Patent Abstracts

These Patent Abstracts of recently issued patents are intended to provide the minimum information necessary for readers to determine if they are interested in examining the patent in more detail. Complete copies of patents are available for a small fee by writing: U.S. Patent and Trademark Office, Box 9, Washington, D.C. 20231.

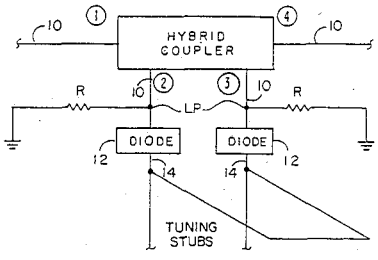
4,764,740 Aug. 16, 1988

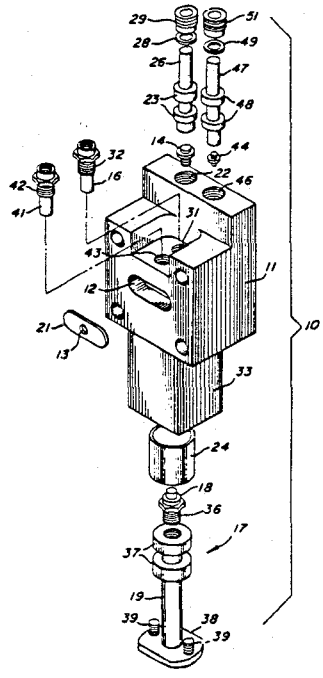
Phase Shifter

Inventor: Maurice A. Meyer.
Assignee: Micronav Ltd.
Filed: Aug. 10, 1987.

Abstract—The present invention relates to a reflection diode phase shifter that achieves amplitude equality between phase shifts of incident energy. Amplitude equality is achieved by placing a resistor R to ground in parallel with the transmission lines connecting a four-port coupler to symmetric reflection terminators having an impedance that is varied by a diode. The resistor is placed at a point on the transmission line having the lowest voltage when the greatest power loss is realized by the phase shifter.

3 Claims, 1 Drawing Sheet





4,766,398 Aug. 23, 1988

Broad-Band Temperature-Compensated Microwave Cavity Oscillator

Inventor: Paul A. Kiedrowski.
Assignee: Motorola, Inc.
Filed: Apr. 30, 1987.

Abstract—This microwave oscillator in one embodiment has two tuning rods (16 and 18) configured to extend within a resonant cavity (12). One of these tuning rods (18) attaches to a shaft (19) that is affixed at one end and that is comprised of a material having a thermal coefficient of expansion that is different from the material comprising the housing (11) that forms the cavity (12). As a result, movement of the tuning rods (16 and 18) will vary as temperature varies, with a resulting stability in the frequency of oscillation.

5 Claims, 3 Drawing Sheets

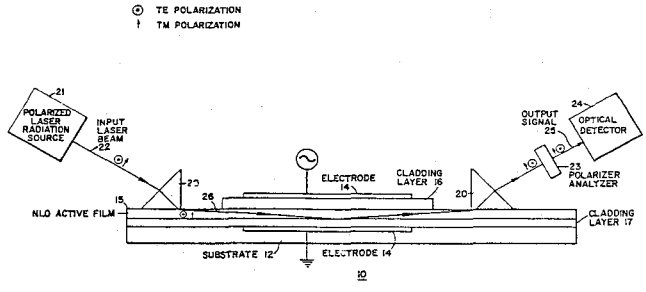
4,767,169 Aug. 30, 1988

Thin-Film Waveguide Electro-Optic Modulator

Inventors: Chia-Chi Teng and Dagobert E. Stuetz.
Assignee: Hoechst Celanese Corporation.
Filed: Feb. 26, 1987.

Abstract—This invention provides a thin-film waveguide electro-optic intensity modulation device. The thin-film waveguide is an isotropic organic medium which exhibits nonlinear optical response. The device is adapted to modulate waveguide radiation by refractive index change commensurate with change in an applied electric field.

