millimeter wave planar Schottky barrier mixer diodes with beam leads, low parasitic and one micron fingers have been developed for 35 GHz, 95 GHz and 140 GHz operation. Preliminary characterization of dual-finger mixer diodes has resulted in a double sideband noise figure of 4.0 dB at 36 GHz and 8.9 dB at 94 GHz (including 1.6 dB NF from the IF preamp). Design, fabrication, and experimental performance of these diodes is reported for 35 GHz and 95 GHz balanced mixer.

# Abstracts

## A Wideband, Backshort-Tunable Second Harmonic W-Band Gunn-Oscillator

*H. Barth. "A Wideband, Backshort-Tunable Second Harmonic W-Band Gunn-Oscillator." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 334-337.*

Today W-Band (75...110 GHz) Gunn-oscillators are mostly built as 2nd harmonic oscillators. Because the fundamental frequency is below cutoff of the waveguide system, a backshort affects the output frequency only slightly. For the same reason, power combining and varactor tuning is extremely difficult. This paper presents design and performance of a more than 15 GHz backshort tunable 2nd harmonic 90 GHz oscillator. Using a common waveguide cavity, designed for both the fundamental and the 2nd harmonic frequency, this oscillator is easily backshort and varactor tunable. It is also well suited for "in line" power combiners. Results for a three diode combiner are given. Finally, a varactor tuned 2 diode combiner with a tuning range of 1.5 GHz is presented.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Metal-Barrier-Metal Junctions for Room Temperature Millimeter-Wave Mixing and Detection

*C.W. Slayman and T.K. Gustafson. "Metal-Barrier-Metal Junctions for Room Temperature Millimeter-Wave Mixing and Detection." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 338-340.*

In the past, metal-barrier-metal (MBM) point-contact diodes have been used at room temperature as coherent detectors from microwave to optical frequencies. For the first time, the millimeter-wave mixing and detection characteristics of stable thin-film Ni-NiO-Ni junctions fabricated by photolithographic means will be reported.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## A 63 W W-Band Injection-Locked Pulsed Solid State Transmitter (1981 [MWSYM])

*H.C. Yen and K. Chang. "A 63 W W-Band Injection-Locked Pulsed Solid State Transmitter (1981 [MWSYM])." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 341-343.*

A high power three-stage W-band injection-locked pulsed solid state transmitter using four hybrid-coupled two-diode IMPATT power combiners as the final stage has been developed. Coherent peak output power of 63 W at 92.6 GHz has been achieved. The transmitter was operated at 100 ns pulsewidth and 0.5 percent duty cycle.

# Abstracts

## Millimeter-Wave Silicon IMPATT Sources and Combiners for the 110-260 GHz Range (1981 [MWSYM])

*K. Chang, F. Thrower and G.M. Hayashibara. "Millimeter-Wave Silicon IMPATT Sources and Combiners for the 110-260 GHz Range (1981 [MWSYM])." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 344-346.*

This paper reports the recent progress in CW and pulsed silicon IMPATT sources in the 110-260 GHz frequency range. A bridged double-quartz-standoff package has been developed and successfully used for the entire frequency range. Power combiners at center frequencies of 140 and 217 GHz have also been developed with peak output power of 9.2 and 1 W respectively.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Chip Level IMPATT Combining at 40 GHz (1981 [MWSYM])

*C.T. Rucker, J.W. Amoss and G.N. Hill. "Chip Level IMPATT Combining at 40 GHz (1981 [MWSYM])." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 347-348.*

Results with series and series-parallel connections of CW40 GHz GaAs IMPATT diodes are discussed. The multichip geometries utilize Raytheon CW double-drift device chips and are essentially scaled versions of successful X-band geometries reported previously. Maximum series combining efficiency of 82 percent has been achieved.

# Abstracts

## Session O -- GaAs Monolithic Circuits

*"Session O -- GaAs Monolithic Circuits." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 349-349.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A Study of Optimal Matching Circuit Topologies for Broadband Monolithic Power Amplifiers

*J.E. Degenford, D.C. Boire, R.G. Freitag and M. Cohn. "A Study of Optimal Matching Circuit Topologies for Broadband Monolithic Power Amplifiers." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 351-353.*

A large signal amplifier design technique for broadband monolithic amplifiers has been expanded to include studies of the optimal output circuit topology from the standpoint of large and small signal gain variations and stability.

# Abstracts

## A Monolithic GaAs 0.1 to 10 GHz Amplifier

*W.C. Petersen, D.R. Decker, A.K. Gupta, J. Dully and D.R. Ch'en. "A Monolithic GaAs 0.1 to 10 GHz Amplifier." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 354-355.*

A monolithic GaAs 4-stage broadband amplifier including active input and output matching has been fabricated on a 2.5 mm square chip. Gain, noise, and VSWR performance in the 0.1 to 10 GHz band will be described.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## A 2-12 GHz Feedback Amplifier on GaAs

*K.B. Niclas and W.T. Wilser. "A 2-12 GHz Feedback Amplifier on GaAs." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 356-358.*

A 2-12 GHz monolithic feedback amplifier has been designed. Initial experiments, made on a semi-monolithic unit, yielded 5.4 dB of minimum gain from 2-12 GHz and 3.8 dB of minimum gain between 2 and 15.3 GHz.

# Abstracts

## A Planar-Type Low-Noise GaAs Monolithic Microwave Amplifier

*D. Xian-Can and Z. Guo-Liang. "A Planar-Type Low-Noise GaAs Monolithic Microwave Amplifier." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 359-361.*

A planar low noise amplifier has been fabricated by selectively implanting oxygen to define the active devices. Noise figure 2.5 dB with associated gain of 7dB over the frequency range 4.8-5.3 GHz has been obtained.

# Abstracts

## A High-Speed Monolithic GaAs 10/11 Counter

*R.E. Lundgren, D.E. Snyder and J.M. Lull. "A High-Speed Monolithic GaAs 10/11 Counter." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 362-364.*

Dual-gate GaAs MESFET logic has been used to develop a monolithic variable-modulus (/spl divide/10//spl divide/11) counter. The circuit incorporates a novel feedback design that will allow the counter to operate up to the maximum speed of its flip-flop components, which have demonstrated cutoff frequencies above 2.5 GHz. The full counter has operated to 1.6 GHz while mounted in a coplanar test fixture. Operation above 2 GHz is expected when a test fixture with reduced crosstalk is used.

# Abstracts

## An 8 GHz MMIC Preamplifier

*D.R. Decker, A.K. Gupta, W.C. Petersen and D.R. Ch'en. "An 8 GHz MMIC Preamplifier." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 365-366.*

A monolithic GaAs low-noise 8 GHz preamplifier has been designed and fabricated on a 2.0 mm square chip. Measured gain, VSWR, and noise performance are described and compared to predicted values.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A Comparison Between Actively and Passively Matched S-Band GaAs Monolithic FET Amplifiers

*R.S. Pengelly, J.R. Suffolk, J.R. Cockrill and J.A. Turner. "A Comparison Between Actively and Passively Matched S-Band GaAs Monolithic FET Amplifiers." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 367-369.*

The ability to design monolithic GaAs circuits which are insensitive to active and passive component variations is demonstrated. Actively and passively matched monolithic S-band amplifiers are compared in terms of reproducibility, GaAs usage, power consumption and processing complexity.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Use of Switching Q in the Design of FET Microwave Switches

*H.A. Atwater and R.W. Sudbury. "Use of Switching Q in the Design of FET Microwave Switches." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 370-372.*

The application of FET's as microwave switches suitable for monolithic integration is analyzed by means of a procedure based on the switching Q of Kurokawa and Schlosser.. Factors determining the Q of FET's for switching are discussed.

# Abstracts

## Session P -- Microwave Acoustics

*"Session P -- Microwave Acoustics." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 373-373.*

# Abstracts

## SAW Based Direct Frequency Synthesizers

*A.J. Budreau. "SAW Based Direct Frequency Synthesizers." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 375-376.*

Many new electronic systems, including spread spectrum links, require frequency synthesizers capable of providing accurate signals of high spectral purity, yet hopping in fractions of a microsecond. Three such synthesizers, based on comb generators, SAW filterbanks, and fast switches, are described. Each of these synthesizers has an output of one of over 200 frequencies of integral MHz value, at approximately 1.3 GHz.

# Abstracts

## SAW Stabilized Radiosondes

*D.J. Dodson, K.F. Lau, M.Y. Huang and T.J. Lukaszek. "SAW Stabilized Radiosondes." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 377-379.*

Two SAW stabilized oscillators with FM and PAM capability have recently been designed and breadboarded to provide 300 ppm frequency stability over a -70°C to +70°C environment. The circuits are being developed for use in low cost, expendable radiosondes operating at 403 MHz and 1680 MHz.

# Abstracts

## SAW Oscillator in UHF Transit Satellite Links (1981 [MWSYM])

*B.Y. Lao, N.J. Schneier, D.A. Rowe, R.E. Dietterle, J.S. Schoenwald, E.J. Staples and J. Wise. "SAW Oscillator in UHF Transit Satellite Links (1981 [MWSYM])." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 380-382.*

A 375 MHz SAW resonator controlled oscillator is developed for application in the transit satellite marine navigation system. The SAW oscillator, in a two-cubic-inch hybrid package, contains a heater, voltage regulator and divider and is a direct replacement for a bulk wave oscillator and its multiplier chain. Short term stability of 2 x 10E -10 and aging of 3 x 10E -8/day were achieved at 75°C. Comparison tests showed that the navigation system accuracy with the SAW oscillator was equivalent to a bulk oscialltor.

# Abstracts

## Tunable Magnetostatic Surface Wave Oscillator at 4 GHz

*R.L. Carter, J.M. Owens, W.R. Brinlee, Y.W. Sam and C.V. Smith, Jr.. "Tunable Magnetostatic Surface Wave Oscillator at 4 GHz." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 383-385.*

An oscillator tunable from 1.8 GHz to 4.0 GHz has been fabricated using a Magnetostatic Surface Wave (MSSW) 2-port etched groove resonator as the frequency selective element, and a bipolar transistor amplifier for gain in the feedback loop. The theory for a resonator based oscillator is summarized, including the effect of loop gain, amplifier noise loop power, and resonator Q on oscillator noise. Noise and amplitude characteristics of the oscillator are reported over the tuning range. FM phase noise is comparable to YIG sphere oscillators and optimization should yield significant improvement.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## IC Compatible SAW Devices on GaAs

*T.W. Grudkowski, G.K. Montress, M. Gilden and J.F. Black. "IC Compatible SAW Devices on GaAs." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 386-388.*

The application of gallium arsenide (GaAs) technology to high frequency digital and microwave integrated circuits is rapidly maturing. The present work considers the additional capabilities afforded by the inherent piezoelectric properties of GaAs. The emphasis of the work is on Surface Acoustic Wave (SAW) device configurations which may eventually be integrated with electronic circuits on the same substrate. The basic transduction and propagation characteristics for Rayleigh waves on <001>, (110) GaAs are reviewed for device operation in the 100-200 MHz frequency range. Recent developments in the design and performance of tunable SAW phase shifters, two-port SAW resonators having loaded Q's up to 13,000, and a monolithic asynchronous correlator/programmable matched filter are presented. The potential of the technology for further development is also addressed.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## SAW Bandpass Filter Components for Microwave Systems

*D.E. Allen and F.S. Hickernell. "SAW Bandpass Filter Components for Microwave Systems." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 389-391.*

The rapid advancement of Surface Acoustic Wave (SAW) technology in recent years has significantly impacted the design of several microwave systems. In particular, current systems having IF or processing frequencies in the 100-1000 MHz range are likely to use SAW technology. This paper presents a discussion of recent microwave system developments which utilize SAW bandpass filters. In each case, performance, size and cost advantages are gained through the use of surface acoustic wave technology. It is concluded that SAW components are indeed very versatile, high reliability parts, which should be considered by microwave designers for providing many viable functions in new system developments.

# Abstracts

## A SAW Interferometer Direction - Finding and Frequency Identification Method

*D.R. Klose and W. Skudera. "A SAW Interferometer Direction - Finding and Frequency Identification Method." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 392-394.*

A technique is described, whereby both frequency and angle of arrival (AOA) information can be measured with high accuracy, on multiple simultaneously received signals. Such a technique is required in signal processing applications used to identify and locate agile parameter emitters in high density signal environments. This signal processing technique will be compared to other standard microwave signal detection, frequency, and AOA measurement methods.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Magnetostatic Wave Compressive Receiver

*C.E. Nothnick, J.F. Billing, M.R. Daniel and T.D. Adams. "Magnetostatic Wave Compressive Receiver." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 395-395.*

An S-band compressive receiver if utilizing an MSW (Magneto-stetic Wave) epitaxial YIG dispersive delay line for broadband spectral analysis is presented. The dispersive line, centered at 2.7 GHz with an 870 GHz bandwidth dispered over 0.2 MSCC allows analysis of a 650 GHz band with 12 MHz resolution.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Session Q -- Microwave and Millimeter-Wave Systems

*"Session Q -- Microwave and Millimeter-Wave Systems." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 397-397.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A Phase Alignment Network for Space Diversity Combining

*G.L. Heiter and H. Miedema. "A Phase Alignment Network for Space Diversity Combining." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 399-401.*

The design and microstrip implementation of the combination of a quadrant phase stepper and continuously variable phase shifter is described which allows clockwise or counterclockwise phase rotation through an arbitrary number of revolutions.

# Abstracts

## Direct Generation of MSK Modulation at Microwave Frequencies

*S. Kumar, W.J. Chudobiak and J.S. Wight. "Direct Generation of MSK Modulation at Microwave Frequencies." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 402-404.*

Direct generation of a modulated signal at microwave frequencies offers considerable simplicity and economy in the transmitter of a microwave communication system. Minimum-shift-keying (MSK) is a digital modulation which yields the same bit-error-rate performance as coherent PSK even though this modulation may be generated as a continuous phase frequency-shift-keying. Utilizing this feature of MSK, this paper describes novel circuits for generation of MSK modulation at microwave frequencies.

# Abstracts

## A Dielectric Resonator Filter as Low Loss Delay Element for 14 GHz On-Board 4/spl 0slash/- DCPSK Demodulation

*L. Accatino and A. Angelucci. "A Dielectric Resonator Filter as Low Loss Delay Element for 14 GHz On-Board 4/spl 0slash/- DCPSK Demodulation." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 405-407.*

A new implementation of a 16.7 ns delay element for on-board regenerative satellite repeaters is presented. The use of high Q dielectric resonator delay filters allows a significant insertion loss reduction with respect to known microstrip solutions, full compatibility with other microstrip circuitry being still maintained. The reduced loss permits some critical demodulator specifications to be substantially relaxed.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## 14 GHz Differential QPSK Demodulator for Regenerative Satellite Repeater

*G. Ohm, M. Alberty and D. Rosowsky. "14 GHz Differential QPSK Demodulator for Regenerative Satellite Repeater." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 408-410.*

A lightweight 14 GHz, 120 Mbit/s differential QPSK demodulator for satellite application is described. The demodulator comprises a low-loss, temperature-stable waveguide delay filter and high-sensitive phase detectors. With this combination low-level operation and a high dynamic range are obtained.

# Abstracts

## Channelized Receiver Covering 26 to 60 GHz with Planar Integrated-Circuit Components

*P.J. Meier, K.D. Breuer, L.D. Cohen, N. Worontzoff, J. Lepore and J. Gunther. "Channelized Receiver Covering 26 to 60 GHz with Planar Integrated-Circuit Components." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 411-413.*

A nine-channel downconverter covering 26 to 60 GHz is described. The system includes reproducible hybrid-coupled multiplexers, balanced integrated circuit (IC) mixers, built-in-test equipment, and LO's including a cavity-stabilized, lumped-element model. The system is the first of its kind to extensively utilize low-cost, high-Q, millimeter- wave IC's.

# Abstracts

## A W-Band, Coherent, Pulse-Compression Radar Transceiver Using Linear Frequency Modulation

*T. Kihm, M. Beebe, C. Brenneise and R.D. Weglein. "A W-Band, Coherent, Pulse-Compression Radar Transceiver Using Linear Frequency Modulation." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 414-416.*

A W-Band, solid state, coherent pulse-compression radar transceiver is described that has demonstrated 0.6m range resolution and 25 Hz doppler resolution. Passive pulse expansion and compression was implemented using two nearly identical microwave SAW filters with 0.47 GHz dispersive bandwidth and a time-bandwidth product of 220. Range (time) sidelobes of -18 dB were obtained in preliminary tests by taking advantage of the natural frequency-time slope inherent in the 94 GHz IMPATT oscillator with peak output power of +25 dBm.

# Abstracts

## Session R -- Phased and Active Array Techniques

*"Session R -- Phased and Active Array Techniques." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 417-417.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## A Scanning Switch Matrix for a Cylindrical Array

*K.J. Keeping, D.S. Rogers and J.-C. Sureau. "A Scanning Switch Matrix for a Cylindrical Array." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 419-421.*

A full-commutating scanning switch matrix has been implemented for a 96-element C-band cylindrical array. The impact of cost/performance tradeoffs on the resulting configuration is discussed.

# Abstracts

## Beam Steering Antenna Control Technique

*A.R. Skatvold, Jr.. "Beam Steering Antenna Control Technique." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 422-427.*

A technique which reduces the requirement for constructing high accuracy phase shifters for steering the main beam in a small (less than 20 elements) linear antenna array is described. The key hardware components are the phase detectors which monitor the phase difference between adjacent radiating elements and a microcomputer to read the phase differences and adjust phase shifters to obtain the desired antenna performance. This closed loop technique will also provide a means for future investigations to verify theoretical versus experimental phase distributions and other element effects in small antenna arrays.

