

BROADCAST[®] engineering

November 1983/\$3

Reel-to-reel roundup

Aural/video STLs

Automation systems update

A98400-----DNB461050 XXXXX BEQ
F10901820000000 34A 1
TERRY W DENBROOK G M
PUGAT SOUND AUDIO
5105 N 46TH
TACOMA WA 98407

We've got it before you want it.

At ADM Technology we manufacture the most advanced audio consoles available. We incorporate new ideas and quality improvements into every console we build. You can be sure the ADM® console you order today will come through with the latest innovations in audio technology.

Our ADM 1600 Series II is a typical example. It is well equipped to handle a broad range of broadcast, production and post-production requirements and has a full measure of expandability.

Although it is a compact, basic console it is constantly updated to share the latest in technological advances with the larger ADM consoles.

Engineered to exacting standards and manufactured to the most rigid tolerances, all ADM's are backed by our exclusive 5-year warranty.

Let's talk consoles soon. Contact ADM Technology, Inc. - The Audio Company - 1626 E. Big Beaver Road, Troy, MI 48064, Phone (313) 524-2100. TLX 23-1114.



ADM

The Audio Company

WEST CENTRAL SALES
(817) 467-2990

WEST COAST SALES
(415) 945-0181

MAIN OFFICE AND
EAST COAST SALES
(313) 524-2100

How the Midwest advantage adds up for you.



Plus, Control Systems

Whatever the control application, from CATV Commercial Insertion to Broadcast Station Master Control, the Midwest Team can provide the solution, from design through implementation.



Technical Expertise

One of the nation's largest suppliers to the communications industry, Midwest offers more than a comprehensive inventory of the finest quality equipment and supplies from the industry's leading manufacturers. We also offer all the technical advice and assistance you need - from initial

planning and design, through engineering and installation. With years of technical education and experience, the staff engineers on the Midwest Team can augment your staff during critical installation periods so you don't have to hire extra, temporary personnel.



Plus, Teleproduction Systems

We can provide complete "turnkey" teleproduction systems, procuring all the necessary components, designing and installing the system, and maintaining all service and warranty responsibilities once the system is in place.



Plus, Transmission Systems

We have the experience and capability to design, supply, install, and maintain transmission systems of any level of complexity, including Television Broadcast, LPTV, CATV, MATV, Microwave, Satellite, Fiber Optics, and more!



Plus Mobile Units

From news gathering vehicles to 45-foot teleproduction units, Midwest offers a complete line of fully integrated mobile units featuring state-of-the-art equipment. We can also design and supply a custom unit to meet your specific needs.



It all adds up to Midwest!

Call us toll free and find out where our capabilities can meet your needs.
800-543-1584



One Sperti Drive
Edgewood, KY. 41017

Circle (3) on Reply Card

Cincinnati, OH
606-331-8990
Columbus, OH
614-476-2800
Dayton, OH
513-298-0421
Cleveland, OH
216-447-9745
Pittsburgh, PA
412-781-7707

Detroit, MI
313-689-9730
Indianapolis, IN
317-251-5750
Louisville, KY
502-491-2888
Lexington, KY
606-277-4994
Bristol, TN
615-968-2289

Nashville, TN
615-331-5791
Charleston, WV
304-722-2921
Virginia Beach, VA
804-464-6256
Washington, DC
301-577-4903
Charlotte, NC
704-399-6336

Atlanta, GA
404-875-3753
Miami, FL
305-592-5355
Tampa, FL
813-885-9308

BROADCAST engineering

The journal of broadcast technology

November 1983 • Volume 25 • No. 11

STLs

19 The propagation path

By Joe McCleary, chief engineer, KHTZ Radio, Los Angeles, CA

31 Aural STL systems

By Jerry Whitaker, radio editor

62 Computing for broadcasters: An STL path analysis program

By Robert L. Chamberlin, United Technimedia, Park City, UT

AUTOMATION SYSTEMS

52 Case study: Automation at WWJM—efficiency on a budget

By Mark Bohach, chief engineer, WWJM, New Lexington, OH

58 Case study: Using the Commodore Automate-64 at KSDB-FM

By David T. MacFarland, associate professor, radio and television, Manhattan, KS

68 Automation trends

By Bill Rhodes, editorial director, and Carl Bentz, television editor

OTHER FEATURES

78 Reel-to-reel audiotape recorder roundup

By Roger Karwoski, operations manager, KBIA, Columbia, MO, and Carl Bentz, television editor

100 Taft airs affordable teletext

By Bebe F. McClain, president, B.F. McClain Productions, Asheville, NC

DEPARTMENTS

6 FCC update

8 Editorial

Deregulation and the public

10 Satellite update

14 Business

118 News

120 Associations

124 New literature

126 New products

132 People

135 Calendar

141 Index of advertisers

142 Classified ads

©Copyright 1983, by Intertec Publishing Corporation. All rights reserved. Photocopy rights: Permission to photocopy for internal or personal use is granted by Intertec Publishing Corp. for libraries and others registered with Copyright Clearance Center (CCC), provided the base fee of \$2.00 per copy of article is paid directly to CCC, 21 Congress St., Salem, MA 01970. Special requests should be addressed to Cameron Bishop, publisher.

ISSN 0007-1994.

BROADCAST ENGINEERING (USPS 338-130) is published monthly by Intertec Publishing Corporation, 9221 Quivira Road, P.O. Box 12901, Overland Park, KS 66212-9981. Postmaster, return form 3579 to P.O. Box 12938 at the above address.