39 Claims, 1 Drawing Sheet



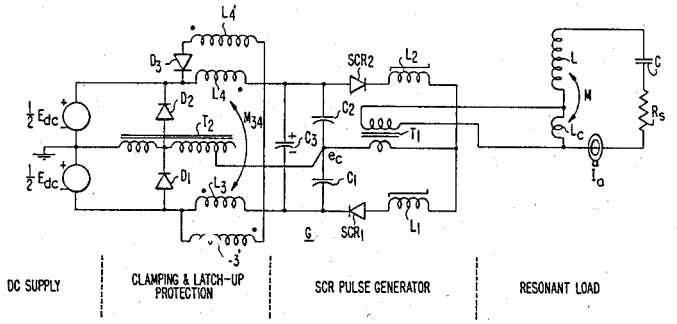
4,767,999 Aug. 30, 1988

Method of and Apparatus for Radio-Frequency Generation in Resonator Tank Circuits Excited by Sequential Pulses of Alternately Opposite Polarity

Inventor: Peter VerPlanck.
Assignee: Megapulse, Inc.
Filed: Nov. 12, 1986.

Abstract—A method of and apparatus for exciting harmonic generation of radio frequency in a tank resonant circuit by bipolar spaced, half-cycle pulses, wherein the period of the tank resonant frequency oscillations is $1/N$ the period between successive pulses of similar polarity, where N is an odd integer greater than unity.

11 Claims, 4 Drawing Sheets



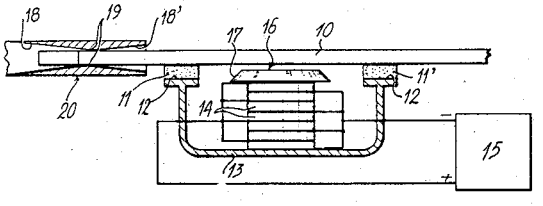
4,768,001 Aug. 30, 1988

Microwave Phase Shifter with Piezoelectric Control

Inventors: Bernard Chan-Son-Lint, Pierre Borderies, and Christian J. Pouit.
Assignee: Office National d'Etudes et de Recherches Aerospatiales (ONERA).
Filed: Apr. 29, 1986.

Abstract—A microwave phase shifter comprise a dielectric waveguide having a flat side and a moving conductor plane member substantially parallel to the waveguide side. Piezoelectric means are provided to move the plane member with respect to the waveguide side between a portion relatively remote from the waveguide side and an other position substantially in contact with the waveguide side. The piezoelectric means consists preferably of a stack of piezoelectric members supplied by a variable dc power source. Owing to the piezoelectric means for moving the conductor plane member, a variable phase shift is continuously adjusted. Such a phase shifter can be as an antenna network when the dielectric waveguide contains groups of radiator perturbations, such as conductor strips, respectively controlled by one or several piezoelectric means carrying conductor plates facing waveguide portions including the perturbations groups.

25 Claims, 6 Drawing Sheets



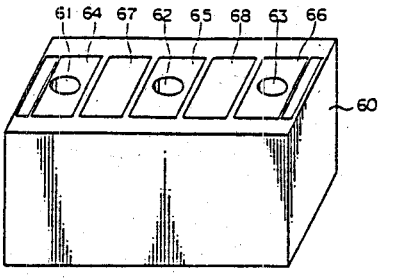
4,768,003 Aug. 30, 1988

Microwave Filter

Inventors: Izumi Kawakami, Tomokazu Komazaki, Katuhiko Gunzi, and Norio Onisi.
Assignee: OKI Electric Industry Co., Inc.
Filed: July 17, 1987.

Abstract—A microwave filter comprising a rectangular ceramics block (30) having a plurality of elongated parallel holes (31–36) extending from the top surface to the bottom surface thereof. The holes are plated with conductive layers (37, 38), and flat conductive areas (39–44) coupled with the layers (37, 38) spatially disposed on the top surface of the dielectric block (30) surround opening ends of the holes (31–36). An input terminal and an output terminal are provided adjacent to the conductive areas (39, 44) at both the extreme sides of the dielectric block (30).