# Abstracts

## 35 GHz Active Aperture

*M.F. Durkin, R.J. Eckstein, M.D. Mills, M.S. Stringfellow and R.A. Neidhard. "35 GHz Active Aperture." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 425-427.*

Characteristics of a millimeter wave active array are described. Injection-locked pulsed IMPATT oscillators providing 36 watts peak transmitter power are integrated with a stripline-fed image array having a gain of 29 dBi. Performance of the transmitter, antenna and integrated active aperture are discussed.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Small Active Phased Array Characteristics with GaAs IMPATT Amplifier Modules

*S.E. Hamilton and G.J. Stern. "Small Active Phased Array Characteristics with GaAs IMPATT Amplifier Modules." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 428-430.*

Application of pulsed GaAs IMPATT modules for phased array radiators is examined. Measured intrapulse phase and gain variations are presented. Module hardware and statistical pattern effects for a small-diameter phased array are discussed.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Broadband Dual-Gate FET Continuously Variable Phase Shifter

*M. Kumar, R.J. Menna and H.-C. Huang. "Broadband Dual-Gate FET Continuously Variable Phase Shifter." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 431-433.*

This paper describes a broadband, GaAs dual-gate FET phase shifter capable of continuous phase shift from 0° -360° over the 4-8 GHz band. Although the present unit is, in discreet term, it is designed to be compatible with monolithic fabrication technology.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Active Microwave Power Combiner/Divider Using a Dual-Gate MESFET

*J.J. Pan. "Active Microwave Power Combiner/Divider Using a Dual-Gate MESFET." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 434-435.*

An active power combiner/divider using a gallium arsenide (GaAs) dual-gate metal semiconductor field-effect transistor (MESFET) is presented herein. This new component is feasible for monolithic microwave integrated circuit (MMIC) fabrication, and provides the advantages of amplification gain, both amplitude and phase adjustability, and reverse isolation.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A Continuously Variable Ku-Band Phase/Amplitude Control Module

*Y. Gazit and H.C. Johnson. "A Continuously Variable Ku-Band Phase/Amplitude Control Module." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 436-438.*

A Ku-band microstrip phase shifter capable of continuous phase and amplitude control is described. Three dual-gate FET amplifiers provide variable amplitude vectors that are separated by 120° and summed through an arrangement of quadrature couplers. The described phase shifter provides a full 360° shift with an amplitude weighting capability of more than 20 dB.

# Abstracts

## Session S -- Low Noise Techniques

*"Session S -- Low Noise Techniques." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 439-439.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## A Low Noise Solid State Amplifier for Replacement of a Ka-Band TWTA

*P.H. Wolfert, J.D. Crowley and F.B. Fank. "A Low Noise Solid State Amplifier for Replacement of a Ka-Band TWTA." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 441-443.*

A low noise solid state amplifier for replacement of a Ka-band TWTA is described. Eight stages of amplification, which utilize cathode notch InP Gunn diodes, provide a gain of 37± 3 dB with an associated N. F. ranging from 13.3 to 16.3 dB in the 27-39.5 GHz band.

# Abstracts

## Cooled Low Noise GaAs Monolithic Mixers at 110 GHz

*B.J. Clifton, G.D. Alley, R.A. Murphy, W.J. Piacentini, I.H. Mroczkowski and W. Macropoulos. "Cooled Low Noise GaAs Monolithic Mixers at 110 GHz." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 444-446.*

We describe the fabrication and testing of GaAs monolithic integrated circuit mixers which have liquid nitrogen double sideband (DSB) mixer noise temperatures in the range 50-200 K and conversion losses of 4.0-5.0 dB.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## A 4GHz Low Noise GaAsFET Amplifier

*L. Hao-mo. "A 4GHz Low Noise GaAsFET Amplifier." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 447-449.*

A 4GHz low noise GaAsFET amplifier has been designed and fabricated. Time-delay protection circuit and input circuit without separation DC element has been used. The performence of two stages 4,0-4,5 GHz amplifier is N/sub F/ 2 db, G/sub a/ 24 db.

# Abstracts

## Impact of Low Noise Technology on Present and Future STACOM Systems (Abstract Only)

*H.C. Okean. "Impact of Low Noise Technology on Present and Future STACOM Systems (Abstract Only)." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 450-450.*

An assessment is presented of the impact of current and projected low noise technology on the specific requirements of ground based and spaceborne satcom receiver terminals. Emphasis will be placed on the role of paramps and FETs in large and small earth stations and of FET amplifiers and image-enhanced mixers in spaceborne receivers.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Highly Reliable Low-Noise MM-Wave Mixers with Whisker-Contacted Honeycomb Diodes

*J.H. Schroth. "Highly Reliable Low-Noise MM-Wave Mixers with Whisker-Contacted Honeycomb Diodes." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 451-453.*

Single ended mixers at 94 GHz and 140 GHz with whisker-contacted honeycomb diodes have been realized. Environmental tests showed that the split block mixermount construction withstands shocks up to 1000 g/2 ms. Commercially available Mott-diodes have been used to obtain noise temperatures of 600°K (SSB) at 94 GHz and 250 uW L.O. drive.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A Subharmonically Pumped Fin-Line Mixer for Satellite TV Receiver Applications

*G. Begemann. "A Subharmonically Pumped Fin-Line Mixer for Satellite TV Receiver Applications." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 454-456.*

A subharmonically pumped fin-line mixer working at the satellite TV frequency band around 12 GHz has been realized with a simple filter and diplexer configuration. All of the mixing products below and encluding double the LO frequency are suppressed by an RF input high-pass filter, which simultaneously rejects the image frequency band. With non-selected commercially available diodes a conversion loss of 5.5 to 6.2 dB has been measured. The calculated DSB noise figure is between 3.9 dB and 4.6 dB.

# Abstracts

## Analysis of Balanced Subharmonically Pumped Mixers with Unsymmetrical Diodes

*R.G. Hicks and P.J. Khan. "Analysis of Balanced Subharmonically Pumped Mixers with Unsymmetrical Diodes." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 457-459.*

A numerical analysis technique is applied to subharmonically pumped balanced mixer circuits where the two diodes differ from each other. Results indicate that a slight imbalance between the diodes has a pronounced effect on mixer performance.

# Abstracts

## Session T -- Biological Effects and Medical Applications

*"Session T -- Biological Effects and Medical Applications." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 461-461.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

Click on title for a complete paper.

# Abstracts

## 27 MHz Waveguide Applicators for Localized Hyperthermia Treatment of Cancer

*R.W. Paglione, F. Sterzer, J. Mendecki, E. Friedenthal and C. Botstein. "27 MHz Waveguide Applicators for Localized Hyperthermia Treatment of Cancer." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 463-464.*

The design of a 27 MHz ridged-waveguide applicator for use in localized hyperthermia treatment of cancer is described. The design includes considerations for mechanical constraints and for the size and location of tumors. Results of animal and clinical experiments are given.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Microstrip Loop Radiators for Local Hyperthermia

*I.J. Bahl, S.S. Stuchly, J.W. Lagendijk and M.A. Stuchly. "Microstrip Loop Radiators for Local Hyperthermia." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 465-467.*

Two new microstrip radiators for inducing local hyperthermia designed to operate at 433 MHz and 915 MHz are described. Empirical design methods and experimental results obtained with phantoms are presented. The radiators have a desired uniform radiation pattern and are well matched to the muscle tissue or a water bolus.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## A New Optical Technique for the Measurement of Temperature in RF and Microwave Fields

*K.A. Wickersheim and R.V. Alves. "A New Optical Technique for the Measurement of Temperature in RF and Microwave Fields." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 468-469.*

Fluoroptic/sup TM/ Thermometry will be compared with other optical temperature measurement techniques, the scientific basis of Fluoroptic Thermometry will be presented, and performance characteristics and applications of the first commercial instrument based on this RF-immune technology will be discussed.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Non-Pertubing Temperature Probe and Thermography Measurements in Microwave Diathermy

*C.U. Hochuli and G. Kantor. "Non-Pertubing Temperature Probe and Thermography Measurements in Microwave Diathermy." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 470-472.*

In support of the BRH proposed microwave diathermy standard, temperature measurements in fat-muscle phantoms using thermography and a non-perturbing temperature probe were investigated. These probe data indicate significant thermography errors.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Hyperthermia

*F.K. Storm. "Hyperthermia." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 473-475.*

The use of heat in cancer treatment dates back to the ancients with the application of red-hot irons by Ramajama (2000 B.C.), Hippocrates (400 B.C.) and Galen (200 A.O.). In more recent times, Westermark (1898) placed hot-water circulating cisterns into advanced carcinomas of the uterus and found palliative shedding of some tumors. Coley (1927) introduced "toxin" therapy for cancer, but stated that responses were associated with temperatures of 39-40° for several days duration, suggesting that the febrile reaction might have been the tumoricidal agent. Simultaneously Keating-Hart and Doyen (1910) introduced electrocoagulation of tumors, which is still in use today. Warren (1933) was one of the first to apply infrared and high-frequency current heating of tumors and found objective remissions of some cancers. With the subsequent development and popularity of x-irradiation therapy, hyperthermia research was all but abandoned until modern times when the selective thermosensitivity of tumor cells was more fully appreciated.

# Abstracts

## The Effects of High Power Microwave Pulses on Red Blood Cells and the Relationship to Transmembrane Thermal Gradients (Nov. 1981 [T-MTT])

*S.L. Gartner, A.W. Friend, K.R. Foster and H. Howe, Jr.. "The Effects of High Power Microwave Pulses on Red Blood Cells and the Relationship to Transmembrane Thermal Gradients (Nov. 1981 [T-MTT])." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 476-478.*

Using red blood cells exposed to various pulsed microwave conditions, we examined the possibility that cellular damage may occur due to the creation of microthermal gradients across the cell membrane.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Microwave Thawing of Frozen Packed Red Blood Cells

*N.L. Campbell and J. Drewe. "Microwave Thawing of Frozen Packed Red Blood Cells." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 479-481.*

Small samples of frozen human packed red blood cells (RBCs) were thawed by microwave heating (2450 MHz) and by water bath heating. The functional integrity of the cells was measured before and after thaw, and over a 6-hour period after wash. Minor differences between microwave and water thawed RBCs were observed.

# Abstracts

## Application of Moment-Methods to Electromagnetic Biological Imaging

*M.J. Hagmann, O.P. Gandhi and D.K. Ghodgaonkar. "Application of Moment-Methods to Electromagnetic Biological Imaging." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 482-482.*

An explicit solution has been obtained for the dielectric properties of an inhomogemeous dielectric scatterer in terms of measured values of the incident and externally-scattered fields. Effects of secondary media, localized sources, and other means for improving the numerical stability will be described.

# Abstracts

## Microwave Imaging: Numerical Simulation and Results

*M.F. Iskander, R. Maini and C.H. Durney. "Microwave Imaging: Numerical Simulation and Results." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 483-485.*

The feasibility of using the linear reconstruction techniques in microwave imaging is examined numerically using the method of moments. Images of phantoms simulating biological objects are obtained using the algebraic reconstruction technique. The obtained resolution and sensitivity are discussed.

# Abstracts

## Session U -- Microwave Field And Network Theory

*"Session U -- Microwave Field And Network Theory." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 487-487.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Propagation Parameters of Coupled Microstrip-Like Transmission Lines for Millimeter Wave Applications (1981 [MWSYM])

*S.K. Koul and B. Bhat. "Propagation Parameters of Coupled Microstrip-Like Transmission Lines for Millimeter Wave Applications (1981 [MWSYM])." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 489-491.*

Variational expression is derived for the propagation parameters of coupled microstrip-like transmission lines for millimeter wave applications using the 'transverse transmission line' method. Numerical results are presented for the coupled inverted and coupled suspended lines.

# Abstracts

## Hybrid Mode Analysis of Microstrip Lines on Anisotropic Substrates (1981 [MWSYM])

*A.-M.A. El-Sherbiny. "Hybrid Mode Analysis of Microstrip Lines on Anisotropic Substrates (1981 [MWSYM])." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 492-494.*

A rigorous hybrid mode analysis is applied to the microstrip line on anisotropic substrate to determine its high frequency performance. The treatment is limited to substrates with uniaxial anisotropy with the principal axis perpendicular to the surface. This includes the practically important case of microstrip lines on Sapphire. The exact results obtained are used to check the validity of the previously introduced concept of equivalent isotropic substrate, which was used by some authors to simplify the calculations of the high frequency parameters of such lines.

# Abstracts

## Analysis of Microstrrip Line on Semiconductor Substrate

*M. Aubourg, J.P. Villotte, F. Codon and Y. Garault. "Analysis of Microstrrip Line on Semiconductor Substrate." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 495-497.*

A two dimensional analysis of MIS (or Schottky contact) microstrip is made with the aid of the finite element method. Theoretical results are compared with experimental results.

# Abstracts

## Wave Propagation in Inhomogeneous Anisotropic Rectangular Waveguides by the Effective Index Method

*M.N. Armenise and M. De Sario. "Wave Propagation in Inhomogeneous Anisotropic Rectangular Waveguides by the Effective Index Method." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 498-500.*

Hybrid mode dispersion and mapping of multilayer rectangular diffused birifrangent waveguides are studied by the effective index method for two orientations, horizontal and vertical, of the crystal optic axis. At first the structure is examined in the approximate lossless approach, then the perturbation technique allows us to evaluate the extinction coefficient value to employ as starting point in the direct search optimization strategy for determining the complex propagation constant for the exact solution. The guided E/sup x//sub 11/ and E/sup y//sub 11/ modes exhibit almost the same cutoff wavelength and their dispersion curves little differ from the ones of corresponding TM/sub 0/, up to 1 μm for vertical optic axis because of the surface plasma waves, and TE/sub 0/ modes of the slab waveguide without and with the metal film respectively.

# Abstracts

## Improved Technique for Evaluation of Slot Discontinuities in Rectangular Waveguide

*P.K. Park and G.J. Stern. "Improved Technique for Evaluation of Slot Discontinuities in Rectangular Waveguide." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 501-503.*

When the Green's dyadics are structured using waveguide modes, xx/over ^^/- component convergence in the source region is not assured. Often image techniques must be emloyed. A new integral equation is formulated to avoid this complication.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Two-Dimensional Analysis for Stripline/Microstrip Circuits

*K.C. Gupta, R. Chadha and P.C. Sharma. "Two-Dimensional Analysis for Stripline/Microstrip Circuits." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 504-506.*

This paper discusses two aspects of two-dimensional circuits at microwave frequencies. First part is intended to emphasize that 2-dimensional planar circuit approach may be used to analyze and optimize stripline circuits. The second part describes a new method called 'desegmentation' which extends the applicability of Green's functions technique for planar circuits.

# Abstracts

## A Generalized n-Port Cascade Connection

*G.R. Simpson. "A Generalized n-Port Cascade Connection." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 507-509.*

An extension of the common two-port cascade connection to a generalized n-port cascade connection is described. An efficient matrix algorithm is then derived which computes the S-parameters of the resulting network from the S-parameters of the two connected networks.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Projective Matrix Transformations in Microwave Network Theory

*R.A. Speciale. "Projective Matrix Transformations in Microwave Network Theory." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 510-512.*

Recent theoretical investigations reveal the dominant role played by a new type of matrix transformation in the theory of microwave networks composed of multiport elements; this is an extension to multidimensional vector spaces of the well-known scalar fractional bilinear transformations. Projective matrix transformations have been found to map the scattering matrix, the impedance matrix, and the admittance matrix of an n-port network embedded in a 2n-port supernetwork. The transfer-scattering matrix and the chain- or ABCD-matrix of a 2n-port network embedded in a 4n-port supernetwork, are also mapped in a similar manner by matrix transformations of the same type. A fundamental application of this new transformation is the generalization of the concept of image-parameters known for 2-port networks to that of image-matrices for 2n-port networks. This generalization leads to a rigorous normal-mode analysis of wave-propagation on image-matched chains of cascaded 2n-port networks.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Session V -- Guided Wave Optics and Signal Processing

*"Session V -- Guided Wave Optics and Signal Processing." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 513-513.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

Click on title for a complete paper.

# Abstracts

## The Integrated Optic Spectrum Analyzer -- A First Demonstration

*T.R. Ranganath, T.R. Joseph and J.Y. Lee. "The Integrated Optic Spectrum Analyzer -- A First Demonstration." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 515-516.*

This paper reports on the performance of the first fully Integrated Optical Spectrum Analyzer consisting of a GaAlAs semiconductor laser, a LiNb0/sub 3/ integrated optic chip, and a Si detector/CCD linear array,

# Abstracts

## Guided Wave Optical RF Spectrum Analyzer

*D. Mergerian, E.C. Malarkey, R.P. Pautienus, J.C. Bradley, A.L. Kellner and M.D. Mill. "Guided Wave Optical RF Spectrum Analyzer." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 517-519.*

The design, fabrication and performance of an integrated optical R.F. spectrum analyzer is described. The device consists of an injection laser, the IO substrate and a photodiode array. It operates over a frequency band-width of 400 MHz centered at 600 MHz and with a complete frame time of 2 µsec. An R. F. input signal dynamic range in excess of 20 dB has been measured.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## A Generalized Two-Dimensional Coupled-Mode Analysis of Curved and Chirped Periodic Structures in Open Dielectric Waveguides (1981 [MWSYM])

*Z.-Q. Lin, S.-T. Zhou, W.S.C. Chang, S. Forouhar and J. Delavaux. "A Generalized Two-Dimensional Coupled-Mode Analysis of Curved and Chirped Periodic Structures in Open Dielectric Waveguides (1981 [MWSYM])." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 520-521.*

A generalized two-dimensional coupled-mode analysis of curved and chirped quasi-periodic structures in planar dielectric waveguides has been formulated. This analysis can be used to design curved and chirped quasi-periodic structures for obtaining phase matched interaction between two specific guided-wave beams. Alternatively, it can be used to calculate the amplitude and the phase of the diffracted guided-wave beam for a given quasi-periodic structure and for a specific incident beam, including the effect of the phase mismatch.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Nonreciprocal Propagation Characteristics of YIG Thin-Film

*T. Mizumoto and Y. Naito. "Nonreciprocal Propagation Characteristics of YIG Thin-Film." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 522-524.*

The characteristics of optical nonreciprocal phase shifter (ONPS), with which optical circulators can be constructed, are investigated. We could confirm experimentally that the YIG thin-film waveguide worked as ONPS.

# Abstracts

## Experiment on Light Intensity Modulation Based on Guided-to-Radation Mode Coupling in Hetero-Structure Thin Film Waveguide

*H. Onodera, I. Awai, M. Nakajima and J. Ikenoue. "Experiment on Light Intensity Modulation Based on Guided-to-Radation Mode Coupling in Hetero-Structure Thin Film Waveguide." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 525-527.*

Coupling of TE/sub 0/ guided mode to TM radiation mode is controled by a modulation signal applied to coplanar electrodes. Almost 30dB/cm of modulation efficiency at 0.6328µm wavelength has been obtained using a Nb/sub 2/O/sub 5/-LiTaO/sub 3/ planar waveguide with modulation voltage 350V and electrodes gap 55µm.

# Abstracts

## Polarization-Rotated Radiation Conversion in Electrooptic Waveguides

*S. Yamamoto. "Polarization-Rotated Radiation Conversion in Electrooptic Waveguides." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 528-530.*

We report several experimental results on the fundamental characteristics of guided-radiation mode coupling in optical waveguides. Three types of polarization-rotated (TE -->TM or vice versa) radiation conversion are examined, which utilize electrooptic effect of LiNbO/sub 3/ and LiTaO/sub 3/.