THE COVER shows the on-air studio of WFMT in Chicago. WFMT is a classical music *superstation* with cable distribution of programming throughout the United States. The reel-to-reel tape recorders in the foreground are Revox PR99s; those in the background are Studer A80RCs. Steve Reeder, WFMT announcer, is at the controls. A roundup on reel-to-reel tape recorders begins on page 78. Photo by James S. Addie.

NEXT MONTH leading authorities from the major networks, the FCC and consulting firms will speak out on how key issues and new technologies are reshaping the future of broadcasting. Some of these factors are imminent; others are years away. Thus, industry experts will share their thoughts on how legislation, regulation and new techniques will affect broadcasting in 1984 and the years beyond.

**"I want the world.
Consistent .05% corner registration
and full auto-setup of up to 96
cameras on computer command."**

HITACHI HEARD YOU.

**AUTO
SETUP**

Don't want much, do you?

Dynamic registration not just at dead center but at all four corners.
Plus 2-minute auto-setup of all those cameras.

You're asking for some smart camera system, networks
of the world and top-drawer video production companies.

Well, Hitachi heard you, and has created an outright *genius*—
the Hitachi SK-110 Camera System.

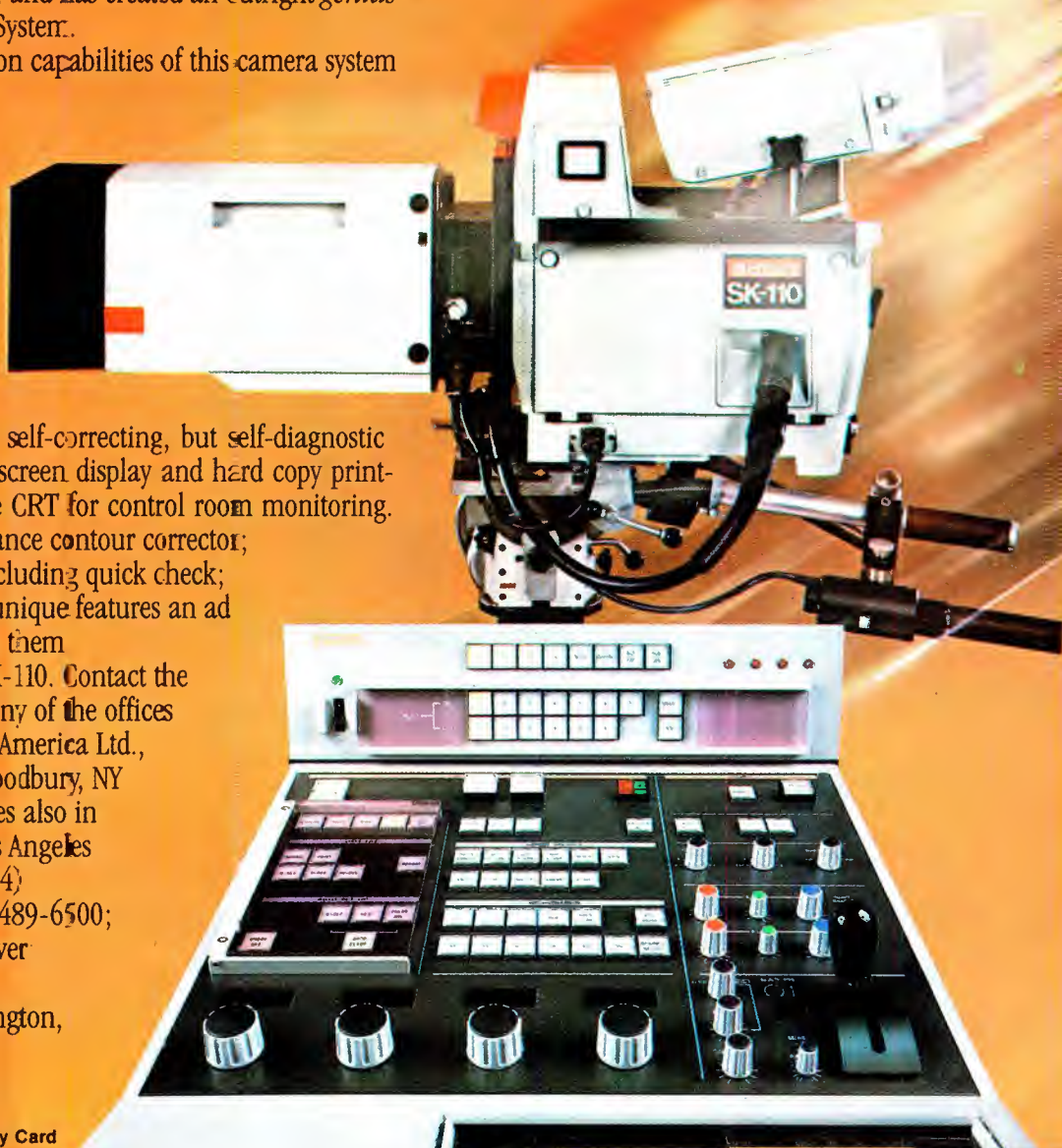
The computer registration capabilities of this camera system
produce pictures of a
clarity and resolution
previously unheard of.

And you get auto-setup
at the push of just one but-
ton, and zero reference,
too, where the computer
sets the green channel and
compares blue and red to
it with absolute precision.

The SK-110 is not only self-correcting, but self-diagnostic
as well. It gives both video screen display and hard copy print-
out; can be hooked into the CRT for control room monitoring.