9 Claims, 6 Drawing Sheets



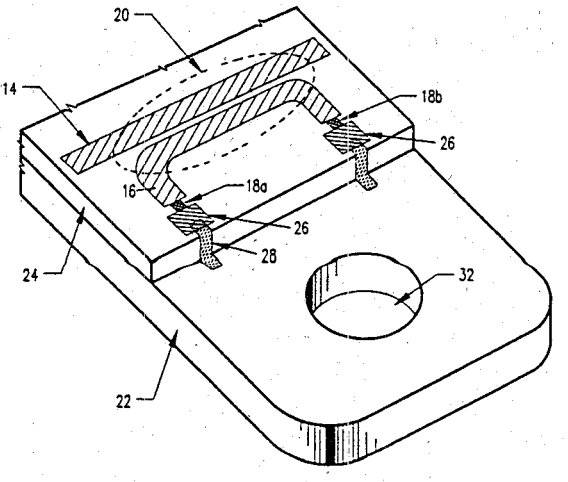
4,768,005 Aug. 30, 1988

Capacitorless dc Bias Lines for Use with RF Signal Processing Apparatus

Inventor: Kenneth N. Kawakami.
Assignee: Microwave Technology, Inc.
Filed: Mar. 25, 1987.

Abstract—A dc bias line module for use with an RF signal processing apparatus which incorporates terminating resistors, in lieu of capacitors, that are connected to the RF line.

7 Claims, 2 Drawing Sheets



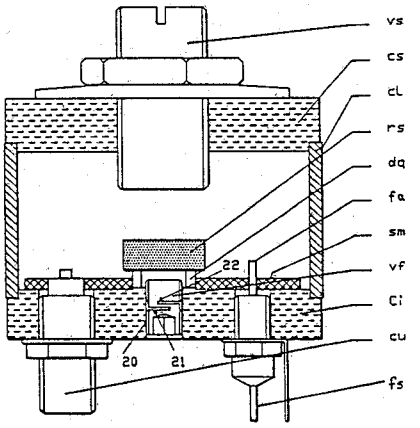
4,769,620 Sept. 6, 1988

Microwave Oscillator with Dielectric Resonator

Inventor: Sebastiano Nicotra.
Assignee: Mizar S.p.A.
Filed: May 22, 1987.

Abstract—The oscillator according to the invention consists at least of: a body which has a determined geometric structure and is closed by an upper cover with a first tuning screw inserted therethrough and by a lower cover having inserted therethrough an output connector, a feed filter and preferably a second tuning screw; a resonator which is geometrically homogeneous with the said body structure and is arranged on the inner wall of the lower cover through a spacer; a microstrip also on the lower cover, arranged sideways but coupled with the resonator; a bipolar transistor or a field effect transistor; substrates preferably of fluorine polymers reinforced with fiber-glass; capacitor elements on radio-frequency block and on output by-pass; and resistances to bias, and feed the transistor and to terminate the microstrip.

3 Claims, 2 Drawing Sheets



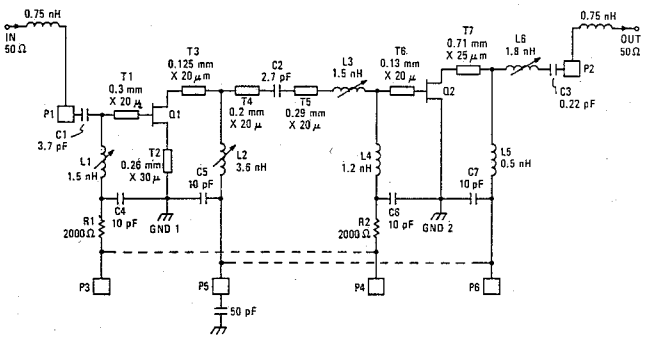
4,771,247 Sept. 13, 1988

MMIC (Monolithic Microwave Integrated Circuit) Low-Noise Amplifier

Inventor: Anthony W. Jacomb-Hood.
Assignee: General Electric Company.
Filed: Sept. 24, 1987.

Abstract—The invention relates to a low-noise amplifier for use at microwave frequencies which may be fabricated using integrated circuit techniques. In accordance with the invention, critical components are made adjustable so as to simplify the design process and manufacturability of the amplifier. A two stage low noise amplifier is disclosed in which tee networks are used as input and output networks in each stage, and in which one element of each tee includes an adjustable spiral inductor. The value of each adjustable spiral inductor may be adjusted by removal of one or more air bridges disposed along the inner turn of the inductor. This permits one to "tune" the amplifier and optimize its performance.