# Abstracts

## Exhibition Guide (1981 [MWSYM])

*"Exhibition Guide (1981 [MWSYM])." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 531-537.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Index of Authors (1981 [MWSYM])

*"Index of Authors (1981 [MWSYM])." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): 539-543.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Back Cover (1981 [MWSYM])

*"Back Cover (1981 [MWSYM])." 1981 MTT-S International Microwave Symposium Digest 81.1 (1981 [MWSYM]): b1-b1.*

# Abstracts

## Front Cover (1982 [MWSYM])

*"Front Cover (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): f1-f2.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Copyright (1982 [MWSYM])

*"Copyright (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): fm1-fm2.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Welcome to the 1982 International Microwave Symposium (1982 [MWSYM])

*D.N. McQuiddy, Jr.. "Welcome to the 1982 International Microwave Symposium (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): fm3-fm4.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Digest Dedication (1982 [MWSYM])

*"Digest Dedication (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): fm5-fm5.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Committees (1982 [MWSYM])

*"Committees (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): fm6-fm7.*

# Abstracts

## Awards (1982 [MWSYM])

*"Awards (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): fm16-fm16.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## MTT-S Microwave Prize (1982 [MWSYM])

*"MTT-S Microwave Prize (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): fm19-fm19.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## 1981 IEEE Fellows (1982 [MWSYM])

*"1981 IEEE Fellows (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): fm20-fm20.*

# Abstracts

## Microwave Communication Technology

*F. Ivanek. "Microwave Communication Technology." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): fm21-fm21.*

Communications represent the largest microwave market segment, worldwide. Analog terrestrial microwave links carry more than half of the long-distance communications in the U.S. and in most other countries. Growing and diversifying applications led to spectrum crowding, which demanded better spectrum utilization. This is being implemented in two ways: (1) through improvements in the spectrum efficiency, i.e., by increasing the transmission capacity within a given channel bandwidth, and (2) through spectrum sharing between different transmission systems (e.g., terrestrial and satellite). The advent of digital microwave transmission introduced additional elements of complexity. Under these circumstances, the microwave industry faces unprecedented challenges in the development and manufacture of communications equipment, components and devices. The talk is intended to concentrate on technological developments in response to the prevailing operational requirements and competitive pressures.

# Abstracts

## Panel Sessions (1982 [MWSYM])

*"Panel Sessions (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): fm22-fm22.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Workshops (1982 [MWSYM])

*"Workshops (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): fm23-fm23.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## MTT-S International Symposium Future Locations (1982 [MWSYM])

*"MTT-S International Symposium Future Locations (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): fm24-fm24.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Schedule of Additional Meetings (1982 [MWSYM])

*"Schedule of Additional Meetings (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): fm24-fm24.*

# Abstracts

## Quick Reference Guide to Sessions by Letter (1982 [MWSYM])

*"Quick Reference Guide to Sessions by Letter (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): fm25-fm25.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Technical Program (1982 [MWSYM])

*"Technical Program (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): fm26-fm31.*

Contents
Publications
Issues
Papers
Authors

Click on title for a complete paper.

# Abstracts

## Table of Contents (1982 [MWSYM])

*"Table of Contents (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): fm32-fm44.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Welcome Page (1982 [MWSYM])

*"Welcome Page (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): fm45-fm45.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Session A -- Opening Session (1982 [MWSYM])

*"Session A -- Opening Session (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): fm46-fm46.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## 30 Years of Microwaves

*T.S. Saad. "30 Years of Microwaves." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 1-1.*

On March 1 of this year, the IEEE Microwave Theory and Techniques Society was 30 years old. I would like to share with you some of the history of our technology, our business, our society and our profession during those 30 years.

# Abstracts

## Thirty Years of Microwaves in China

*H. Hung-chia. "Thirty Years of Microwaves in China." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 2-6.*

This report is a brief survey of the evolution of microwave art in China through its several stages in the past thirty years. After a historical account of the Chinese microwaves, the author has endeavored to provide a cross-sectional view of the current state of the microwave art in this country. Emphasis is laid on some typical microwave systems, on microwave solid state devices and integrated circuits, on the efforts made by the Chinese microwave people in pushing the frequency to the short millimeter or submillimeter wavelength range with a view to covering the entire electromagnetic spectrum, and on exploring novel microwave applications which appear potentially attractive and very promising. A survey of the past and the present shows that remarkable progress in microwave R&D has been made in China, despite long periods of hard times. However, it is expected that more years of assiduous effort will be required in many areas of the microwave art before the advanced standards in other parts of the world can be attained.

# Abstracts

## Microwaves - The Years to Come

*L. Young. "Microwaves - The Years to Come." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 7-7.*

Current and proposed Government funded research and development is conducted with the anticipation that such R&D will eventually lead to a generation of new or improved microwave components and systems.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Session B -- Low Noise Techniques

*"Session B -- Low Noise Techniques." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 9-9.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Low-Noise Technology, 1982 State-of-the-Art

*S. Weinreb. "Low-Noise Technology, 1982 State-of-the-Art." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 10-12.*

The current noise performance in the 100 MHz to 300 GHz range of transistors, paramps, masers, Schottky diode mixers, and superconductor-insulator-superconductor (SIS) mixers will be summarized and compared with the natural limits due to cosmic noise, atmosphere, and quantum effects. Recent advances concerning cooled FET amplifiers, cryogenic coolers, and millimeter wave mixers will be discussed.

# Abstracts

## Millimetre Wave Low Noise E-Plane Balanced Mixers Incorporating Planar MBE GaAs Mixer Diodes

*R.N. Bates, R.K. Surridge, J.G. Summers and J. Woodcock. "Millimetre Wave Low Noise E-Plane Balanced Mixers Incorporating Planar MBE GaAs Mixer Diodes." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 13-15.*

Planar GaAs Mott mixer diodes have been made for use in novel E-plane balanced mixers at 35 and 85 GHz. Single sideband noise figures of 6 dB at 35 GHz and 7.5 dB at 85 GHz (including 1 dB I.F. contribution) have been achieved. Both devices and circuits are suitable for low cost, high volume applications.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A 30 GHz FET Receiver

*E. Watkins, J.M. Schellenberg and H. Yamasaki. "A 30 GHz FET Receiver." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 16-18.*

This paper describes a GaAs FET receiver operating from 27.5 to 30.0 GHz with a 4.6 dB noise figure and 17 dB conversion gain at band center. A three-stage FET amplifier (4.4 dB noise figure, 17.5 dB gain), a 25 GHz FET oscillator (10 mW output), and dual-gate FET mixer (3 dB conversion gain, 10 dB noise figure) were developed for this receiver.

# Abstracts

## A 22 to 24 GHz Cryogenically Cooled Low Noise FET Amplifier in Coplanar Waveguide

*A. Cappello and J. Pierro. "A 22 to 24 GHz Cryogenically Cooled Low Noise FET Amplifier in Coplanar Waveguide." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 19-22.*

This paper describes the design and development of a 22 to 24 GHz Cryogenically Cooled Amplifier with a noise temperature of 150K and a gain of 33 dB at 23 GHz when the amplifier is cooled to 77K.

# Abstracts

## Session C -- Microwave Mixers

*"Session C -- Microwave Mixers." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 23-23.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

Click on title for a complete paper.

# Abstracts

## The Gap Diode: A New High Frequency Mixer and Detector

*S.J.J. Teng, P. Chen, F.J. Rosenbaum and R.E. Goldwasser. "The Gap Diode: A New High Frequency Mixer and Detector." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 24-26.*

A new metal-semiconductor device is reported whose I-V characteristic is controlled by a geometric gap between adjacent Schottky barrier regions. An improved performance low turn-on votlage GaAs diode is demonstrated at 10 through 70 GHz.

# Abstracts

## Subharmonic Mixer Using Planar Doped Barrier Diodes

*S. Dixon, R.J. Malik, J. Paul, P. Yen, T.R. Aucoin and L.T. Yaun. "Subharmonic Mixer Using Planar Doped Barrier Diodes." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 27-29.*

As a part of an Electronics Technology and Devices Laboratory internal effort, a novel subharmonically pumped mixer using planar doped barrier (PDB) diodes has been designed and fabricated. It adopts a configuration which is used primarily to optimize the MBE grown PDB diodes. A conversion loss, in the order of 6 dB has been achieved using a 1.2 GHz local oscillator and a signal frequency of 2.0 GHz.

# Abstracts

## Single-Sideband Mixers for Communications Systems

*B.R. Hallford. "Single-Sideband Mixers for Communications Systems." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 30-32.*

Two types of balun-coupled single-sideband (SSB) mixers suitable for communications systems will be presented in their equivalent circuit and RF planar configuration. A 6-GHz SSB mixer model will be fully described.

# Abstracts

## A Novel Broadband Double Balanced Mixer for the 18-40 GHz Range

*A. Blaisdell, R. Geoffroy and H. Howe. "A Novel Broadband Double Balanced Mixer for the 18-40 GHz Range." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 33-35.*

Double balanced mixers have been constructed in the 18-40 GHz range, utilizing unique planar transmission line techniques which permit easy integration of the mixers with other components to provide a compact, low-cost receiver assembly for band extension of EW systems, The design concepts are discussed and the performance results are presented for three mixer circuits mounted in waveguide structures for operation from 18-26.5 GHz, 26.5-40 GHz and 18-40 GHz.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## The Image Rejection Harmonic Mixer

*D. Weiner, J. Griffin and L. McCarty. "The Image Rejection Harmonic Mixer." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 36-38.*

Image channelization techniques are combined with antiparallel diode harmonic mixing to create a new type of mixer: the Image-Rejection Harmonic Mixer (IRHM). Such a mixer features: (1) adaptability to wide-bandwidth coverage with inherent image suppression, (2) simplified constuction versus fundamental image rejection mixers, and (3) easier local oscillator implementation. Performance of an S-band mixer is shown.

# Abstracts

## Session D -- Microwave Acoustics: Devices and Applications

*"Session D -- Microwave Acoustics: Devices and Applications." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 39-39.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A Review of Electronic Warfare (EW) Receivers with Acoustic Devices

*J.B.Y. Tsui, W.T. Brumfield and J.F. Hoffmann. "A Review of Electronic Warfare (EW) Receivers with Acoustic Devices." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 40-42.*

This paper discusses state of the art of channelized receivers with surface acoustic wave (SAW) filters, the the impact of SAW dispersive delay lines on microscan receivers, and the general characteristics of Bragg cell receivers.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A SAW Resonator Stabilized Oscillator for a CATV Set-Top Converter

*S. McIntosh. "A SAW Resonator Stabilized Oscillator for a CATV Set-Top Converter." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 43-45.*

A SAW resonator stabilized oscillator for a CATV set-top converter has been designed and is in high volume production. The SAW oscillator, operating at one of four frequencies near 680 MHz with a long-term stability of ±10 kHz, is the 2nd LO in a dual conversion, 54-channel converter. The oscillator uses a 0°, two-port SAW resonator in conjunction with a dual-gate MOS Field Effect Transistor. Tuning to exact frequency is accomplished by compression or expansion of two air wound inductors. This oscillator has significant performance advantages over conventional L-C oscillators, and significant cost advantages over crystal multiplier, frequency synthesizer, and AFC designs.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## 800 MHz Low Loss SAW Filter Using New Phase Weighting

*M. Hikita, Y. Kinoshita, H. Kojima, T. Tabuchi and A. Sumioka. "800 MHz Low Loss SAW Filter Using New Phase Weighting." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 46-48.*

A new high performance SAW filter for a mobile telephone is presented here. New technologies - - low loss weighting in an IDT, and a new resonant filter configuration - - are described. Experimental results with 3.5~4.0 dB insertion loss at 830 MHz are presented.

# Abstracts

## Hybrid FET/SAW Programmable Transversal Filter

*C.M. Panasik. "Hybrid FET/SAW Programmable Transversal Filter." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 49-51.*

A programmable transversal filter is described which employs hybrid tap weight circuitry to produce continuously adjustable tap weight magnitude and sign. The breadboard consists of a LiNb0/ sub 3/ surface acoustic wave device utilizing a wideband 250 MHz input IDT and a 16 tap (200 MHz) output electrode array and associated electronics. A novel sampling technique allows the output array to function from 200 to 300 MHz. Programmable tap weight changes over greater than 40 dB and at a 9 MHz rate have been demonstrated. Experimental results are compared with theoretical analyses of loss mechanisms and filter response capabilities.

# Abstracts

## Session E -- High Power Techniques

*"Session E -- High Power Techniques." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 53-53.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## High-Power 2-9 GHz Solid State Switch

*D.W. Kintigh and W.K. Niblack. "High-Power 2-9 GHz Solid State Switch." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 54-56.*

A fast high power solid state switch has been developed using optimized epitaxial silicon PIN chips. It is capable of switching over 360 watts of CW of power from 2-9 GHz and switching in 400 ns.

# Abstracts

## A Linearized High Power Microwave Digital Phase Modulator

*M. Cuhaci, G.J.P. Lo and N.S. Hitchcock. "A Linearized High Power Microwave Digital Phase Modulator." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 57-59.*

A new technique for linearizing the reflection characteristics of PIN diodes in a high-power microwave digital modulator is described. The application of this technique in low data rate systems permits the use of less costly microwave hardware and results in efficient utilization of the transmitter power.

# Abstracts

## A High Power W-Band (90-99 GHz) Solid State Transmitter for High Duty Cycles and Wide Bandwidth

*G.R. Thoren and M.J. Virostko. "A High Power W-Band (90-99 GHz) Solid State Transmitter for High Duty Cycles and Wide Bandwidth." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 60-62.*

A high average power W-Band solid state transmitter using a 2-diode and a 4-diode IMPATT power combiner has achieved over 1.89 W and exceedingly versatile performance over a broad range of pulsewidths and duty cycles with a tunable bandwidth from 90 GHz to 99 GHz.

# Abstracts

## Non Linear Equivalent Circuit for Broadband GaAs MESFET Power Amplifier Design

*R. Soares, M. Goudelis, B. Loriou and E. de Los Reyes Devo. "Non Linear Equivalent Circuit for Broadband GaAs MESFET Power Amplifier Design." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 63-65.*

A non-linear equivalent circuit is developed to model the fundamental frequency r.f. performance of a 1µm x 800 µm GaAs MESFET, based on two-port large-signal amplifier measurements between 6-8 GHz. Potentially larqe-band, the circuit accurately predicts in-band AM/PM conversion and saturation of the device with arbitrary terminal loads.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## A 4.5 GHz 40 Watt GaAs FET Amplifier

*N. Fukuden, F. Ogata, M. Hayakawa, H. Sugawara, M. Takagi and Y. Arai. "A 4.5 GHz 40 Watt GaAs FET Amplifier." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 66-68.*

A high power GaAs FET amplifier with an output power of 40 watts at 4.5 GHz has been developed. Power conbining loss of 1.1 dB was investigated and cooling system using heat pipe was developed.

# Abstracts

## An RF-Primed All-Halogen Gas Plasma Microwave High Power Receiver Protector

*H. Goldie and S. Patel. "An RF-Primed All-Halogen Gas Plasma Microwave High Power Receiver Protector." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 69-71.*

A new type of keepalive for gaseous hybrid waveguide receiver protectors is shown to provide reliable and reproducible power limiting. The design allows halogen gases to be used in place of conventional gasfills, resulting in extremely fast recovery periods independent of duty cycle over a wide range. Recovery periods less than 100 nsec were measured at incident power levels of 200 watts peak at X-band frequencies over a duty cycle range of 0.00005 to 0.5.

# Abstracts

## Potential Arc Hazard Produced by Handling Connectors While Operating Pulsed Microwave Equipment

*A.W. Friend and S.L. Gartner. "Potential Arc Hazard Produced by Handling Connectors While Operating Pulsed Microwave Equipment." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 72-73.*

Large microwave pulses with low average power can cause arcs between the sharp center pins of N-type connectors and biological tissues. These arcs may have enough energy to ignite volatile vapors.

# Abstracts

## L-Band Si Power V-FET

*C. Xian-e, Z. Ping-hai and Q. Wen-rui. "L-Band Si Power V-FET." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 74-76.*

A new structure Si vertical channel FET ---- the covered gate structure has been developed. Compared with the buried gate structure, an increasing power gain by more than 5 dB has been obtained. L-band devices with output power higher than 10W, power gain 6 dB at 1GHz have been fabricated. The relationship between the electrical properties and devices structure parameters are discussed. The excellent temperature performance and other characteristics are reported.

# Abstracts

## Session F -- Magnetostatic Waves: Devices and Applications

*"Session F -- Magnetostatic Waves: Devices and Applications." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 77-77.*

# Abstracts

## An Epitaxial YIG 10-Channel Filter Bank

*J.D. Adam. "An Epitaxial YIG 10-Channel Filter Bank." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 78-79.*

The design, construction and performance of an X-band 10-channel filter bank using magnetostatic wave propagation in epitaxial YIG films is described.

# Abstracts

## Simultaneous Pulse Separator

*P. Wahi and Z. Turski. "Simultaneous Pulse Separator." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 80-82.*

Simultaneous signals in EW/IFM receivers escape unnoticed, thus lowering the probability of intercept. Propagation of these signals through a highly dispersive delay line should separate them in time domain. Magnetostatic waves are inherently dispersive and, therefore, offer great promise for correcting the simultaneous signals problem directly at microwave frequencies. A simultaneous pulse separator using a dispersive delay line is proposed, and the experimental results of an MSW dispersive delay line are reported.

# Abstracts

## Ion Implanted Oblique Incidence Magnetostatic Waves

*R.L. Carter, J.M. Owens, C.V. Smith and K.W. Reed. "Ion Implanted Oblique Incidence Magnetostatic Waves." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 83-85.*

Ion implanted bars have been used in MSFVW oblique incidence reflective array filters at 3 GHz. Theory is presented based on a four layer dispersion relation and the impulse model. Experimental results agree well with theory.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Magnetostatic Wave Propagation within Obliquely Magnetized YIG Films

*T. Koike. "Magnetostatic Wave Propagation within Obliquely Magnetized YIG Films." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 86-88.*

The theory of the magnetostatic volume and surface wave propagation within obliquely magnetized YIG films and a correction to the previously reported results are discussed. The experimental confirmation of the new theory is also given.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Session G -- Radiometers

*"Session G -- Radiometers." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 89-89.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Flight Test Evaluation of a Noise Injection Dicke Microwave Radiometer Employing Digital Signal Processing

*R.W. Lawrence, R.F. Harrington and N.S. Higdon. "Flight Test Evaluation of a Noise Injection Dicke Microwave Radiometer Employing Digital Signal Processing." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 90-92.*

A noise injection Dicke Microwave Radiometer employing a digital signal processor has been designed., developed, and flight tested. The principles of operation, along with results of laboratory and flight tests on this system are presented.

# Abstracts

## An Experimental Millimetre-Wave Radiometric Tracker

*S.J. Nightingale and G. Payne. "An Experimental Millimetre-Wave Radiometric Tracker." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 93-95.*

Recent improvements in mixer design and device technology have made possible the realisation of high performance millimetric receivers. This paper describes a 4 channel amplitude comparison radiometric receiver for target tracking which has been developed within certain specified constraints.