There's a high-performance contour corrector;
5 automatic setup modes including quick check;
5 data files; so many other unique features an ad
can't begin to tell you about them.

The ultimate Hitachi SK-110. Contact the
broadcast video division at any of the offices
listed below. Hitachi Denshi America Ltd.,
175 Crossways Park West, Woodbury, NY
11797 (516) 921-7200. Offices also in
Chicago (312) 344-4020; Los Angeles
(213) 538-4880; Atlanta (404)
451-9453; Cincinnati (513) 489-6500;
Dallas (214) 233-7623; Denver
(303) 344-3156; Seattle,
(206) 575-1690; and Washington,
D.C. (301) 459-8262.



Circle (4) on Reply Card

www.americanradiohistory.com

The Beyer MCE 5 sounds so transparent, it often goes unnoticed.



The exceedingly small and unobtrusive Beyer MCE 5 lavalier mic tends to disappear from view in front of any camera. And its natural, uncolored sound is so transparent, you tend to forget there's a microphone between you and your audience. Quiet and sensitive, with a frequency response of 20 to 20,000 Hz, the MCE 5 features a matte-black finish which makes it even harder to spot. The MCE 5 is available with XLR, 1/4" Phone, Lemo and open-ended versions (for wireless) to meet all broadcast applications.

The Dynamic Decision

beyerdynamic |||||

Beyer Dynamic, Inc., 5-05 Burns Avenue, Hicksville, New York 11801 (516) 935-8000

Circle (5) on Reply Card

SPECIFY EXCELLENCE!

from the company who pioneered equalization

• ACTIVE AND PASSIVE EQUALIZERS

18 different Models to choose from

• REAL TIME ANALYZERS

Octave Band, one-third and one-sixth octave

• BI-AMP AND TRI-AMP CROSSOVERS

Low-level at any frequency and slope

• NARROW BANDWIDTH NOTCH FILTERS

Control of room feedback and ring modes

• CUSTOM FILTERS FOR AUDIO APPLICATIONS

High-pass low-pass band-pass notch

SEND FOR OUR COMPLETE PRODUCT CATALOG



INSTRUMENTS, INCORPORATED
P.O. BOX 698
AUSTIN, TX 78767
(512) 892-0752
TELEX 776409 WHITE INST AUS

Circle (6) on Reply Card

BROADCAST[®] engineering

Editorial and advertising correspondence should be addressed to: P.O. Box 12901, Overland Park, KS 66212-9981 (a suburb of Kansas City, MO); (913) 888-4664. Telex: 42-4156 Intertec OLPK. Circulation correspondence should be sent to the above address, under P.O. Box 12937.

EDITORIAL

Bill Rhodes, *Editorial Director*
Carl Bentz, *Television Editor*
Jerry Whitaker, *Radio Editor*
Nils Conrad Persson, *Electronics Editor*
David Hodes, *Video Editor*
Miguel Chivite, *International Editor*
Fred Ampel, *Audio Editor*
Rhonda L. Wickham, *Managing Editor*
Karen Arnhart Booth, *Associate Editor*
Jane Cigard, *Editorial Assistant*
Tom Cook, *Editorial Assistant*
Barbara Ehli, *Editorial Assistant*
Pat Blanton, *Directory Editor*

ART

Kevin Callahan, *Art Director*
James Sen Clark, *Senior Graphic Designer*

TECHNICAL CONSULTANTS

John H. Battison, *Antennas/Radiation*
Blair Benson, *TV Technology*
Dennis Ciapura, *Technology*
Dane E. Ericksen, *Systems Design*
Howard T. Head, *FCC Rules*
Wallace Johnson, *FCC/Bdct. Engineering*
Donald L. Markley, *Facilities*
Harry C. Martin, *Legal*
Robert J. Nissen, *Studio/Communications*
Hugh R. Paul, *International Engineering*
Art Schneider, *A.C.E., Post-production*
Elmer Smalling, III, *Cable Systems*
Vincent Wasilewski, *Communications Law*

CORRESPONDING ASSOCIATIONS

American Society of TV Cameramen
Assn. for Bdct. Engr. Standards
National Association of Broadcasters
National Radio Broadcasters Assn.

CIRCULATION

John C. Arnst, *Director*
Evelyn Rogers, *Manager*
Dee Manies, *Reader Correspondent*

ADMINISTRATION

R. J. Hancock, *President*
Cameron Bishop, *Publisher*
Eric Jacobson, *Associate Publisher*

ADVERTISING

Robyn Kahn, *Marketing Coordinator*
Mary Birnbaum, *Production Manager*

Regional advertising sales offices listed near the Advertisers' Index.

Member,
American Business Press



Member,
Business Publications
Audit of Circulation



BROADCAST ENGINEERING (USPS 338-130) is published monthly by Intertec Publishing Corporation, 9221 Quivira Road, P.O. Box 12901, Overland Park, KS 66212-9981. Postmaster, return form 3579 to P.O. Box 12938 at the above address.

BROADCAST ENGINEERING is edited for corporate management, engineers/technicians and other station management personnel at commercial and educational radio and TV stations, teleproduction studios, recording studios, CATV and CCTV facilities and government agencies. Qualified persons also include consulting engineers and dealer/distributors of broadcast equipment.

SUBSCRIPTIONS: BROADCAST ENGINEERING is mailed free to qualified persons in occupations described above. Non-qualified persons may subscribe at the following rates: United States, one year, \$25; all other countries, one year, \$30. Back issue rates, \$5, except for the September Buyers' Guide issue, which is \$15. Rates include postage. Adjustments necessitated by subscription termination at single copy rate. Allow 6-8 weeks for new subscriptions or for change of address. Controlled circulation postage paid at Shawnee Mission, KS.