9 claims, 3 Drawing Sheets



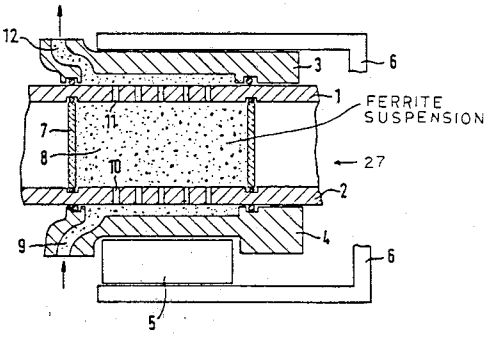
4,771,252 Sept. 13, 1988

High-Power Waveguide Junction Circulator Having Ferrite Suspension at the Junction

Inventors: Günter Morz, Wolfgang Weiser, Sigmund Lenz, and Erich Pivit.
Assignee: ANT Nachrichtentechnik GmbH.
Filed: Oct. 2, 1987.

Abstract—A junction circulator for high power, high-frequency use employs cooled ferrite material disposed in the microwave junction zone where it is exposed to a static magnetic field. The cooled ferrite material is provided by a plurality of small ferrite particles which are suspended in a liquid coolant.

6 Claims, 2 Drawing Sheets



4,772,854 Sept. 20, 1988

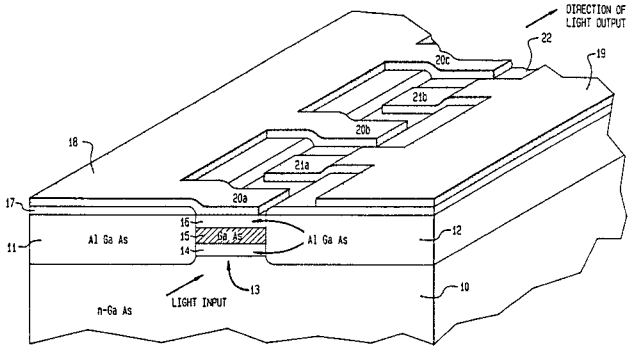
All-Optical Repeater

Inventor: Yaron Silberberg.
Assignee: Bell Communications Research, Inc.
Filed: Dec. 24, 1986.

Abstract—An all-optical device containing saturable gain, saturable loss and unsaturable loss regions which functions to transform weak, distorted optical pulses into uniform standard-shape pulses. The device performs thresholding,

amplification and pulse shaping as required from an optical repeater, and may be implemented in semiconductor technology.

5 Claims, 2 Drawing Sheets



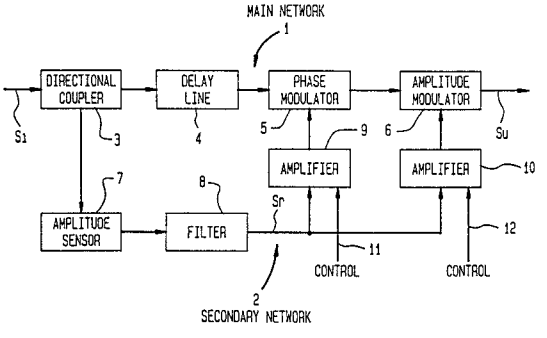
4,772,855 Sept. 20, 1988

Linearizer for Microwave Power Amplifiers

Inventors: Carlo Buoli and Nicolangelo Palermo.
Assignee: Siemens Telecommunicazioni, S.p.A.
Filed: Jan. 22, 1988.

Abstract—A linearizer circuit is described having a main radio frequency or intermediate frequency network and secondary baseband frequency network. The main network includes a directional coupler, a delay line, a phase modulator and an amplitude modulator. The secondary network includes means for amplitude detecting and filtering an input signal and a pair of adjustable-gain amplifiers which receive the amplitude detected signal and on the basis of the gain adjustment act on the two modulators as to give them nonlinear response curves so as to compensate for the nonlinearity of the power amplifier placed downstream from the linearizer.