# Abstracts

## High Sensitivity, Accurate MMW Radiometers for Ground-Mapping Systems

*W.B. Day, E.H. Kraemer, R.S. Roeder and R.E. Wilt. "High Sensitivity, Accurate MMW Radiometers for Ground-Mapping Systems." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 96-98.*

AC coupled, periodically calibrated, total power radiometric sensors, covering the atmospheric windows from 10 to 220 GHz, are described. Modulated rf noise generators are used to provide pilot signals for gain stability.

# Abstracts

## Performance Simulator for a Wind Scatterometer

*P. Hans and D. Miller. "Performance Simulator for a Wind Scatterometer." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 99-101.*

Towards the middle of the decade, Europe will launch the next generation of its Earth Resources Satellites, ERS 1. One Sensor, the Wind Scatterometer will be used to measure the wind vectors over the oceans. This paper describes the computer performance simulation which will be used to optimise the sensor design. System geometry, propagation path and receiver processing modelling on a desk-top computer provides an interactive tool for rapidly investigating design changes. Program description is non-mathematical and includes copies of selected outputs for clarification.

# Abstracts

## Session H -- Optical and Microwave Techniques for Guided Wave Structures

*"Session H -- Optical and Microwave Techniques for Guided Wave Structures." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 103-103.*



Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Microwave Circuit Models of Semiconductor Injection Lasers (1982 [MWSYM])

*R.S. Tucker and D.J. Pope. "Microwave Circuit Models of Semiconductor Injection Lasers (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 104-106.*

Small-signal two-port circuit models of packaged broad-stripe and buried-heterojunction AlGaAs laser diodes are presented. The models show good agreement with measured reflection coefficient and modulation frequency response data.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Comparison of Numerical and Effective-Index Methods for a Class of Dielectric Waveguides

*A. Linz and J.K. Butler. "Comparison of Numerical and Effective-Index Methods for a Class of Dielectric Waveguides." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 107-109.*

A numerical method and the effective-index method are applied to a three-layer, constant thickness dielectric waveguide with smoothly varying dielectric constant inside the active layer and constant permittivity in the confining layers. The results of the two methods are compared in terms of the propagation constant gamma calculated by each method. Application of the effective-index method facilitates a physical understanding of dielectric waveguide modes as well as providing an efficient approximate method for calculating mode behavior.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Capacitively Loaded Transmission Line for Subnanosecond Stepped Delta beta Operation of an Integrated Optical Directional Coupler Switch

*U. Langmann and D. Hoffmann. "Capacitively Loaded Transmission Line for Subnanosecond Stepped Delta beta Operation of an Integrated Optical Directional Coupler Switch." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 110-112.*

A coplanar transmission line loaded with lumped electrode capacitances, which are distributed along the line, is used for a broadband traveling wave type Delta beta operation of an integrated optical directional coupler switch on a LiNbO/sub 3/ substrate.

# Abstracts

## Proposal of an Analytical Technique Using Circularly Polarized Waves and its Application

*K. Kusano. "Proposal of an Analytical Technique Using Circularly Polarized Waves and its Application." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 113-115.*

A new analytical technique is constructed by using circularly polarized waves. And further, it is applied to calculate and interpret the polarization characteristics of optical fiber.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Phase Matched Optical Dielectric Waveguide Using 'The Artificial Anisotropic Structure'

*T. Mizumoto, H. Arai and Y. Naito. "Phase Matched Optical Dielectric Waveguide Using 'The Artificial Anisotropic Structure'." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 116-118.*

Phase matching technique by 'the artificial anisotropic structure' in the optical dielectric waveguide is proposed. A thin film mode converter can be realized by this technique. Mode conversion is estimated approximately.

# Abstracts

## Design of Chirped Grating Lenses in Planar Optical Waveguides

*W.S.C. Chang, S. Forouhar, J.-M. Delavaux and R.-X. Lu. "Design of Chirped Grating Lenses in Planar Optical Waveguides." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 119-121.*

Theoretical designs of chirped grating lenses have yielded very high efficiency and moderately large angular fields of view. Experimentally, high efficiency (0.7dB insertion loss) and large angular field of view (0.1 radians) have been obtained in low index glass waveguides. Performance in high index waveguides such as LiNbO /sub 3/ will be limited by the n/sub eff/-n/subs/, the index of the groove material and the tolerance of the microfabrication processes.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## A Planar Electro-Optic Beam Splitter with a Sawtooth Electrode

*C.L. Lee, J.S. Horng and C.-H. Huang. "A Planar Electro-Optic Beam Splitter with a Sawtooth Electrode." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 122-123.*

A planar electro-optic beam splitter with a sawtooth electrode is presented. The realized device on LiNbO/sub 3/ showed that this device had a deflection power two times higher than the beam splitter with conventional prism electrodes. It is easier to be fabricated and gives a higher operating speed.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Session I -- Two Terminal Devices and Combining Techniques

*"Session I -- Two Terminal Devices and Combining Techniques." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 125-125.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

Click on title for a complete paper.

# Abstracts

## A 1kW/sub peak/, 300 W/sub avg/ IMPATT Diode Injection Locked Oscillator

*C.A. Drubin, A.L. Hieber, G. Jerinic and A.S. Marinilli. "A 1kW/sub peak/, 300 W/sub avg/ IMPATT Diode Injection Locked Oscillator." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 126-128.*

Design procedures were developed for and applied to a circularly cylindrical resonant cavity combiner (CCRCC) operating in the TM /sub 020/ mode. Thirty-two (32) GaAs double-drift IMPATT diodes were power combined in such a structure yielding 313 watts average and 1043 watts peak at X-Band.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A Dual Diode TM /sub 020/ Cavity for IMPATT Diode Power Combining

*R. Laton, S. Simoes and L. Wagner. "A Dual Diode TM /sub 020/ Cavity for IMPATT Diode Power Combining." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 129-131.*

A unique design for doubling the number of IMPATT diodes combined in a TM /sub 020/ mode cavity combiner is described. Resulting performance exhibits improved combining efficiency and bandwidth over conventional TM /sub ono/ mode cavities.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Multidiode Waveguide Power Combiners

*S.E. Hamilton and B.M. Fish. "Multidiode Waveguide Power Combiners." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 132-134.*

An approach for increasing the density of IMPATT diodes in a waveguide power combiner is introduced. Design concepts and performance characteristics of three configurations are presented. These demonstrate the versatility of the waveguide power combiner.

# Abstracts

## 120-Gunn Diode Power Combining at 23 GHz

*S. Mizushina and M. Madihian. "120-Gunn Diode Power Combining at 23 GHz." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 135-137.*

Powers from a total of up to 120 Gunn diodes were combined at 23 GHz by combining three or five or seven 12- or 24-device Kurokawa oscillators through short-slot couplers in conjunction with high-level injection locking. Overall power-combining efficiencies were 76-91 percent.

# Abstracts

## Analysis and Use of Harkless Diode Mount for IMPATT Oscillators

*P.J. Allen, B.D. Bates and P.J. Khan. "Analysis and Use of Harkless Diode Mount for IMPATT Oscillators." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 138-141.*

An equivalent circuit is derived for the Harkless diode mount used in IMPATT oscillators and the Kurokawa waveguide combiner. Comparison with experimental measurements of the authors and other workers shows that this equivalent circuit is accurate for a wide range of conditions, including multimode waveguide propagation and the diode off-center in the guide. This equivalent circuit is directly applicable to IMPATT combiner studies and is used in a recently-developed oscillator analysis technique to accurately predict oscillator frequency and power output and to examine second-harmonic tuning in the Harkless oscillator circuit. The results are supported by experimental evidence.

## Power Combiners with Gunn Diode Oscillators (Abstract Only)

*J.J. Potoczniak, H. Jacobs, C. LoCascio and G. Novick. "Power Combiners with Gunn Diode Oscillators (Abstract Only)." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 142-142.*

Combiners were developed using two Gunn diodes in dielectric waveguide (image line) oscillator circuits. The optimum configuration consisted of each Gunn diode being imbedded in a separate rectangular dielectric cavity as a primary source of oscillation. The frequency of operation was near 10 GHz. The dielectric resonators were then radiatively coupled to a common dielectric resonator from which the combined power could be obtained. It was found that the combined power was much greater than the sum of the power obtainable from separate isolated oscillators. The proposed combiner appears attractive from the point of view of simplicity of construction and low cost and should be applicable to the millimeter-wave region, where the difficulties of precision machined metal walled cavities are very great.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Gallium Arsenide IMPATT Diodes at 20 GHz

*M.G. Adlerstein, J.W. McClymonds and D. Masse. "Gallium Arsenide IMPATT Diodes at 20 GHz." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 143-145.*

High performance double-drift Read GaAs IMPATT diodes have yielded power levels of 4 W CW with 20 percent efficiency at 20 GHz with a junction temperature less than 250° C. In this paper we describe the profile, chip and thermal design of such diodes. It is shown that further improvements in thermal design should result in diodes giving up to 8W CW. Electrical series resistance and package parasitics are important parameters in determining the device performance and amplifier bandwidth. We show that there need not be a tradeoff between thermal and parasitic characteristics of a 20 GHz diode package.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Pulsed Characterization of X-Band GaAs DDR IMPATT Diodes

*M. Harris, R. Laton and L. Wagner. "Pulsed Characterization of X-Band GaAs DDR IMPATT Diodes." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 146-148.*

A method, and the resulting data, for measurement of transient impedance behavior of pulsed X-band GaAs IMPATT diodes is described.

Click on title for a complete paper.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Session J -- GaAs FET Amplifiers

*"Session J -- GaAs FET Amplifiers." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 149-149.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## S-Band GaAs Power FET

*H.M. Macksey, H.Q. Tserng and G.H. Westphal. "S-Band GaAs Power FET." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 150-152.*

The design, fabrication, and performance of an S-band GaAs power FET are described. A pulsed 38.4 mm gate width device has produced up to 20 W with 8 dB gain across the 3 to 3.5 GHz band.

# Abstracts

## Internally Matched (IM) Plated Source Bridge (PSB) Power GaAs FET Achieving a High Performance Power Amplifier in X-Band

*S. Igi, M. Kobiki, T. Sakayori, M. Ohashi, M. Wataze, T. Suzuki and K. Kusunoki. "Internally Matched (IM) Plated Source Bridge (PSB) Power GaAs FET Achieving a High Performance Power Amplifier in X-Band." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 153-155.*

Internal matched devices with 2W and 5W power output at 10 GHz have been developed by using up-side-down mounted GaAs FETs which have PSB (Plated Source Bridge) structures. By parallel running two 5W devices, 7W solid-state power amplifiers in X-band have been practical.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## K- and Ka-band Power GaAs FETs

*T. Noguchi and Y. Aono. "K- and Ka-band Power GaAs FETs." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 156-158.*

A deep-recess channel structure has been applied to high power FETs in order to improve performances above to K-band. Internally matched devices have exhibited 2W power output with 16% power-added efficiency at 18 GHz, and 165 mW with 3dB associated gain at 29.5 GHz.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Design of Medium Power, 6-12 GHz GaAs FET Amplifier, Using High Dielectric Networks

*S.D. McCarter and A.M. Pavio. "Design of Medium Power, 6-12 GHz GaAs FET Amplifier, Using High Dielectric Networks." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 159-161.*

The input and output networks for a 4800 µm (four 1200 µm cells) gallium arsenide FET amplifier were successfully developed and constructed on high dielectric substrate material using distributed transmission line techniques. This paper describes the design and fabrication of the input and output networks and the performance of a completed 6-12 GHz 4 watt amplifier.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## A Network Modeling and Design Method for a 2-18 GHz Feedback Amplifier (1982 [MWSYM])

*A.M. Pavio. "A Network Modeling and Design Method for a 2-18 GHz Feedback Amplifier (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 162-165.*

An accurate network theory and modeling method, including feedback loop circuit parasitics and device limitations, is presented for the design of broadband microwave feedback amplifiers. Discussed are circuit realization and measured performance in relation to VSWR, gain flatness and stabilty of a 2 to 18 GHz three stage amplifier.

# Abstracts

## A 26.5-40.0 GHz GaAs FET Amplifier

*J. Rosenberg, P. Chye, C. Haung and G. Policky. "A 26.5-40.0 GHz GaAs FET Amplifier." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 166-168.*

Sub-half-micron gate GaAs FET's have been used to fabricate a MIC balanced amplifier module with 4.2 dB of minimum gain over 26.5-40.0 GHz. The module and devices are described and data is presented for gain, VSWR, noise figure, and power on the module.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Class B Operation of Microwave FETs for Array Module Applications

*M. Cohn, J.E. Degenford and R.G. Freitag. "Class B Operation of Microwave FETs for Array Module Applications." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 169-171.*

In addition to the well known class B advantages of high eta /sub PA/ and self turn on for pulsed operation, it is shown herein that class B FET amplifiers have several other important features including: 1) Significantly reduced power dissipation 2) A dynamic range of typically 8-10 dB over which gain is constant and power added efficiency is >30%. 3) Phase behavior (static and dynamic) is comparable to that observed with similar FETs operated class A. 4) Absence of erratic phase behavior during pulse turn-on and turn-off. These features make class B operation of power FET's very attractive for phased array module applications.

# Abstracts

## Design and Fabrication Techniques for Lumped-Element GaAs MESFET Power Amplifiers Using Automated Assembly Procedures

*J.B. Klatskin, R.L. Camisa and D. Haggis. "Design and Fabrication Techniques for Lumped-Element GaAs MESFET Power Amplifiers Using Automated Assembly Procedures." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 172-174.*

This paper describes the development and fabrication of lumped-element GaAs MESFET power amplifiers. The amplifiers manufactured were designed for both narrow-band and wideband (6-11 GHz) operation. Emphasis is directed toward performance trimming and automated assembly.

# Abstracts

## Session K -- Phased Array Techniques

*"Session K -- Phased Array Techniques." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 175-175.*

# Abstracts

## Solid State Radar's Path to GaAs

*D.N. McQuiddy, Jr.. "Solid State Radar's Path to GaAs." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 176-178.*

Significant advances have been achieved recently in the field of solid-state active modules. It is now possible to project improved radar system capabilities for meeting the operational requirements of the next generation aircraft. The active element phased array radar can provide an interdiction/strike aircraft with the ability 1) to terrain sense for low level flight, 2) to detect and counter both air and ground threats, and 3) to navigate and acquire targets for improved weapon delivery. The beam scanning rates and beam shape agility necessary for interleaving these functions are not achievable with conventional mechanically scanned antennas or with phase scanned passive arrays. High performance, low cost solid-state active transmit/receive modules are key to the successful implementation of an active element phased array radar (solid-state radar).

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## High Phase Accuracy Active Phased Array Module for Multi-Function Radars

*C.J. Ward, J.R. Forrest, P. Malamis, A.A. Salles, M.E. Brinson and A.J. Parsons. "High Phase Accuracy Active Phased Array Module for Multi-Function Radars." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 179-181.*

The paper describes an S-Band (2.7-3.1GHz) transmit/receive phased array module giving 40W output for 100µs pulses at 10% duty cycle. The module incorporates closed-loop phase control to reduce to a low level any phase errors between the input reference signal and the output. Initial work on the development of a fibre optic interface for input of the coherent r.f. reference signal is also described.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Dual Polarization Phased Array Diode Phase Shifter Module

*J.F. White and D.J. Fryklund. "Dual Polarization Phased Array Diode Phase Shifter Module." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 182-184.*

A phased array module has been designed containing a matched power divider and four 3-bit phase shifter channels, each of which has a 3 dB splitter and two 180 degree phase shifter bits. In this way, 3-bit phase control is accomplished along with electronic switching between two radiative polarizations on both transmit and receive. Three thousand modules (containing 12000 phase shifters) have been completed for use in a phased array antenna. Each phase shifter channel was tested using a Hewlett-Packard 1000 automated network analyzer. Average insertion loss of less than 1.7 dB (after allowance for power division) was realized with 13 degrees RMS error for the entire 12000 phase shifter assembly. This insertion loss includes the ohmic dissipation in the absorptive 8 to 1 overall power division inherent in the module's design as well as ohmic and reflective losses of a push-on simultaneous connection of the eight RF output ports of the module. Special considerations encountered in the design, manufacture and automated measurement of these modules will be high-lighted in the talk.

Click on title for a complete paper.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Experimental Thin-Film, Etched-Circuit Rectenna

*W.C. Brown and J.F. Triner. "Experimental Thin-Film, Etched-Circuit Rectenna." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 185-187.*

The design and experimental evaluation of a 2.45 GHz thin-film etched-circuit rectenna based upon the use of Mylar or Kapton F film is discussed. Efficiencies of 85% and DC power output to mass ratios of one watt per gram have been achieved.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## A Commutative Spot Transmissive Lens Antenna

*C. Orr. "A Commutative Spot Transmissive Lens Antenna." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 188-189.*

Texas Instruments Incorporated is currently under contract to the U.S. Air Force Space Division to design, fabricate and evaluate an electronically steerable solid state transmit only array and to assess its viability for use in space platform applications. The unique approach being developed is capable of limited earth coverage scan (± 3 beamwidths) without employing the use of phase shifters. It also makes use of the latest in microwave monolithic amplifier technology.

# Abstracts

## Substrate Optimization for Integrated Circuit Antennas (1982 [MWSYM])

*N.G. Alexopoulos, P.B. Katehi and D.B. Rutledge. "Substrate Optimization for Integrated Circuit Antennas (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 190-192.*

Imaging systems in microwaves, millimeter and submillimeter wave applications employ printed circuit antenna elements. The effect of substrate properties is analyzed in this paper by both reciprocity theorem as well as integral equation approach for infinitesimally short as well as finite length dipole and slot elements. Radiation efficiency and substrate surface wave guidance is studied for practical substrate materials as GaAs, Silicon, Quartz and Duroid.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Extra Broad Band Phase-Shifter Modules

*D. Bedoure. "Extra Broad Band Phase-Shifter Modules." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 193-195.*

The design theory of diode phase-shifters is well known. This has balanced phase bits connected to the opposite ports of a 3 dB hybrid coupler. The simple equations obtained in this case are no longer valid when strip-line technology is applied to the design of this type of circuit. The complexity of the resulting equations prevents a simple description. The only possibility is the optimization using a simulation programme. The method by which the equations required for this programme are obtained, is given here. Theoretical results and values for the constituent elements of a standard design are also included. Finally theoretical and practical results are shown, representing the optimized design of a phase-shifter operating in the 6 to 18 GHz band.

# Abstracts

## Session L -- Millimeter Wave Integrated Circuits (1982 [MWSYM])

*"Session L -- Millimeter Wave Integrated Circuits (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 197-197.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## New Structures for Impedance Transformation in Fin-Lines

*H. El Hennawy and K. Schunemann. "New Structures for Impedance Transformation in Fin-Lines." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 198-200.*

Cascaded transitions between unilateral and bilateral fin-line show unique features for impedance transformation. This is illustrated with a new broadband switch circuit, which has been realized by c.a.d..