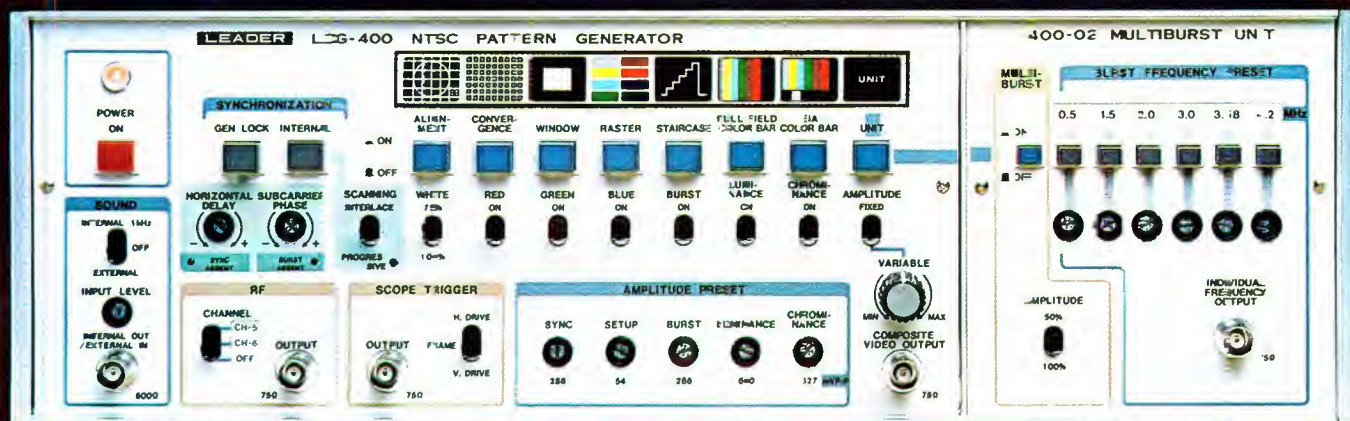


©1983. All rights reserved.
Intertec Publishing Corp.



The Leader Sync/Test Generators.

Every important feature for under \$2,000.



Precise NTSC sync/test pattern generators.

Leader's LCG-400 series sync/test generators provide accurate reference signals for any off-the-air broadcast or non-broadcast operation. Available in either multi-burst or sweep marker configurations, the LCG-400 provides EIA and full-field color bars as well as staircase, raster (in eight colors), window, convergence and cross-hatch test signals... plus gen-lock capabilities and a host of auxiliary outputs. As a matter of fact, Leader's sync/test generators do virtually everything the \$4,000 generators do... except cost as much.

A network-proven 50 MHz oscilloscope.

The Leader LBO-517 oscilloscope makes accurate and detailed measurements. It offers sensitivities of 1 mV to 10 MHz and 5 mV to 50 MHz. Two main and two auxiliary channels can be displayed on main and delayed time bases (8 traces) simultaneously while intensifying



LBO-517 50 MHz Oscilloscope.

the delayed portion. Composite triggering provides *stable* viewing of two asynchronous inputs. Positive, stable triggering on composite video signals, at either H or V rates, is automatic. Leader's new dome-mesh 20 kV CRT assures bright, clearly defined displays, even at the highest or lowest sweep rates. Very competitively priced.

The Leader Vectorscope is unique.

Only the Leader LVS-5850 NTSC Vectorscope offers CRT-generated phase/amplitude targets that are as bright and clear as the vectors themselves. Now you can easily verify NTSC Vectors in darkened control rooms. And, electronically generating the targets eliminates non-linearity errors caused by CRT aging. You can mount it in your existing console, view it from any angle



LVS-5850 NTSC Vectorscope.

or distance, and be confident that what you see is what you've got.

Two-year warranty. Evaluation units.

A history of high reliability permits Leader to provide a generous two-year warranty (even on the CRT)... backed by factory service depots on the East and West Coasts.

Evaluation units are available to all qualified customers.

Call toll-free (800) 645-5104 to request: an evaluation unit, our latest catalog, the name of your nearest "Select" distributor and additional information.

For video engineers who know the difference.

LEADER
Instruments Corporation

380 Oser Avenue
Hauppauge, N.Y. 11788 (516) 231-6900
Regional Offices:
Chicago, Los Angeles, Dallas.

For Information Circle (7) on Reply Card
For Demonstration Circle (8) on Reply Card

FCC update

Harry C. Martin, partner, Reddy, Begley & Martin, Washington, DC

November 1983



7-station rule modification proposed

The commission has instituted a rulemaking proceeding looking toward eliminating, to the extent possible, current restrictions that limit to seven the number of broadcast stations one entity may own in the same service. As an interim measure, the commission may raise the allowable ownership limits to 36 for AM and FM stations and 14 for TV stations.

In initiating the rulemaking, the commission expressed concern that the existing 7-station rule may limit programming diversity contrary to the initial purpose of the rule (in other words, to maximize diversification of program and service viewpoints). The cost of producing and distributing programs can be prohibitive, the FCC said, and relaxing current restrictions may allow access to additional resources, promoting program diversity. In this connection, the position of the agency's Office of Plans and Policy is that the FCC should focus only on local ownership rules to carry out its program diversity policy, because "the range of choices available to viewers depends on the number of outlets available at the local level."