8 Claims, 2 Drawing Sheets



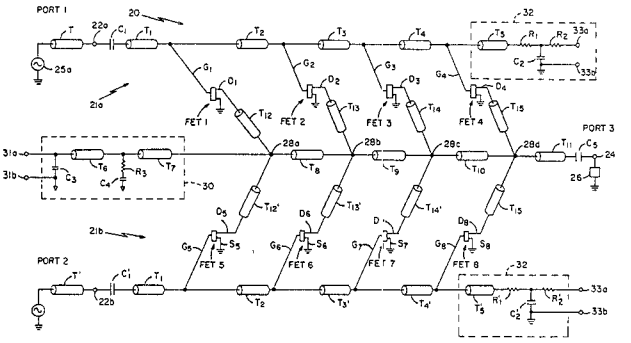
4,772,858 Sept. 20, 1988

Distributed Amplifying Switch/RF Combiner

Inventors: Toshikazu Tsukii and Yalcin Ayasli.
Assignee: Raytheon Company.
Filed: Nov. 4, 1987.

Abstract—A distributed circuit includes a plurality of field effect transistors (FET's), each one of such FET's having gate, drain and source electrodes, with a first portion, or a first channel, of such FET's having gate electrodes and drain electrodes successively coupled between a first input terminal and an output terminal, and a second like portion or a second channel of such FET's having gate electrodes and drain electrodes successively coupled between a second input terminal and said output terminal. Separate bias circuits are provided to the input electrodes of the first and second channels. Bias signals fed to the bias circuits and coupled to the input electrodes place the FET's in an "on" state to provide gain to RF input signals fed thereto, or in a "pinch-off" state to isolate RF signals fed to the input electrodes of the FET's. Accordingly, a 2×1 switch or a two-way active RF combiner which provides gain to a signal is provided.

12 Claims, 8 Drawing Sheets



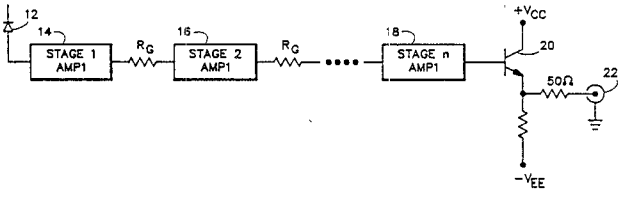
4,772,859 Sept. 20, 1988

Microwave Temperature-Compensated Cascadable Amplifier for Fiber Optical Receiver

Inventor: Ryoichi Sakai.
Assignee: Tektronix, Inc.
Filed: June 4, 1987.

Abstract—A temperature-compensated amplifier network for a fiber optical receiver includes a photodiode having an optical input and a current output, and a cascadable transimpedance amplifier having N stages, each stage having a common base–emitter voltage. An emitter-follower transistor is coupled to the last stage of the transimpedance amplifier network and has a base-emitter voltage of the same magnitude but of opposite polarity from the base-emitter voltage of each of the amplifier stages. Any dc drift of the amplifier stages is therefore offset by a compensating drift in the opposite direction by the output emitter-follower.

4 Claims, 1 Drawing Sheet



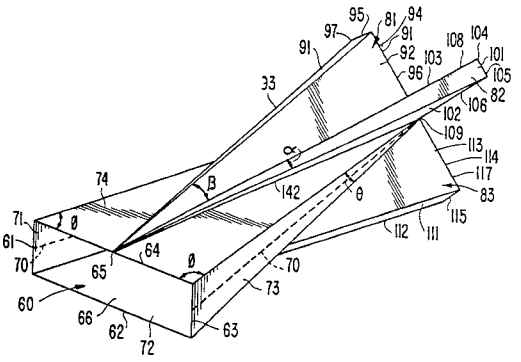
4,772,861 Sept. 20, 1988

TE_{20} Rectangular to Crossed TE_{20} Rectangular Mode Converter for TE_{01} Circular Mode Launcher

Inventor: Lock R. Young.
Assignee: Harris Corporation
Filed: Mar 16, 1987.

Abstract—The middle stage of a Marié-type mode launcher is configured by sliding together a pair of reusable multiwedge shaped mandrels which, when placed together in the direction of the longitudinal axis of the launcher, form a compound mandrel from which a TE_{20} rectangular to crossed TE_{20} rectangular stage may be electroformed. One mandrel has a first double wedge-shaped section that tapers from a rectangular open end (that joins with the rectangular output end of the first stage) to an edge that is effectively diagonally located between opposing vertices of intersecting surfaces of adjacent pairs of four tapered sections that form the 'X'-shaped open output end of the middle stage. The taper of the first section is a dual taper, in directions parallel with the sides of the rectangular input end of the middle stage. The second mandrel is comprised of four symmetrically arranged multi-tapered finger sections each of which has a rectangularly shaped open output end from three sides of which extend planar surfaces respectively tapering effectively to points that are coincident with the longer ones of parallel sides of the open rectangular end of the middle stage