# Abstracts

## Wideband Subharmonically Pumped W-Band Mixer in Single-Ridge Fin-Line

*P.J. Meier. "Wideband Subharmonically Pumped W-Band Mixer in Single-Ridge Fin-Line." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 201-203.*

A subharmonic mixer is described with an instantaneous bandwidth of 12 GHz centered near 95 GHz. The wide bandwidth is achieved by closely integrating a low-capacitance diode mount, printed-circuit matching elements, and simple yet effective filters which are uniquely suited to realization in single-ridge fin-line.

# Abstracts

## Broadband Planar Balanced Mixers for Millimeter-Wave Applications

*L. Bui and D. Ball. "Broadband Planar Balanced Mixers for Millimeter-Wave Applications." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 204-205.*

This paper describes the design and fabrication of broad-band millimeter-wave mixers using GaAs beam lead diodes and planar circuit techniques. At Ka band, a conversion loss of less than 9 dB with instantaneous bandwidths of 26 to 40 GHz (RF) and 2 to 16 GHz (IF) has been measured. At W band, the conversion loss was less than 11 dB for an instantaneous RF of 78 to 94 GHz and an IF of 26 to 42 GHz.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## A Zero-Bias GaAs Millimeter Wave Integrated Detector Circuit

*C.C. Chang, D.L. Lynch, M.D. Sohigian, G.F. Anderson, T. Schaffer and G.I. Roberts. "A Zero-Bias GaAs Millimeter Wave Integrated Detector Circuit." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 206-208.*

A monolithic GaAs millimeter wave diode detector circuit has been developed. A novel zero-bias detector diode is integrated with Ta/sub 2/N resistors and a Si/sub 3/N/sub 4/ capacitor on a chip 440 µm x 500 µm in size. Excellent detector performance has been demonstrated through 40 GHz.

# Abstracts

## Widely Tunable Millimeter-Wave Mixers Using Beam-Lead Diodes

*S. Nussbaum, J.A. Calviello, E. Sard and N. Arnoldo. "Widely Tunable Millimeter-Wave Mixers Using Beam-Lead Diodes." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 209-211.*

Newly developed GaAs beam-lead diodes have been used in mixers covering the millimeter bands of 35 to 50 GHz, 70 to 90, and 90 to 120 GHz. The mixers were tested at room temperature and achieved the following single sideband conversion losses: 4 to 4.5 dB from 35 to 50 GHz, 5 to 7 dB from 70 to 90 GHz, 4.5 to 6.5 dB from 90 to 120 GHz. SSB mixer noise temperature from 90 to 120 GHz ranged from 494 K to 1200 K. Room and cryogenic noise temperature measurements for the other mixers are in progress.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Microstrip Devices for Millimetric Frequencies

*M.J. Sisson, P.M. Brigginshaw, P.N. Wood, P.R. Brown, A.M. Hansom and M.R. Nicholls. "Microstrip Devices for Millimetric Frequencies." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 212-214.*

A new generation of glass reinforced low capacitance beam lead mixer and PIN diodes has been developed for use at millimetric frequencies. In microstrip circuitry the gallium arsenide mixer diodes display typical conversion losses of 6.5 dB (single ended) and 7.0 dB (balanced) at 94 GHz, and 7.5 dB (single ended) at 140 GHz. A microstrip PIN switch produces greater than 30 dB isolation at 90 GHz with an insertion loss of 1 dB per diode pair.

# Abstracts

## Millimeter-Wave Hybrid-Open Microstrip Techniques

*T.H. Oxley, R.E. Scarman and P.L. Lowbridge. "Millimeter-Wave Hybrid-Open Microstrip Techniques." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 215-217.*

This paper discusses some of the recent advancements in the application of hybrid-open microstrip techniques to integrated mm-wave receiver components and sub-systems in the frequency range of 26 to 110 GHz.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Hybrid Coupled Microstrip Reflection Amplifiers

*D. Rubin. "Hybrid Coupled Microstrip Reflection Amplifiers." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 218-220.*

A two-stage (four diode) hybrid coupled amplifier has been fabricated on microstrip using Indium Phosphide Gunn diodes. A minimum of 5 dB gain was achieved over 33-38 GHz. The gain of this type of amplifier is very dependent on input and output VSWR. It will be shown analytically that these devices, even when constructed monolithically, will be limited to narrow bandwidths.

# Abstracts

## Session M -- Microwave Systems Applications

*"Session M -- Microwave Systems Applications." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 221-221.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A 20-Watt C-Band BPSK Modulated FET Transmitter for Microwave Landing System

*S.R. Mazumder, T. Dao, T.L. Tsai and W.C. Tsai. "A 20-Watt C-Band BPSK Modulated FET Transmitter for Microwave Landing System." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 222-224.*

A modularized 20 watt C-band BPSK modulated FET transmitter Is developed for Microwave Landing System. The transmitter contains a x6 active multiplier using bipolar and FET, a BPSK modulator with proper amplitude shaping to achieve more than 30 dB suppression in off-channel emission and a FET power amplifier chain with a four-way power output stage.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A 1 Watt GaAs Power Amplifier for the NASA 30/20 GHz Communication System

*J. Goel, G. Oransky, S. Yuan, P. O'Sullivan and J. Burch. "A 1 Watt GaAs Power Amplifier for the NASA 30/20 GHz Communication System." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 225-227.*

A multistage GaAs FET power amplifier, employing cascaded balanced stages using state-of-the-art 1/4, 1/2, and 1 watt devices, has been developed. A linear gain of 30 dB with 1.25 watts output has been achieved over a 17.7 to 19.4 GHz frequency band. The development and performance of the amplifier and its components are discussed.

# Abstracts

## A 50 GHz MIC Transmitter/Receiver Using a Dielectric Resonator Oscillator

*Y. Tokumitsu, M. Ishizaki, T. Saito and E. Matsumoto. "A 50 GHz MIC Transmitter/Receiver Using a Dielectric Resonator Oscillator." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 228-230.*

A compact and low cost 50 GHz transmitter/receiver has been developed for a 10.7 Mb/s digital radio system. The output power of the transmitter is 5 dBm. A dielectric resonator is utilized for the 50 GHz oscillator, obtaining a frequercy stability of less than ±100 PPM (0 °C - 50°C). These circuits are integrated on Fine Grained Alumina FGA) substrates. The size of the transmitter/receiver is 54x48x15 millimeters.

# Abstracts

## A Compact Low Cost 60 GHz Communicator

*A. Hislop. "A Compact Low Cost 60 GHz Communicator." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 231-232.*

A 60 GHz communicator is described. A low cost suspended substrate circuit performs as a modulator, duplexer and down-converter. A single unstabilized Gunn oscillator acts as both transmitter and receiver local oscillator. The communicator has eight selectable subcarrier channels.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A Low Noise Frequency Agile X-Band Source

*Z. Galani, M. Bianchini and R. DiBiase. "A Low Noise Frequency Agile X-Band Source." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 233-235.*

A low noise frequency agile X-band source designed for a missile seeker Master Oscillator is presented. The source consists of a push-push X-band VCO phase-locked to a single crystal oscillator using a sampling phase detector. The performance of the source is presented under static conditions and the severe missile vibration environment.

# Abstracts

## A 14 GHz DCPSK Direct Demodulator for Satellite Applications

*L. Accatino and A. Angelucci. "A 14 GHz DCPSK Direct Demodulator for Satellite Applications." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 236-238.*

A direct 14 GHz DCPSK demodulator utilizing a low-loss dielectric resonator filter as delay element is presented. Improved sensitivity performance is obtained and possible areas of further improvement are discussed.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Coupler Crossbar Microwave Switch Matrix

*P.T. Ho, J.R. Pelose and R. Maliszewski. "Coupler Crossbar Microwave Switch Matrix." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 239-241.*

A microwave switch matrix is needed to provide dynamic transponder interconnectivity for the next generation of digital communication satellites. This paper describes the development of a unique 4 x 4 coupler crossbar microwave switch matrix which meets the future satellite-switched, time-division, multiple access (SS-TDMA) requirements.

# Abstracts

## Direct Baseband to Microwave MSK Generation by Using Injection Locked Oscillator

*S.A. Myrillas and J.S. Wight. "Direct Baseband to Microwave MSK Generation by Using Injection Locked Oscillator." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 242-244.*

In this paper the feasibility of direct MSK generation by using injection locking for stability improvement is investigated theoretically as well as experimentally. In specific, the experimental work deals with the development of such a system transmitting at a rate of 4 Mbits/sec, and its performance evaluation.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Session N -- Ferrite Applications (1982 [MWSYM])

*"Session N -- Ferrite Applications (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 245-245.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## A Resonantly Coupled, Ferrite-Tuned Buncher-Cavity System for the Los Alamos Proton Storage Ring

*L.M. Earley, G.P. Lawrence, J.M. Potter and F.J. Humphry. "A Resonantly Coupled, Ferrite-Tuned Buncher-Cavity System for the Los Alamos Proton Storage Ring." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 246-248.*

Resonantly coupled buncher and ferrite-loaded tuning cavities at 503.125 MHz are separately optimized to provide fast tracking of time-dependent beam current changes in the Los Alamos Proton Storage Ring (PSR) while maximizing radio-frequency (rf) stability and efficiency.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Broadband Fin-Line Circulators

*U. Goebel and C. Sehieblich. "Broadband Fin-Line Circulators." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 249-251.*

A novel configuration for fin-line circulators is introduced, with improved coupling to the ferrite resonator. It uses a unilateral structure and is well suited for integrated systems. Two devices in Ka-band and X-band show a 20 dB isolation bandwidth of 25% respectively 35%.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Low Loss 92-100 GHz Circulators

*W. Piotrowski and S. Schell. "Low Loss 92-100 GHz Circulators." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 252-254.*

A broadband W-band circulator is described that achieves 0.5 dB insertion loss over the frequency range from 92.5 to 100.6 GHz. The large bandwidth improvement results from using two higher propagating modes.

# Abstracts

## Dielectric Waveguide Phase Shifter

*J.J. Green. "Dielectric Waveguide Phase Shifter." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 255-256.*

Using ferrite waveguide toroids and dielectric ribs (epsilon/sub r/ = 50), we have demonstrated that a dielectric waveguide (no metal walls) phase shifter (Delta Phi = 600°) can propagate with reasonable insertion loss (/spl ap/3 dB) and modest cross coupling (/spl ap/ 15 dB). With brass inserts, the cross coupling can be further reduced (> 20 dB) with some sacrifice of insertion loss and phase shift. The use of dielectric waveguide phase shifters should allow simpler, lower-cost phased arrays in the conventional frequency range (3 to 20 GHz). At millimeter wave frequencies there is the possibility of making a column of phase shifters from slabs of ferrite and dielectric using flat-grinding and cutting techniques.

# Abstracts

## A 60 GHz Dual-Mode Ferrite Phase Shifter

*C.R. Boyd, Jr.. "A 60 GHz Dual-Mode Ferrite Phase Shifter." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 257-259.*

Projected system needs continue to indicate a future requirement for phase shifters at millimeter-wave frequencies. The current state-of-the-art at these frequencies clearly favors ferrite type phase shifters over competing approaches. The two geometries that have been mainly considered for latching ferrite units are: (a) the axial toroid, transverse bias field, nonreciprocal type, and, (b) the dual-mode, longitudinal bias field, reciprocal type. The dual-mode type has a very simple r-f waveguide cross-section compared with the axial toroid type, and thus offers the possibility of easier and cheaper fabrication to necessary tolerances compared with the axial toroid type.

# Abstracts

## High Power, Low Phase Distortion, Electronic Ferrite Attenuator

*L. Dubrowsky, J. Cohen, G. Kern, W. Milberger, R. Porter and J. VanDamme. "High Power, Low Phase Distortion, Electronic Ferrite Attenuator." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 260-262.*

This paper discusses the unique design and fabrication methods for the waveguide, coolant channels, and drive yokes of an electronically driven, S-band, high power, four-port, differential phase shift type attenuator. These methods result in a fast-switching, low drive power, low-loss device, with relatively small size and light weight.

# Abstracts

## Design and Performance of a K - Band YIG Tuned Multiplier

*L.A. Stark. "Design and Performance of a K - Band YIG Tuned Multiplier." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 263-265.*

A hybrid, integrated, step recovery diode, YIG tuned multiplier has been developed covering the range from 2.0 to 26.5 GHz. Features include wide band operation, frequency tracking biasing, and pulsed operation.

# Abstracts

## Session O -- Nonlinear Applications of GaAs FETs

*"Session O -- Nonlinear Applications of GaAs FETs." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 267-267.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## GaAs FET Limiting Amplifier Designed for Low AM to PM Conversion

*C.R. Baughman and J.Y. Chin. "GaAs FET Limiting Amplifier Designed for Low AM to PM Conversion." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 268-270.*

A 0.5 µm gate length GaAa FET has been characterized for use in a low AM to PM conversion limiting amplifier at 12.0 GHz. A unique linear behavior for FET AM/PM is observed with respect to DC biasing, and its data are presented along with input and output matching information. FET limiting amplifier design techniques and data on a nine-stage amplifier are also reported.

# Abstracts

## BR FET: A Band Rejection FET for Amplifier and Mixer Applications

*C. Tsironis. "BR FET: A Band Rejection FET for Amplifier and Mixer Applications." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 271-273.*

A new type of GaAs FET device, the Band Rejection FET (BR FET), is presented. It is a dual gate FET with a LC series resonant circuit connected in parallel with the intergate ohmic contact that acts as a band rejection filter. The main applications of this device are band rejection amplifiers and image rejection mixers. As an amplifier, the BR FET has a gain of more than 3 dB at 12 ± 0.4 GHz with 20 dB rejection at 9.5 ± 0.4 GHz. As a mixer, the BR FET permits conversion gain (>= 4 dB) with image frequency rejection of over 30 dB.

# Abstracts

## Varactor Tuned Dielectric Resonator GaAs FET Oscillator in X-Band

*K.W. Lee and W.R. Day. "Varactor Tuned Dielectric Resonator GaAs FET Oscillator in X-Band." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 274-276.*

A varactor tuned, dielectric resonator FET oscillator has been developed in X-band with an electronic tuning range of 0.2 percent to permit phase locking AFC or FM. Performance data are presented from -54° C to +125° C.

# Abstracts

## Efficient Low-Noise Three Port X-Band FET Oscillator Using Two Dielectric Resonators

*A.P.S. Khanna, J. Obregon and Y. Garault. "Efficient Low-Noise Three Port X-Band FET Oscillator Using Two Dielectric Resonators." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 277-279.*

A new, simple to realize, X band, 3 port stable FET oscillator is presented. The oscillator using 2 identical dielectric resonators as oscillator circuit elements, operates at 8.53 GHz, has an overall efficiency of 22% and FM noise better than 0.2 Hz/ /spl radic/Hz at 10 KHz from carrier.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Frequency Doublers with GaAs FET's

*C. Rauscher. "Frequency Doublers with GaAs FET's." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 280-282.*

A comprehensive study is presented of single-gate GaAs FET frequency doublers, including self-oscillating doublers, focusing specifically on their applicability to mm-wave power generation. Large-signal simulations are used to identify critical design aspects; with three experimental circuits substantiating the assumptions and predictions.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A 45 GHz GaAs FET MIC Oscillator-Doubler

*T. Saito, M. Iwakuni, T. Sakane and Y. Tokumitsu. "A 45 GHz GaAs FET MIC Oscillator-Doubler." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 283-285.*

A 45 GHz MIC oscillator-doubler usinq the gate-to-drain nonlinearity of a common-drain GaAs FET has been investigated. This oscillator-doubler has a high output power of 11.6 dBm, a high doubler efficiency of 9 dB and a high power efficiency of 1.6%.

# Abstracts

## X-Band Burnout Characteristics of GaAs MESFETs (1982 [MWSYM])

*J.J. Whalen and R.T. Kemerley. "X-Band Burnout Characteristics of GaAs MESFETs (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 286-288.*

X-Band microsecond pulse, millisecond pulse, and CW burnout data have been measured for GaAs MESFETs. Values of incident pulse power required to cause burn-out are presented and discussed.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Monolithic Microwave Integrated GaAs FET Oscillators

*Y. Yukang and W. Fuchen. "Monolithic Microwave Integrated GaAs FET Oscillators." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 289-290.*

The analysis by means of three-port S-parameters shows that larger output power can be obtained from GaAa MESFET oscillator at their source ports rather than at their drains. An output power of 40 mW was measured at 8.2 GHz on a finished monolithic oscillator with 15% efficiency and 300 µm gate-width.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Session P -- Microwave Field Theory

*"Session P -- Microwave Field Theory." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 291-291.*

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## A Unified Analysis for Planar Transmission Lines

*A.K. Saad and K. Schunemann. "A Unified Analysis for Planar Transmission Lines." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 292-294.*

A unified analysis for planar transmission lines is presented, which needs about 2 orders of magnitude less computer time than the spectral domain method. It is applied to various microstrip-lines and to fin-lines.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Analysis of Trapped Image Guides Using Effective Dielectric Constants and Surface Impedances

*W.B. Zhou and T. Itoh. "Analysis of Trapped Image Guides Using Effective Dielectric Constants and Surface Impedances." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 295-297.*

Trapped image guides are analyzed using a new method. The results agree much better with experimental data than those previously derived from a simple effective dielectric constant approach.

# Abstracts

## Coupling Through a Slot Between a Dielectric Image Line and a Parallel Plate Guide

*R.D. Nevels and C.M. Butler. "Coupling Through a Slot Between a Dielectric Image Line and a Parallel Plate Guide." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 298-299.*

In this paper we formulate the exact integral equation for the tangential electric field in a slot in a parallel plate waveguide covered by a dielectric slab. The integral equation is solved numerically and the power transmitted into the far space wave and bi-directional surface wave is investigated.

# Abstracts

## Bends in Nonradiative Dielectric Waveguides (1982 [MWSYM])

*T. Yoneyama, S. Nishida and M. Yamaguchi. "Bends in Nonradiative Dielectric Waveguides (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 300-301.*

An experimental study was made of bends in the nonradiative dielectric waveguide at 50 GHz. The main cause of the bending loss was found to be the reflection at the transitions between the straight and curved waveguides rather than the radiation. A bend with a curvature radius as small as one guide wavelength could be realized.

# Abstracts

## Variational Methods for Nonstandard Eigenvalue Problems in Microwave Field Analysis

*I.V. Lindell. "Variational Methods for Nonstandard Eigenvalue Problems in Microwave Field Analysis." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 302-304.*

The nonstandard eigenvalue problem is defined and shown to originate in microwave field problems. A unified variational principle is introduced and applied to some simple, yet nontrivial, problems to demonstrate that a nonstandard formulation may lead to a simpler solution of the same problem than a standard one.