Some specific issues the FCC would like to see addressed are:

- whether the growth of the broadcasting industry in the past 30 years is a reasonable justification for the FCC's proposed modification;
- what significance the commission should accord to broadcast-like alternatives (particularly cable TV) in its consideration of whether the current rules are outmoded;
- whether the commission should defer review of matters related to economic concentration (in other words, anti-trust considerations) to other federal agencies such as the Federal Trade Commission or the Department of Justice;
- what the relevant markets should be in considering economic concentration matters;
- how the FCC should assess the market characteristics for information diversity purposes;
- whether the current policy of diversity of ownership is effective in

promoting diversity of program and viewpoint;

- whether separate treatment should be given to radio and TV stations; and
- whether special restrictions should be imposed on expansion of network ownership of stations.

No action is expected in this proceeding until at least mid-1984.

LPTV processing update

The new computer designed to handle the estimated backlog of 12,000 LPTV applications has been operational since June 1983 and the first LPTV/TV translator lottery was conducted in late September. Approximately 100 applications were involved in the first lottery.

The commission is developing new computer programs designed to more efficiently purge the database of technically defective applications. These programs were expected to be operational in late September and the purge process to be completed by the end of the year. Thereafter, commission staff efforts will focus exclusively on the technically feasible proposals. Problems that may arise due to filing applications under two sets of rules (the old "judgmental" standards and the new technical standards) will be dealt with as they occur, and any modifications to the current programs that may be necessary will be made as required.

Finally, the commission (effective Sept. 15, 1983) froze filings on all low power and TV translator applications so that processing of applications currently on file may be expedited. The one exception to this filing freeze is for applications that are mutually exclusive with those on cutoff lists.

2GHz and 7GHz bands retained as private preserve

To preclude interference from future DBS operations in the 12.2-12.7GHz band, the commission has taken action to accommodate existing 12GHz users on other frequencies. A plan to permit the displaced 12GHz users to share the 2GHz and 7GHz bands with TV auxiliary stations was rejected.

The new rules provide existing 12GHz users non-exclusive use of the 18GHz band and access to the 6GHz and 13GHz bands. Should these replacement frequencies prove inadequate, the commission will consider waiver requests for reaccommodation on other frequencies, including the 2GHz private band.

Obscene materials

The commission is soliciting comments on what steps, if any, it should take to prohibit use of common carrier facilities to transmit obscene materials.

Specifically, the commission has requested comments on whether the agency has authority to determine if material is obscene and, if so, whether it is advisable for it to get involved in regulating the content of messages transmitted by telephone. Also, the commission is seeking comments on whether a common carrier has authority to determine what materials are obscene and to exclude those materials from carriage or terminate service.

Restrictions on AM broadcast operations

Depending on final agreement with Canada and Mexico, the FCC has relaxed its rules to permit expanded operation hours for many daytime-only standard broadcast stations. The agreement with Mexico is expected to be completed early in 1984.

Specifically, the new rules will:

- permit pre-sunrise operation of Class I daytimers located east of co-channel Class I-A stations;
- allow Class II daytimers operating west of co-channel 1-A's and outside their primary skywave contours to begin pre-sunrise broadcasts at 6 a.m.—regardless of local sunrise time at the 1-A;
- allow Class II-D daytimers outside a co-channel Class I-A's primary contour to broadcast until 6 p.m. at a maximum of 500kW. Daytimers within the primary contour of a 1-A to the west will have to sign off at the 1-A local sunset time (if earlier than 6 p.m.); and
- permit Class III daytimers to operate until two hours past local sunset at 500W, reduced as necessary to provide protection for other Class III stations on the channel.

The commission has adopted a formula for identifying stations that will be affected by the new rules and is now applying that formula to existing stations. Stations affected by the new rules will be notified as the commission determines that they qualify under the new formula. At press time, the commission expected to complete this process and to compile a master list of stations affected by late October or early November. 

THE AGONY AND THE ECSTASY



AGONY:

You work hard to keep your plant clean. A little tweak here, another adjustment there.

It's an endless maze of video paths, and you're the guy in the hot seat.

To make matters worse, everytime you have things just the way you want them, somebody decides to plug in a new video source. It's tweaking time again and the longer it takes, the more it costs. Agony, pure agony.

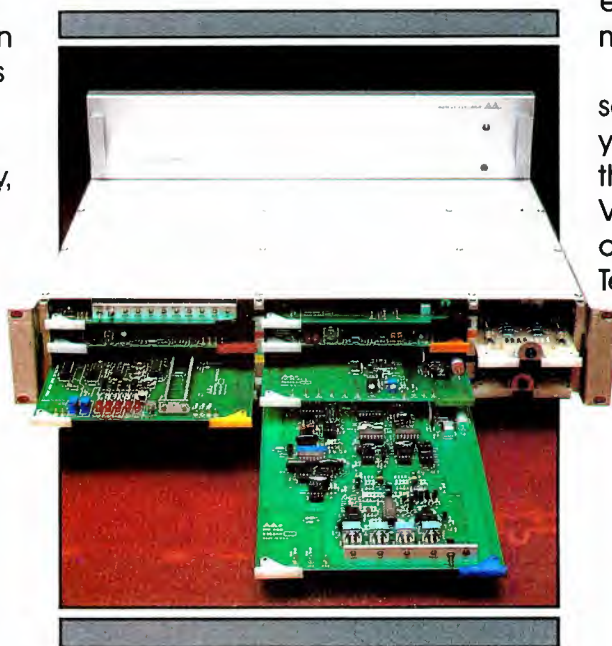
ECSTASY:



The Grass Valley Group Proc Amp. Always SC/H phased. You get full regeneration of sync and burst,

adjustable blanking width, soft and hard clippers, independent adjustability of chroma and luminance, external reference and much more. Ecstasy.