15 Claims, 6 Drawing Sheets



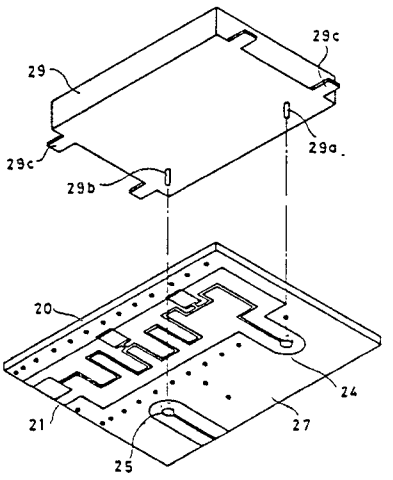
4,772,862 Sept. 20, 1988

Filter Apparatus

Inventors: Kazuhiko Kubo, Akira Usui, Hiroyuki Nagai, Hideyuki Miyake, and Takashi Fujino.
Assignee: Matsushita Electric Industrial Co., Ltd.
Filed: Dec 16, 1986

Abstract—On an upper surface of a substrate (20) a band-pass filter (29) is provided, and on the opposite (lower) surface of a substrate (20) a low-pass filter comprising a conductive layer pattern (27) and capacitors (22, 23) is provided, wherein conductive layers (27) are provided on substantially the entire area of the upper surface excluding portions for terminals and on the lower surface excluding portions for the low-pass filter and the terminals, and by connecting both conductive layers by means of a row of through-hole connections, the input terminal (24) and the output terminal (25) are shielded from each other

8 Claims, 9 Drawing Sheets



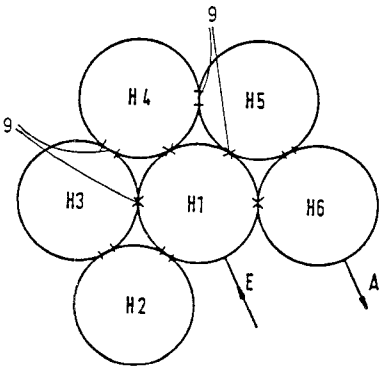
4,772,863 Sept. 20, 1988

Microwave Filter Equipped with Multiply Coupled Cavity Resonators

Inventors: Uwe Rosenberg and Dieter Wolk.
Assignee: ANT Nachrichtentechnik GmbH.
Filed. June 23, 1987.

Abstract—A microwave filter composed of a plurality of cylindrical cavity resonators each having a sidewall extending parallel to the direction of wave propagation in the resonator, wherein the cavity resonators are disposed with their sidewalls in contact with one another in a compact cylinder pack arrangement so that the sidewall of each cavity resonator is in contact with the sidewall of the maximum number of other mutually adjacent resonators, and coupling structures connecting resonators whose sidewalls are in contact, via the contacting sidewalls, for coupling electromagnetic energy between the resonators

7 Claims, 1 Drawing Sheet



4,774,477 Sept. 27, 1988

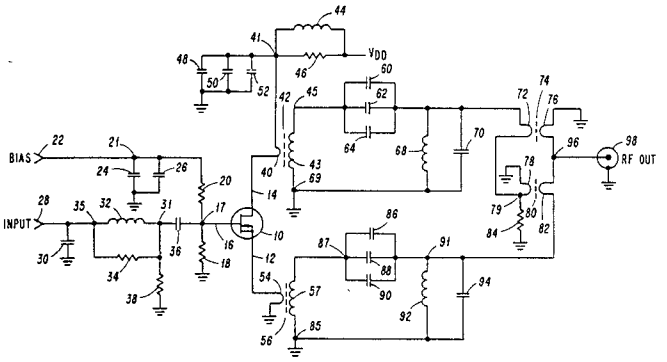
Power Amplifier Having Low Intermodulation Distortion

Inventors: William D. Rodes and David L. Krett.
Assignee: Rockwell International Corporation
Filed: Mar 18, 1987

Abstract—Intermodulation distortion in RF FET amplifiers operating in the class AB mode is reduced without limiting the bandwidth by providing transformer coupled outputs from both the source and drain circuits. The

negative feedback provided by the transformer in the source circuit reduces distortion but does not limit bandwidth in the manner of the reactive network normally used for correct phasing in circuits employing drain to gate feedback Using this technique, the distortion components are typically 40–45 dB below the desired signal when a two-tone test is used, which exceeds the typically available level of 30 dB in prior art circuits.