# Abstracts

## New Aspects Concerning the Definition of Microstrip Characteristic Impedance as a Function of Frequency

*R.H. Jansen and N.H.L. Koster. "New Aspects Concerning the Definition of Microstrip Characteristic Impedance as a Function of Frequency." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 305-307.*

The definition of microstrip characteristic impedance is considered in conjunction with a rigorous frequency dependent hybrid-mode approach to planar n-ports. Analytical reflections of general validity and numerical results obtained for the nonsymmetrical gap and the microstrip impedance step provide new aspects for a proper choice of the definition.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Compensation of Discontinuities in Planar Transmission Lines (1982 [MWSYM])

*R. Chadha and K.C. Gupta. "Compensation of Discontinuities in Planar Transmission Lines (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 308-310.*

Compensation of discontinuity reactances associated with steps, right-angled bends, and T-junctions in planar transmission lines has been carried out by removing appropriate triangular portions from the discontinuity configurations. Two-dimensional analysis using Green's functions approach has been employed.

# Abstracts

## Analytical Expressions for the Parameters of Finned and Ridged Waveguides

*W.J.R. Hoefer and M.N. Burton. "Analytical Expressions for the Parameters of Finned and Ridged Waveguides." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 311-313.*

Novel closed-form expressions for the cutoff frequency and the characteristic impedance of finned and ridged waveguides are presented. Agreement with previously published numerical data is better than one percent for all parameters of practical interest. The expressions considerably facilitate computer-aided design and tolerance analysis of ridged waveguide structures without compromise in accuracy.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Session Q -- Automated Microwave Measurements

*"Session Q -- Automated Microwave Measurements." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 315-315.*

# Abstracts

## Aspects of the Calibration of a Single Six-Port Using a Load and Offset Reflection Standards (1982 [MWSYM])

*G.P. Riblet and E.R.B. Hansson. "Aspects of the Calibration of a Single Six-Port Using a Load and Offset Reflection Standards (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 316-318.*

In this contribution some aspects of the calibration of a single six-port using a load and offset reflection standards are discussed. The applicability of the methods developed is demonstrated by the successful calibration of a six-port consisting of a directional coupler plus a symmetrical five port junction.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Diode Detector Characteristics for a 94 GHz Six-Port Application (1982 [MWSYM])

*R.A. Fong-Tom and H.M. Cronson. "Diode Detector Characteristics for a 94 GHz Six-Port Application (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 319-321.*

The suitability of commercially available diodes as power detectors in a 94 GHz six-port is examined. Square law response, noise, variation of reflection coefficient with power, and temperature effects are studied. The results show that silicon Schottky diodes are the best available.

# Abstracts

## Phase and Amplitude Characteristics of Dielectric Waveguide Coupler and Six-Port Network

*D. Radovich and J. Paul. "Phase and Amplitude Characteristics of Dielectric Waveguide Coupler and Six-Port Network." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 322-324.*

An improved six-port network has been designed and fabricated using dielectric waveguide. The amplitude and phase characteristics of the 90° hybrids, as well as the amplitude characteristics of the six-port network over the range from 75 to 110 GHz, have been measured. Results of the experiments show that the six-port network is useful over a substantial portion of W band.

# Abstracts

## A Computer-Controlled Dielectric Constant Measurement System: The Moving Vane Dielectometer

*G.E. Everett and J.W. Battles. "A Computer-Controlled Dielectric Constant Measurement System: The Moving Vane Dielectometer." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 325-327.*

A computer-controlled dielectric constant and data analysis system has been developed. Motion of a metallic vane in an inhomogeneously dielectric-filled rectangular wave guide system provides reflection coefficient versus effective sample length from which the dielectric constant is determined.

# Abstracts

## A Two-Tier Deembedding Technique for Packaged Transistors

*R. Vaitkus and D. Scheitlin. "A Two-Tier Deembedding Technique for Packaged Transistors." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 328-330.*

This paper describes a technique for deembedding transistor chip scattering parameters from the measurements of packaged devices in a standard transistor test fixture by the use of a set of secondary calibration standards, consisting of empty and specially wire-bonded transistor packages.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Computer-Aided Determination of Resonator Characteristics Based on Expansion in Normal Modes and Using Automatic Network Analyser Data

*D.W. Griffin. "Computer-Aided Determination of Resonator Characteristics Based on Expansion in Normal Modes and Using Automatic Network Analyser Data." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 331-333.*

Errors that are likely to arise in determining resonator characteristics by simple equivalent circuit interpretation of measured input impedance data are explained. A method based on expansion in normal modes and involving computer aided analysis of data gathered with an automatic network analyser is explained by reference to experimental evaluation of microstrip-type rectangular patch antenna element characteristics.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## A Microprocessor Controlled Phase Measurement System for 2856 MHz Pulses

*J.D. Fox and H. Schwarz. "A Microprocessor Controlled Phase Measurement System for 2856 MHz Pulses." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 334-336.*

A computer controlled phase detection system used to measure and stabilize the phase of high power RF pulses in the two mile Stanford Linear Accelerator has been developed. This system measures the phase of a 1 µsec 2856 MHz 50 MW RF pulse with respect to a CW reference signal at the same frequency at a 180 Hz rate with <0.2° resolution.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Session R -- Microwave Measurements

*"Session R -- Microwave Measurements." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 337-337.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Microstrip Measurements

*T.C. Edwards. "Microstrip Measurements." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 338-341.*

Extensive measurements are essential for the characterisation of microstrip and design using this medium. Resonator methods are significant and these are given prominence in this tutorial/overview paper. Brief considerations are included of parallel-coupled microstrips, Q-factor measurements, and TDR techniques.

# Abstracts

## Measurement of the Characteristic Impedance of Microstrip Over a Wide Frequency Range

*W.J. Getsinger. "Measurement of the Characteristic Impedance of Microstrip Over a Wide Frequency Range." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 342-344.*

Measurement of the characteristic impedance of a 0.25-in.-wide microstrip on 0.25-in. alumina by two new, accurate techniques showed the expected small decrease as frequency changed from 400 to 1000 MHz, and an unexpected increase as frequency went from 1000 to 2400 MHz.

# Abstracts

## Large-Signal Characterization of Two-Port Nonlinear Active Networks

*D.C. Yang and D.F. Peterson. "Large-Signal Characterization of Two-Port Nonlinear Active Networks." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 345-347.*

A large-signal measurement technique for characterizing the single frequency behavior of nonlinear two-port networks is presented. Nonlinear networks are measured under various terminal conditions to establish optimal circuit design criteria. Results for common drain oscillator circuits are given as an example.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## A Programmable Load for Power and Noise Characterization

*B.W. Leake. "A Programmable Load for Power and Noise Characterization." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 348-350.*

A digitally-controlled one-port tuner, providing sixty-four distinct impedances, has been used to examine the relationship between nonlinear power transistor performance and load impedance. In a similar way, the noise parameters of low noise linear transistors have been deduced from measurements using the tuner to control source impedance. All control, measurement and data reduction functions are performed with a desktop computer.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Noise Waves, a Concept Leading to Deep Insight and Accurate Noise Characterization

*R. Meys and M. Milecan. "Noise Waves, a Concept Leading to Deep Insight and Accurate Noise Characterization." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 351-353.*

Rapid advances in GaAs FET technology have raised the problem of accurately determining the noise performance of rather low gain devices at increasing frequencies. We propose a solution based on the description of noise through correlated waves that avoids many difficulties associated with classical methods (source mismatch error, biased optimum, unpredictable tuner losses, no consistency checks). It lends itself to both automation and computer implementation.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## De-Embedding the Capacitance of a Resonant Circuit Using Time-Domain Reversal and Subtraction

*H.E. Stinehelfer, Sr.. "De-Embedding the Capacitance of a Resonant Circuit Using Time-Domain Reversal and Subtraction." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 354-356.*

A precision 50 ohm line 10 cm long was modified by a #4-40 screw at its center. The screw forms a capacitance to the center conductor and a resonant circuit at 17.7 GHz. Evaluating the data with the new MAMA program reveals parasitic of the screw which form the resonance response.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## An Automated Power Meter Calibration System

*R.C. Powell, H.W. Banning and J.R. Byloff. "An Automated Power Meter Calibration System." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 357-359.*

A computer aided measurement system for automatically calibrating microwave power meters, bolometer mounts and other power sensors is described. The theory for calibrating bolometer mounts using a power splitter is given. Techniques for using the system are discussed.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A Better Waveguide Short Circuit

*R.L. Eisenhart and R.C. Monzello. "A Better Waveguide Short Circuit." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 360-362.*

A new movable waveguide short circuit is presented which has better characteristics than designs presently in use. Comparison measurement data is shown on a variety of designs. Particular advantages of the new design are noted.

# Abstracts

## Session S -- Millimeter-Wave Solid-State Devices

*"Session S -- Millimeter-Wave Solid-State Devices." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 363-363.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## 141GHz Generation by a GaAs Gunn Oscillator Up-Converter Chain

*H. Barth. "141GHz Generation by a GaAs Gunn Oscillator Up-Converter Chain." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 364-366.*

A 141GHz source is realized using a resistive up-converter driven by a single GaAs Gunn oscillator delivering fundamental (47GHz) as well as 2nd harmonic (94GHz) frequency power. The output power at the sum frequency is 3dBm.

# Abstracts

## Millimeter-Wave BARITT Diode Mixers and Detectors

*J. Chen, J.R. East, R.O. Grondin, G.I. Haddad, Y. Anand, D. Densenouci, S. Ellis and L. Mang. "Millimeter-Wave BARITT Diode Mixers and Detectors." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 367-368.*

The properties of BARITT diode mixers and detectors at millimeter wavelengths have been investigated. The diodes are rugged, easy to fabricate, and have mixer and detector performance comparable to Schottky diodes.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## A W-Band Wideband Crossbar Mixer

*K. Louie. "A W-Band Wideband Crossbar Mixer." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 369-371.*

A broadband mixer using crossbar structure is described. This mixer achieves a fixed tuned instantaneous RF and IF bandwidth of greater than 20 GHz with SSB conversion loss of less than 7.5 dB.

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Beam Lead Dielectric Crossbar Mixers from 60 to 140 GHz

*J. Paul, L. Yuan and P. Yen. "Beam Lead Dielectric Crossbar Mixers from 60 to 140 GHz." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 372-373.*

Dielectrically loaded crossbar mixers have been developed for operation from 60 to 140 GHz. Using beam lead diodes and a low cost fabrication technique, conversion losses of 5 dB at V band, 5 dB at W band, and 6.5 dB at D band have been measured.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## 140 GHz Quasi-Optical Planar Mixers

*L. Yuan, J. Paul and P. Yen. "140 GHz Quasi-Optical Planar Mixers." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 374-375.*

A planar quasi-optical mixer operating around 140 GHz has been developed using beam lead diodes. Utilizing a spherical lens for the RF input, a conversion loss as low as 7 dB has been measured at 127 GHz with an LO frequency of 141 GHz.

# Abstracts

## Quasi-Optical Polarization-Duplexed Balanced Mixer

*K.D. Stephan, N. Camilleri and T. Itoh. "Quasi-Optical Polarization-Duplexed Balanced Mixer." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 376-378.*

A millimeter-wave antenna-mixer structure on a dielectric substrate is described. Measurements of a 10-GHz model in a quasi-optical system show good conversion loss and LO-to-RF isolation exceeding 30 dB. A GaAs monolithic integrated circuit seems feasible.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A Ka-Band Orthogonal Hybrid Fin-Line Mixer

*J.S. Wong and K.-I. Chung. "A Ka-Band Orthogonal Hybrid Fin-Line Mixer." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 379-381.*

This paper describes a novel Ka-band mixer which utilizes a printed-circuit board. This device is mounted in an orthogonal hybrid tee. The design is scalable to higher millimeter-wave frequencies and provides a small (< 1 cubic inch) low-cost mixer with typical conversion loss of 6 dB.

# Abstracts

## Numerical Analysis of Subharmonic Mixers Using a Bilinear Diode Model

*R.G. Hicks and P.J. Khan. "Numerical Analysis of Subharmonic Mixers Using a Bilinear Diode Model." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 382-384.*

Using a bilinear approximation of the Schottky barrier diode characteristic, conversion loss peaks were accurately determined for a typical millimeter-wave subharmonically-pumped mixer. This approach requires significantly less computer time than a full nonlinear analysis.

# Abstracts

## Session T -- Filters and Multiplexers

*"Session T -- Filters and Multiplexers." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 385-385.*

# Abstracts

## Miniature Filters and Equalizers Utilizing Dual Mode Dielectric Resonator Loaded Cavities

*S.J. Fiedziuszko and R.C. Chapman. "Miniature Filters and Equalizers Utilizing Dual Mode Dielectric Resonator Loaded Cavities." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 386-388.*

A novel approach in high performance, dual mode filters and equalizers is described. Miniature, light weight, temperature stable designs utilize dual mode, dielectric resonator loaded cavities. The basic configurations and performance characteristics are presented.

Click on title for a complete paper.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Mode Suppressor for Dielectric Resonator Filters

*C.L. Ren. "Mode Suppressor for Dielectric Resonator Filters." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 389-391.*

The presence of tuning screws can shift spurious modes resonance of the dielectric resonators to frequency close to or even equal to resonant frequency of the principal mode, therefore interfering with the filter's performance. A simple mode suppressing scheme is presented to solve this potentially serious problem.

# Abstracts

## Coupling Coefficient Between Magnetic Loop and a Dielectric Resonator in an Evanescent Waveguide

*P. Guillon and Y. Garault. "Coupling Coefficient Between Magnetic Loop and a Dielectric Resonator in an Evanescent Waveguide." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 392-394.*

This paper studies the end coupling between a magnetic loop and a dielectric resonator housed in an evanescent metallic waveguide. A theoretical and experimental analysis of the variations of the external quality factor as a function of the distance between the loop and the resonator is presented. The influence of the interstage coupling between two dielectric resonators on the end coupling will be also evaluated.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

## The Generalised Integrated-Pole Direct Coupled Cavity Filter (Abstract Only)

*D.S.G. Chambers and J.D. Rhodes. "The Generalised Integrated-Pole Direct Coupled Cavity Filter (Abstract Only)." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 395-395.*

This paper details the rectangular waveguide realisation of the asymmetric integrated-pole prototype. A novel waveguide section is introduced and characterised in detail. The asymmetric amplitude responses exhibited by these filters, can be used to good effect in microwave filter networks designed to reject a particular band of image frequencies close to the desired band. Alternatively the generalised pole-placing technique can be used to obtain rejection over any required frequencies. Two examples are given, including a seventh degree filter with attenuation poles at two different frequencies.

# Abstracts

## Improved Selectivity in Cylindrical TE/sub 011/ Filters by TE/sub 211//TE/sub311/ Mode Control

*D.E. Kreinheder and T.D. Lingren. "Improved Selectivity in Cylindrical TE/sub 011/ Filters by TE/sub 211//TE/sub311/ Mode Control." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 396-398.*

A new method is presented for the design of low loss cylindrical TE/sub 011/ mode resonators whereby transmission nulls can be placed near the TE/sub 011/ resonance by controlling the TE/sub 211/ and TE/sub 311/ modes that are naturally excited in the same resonator. The frequency of the nulls are controlled by the angular offset of the sidewall coupling apertures and the relative amplitude of the TE/sub 011/ mode compared with the TE/sub 211/ and TE/sub 311/ modes. It is also shown that a lumped constant circuit model can be used to accurately represent the multimode response of the resonator.

# Abstracts

## Varactor Tuned Microwave Filters

*I.C. Hunter and J.D. Rhodes. "Varactor Tuned Microwave Filters." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 399-401.*

The design and realization techniques of varactor tuned microwave filters are presented. Novel filter circuits are used and these are realized using Suspended Substrate Stipline. Experimental devices exhibit broad tuning bandwidths and low dissipation loss. Both bandpass and band-stop filters are described.

# Abstracts

## Synthesis of Low-Pass Elliptic Filters for MIC as a Class of Non-Commensurate Distributed Circuits

*M. Salerno and R. Sorrentino. "Synthesis of Low-Pass Elliptic Filters for MIC as a Class of Non-Commensurate Distributed Circuits." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 402-404.*

A new synthesis technique of low-pass elliptic filters particularly suited for realization in printed circuit version is presented. The synthesis is based on the use of non-commensurate transmission line sections and stubs. Microstrip filters of seventh order with cutoff frequency in the X-band have been fabricated and measured in the frequency range 2-18 GHz. The performance is shown to be quite satisfactory particularly in the pass-band.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## An 11 GHz Contiguous Band Output Multiplexing Network for INTELSAT VI Spacecraft

*R. Tong, J. Dorey, P. Mabson, W.C. Tang, E. Klein-Lebbink and C.M. Kudsia. "An 11 GHz Contiguous Band Output Multiplexing Network for INTELSAT VI Spacecraft." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 405-407.*

Measured data of a 5-Channel 11GHz Contiguous Band Multiplexer meeting INTELSAT VI requirements is presented. No compensating networks or dummy channels are used in the physical realization of the multiplexer, thus advancing the state-of-the-art.

# Abstracts

## Session U -- Microwave Integrated Circuits

*"Session U -- Microwave Integrated Circuits." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 409-409.*

# Abstracts

## Phase Velocity Compensation in Parallel-Coupled Microstrip

*S.L. March. "Phase Velocity Compensation in Parallel-Coupled Microstrip." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 410-412.*

Techniques for compensating the unequal even- and odd-mode phase velocities encountered in parallel-coupled micro-strip are discussed. New results on the use of lumped and semi-lumped capacitors are presented, A newer geometry, a cross between suspended-substrate stripline and microstrip, can be used to manufacture quadrature couplers with improved, broadband directivity performance.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## The Equad: A Flat Amplitude, Octave Bandwidth Planar Quadrature Network

*R.V. Snyder. "The Equad: A Flat Amplitude, Octave Bandwidth Planar Quadrature Network." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 413-415.*

This paper will describe a hybrid structure with quadrature properties. The technique to be described adds bandpass - bandstop networks to the outputs of in-phase N-way power dividers resulting in circuits possessing hybrid properties with output port phases in quadrature. Output amplitude characteristics may be made equal or may differ by offset values, depending on the power split properties of the power divider chosen. Applications to amplifier arrays and antenna feeds are discussed.