To find out how our solution can solve your problems, contact the nearest Grass Valley Group regional office listed below. Tell them you're tired of being the twaker of the house.



THE GRASS VALLEY GROUP, INC.®

P.O. BOX 1114 GRASS VALLEY CALIFORNIA 95945 USA · TEL (916) 273-8421 TWX 910 530 8280

A TEKTRONIX COMPANY

Offices: **Eastern Regional:** 499 Thornall St, Edison, NJ 08817, (201) 549-9600 • **Southeastern District:** 1644 Tullie Circle N.E., Ste 102, Atlanta, GA 30329 (404) 321-4318 • **Midwestern Regional:** 810 West Bristol St, Elkhart, IN 46514 (219) 264-0931 • **Northwestern District:** 3585 North Lexington Ave, Ste 238, Arden Hills, MN 55112 (612) 483-2594 • **Southwestern District:** 316 Seminary South Office Bldg, Fort Worth, TX 76115 (817) 921-9411 • **Western District:** 1032 Elwell Court, Ste 244, Palo Alto, CA 94303 (415) 968-6680 • **Western Regional:** 21243 Ventura Blvd, Ste 206, Woodland Hills, CA 91364 (213) 999-2303

Circle (9) on Reply Card

November 1983 **Broadcast Engineering** 7

Deregulation and the public



A guest editorial by Daniel L. Ritchie, chairman and CEO, Group W, Westinghouse Broadcasting and Cable, New York, NY

For several years, deregulation has been one of the more unavoidable topics inside or outside of Washington. And fashionable ideas, however intrinsically valid they may be, can be dangerous.

Certainly the idea of totally deregulating broadcast television has produced some unlikely alliances. It's just as Fred Friendly pointed out some years ago in his book on the First Amendment: It's hard to tell the "good guys" from the "bad guys."

You can mark me down among those opposing the *total* deregulation of broadcasting. In particular, I would strongly argue for retaining broadcasting's fairness doctrine, which requires broadcasters to present a diversity of views on important issues. I also support retaining requirements for affirmative action to remove discrimination against women and racial minorities. Let me tell you why I think this way.

There are four key arguments generally used by those who call for deregulating broadcast television:

1) The FCC in general and the fairness doctrine in particular are failures. They haven't worked. Indeed, they usually have worked *against* their intended aims.

2) FCC regulations have been unreasonably expensive to broadcasters.

3) The new technologies have eliminated scarcity, which was the original and sole reason for regulating broadcast television.

4) Any regulation of television is an unconstitutional infringement of the First Amendment.

Let's take these arguments one at a time.

Critics who say that the fairness doctrine has been a failure should answer two brief arguments—one general and one specific. First, more generally, is imperfection the same thing as uselessness? Because a medicine proves not to be a universal remedy, is that sufficient reason for doctors to abandon its use altogether? More specifically, to all those who say the fairness doctrine has been a failure, I would merely say, look at the record. From the moment that Mississippi TV station WLBT lost its license under a fairness doctrine challenge, our entire industry was put on notice as to the consequences facing any station that worked to disfranchise a portion of its community.

Second, is it true that regulation has been unreasonably expensive to broadcasters? Let me speak from my own personal experience. Group W is now and always has been a business. We are not an eleemosynary institution. We have always believed that it's possible to make a profit and to do the right thing. It's more difficult that way, to be sure, but it can be done.

And frankly, our policies and practices have been changed little, if at all, by the introduction of regulation or its recent removal from radio. (Before the fairness doctrine, we had one of our own. Should the government repeal its doctrine, we still will keep ours.)