8 Claims, 3 Drawing Sheets



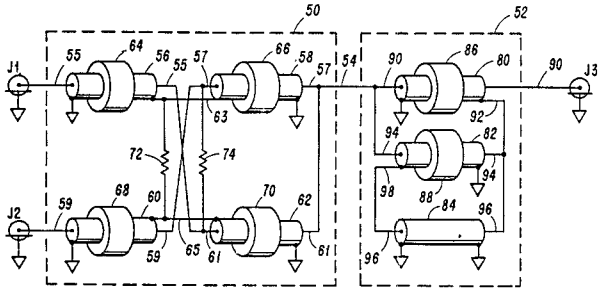
4,774,481 Sept. 27, 1988

Wide-Band Transmission Line Signal Combiner/Divider

Inventors: Richard C. Edwards and Burton L. Martin.
Assignee: Rockwell International Corporation
Filed: Sept. 30, 1986.

Abstract—RF signals may be split or combined across a wide band of frequencies with low insertion losses, large isolation between input ports, and low voltage standing wave ratio by means of coaxial transmission line sections interconnected in a bridge configuration. Even mode impedances between the cable shield and the common ground plane may be eliminated by placing ferrite sleeves on each line section. Impedance transformations introduced by the splitter/combiner are counteracted by a coaxial line impedance transformer.

4 Claims, 3 Drawing Sheets



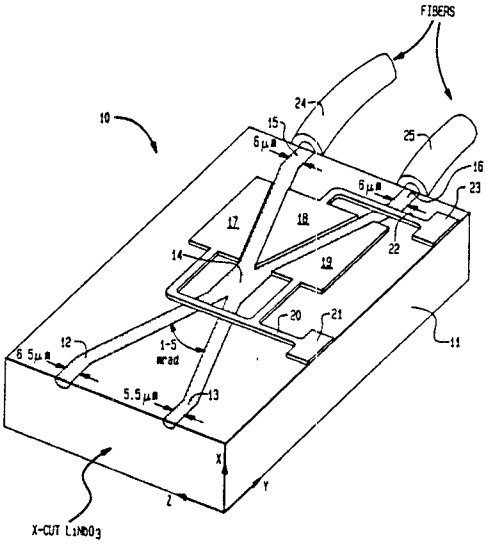
4,775,207 Oct. 4, 1988

Electro-Optical Switch

Inventor: Yaron Silberberg.
Assignee: Bell Communications Research, Inc
Filed: Mar. 17, 1987

Abstract—An electro-optic switch implemented on a substrate which includes first and second input waveguides of unequal width and a central region in which light from the two input waveguides converge. First and second output waveguides are provided which diverge from the central region. Electrodes for generating an electric field are disposed adjacent the central region and output waveguides for switching a beam of light from the first to the second output waveguide in a step-like manner in response to a control voltage.

8 Claims, 2 Drawing Sheets



4,775,214 Oct. 4, 1988

Wavelength Coded Resonant Optical Sensor

Inventor: Lawrence A. Johnson.
Assignee: Rosemount Inc.
Filed: Oct. 1, 1986.

Abstract—An optical sensor for providing an output signal representative of a sensed parameter such as pressure or temperature which includes an input/output optical waveguide and an optical resonator The input/output waveguide is coupled to the resonator so that a significant change in light intensity at the output of the input/output waveguide occurs at resonance of the optical resonator. The optical resonator exhibits first and second independent resonant modes which differ from one another as a function of the parameter to be sensed. A narrow bandwidth variable frequency light source provides a frequency swept light beam to the input/output waveguide, and one or more photodetectors sense the intensity of the light beam at the output of the input/output waveguide to produce an output signal representative of the parameter based upon the time difference between occurrence of the first and second resonant modes.

53 Claims, 8 Drawing Sheets