# Abstracts

## MIC Directional Filters Using Dielectric Resonators

*M.L. Majewski and N.A. McDonald. "MIC Directional Filters Using Dielectric Resonators." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 416-418.*

Three novel, simple realizations of Microwave Integrated Circuit (MIC) directional filters using cylindrical dielectric resonators are described. These are a filter employing two three-port circulators for separation of the band-pass (B-P) and band-rejection (B-R) ports, a traveling wave filter employing two 3-dB hybrids separating the B-P and B-R ports, and a filter consisting of two rnicrostrip lines with a dielectric resonator (d.r.) suspended between them. Approximate methods of calculating the filters resonant frequency and the coupling of the dielectric resonator to the microstripline are also given.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Variable Coupling Directional Couplers Using Varactor Diodes

*S. Toyoda. "Variable Coupling Directional Couplers Using Varactor Diodes." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 419-421.*

A microstrip variable coupling directional couplers for 4 GHz band have been proposed and tested. By changing the junction capacitances of the varactor diodes, the coupling varies from 4 dB to 20 dB, and the directivity varies from 16 dB to 29 dB. Available frequency range is from 2.7 GHz to 5.3 GHz.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## An Improved PIN Diode Attenuator for High Reliability MIC Applications

*P.R. Horkin. "An Improved PIN Diode Attenuator for High Reliability MIC Applications." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 422-424.*

Selection of either absorptive or reflective style PIN diode attenuators is based upon performance requirements such as bandwidth dynamic range, VSWR, switching speed, and reliability. Unfortunately, all of the desirable features cannot be combined into a single design. A new concept in PIN diode attenuators is presented here in which inherent properties of a microstrip transmission line operating in a quasi-TEM mode is incorporated into a distributed-absorptive attenuator circuit. Numerous conflicting requirements are overcome thus providing the designer with new design trade-offs not previously available. Additionally, this new attenuator structure is inherently endowed with soft failure modes, thereby increasing reliability. The structure has been fabricated on hard substrate microstrip and is compatible with super-component fabrication techniques.

# Abstracts

## An Analytic Design Approach for 2-18 GHz Planar Mixer Circuits

*R.B. Culbertson and A.M. Pavio. "An Analytic Design Approach for 2-18 GHz Planar Mixer Circuits." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 425-427.*

A design procedure for planar broadband mixers is proposed which employs filter synthesis for exact balun design and nodal analysis to check for deleterious port interactions. The method has been successfully used to obtain working mixers in one thin film fabrication cycle on alumina and fused quartz substrates. A representative design is presented with experimental data.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## A Compact Broadband Multifunction MIC Module

*E.C. Niehenke. "A Compact Broadband Multifunction MIC Module." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 428-430.*

A development effort is described that yielded a compact broadband module using soft and hard substrate material employing microstrip, slot line, and coplanar line. Integrated functions include coupling, limiting, up-conversion, downconversion, broadband amplification, amplitude modulation, switching, gating, and stable frequency generation. A new high-level frequency converter with a +28 dBm intercept point resulted in high dynamic range, spurious-free operation (- 45 dBc). Extremely flat amplification with low current drain is achieved with novel distributed and cascode FET amplifiers at S-C and X-bands.

# Abstracts

## The Use of Sampling Techniques for Miniaturized Microwave Synthesis Applications

*B.E. Gilchrist, R.D. Fildes and J.G. Galli. "The Use of Sampling Techniques for Miniaturized Microwave Synthesis Applications." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 431-433.*

The use of sampling for broadband frequency synthes is presented. This approach offers several significant advantages over present techniques including reduced size, power consumption, switching speed, and circuit complexity while exhibiting improved synthesis reliability.

# Abstracts

## Session V -- Microwave Biological Effects

*"Session V -- Microwave Biological Effects." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 435-435.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Changes in Cardiac-Cell Membrane Noise During Microwave Exposure

*R.L. Seaman, R.K. Ayer, Jr. and R.L. DeHaan. "Changes in Cardiac-Cell Membrane Noise During Microwave Exposure." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 436-437.*

The microscopic voltage fluctuations (noise) of a biological membrane result from electrical and chemical processes within the membrane. Analysis of spontaneously-occurring noise can reveal changes in ion channel kinetics which are not readily apparent from other types of analysis as well as information about membrane electrical properties. We report here the results of preliminary studies in which 2450-MHz CW energy was applied to aggregates of embryonic heart cells in culture with an open-ended coaxial exposure device. Irradiation at Specific Absorption Rates (SARs) of 122 to 237 mW/g caused a bulk temperature rise of no more than 0.8°C, but increased the power ratio of the membrane noise by 1.94±3.81 dB. Because of the large variability, this increase was not significant at the 5% level.

# Abstracts

## A Self-Balancing Microwave Radiometer for Non-Invasively Measuring the Temperature of Subcutaneous Tissues During Localized Hyperthermia Treatments of Cancer

*F. Sterzer, R. Paglione, F. Wozniak, J. Mendecki, E. Friedenthal and C. Botstein. "A Self-Balancing Microwave Radiometer for Non-Invasively Measuring the Temperature of Subcutaneous Tissues During Localized Hyperthermia Treatments of Cancer." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 438-440.*

The use of a self-balanced microwave radiometer in localized rf and microwave hyperthermia treatments of cancer is described. Initial clinical observations are presented.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Thermal Drift in Microwave Thermography

*J. Shaeffer, A.M. El-Mahdi, R.J. Bielawa, J.F. Regan and K.L. Carr. "Thermal Drift in Microwave Thermography." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 441-443.*

Thermal drift in microwave thermography results from prolonged contact between a microwave antenna at one temperature and a subject at a different temperature. Appropriate antenna heating can minimize thermal drift, permitting more accurate temperature measurements.

# Abstracts

## Dynamic 'In Vivo' Performance of Temperature Controlled Local Microwave Hyperthermia at 2.45 GHz

*R. Knochel, W. Meyer and F. Zywietz. "Dynamic 'In Vivo' Performance of Temperature Controlled Local Microwave Hyperthermia at 2.45 GHz." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 444-447.*

A microwave system was constructed, suitable for local heating of animal tumours. The system basically consists of a 2.45 GHz generator, operating in a pulsed power mode, a micro-thermocouple temperature monitoring equipment and different applicators. Performance was tested on phantom tissue and by heating solid rat tumours, revealing differences in the heating response of the control-loop when both cases are compared. The system is capable of heating the tumours to a desired temperature level (eq. 43 °C) and maintains temperature within ± 0.1°C during treatment.

# Abstracts

## Session W -- Computer-Aided Design

*"Session W -- Computer-Aided Design." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 449-449.*

# Abstracts

## Large-Signal GaAs FET Amplifier CAD Program

*A. Platzker and Y. Tajima. "Large-Signal GaAs FET Amplifier CAD Program." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 450-452.*

A CAD Program for the design of multistage power GaAs FET amplifiers has been developed. The program is capable of analyzing the circuit performance of power amplifiers as a function of their input powers and frequency. Either graphic or printed output is available. In an optimizing mode, the program returns the load and source admittance values for optimum power performance of FET devices.

# Abstracts

## A Computer-Aided Approach to the Nonlinear Design of Microwave Transistor Oscillators

*V. Rizzoli and A. Lipparini. "A Computer-Aided Approach to the Nonlinear Design of Microwave Transistor Oscillators." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 453-455.*

The design of microwave transistor oscillators is tackled by modern nonlinear network techniques. The result is a general computer-aided approach providing cost-effective MIC designs and full numerical description of circuit performance.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## An Optimization Technique for Lumped - Distributed Two Ports

*K.W. Iobst and K.A. Zaki. "An Optimization Technique for Lumped - Distributed Two Ports." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 456-458.*

A frequency domain direct efficient analysis and optimization technique of a large class of lumped-distributed networks containing active elements is presented. Sensitivity and Hessian matrix calculations are performed using truncated Taylor series expansion of two port parameters of subnetworks. An interactive computer program was developed to demonstrate the application of the method. An example of network optimization is included to illustrate the powerfulness of the technique.

# Abstracts

## Odd Order Impedance Matching Networks for Low Cost Microwave Integrated Circuits

*A.N. Riddle and R.J. Trew. "Odd Order Impedance Matching Networks for Low Cost Microwave Integrated Circuits." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 459-461.*

A new odd order impedance matching network with reduced sensitivity to active device capacitance variations is presented. A synthesis procedure for these networks is presented and experimentally verified with the construction of a amplifier. These networks are useful in the development of low cost microwave integrated circuits since they reduce the harmful effects of device variations.

# Abstracts

## Processing System for Design and Analysis of Microwave-Integrated-Circuits Layouts

*S.S. Saviani and A.J. Giarola. "Processing System for Design and Analysis of Microwave-Integrated-Circuits Layouts." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 462-464.*

A processing system consisting of two main computer programs, one for the design and the other for the analysis of microwave-integrated-circuits layouts using microstriplines is described. Two circuits are shown as examples and the results agree with those available in the literature.

# Abstracts

## A Novel Approach to Computer Automated Microwave Circuit Mask Design

*T. Dowling, J. Birch, S. Temple, S. Monaghan, H.E. Stinehelfer, N. Cavallaro and A. Davis. "A Novel Approach to Computer Automated Microwave Circuit Mask Design." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 465-467.*

A novel computer program is presented which automates the design of microwave circuit masks using a library of verified elements. Three library elements are fabricated, evaluated using computer-aided time domain techniques, and compared with CAD model predictions.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Automatic Artwork Generation for Microwave Integrated Circuits

*W.H. Childs and J. McGregor. "Automatic Artwork Generation for Microwave Integrated Circuits." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 468-470.*

A computer program that automatically converts microwave circuit computer models to MIC artwork has been created. The algorithms and user interface are described. In addition, an interactive graphical mode which allows artwork to be created using microwave circuit entities and connections is also described.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Computer-Aided Design of Millimeter-Wave E-Plane Filters (1982 [MWSYM])

*Y.C. Shih, T. Itoh and L.Q. Bui. "Computer-Aided Design of Millimeter-Wave E-Plane Filters (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 471-473.*

A computer-aided design (CAD) algorithm has been developed for a class of E-plane band pass filters. The analysis portion of the algorithm is mathematically exact and numerically very efficient. Filters designed with this method have been fabricated and tested in Ka-band and V-band with excellent agreement with design.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Session X -- GaAs Monolithic Circuits

*"Session X -- GaAs Monolithic Circuits." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 475-475.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## X, Ku-Band GaAs Monolithic Amplifier

*Y. Tajima, T. Tsukii, E. Tong, R. Mozzi, L. Hanes and B. Wrona. "X, Ku-Band GaAs Monolithic Amplifier." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 476-478.*

A two-stage X-, Ku-band monolithic FET amplifier has been developed. Initial results indicate a gain of 7-10 dB across the 8-20 GHz band with a typical rf power output of 100 mW. A balanced amplifier consisting of two two-stage amplifiers and a pair of Lange couplers yielded 10.5 ± 1 dB gain from 7.5 to 18 GHz and an output power of 150-250 mW in Ku-band.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## GaAs Monolithic Wideband (2-18 GHz) Variable Attenuators

*Y. Tajima, T. Tsukii, R. Mozzi, E. Tong, L. Hanes and B. Wrona. "GaAs Monolithic Wideband (2-18 GHz) Variable Attenuators." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 479-481.*

GaAs monolithic variable attenuators have been developed. They operate in a very wide frequency band, are very small, and are controlled by one voltage. Insertion loss of 2-3 dB and a dynamic range of attenuation of 10 dB were obtained in the 2-18 GHz frequency range,

# Abstracts

## Monolithic Voltage Controlled Oscillator for X and Ku-Bands (1982 [MWSYM])

*B.N. Scott and G.E. Brehm. "Monolithic Voltage Controlled Oscillator for X and Ku-Bands (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 482-485.*

A GaAs Voltage Controlled Oscillator Circuit that tunes from 11.15 to 14.39 GHz and 16.0 to 18.74 GHz has been designed and fabricated. The 1.1 mm x 1.2 mm chip includes two varactors, a 300 µm FET, bypass capacitors, tuning inductors and isolation resistors. Wideband circuit design techniques will be described. Varactor and circuit effects causing the non-continuous bandwidth will be discussed showing the capability of continuous 11 to 18 GHz tuning using a single GaAs chip.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## A Monolithic X-Band Four-Bit Phase Shifter

*Y. Ayasli, A. Platzker, J.L. Vorhaus and L.D. Reynolds. "A Monolithic X-Band Four-Bit Phase Shifter." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 486-488.*

X-band GaAs MMIC passive phase shifters have been developed using FET switches. A four-bit digital phase shifter with 5.1 ± 0.6 dB insertion loss has been realized on a single 6.4 x 7.9 x 0.1 mm chip.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A Multi-Chip GaAs Monolithic Transmit/Receive Module for X-Band

*R.A. Pucel, Y. Ayasli, D. Wandrei, J.L. Vorhaus, S. Temple, R. Waterman, A. Platzker and C. Cavicchio. "A Multi-Chip GaAs Monolithic Transmit/Receive Module for X-Band." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 489-492.*

The design, construction, and performance of an X-band multi-chip GaAs monolithic transmit/receive module is described. The module consists of a four-bit FET phase -shifter, two-stage low-noise amplifier, four-stage power amplifier, and associated FET switches.

# Abstracts

## Session Y -- Solid State Millimeter Wave Sources

*"Session Y -- Solid State Millimeter Wave Sources." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 493-493.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## A Broadband, Solid State Millimeter-Wave Synthesizer

*M.P. Fortunato and K.Y. Ishikawa. "A Broadband, Solid State Millimeter-Wave Synthesizer." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 494-496.*

A microprocessor controlled, low noise, millimeter-wave IMPATT frequency synthesizer has been developed. The IMPATT is phase locked to a crystal reference and covers greater than a 10 GHz band.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## 41 GHz 10 Watt Solid State Amplifier

*D.W. Mooney and F.J. Bayuk. "41 GHz 10 Watt Solid State Amplifier." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 497-499.*

This paper describes the results of the study, design, development and test of a 10-watt, 41 GHz solid state amplifier employing rectangular waveguide resonant cavity mode combining of high frequency diodes. This development effort is of significance because it extends beyond 40 GHz the ability to design high power, broadband, multistage amplifiers with reasonable efficiencies suitable for spacecraft applications. Specifically, an amplifier with a power level of more than 10 watts and gain level of greater than 30 dB and a bandwidth of 250 MHz at 41 GHz was demonstrated. This development offers an alternative to the traveling wave tube amplifier in the millimeter wave spectrum. Such an amplifier has projected high reliability and less complexity, size, and weight than a TWTA and is therefore particularly suitable for space applications.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## A Medium Power Solid State Amplifier for V-Band

*P.H. Wolfert, J.D. Crowley and F.B. Fank. "A Medium Power Solid State Amplifier for V-Band." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 500-502.*

A solid state amplifier for the 54 to 58 GHz band is described. The amplifier uses two layer InP Gunn devices. Three stages of amplification provide an output power of 100 mW at a gain of 15 dB. The small signal gain is 30 dB; the noise figure is in the 15.5 to 16.5 dB range. The design of a broadband low-loss V-band circulator, which was used in the amplifier, is also described.

# Abstracts

## CW InP Gunn Diode Power Combining at 90 GHz

*J.J. Sowers, J.D. Crowley and F.B. Fank. "CW InP Gunn Diode Power Combining at 90 GHz." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 503-505.*

CW power combining of two, three, or four InP Gunn devices has been achieved at 90 GHz. Diodes were first characterized in individual radial line circuit modules. Modules with similar operating characteristics were stacked in-line to form power combining units. Greater than 1/4 watt was obtained from four InP diodes.

# Abstracts

## On the Harmonic Operation of Millimeterwave Gunn Diodes

*W.H. Haydl. "On the Harmonic Operation of Millimeterwave Gunn Diodes." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 506-509.*

The behavior of GaAs Gunn diodes having epitaxial layer thicknesses of the order of 2 µm has been investigated. A coaxial (radial disc) bias circuit provides a resonant circuit at the fundamental operating frequency of the diode (30-50 GHz). The circuit can be tuned over a wide frequency range by various means. The harmonic components have been measured up to 110 GHz.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Performance Capabilities of Indium Phosphide n/sup +/-n-n/sup +/ Transferred Electron Devices at Millimetre Wave Frequencies

*I.G. Eddison and I. Davies. "Performance Capabilities of Indium Phosphide n/sup +/-n-n/sup +/ Transferred Electron Devices at Millimetre Wave Frequencies." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 510-512.*

This paper describes the development of indium phosphide n/sup +/-n-n/sup +/ devices which exhibit good output power and conversion efficiency capabilities in the mm wave frequency range. A brief review of the material growth and device fabrication technologies is given before the resultant device performances are discussed. It is shown that above 50 GHz indium phosphide exhibits clear power and efficiency advantages over existing gallium arsenide TEOS. Details are also given of the second order stability parameters shown by practical indium phosphide devices together with their likely importance to the system designer.

# Abstracts

## High Frequency Limitation of GaAs Transit-Time Diodes

*N. Lee and D.-S. Pan. "High Frequency Limitation of GaAs Transit-Time Diodes." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 513-515.*

The high-frequency capabilities of GaAs transit-time diodes have been investigated by extensive computer simulations. The spatial effect of interband tunneling and impact ionization were included. We have found GaAs diodes can operate with significant efficiency, approximately 5% in the millimeter and sub-millimeter frequency range. These results are in agreement with a recent report of a 338 GHz GaAs TUNNET/sup 1/.

# Abstracts

## V-Band InP Gunn Diode

*D. Yanmao, Z. Hongzhi, S. Youngxi and F. Jingzhi. "V-Band InP Gunn Diode." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 516-516.*

The n/sup +/-n-n/sup +/ InP wafers are continually grown by VPE. An integral heat sink process is utilized to fabricate CW InP Gunn diodes with multiple-layer n/sup +/-n-n/sup +/, which operate in V-band. The rf performance of the diode is determined using a coaxial waveguide cavity. CW output powers of 151 mW at 50.6 GHz and 147 mW at 58.3 GHz have been achieved with efficiencies of 2.48% and 2. 54%, respectively.

# Abstracts

## Session Z -- Filters and Passive Networks

*"Session Z -- Filters and Passive Networks." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 517-517.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Equivalent Transformations for Mixed Lumped and Distributed Circuits

*R. Sato, Y. Nemoto and K. Kobayashi. "Equivalent Transformations for Mixed Lumped and Distributed Circuits." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 518-520.*

In this paper we show the basic concepts of the equivalent transformations for a class of mixed lumped and distributed circuits and extend these transformations to mixed lumped and multiconductor coupled circuits. Then we discuss an equivalent transformation for a circuit consisting of a cascade connection of a lumped resonant circuit and unit element.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Octave-Wide Matched Symmetrical, Reciprocal, 4- And 5 Ports

*F.C. de Ronde. "Octave-Wide Matched Symmetrical, Reciprocal, 4- And 5 Ports." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 521-523.*

Symmetrical 4- and 5 ports were matched over an octave by applying a matching technique, based on duality. Internal matching was introduced instead of external; so matching inside the structure for optimizing the ratio of radial currents to tangential ones.