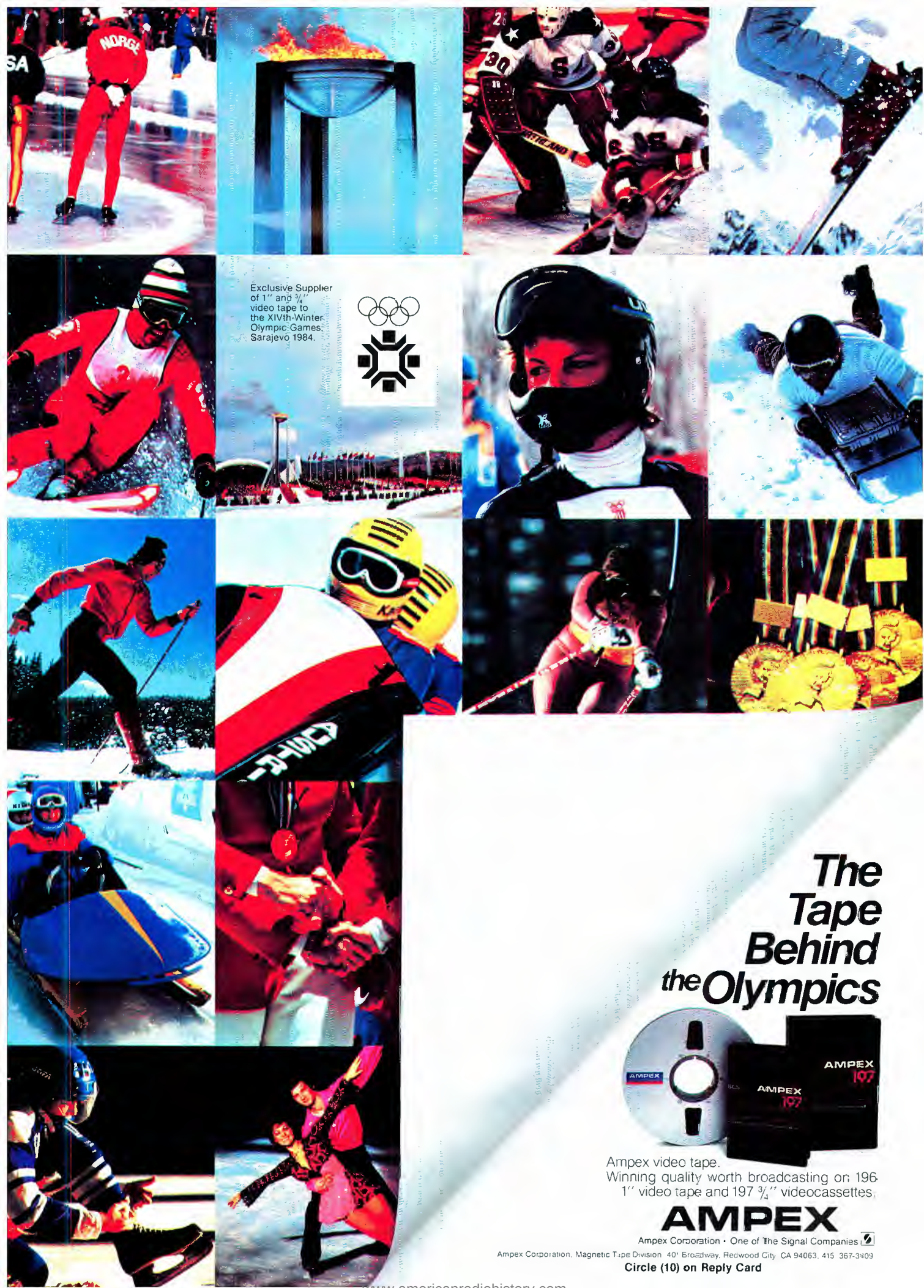
The deregulation of radio has not caused us to discontinue our program logging or our efforts at ascertainment. We regard both of those activities as essential business requirements.

I also have considerable problems with the third argument for deregulation; that channel scarcity has been made obsolete by such new technologies as multichannel CATV and direct broadcast by satellite. To paraphrase Lincoln Steffens, I have seen the future, and it's still in the future.

Cable is here, it's real, it's exciting, and we in Group W are involved in it. We believe cable is a medium that deserves full First Amendment rights. But the simple fact is that cable exists for only 40% of the people in this country. And many of the other much-talked-about new technologies are still just that: much talked about. That means that millions of Americans still will be relying throughout the '80s on the same broadcast signals they watched in the '50s.

Even in cable households, broadcast television remains the mass medium, and scarcity for the would-be broadcaster still, and always, will exist. Not everyone can broadcast; the government must somehow choose among those who

Continued on page 139



Exclusive Supplier
of 1" and 3/4"
video tape to
the XIVth Winter
Olympic Games
Sarajevo 1984.



The Tape Behind the Olympics



Ampex video tape.
Winning quality worth broadcasting on 196
1" video tape and 197 3/4" videocassettes.

AMPEX

Ampex Corporation • One of The Signal Companies

Ampex Corporation, Magnetic Tape Division 401 Broadway, Redwood City CA 94063, 415 367-3409

Circle (10) on Reply Card



Satellite update

By John Kinik, satellite correspondent

The Region 2 Administrative Radio Conference (RARC-'83), which was held in July in Geneva, Switzerland (with the participation of 24 countries), has determined a specific technical plan for implementing direct broadcast satellites (DBS) in the Western Hemisphere. This plan, known as the Final Acts of The Region 2 ITU Broadcasting Satellite Conference, allocates satellite orbital positions and frequency spectrum/channelization and establishes the maximum signal power to be received at the earth.

Also, other key technical performance parameters have been established to provide the basis for satellite and receive earth station designs. Considering the number and variety of plans tabled by the Region 2 countries, it is remarkable that a single cohesive plan was drafted and agreed upon in the time frame involved. The conference results are pleasing to the United States, because the main requirements put forward by the US delegation were met. The basic elements of the plan, as it relates to the major North American countries—the United States, Canada and Mexico—are described as follows.

DBS channel plan

One of the major disagreements at the conference focused on the division of the 500MHz bandwidth (12.2-12.7GHz) into a channel plan. The United States proposed a 24MHz channel bandwidth, with 13MHz channel separation, giving 36 channels per orbital slot. A competing plan argued for a total of only 16 channels per orbital slot. The latter plan would not have met the requirement for a

total of some 2000 channels originally requested by all countries, when all orbital slots were considered. A compromise was reached, with a modified high capacity plan adopted, resulting from a joint effort between the United States, Canada, Mexico and Brazil. The plan is based on a 24MHz bandwidth, with 14.58MHz spacing, giving 32 channels per orbital position.

Orbital positions

The assignment of orbital positions involved compromises for all three of the major North American countries. The positions assigned were as follows (in degrees west longitude):

- United States—175°, 166°, 157°, 148°, 119°, 110°, 101°, 61.5°;
- Canada—138°, 129°, 91°, 82°, 72°, 70.5°; and
- Mexico—136°, 127°, 78°, 69°.