# Abstracts

## Passive Superconducting Microwave Circuits for 2-20 GHz Bandwidth Analog Signal Processing

*J.T. Lynch, A.C. Anderson, R.S. Withers, P.V. Wright and S.A. Reible. "Passive Superconducting Microwave Circuits for 2-20 GHz Bandwidth Analog Signal Processing." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 524-526.*

A new technology for making analog signal-processing devices such as linear-FM chirp filters with time-bandwidth products up to 1000 is being developed using niobium stripline on sapphire. Preliminary results of delay lines, resonators, and a 25-ns, 2-GHz chirp filter will be presented.

# Abstracts

## Waveguide Power Divider Using Metallic Septum with Resistive Coupling Slot

*F. Takeda, O. Ishida and Y. Isoda. "Waveguide Power Divider Using Metallic Septum with Resistive Coupling Slot." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 527-528.*

This paper describes a waveguide power divider using a metallic septum. In this divider, a high isolation and a low insertion loss were obtained by using a resistive coupling slot in the septum.

# Abstracts

## A Simplified "Real Frequency" Technique Appliable to Broadband Multistage Microwave Amplifiers

*B.S. Yarman and H.J. Carlin. "A Simplified "Real Frequency" Technique Appliable to Broadband Multistage Microwave Amplifiers." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 529-531.*

A computer-aided design procedure, a simplified "Real Frequency" technique, applicable to broadband, multistage FET amplifiers is presented. The design procedure requires no decisions to be made in advance as to algebraic form of transfer function, or circuit topology. Furthermore it is more efficient, accurate and complete than currently-available CAD methods.

# Abstracts

## CAD of Rectangular and Ridged Waveguide Bandpass Filters

*L. Si-Fan and C. Yi-Yuan. "CAD of Rectangular and Ridged Waveguide Bandpass Filters." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 532-534.*

The parameters of equivalent circuit of an inductive strip inserted in ridged waveguides are analyzed. A CAD of bandpass filters is developed. The experimental results are in good agreement with theoretical calculation.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Sub-Miniature, Microwave Printed Circuit Filters with Arbitrary Passband and Stopband Widths

*B.J. Minnis. "Sub-Miniature, Microwave Printed Circuit Filters with Arbitrary Passband and Stopband Widths." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): 535-537.*

New classes of sub-miniature, microwave printed circuit filters whose passband and stopband widths may be independently specified are defined for realisation in triplate stripline. They are exceedingly small and highly selective devices suitable for use in the 1-20 GHz frequency range.

# Abstracts

## 1982 IEEE/MTT-S Exhibition Floor Plans (1982 [MWSYM])

*"1982 IEEE/MTT-S Exhibition Floor Plans (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): bm1-bm1.*

# Abstracts

## Exhibitors (1982 [MWSYM])

*"Exhibitors (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): bm2-bm2.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Exhibition Guide (1982 [MWSYM])

*"Exhibition Guide (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): bm3-bm10.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Index of Authors (1982 [MWSYM])

*"Index of Authors (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): bm11-bm15.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Hotel Layout (1982 [MWSYM])

*"Hotel Layout (1982 [MWSYM])." 1982 MTT-S International Microwave Symposium Digest 82.1 (1982 [MWSYM]): b1-b2.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Front Cover (1982 [MCS])

*"Front Cover (1982 [MCS])." 1982 Microwave and Millimeter-Wave Monolithic Circuits Symposium Digest 82.1 (1982 [MCS]): f1-f1.*

# Abstracts

## Copyright (1982 [MCS])

*"Copyright (1982 [MCS])." 1982 Microwave and Millimeter-Wave Monolithic Circuits Symposium Digest 82.1 (1982 [MCS]): fm1-fm2.*

# Abstracts

## Welcome (1982 [MCS])

*B.E. Spielman. "Welcome (1982 [MCS])." 1982 Microwave and Millimeter-Wave Monolithic Circuits Symposium Digest 82.1 (1982 [MCS]): fm3-fm3.*

On behalf of the Steering Committee, I hope that everyone attending the 1982 Microwave and Millimeter-Wave Monolithic Circuits Symposium will find it an informative and rewarding experience, This is the first such symposium, but one which will be held annually in conjunction with the IEEE MTT-S International Microwave Symposium.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## 1982 Symposium Steering Committee (1982 [MCS])

*"1982 Symposium Steering Committee (1982 [MCS])." 1982 Microwave and Millimeter-Wave Monolithic Circuits Symposium Digest 82.1 (1982 [MCS]): fm4-fm4.*

# Abstracts

## Technical Program, Overview (1982 [MCS])

*M. Yoder. "Technical Program, Overview (1982 [MCS])." 1982 Microwave and Millimeter-Wave Monolithic Circuits Symposium Digest 82.1 (1982 [MCS]): fm5-fm5.*

Our technical program this year has been chosen to provide microwave and millimeter wave systems enigneers with broad and representative examples of monolithic circuits applicable to their needs. The spectrum covered ranges from DC to optical frequencies; emphasis this year is given to the microwave spectrum. This emphasis region is currently representative of the activity of industry as a whole.

# Abstracts

## Technical Program Committee (1982 [MCS])

*"Technical Program Committee (1982 [MCS])." 1982 Microwave and Millimeter-Wave Monolithic Circuits Symposium Digest 82.1 (1982 [MCS]): fm6-fm6.*

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Table of Contents (1982 [MCS])

*"Table of Contents (1982 [MCS])." 1982 Microwave and Millimeter-Wave Monolithic Circuits Symposium Digest 82.1 (1982 [MCS]): fm7-fm7.*

Contents
Publications
Issues
Papers
Authors

# Abstracts

## Index of Authors (1982 [MCS])

*"Index of Authors (1982 [MCS])." 1982 Microwave and Millimeter-Wave Monolithic Circuits Symposium Digest 82.1 (1982 [MCS]): fm8-fm8.*

# Abstracts

## Commercial Applications of Microwave Monolithic Circuits?

*J. Magarshack. "Commercial Applications of Microwave Monolithic Circuits?." 1982 Microwave and Millimeter-Wave Monolithic Circuits Symposium Digest 82.1 (1982 [MCS]): 1-4.*

The suitability of GaAs microwave monolithic integrated circuits will be examined of different applications in the commercial (non-military) fields. A survey of such applications is undertaken together with an assessment of present day technologies which could satisfy their needs. Some conclusions are drawn.

# Abstracts

## Monolithic Circuits for 12 GHz Direct Broadcasting Satellite Reception

*C. Kermarrec, P. Harrop, C. Tsironis and J. Faguet. "Monolithic Circuits for 12 GHz Direct Broadcasting Satellite Reception." 1982 Microwave and Millimeter-Wave Monolithic Circuits Symposium Digest 82.1 (1982 [MCS]): 5-10.*

This paper describes the design, fabrication and performances of gallium arsenide monolithic circuits of each of the principal microwave functions of a 12 GHz DBS receiver. The technology includes the use of Czochralski grown semi-insulating substrates, ion implanted active layers and localised growth of lines and interdigital capacitances. The low noise amplifier presents a 3,6 dB noise figure with 7,3 dB gain in the r.f. band. A dual gate mixer is presented with 6,5 dB noise figure and 2 dB conversion gain. The stable local oscillator has 32 mW output power and a stability of ± 0,3 ppm/K.

# Abstracts

## GaAs Monolithic Circuits Mounted Over High Q Dielectric Resonators

*E.M. Bastida and P. Bergamini. "GaAs Monolithic Circuits Mounted Over High Q Dielectric Resonators." 1982 Microwave and Millimeter-Wave Monolithic Circuits Symposium Digest 82.1 (1982 [MCS]): 11-15.*

The coupling of a dielectric resonator through coplanar waveguides is experimentally studied and the feasibility of very selective microwave circuits, where the resonator is placed below the active and passive circuit components, is demonstrated. The design and the operation of high-stability feedback-type coplanar oscillators are reported. The possibility of mounting a monolithic chip over a high-Q dielectric cavity, avoiding unwanted resonator coupling anywhere in the circuit, is demonstrated. This allows the sealing of the overall circuit in a practical low-size case. Finally, the performances of a test monolithic chip carrying two different oscillators are stressed.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## Direct-Coupled GaAs Monolithic IC Amplifiers

*S. Hori, K. Kamei, M. Tatematsu, T. Chigira, H. Ishimura and S. Okano. "Direct-Coupled GaAs Monolithic IC Amplifiers." 1982 Microwave and Millimeter-Wave Monolithic Circuits Symposium Digest 82.1 (1982 [MCS]): 16-19.*

A two-stage GaAs FET monolithic amplifier has been developed that exhibits a noise figure of 2dB and a gain of 20dB at frequencies from 0.3 to 1.5 GHz. The FET gate width is optimized to 1mm to lower the noise figure for a 50 Omega signal source impedance. A direct-coupled scheme is used for chip size reduction. All the circuit elements such as FETs, Schottky diodes and resistors are fabricated by using selective ion-implantation for realizing a planar structure.

# Abstracts

## A Monolithic GaAs DC to 2 GHz Feedback Amplifier

*W.C. Petersen, A.K. Gupta and D.R. Decker. "A Monolithic GaAs DC to 2 GHz Feedback Amplifier." 1982 Microwave and Millimeter-Wave Monolithic Circuits Symposium Digest 82.1 (1982 [MCS]): 20-22.*

Resistive feedback in low frequency FET amplifiers is an attractive method of simultaneously attaining gain flatness and excellent input/output VSWR over wide bandwidths. Combined with simple matching circuitry, the feedback approach allows the design of general purpose utility amplifiers requiring much less chip area than when conventional matching techniques are used. The 1.5 by 1.5 millimeter chip described in this paper provides 10 dB ± 1 dB gain, excellent input and output VSWR, and saturated output power in excess of +20 dBm frcm below 5 MHz to 2 GHz. The noise figure is approximately 2 dB when biased for minimum noise, with an associated gain of 9 dB.

MTT
IEEE
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Slow-Wave Approach for Monolithic GaAs ICs

*E.M. Bastida, G.P. Donzelli and N. Fanelli. "Slow-Wave Approach for Monolithic GaAs ICs." 1982 Microwave and Millimeter-Wave Monolithic Circuits Symposium Digest 82.1 (1982 [MCS]): 23-24.*

One of the most important things in the MMICs design is to minimize the monolithic circuit size. Microstrip or coplanar line approach, cannot lead to a consistent size reduction because the physical line lengths, for a given electrical length, are not very different in A1/sub 2/0/sub 3/ and in GaAs.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## Heterodyne Experiments from Millimeter Wave to Optical Frequencies Using GaAs MESFETs Above f/sub T/

*A. Chu, H.R. Fetterman, D.D. Peck and P.E. Tannenwald. "Heterodyne Experiments from Millimeter Wave to Optical Frequencies Using GaAs MESFETs Above f/sub T/." 1982 Microwave and Millimeter-Wave Monolithic Circuits Symposium Digest 82.1 (1982 [MCS]): 25-27.*

Response of GaAs FETs in mm-wave and optical heterodyne experiments has been obtained at frequencies above the frequency of unity current gain, f/sub T/. In the mixing of two visible lasers, beat frequencies as high as 300 GHz have been observed. These high IFs were down converted to microwave frequencies by radiatively coupling mm-wave local oscillators into the gate region.

# Abstracts

## Ka-Band Monolithic GaAs Balanced Mixers (1982 [MCS])

*A. Contolatis, C. Chao, S. Jamison and C. Butter. "Ka-Band Monolithic GaAs Balanced Mixers (1982 [MCS])." 1982 Microwave and Millimeter-Wave Monolithic Circuits Symposium Digest 82.1 (1982 [MCS]): 28-30.*

A monolithic GaAs balanced mixer chip has been optimized and integrated with a hybrid MIC IF preamplifier in a wafer-type package with significant improvement in RF bandwidth and reduction in chip size. A double sideband noise figure of less than 6 dB has been achieved over a 31 to 39 GHz frequency range with a GaAs chip size of only .05 X .43 inches. This includes the contribution of a 1.5 dB noise figure due to IF preamplifier (5-500 MHz).

# Abstracts

## Yield Considerations for Ion Implanted GaAs MMICs (1982 [MCS])

*A.K. Gupta, W.C. Petersen and D.R. Decker. "Yield Considerations for Ion Implanted GaAs MMICs (1982 [MCS])." 1982 Microwave and Millimeter-Wave Monolithic Circuits Symposium Digest 82.1 (1982 [MCS]): 31-35.*

An ion implantation based process is described for fabricating GaAs Monolithic Microwave Integrated Circuits (MMICs) incorporating active devices, RF circuitry and bypass capacitors. Low ohmic contact resistance and good control of metal-insulator-metal (MIM) capacitance values is demonstrated and some factors affecting FET and capacitor yield are discussed. High DC yield of typical amplifier circuits is shown indicating that this process has the potential for achieving very high overall yields in a production environment. Good yield of functional MMIC modules with subsystem complexity is projected.

MTT®

IEEE®

Contents

Publications

Issues

Papers

Authors

Click on title for a complete paper.

# Abstracts

## The Design and Calibration of a Universal MMIC Test Fixture

*J.A. Benet. "The Design and Calibration of a Universal MMIC Test Fixture." 1982 Microwave and Millimeter-Wave Monolithic Circuits Symposium Digest 82.1 (1982 [MCS]): 36-41.*

A universal test fixture suitable for performing repeatable, nondestructive microwave tests for characterizing various sized monolithic microwave integrated circuit (MMIC) chips has been developed at Rockwell International. The fixture, which encloses the MMIC chip, is designed to accommodate multiple RF inputs and outputs as well as up to 36 independent isolated bias connections. A method for calibrating the fixture on an automatic network analyzer (ANA) without the use of known precision calibration standards was also developed. A description of the fixture and the calibration method is presented in this paper.

# Abstracts

## An X-Band 10 W Monolithic Transmit-Receive GaAs FET Switch

*Y. Ayasli, R. Mozzi, L. Hanes and L.D. Reynolds. "An X-Band 10 W Monolithic Transmit-Receive GaAs FET Switch." 1982 Microwave and Millimeter-Wave Monolithic Circuits Symposium Digest 82.1 (1982 [MCS]): 42-46.*

A monolithic transmit-receive GaAs FET switch capable of switching more than 10 W CW power with about 1 dB insertion loss and 26 dB isolation at X-band frequencies is reported.

Click on title for a complete paper.

MTT

IEEE

Contents

Publications

Issues

Papers

Authors

# Abstracts

## A Practical Wide Band GaAs Phase Detector

*I. Shahriary, T.S. Lin and K. Weller. "A Practical Wide Band GaAs Phase Detector." 1982 Microwave and Millimeter-Wave Monolithic Circuits Symposium Digest 82.1 (1982 [MCS]): 47-49.*

A GaAs monolithic phase detector operating over the frequency range of 1 MHz to 8 GHz, with a phase detection sensitivity factor of up to 1.6 has been developed at TRW. The detector circuit consists of a doubly balanced transconductance multiplier which has a total of 7 FETs and requires only one DC bias point. The detector chip measures 30 x 35 MILS and has a DC power consumption of 100 mW.

# Abstracts

## Monolithic GaAs Interdigitated 90° Hybrids with 50- and 25-Ohm Impedances

*M. Kumar, S.N. Subbarao, R.J. Menna and H.-C. Huang. "Monolithic GaAs Interdigitated 90° Hybrids with 50- and 25-Ohm Impedances." 1982 Microwave and Millimeter-Wave Monolithic Circuits Symposium Digest 82.1 (1982 [MCS]): 50-53.*

This paper describes the design, fabrication and performance of two monolithic GaAs C-band 900 interdigitated couplers with 50-ohm and 25-ohm impedances, respectively. A comparison of the performance of these two couplers shows thar the 25-ohm coupler has the advantages of lower loss, higher fabrication yield and needs fewer numbers of matching elements when it is used in the balanced amplifier configuration. The fewer number of matching elements results in great savings in the GaAs real estate for MMICS. Both the couplers have been fabricated on a 0.1 mm thick GaAs SI substrate. The measured results agree quite well with calculated results. The losses of the 50-ohm and 25-ohm couplers are 0.5 and 0.3 dB, respectively, over the 4-8 GHz frequency band.

MTT®
IEEE®
Contents
Publications
Issues
Papers
Authors

# Abstracts

## Design and Fabrication of GaAs Analog-to-Digital ICs

*L.C. Upadhyayula and W.R. Curtice. "Design and Fabrication of GaAs Analog-to-Digital ICs." 1982 Microwave and Millimeter-Wave Monolithic Circuits Symposium Digest 82.1 (1982 [MCS]): 54-56.*

Some RADAR systems require 2- or 3-bit ADCS operating at several hundred megahertz to gigahertz sampling rates. Earlier, we have shown that GaAs MESFET comparators can meet both the speed and resolution requirements of such A/Ds. A 3-bit A/D circuit was designed and optimized. ICs were fabricated and successfully operated from dc through gigs-sample per second rate.

# Abstracts

## Fabrication Techniques for X-Band Monolithic VCOs

*G.E. Brehm, B.N. Scott and F.H. Doerbeck. "Fabrication Techniques for X-Band Monolithic VCOs." 1982 Microwave and Millimeter-Wave Monolithic Circuits Symposium Digest 82.1 (1982 [MCS]): 57-60.*

Monolithic GaAs FET VCOs have been designed and fabricated utilizing a submicron-gate FET, wide-capacitance-ratio varactor diodes, MIM capacitors, microstripline inductors, resistors and air-bridge interconnections on a single GaAs chip. Design considerations and fabrication techniques for each of these components are given.

# Abstracts

## A Two-Stage Monolithic IF Amplifier Utilizing a High Dielectric Constant Capacitor

*A. Chu, L.J. Mahoney, M.E. Elta, W.E. Courtney, W.J. Piacentini and J.P. Donnelly. "A Two-Stage Monolithic IF Amplifier Utilizing a High Dielectric Constant Capacitor." 1982 Microwave and Millimeter-Wave Monolithic Circuits Symposium Digest 82.1 (1982 [MCS]): 61-63.*

A two-stage monolithic IF amplifier incorporating sputtered Ta/sub 2/0/sub 5/ capacitor has been fabricated. The monolithic capacitor is based on a composite layer structure consisting of Au, Ta, Ta/sub 2/0/sub 5/, Ta and Au. This layered structure is sequentially deposited in a single sputtering run, which eliminates all possibility of particulate contamination. As a result a thin pinhole-free dielectric layer can be deposited over large areas, and 140 pF capacitors have been fabricated with excellent yields. The large unit area capacitance of 1500 pF/mm² available with the present process has the potential for reducing the size and cost of both microwave monolithic circuits and hybrid thin-film circuits.

# Abstracts

## Back Cover (1982 [MCS])

*"Back Cover (1982 [MCS])." 1982 Microwave and Millimeter-Wave Monolithic Circuits Symposium Digest 82.1 (1982 [MCS]): b1-b1.*