The eight orbital positions give the United States a theoretical total of 256 channels for all current and anticipated future DBS applicants. Practically speaking, however, the eastern-most position (61.5°) has severe limitations caused by satellite eclipse occurring during prime evening hours, and the two western-most positions (175°, 166°) are accessible from the Pacific Time Zone only. This places a limitation on their usefulness with respect to the basic US concept of four time zones, with each satellite covering one or two time zones. The US position going into the conference was for 10° spacing, whereas the resulting assignments are based on non-uniform spacing, with a typical minimum spacing of 9° for any country.

Signal power

The maximum signal power flux density at the earth has been set at -107dBW per square meter. The United States had proposed a higher power (-105dBW per square meter) and has taken exception to the lower power level, implying that it might not comply with that requirement. The lower level was adopted because of the concern of some countries (such as Brazil) with high rainfall rates, which produce signal fading at the frequencies involved, making it difficult to reach the higher power level proposed by the United States. Also, other North American countries were concerned that the higher level might lead to much lower priced receive earth stations that would be purchased by their citizens to receive US signals, rather than their own signals.

Space WARC-'85

A World Administrative Radio Conference will be held in 1985 to approve usage of satellite orbital and spectrum resources for the world, including the Final Acts of The Region 2 Conference. Thus, the Final Acts are not necessarily final, and some controversial issues are bound to arise, including the possibility that the United States will ignore the lower power flux density level set by the conference and carry on regardless with its originally proposed design. The basic framework for DBS satellites has been established by the Final Acts of the Region 2 Conference, but there is room for a great deal of flexibility, and there will be a need for unprecedented cooperation between countries on issues that will arise. Otherwise, Space WARC-'85 could be a stormy conference.

||:~>)))||

For those who think they've heard it all...

Neve's full line of broadcast audio consoles

If you've heard it all, chances are you use or own a Neve.
If you *think* you've heard it all, we'd like to take you beyond
your sound barrier with one of Neve's full line of audio
consoles and post-production systems.

We think you should hear for yourself what so many audio
engineers and broadcast facility personnel already know:
For superior technical performance, reliability, logic cir-
cuitry (that can interface with switchers, mic muting, loud-
speaker muting, etc.), exceptional value, maintenance-ease
and a pure, natural sound, there's nothing that comes close
to Neve.

Of course, since many broadcasters already know about

Neve's quality, they've chosen to invest in a Neve.

Networks and independent stations invest in Neve to en-
sure that their audience hears the finest sound available.
Post-production facilities invest in Neve to ensure that their
clients receive the finest product available and to keep cli-
ents coming back, while attracting new business with the
Neve name.

Neve designs a full line of audio consoles and probably has a
system to fit your specific needs.

So unless you've heard it all, isn't it time to aspire
to Neve?

For further information, call us, or write.

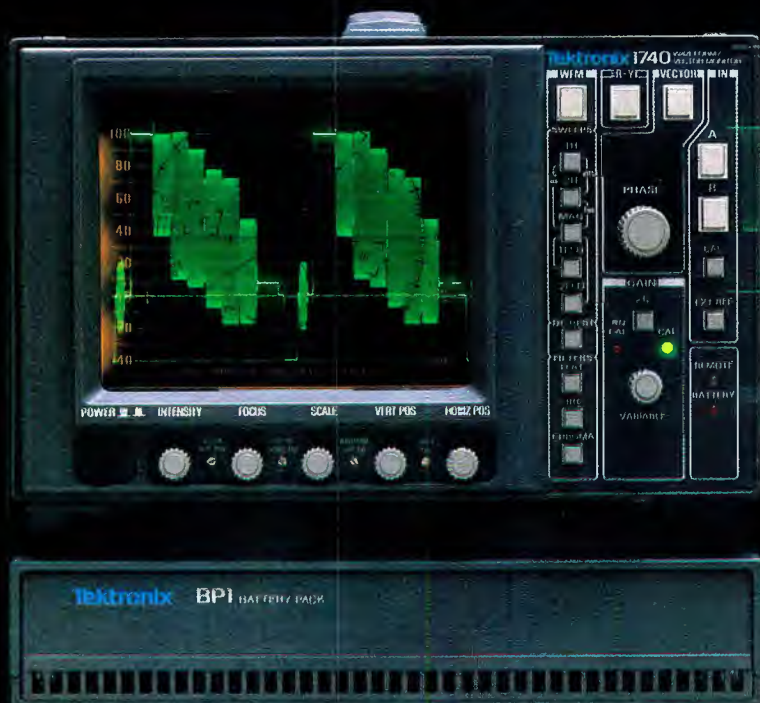
Aspire to **Neve**

RUPERT NEVE INCORPORATED: Berkshire Industrial Park, Bethel, Connecticut 06801 (203) 744-6280 Telex 969638 • 7533 Sunset Blvd., Hollywood, California 90046 (213) 874-8124 Telex 194942 • RUPERT NEVE OF CANADA, LTD. represented by: Manta Electronics Group, 204 King St. East, Toronto, Ontario M5A 1J7 Canada (416) 868-0513 Telex 06-986766 • Sonotechnique, 2585 Bates, Suite 304, Montreal, P.Q. H3S 1A9 Canada (514) 739-3368 Telex 055-62171
NEVE ELECTRONICS INTERNATIONAL, LTD: Cambridge House, Melbourn, Royston, Hertfordshire, SG8 6AU England Phone (0763) 60776
RUPERT NEVE GmbH: 6100 Darmstadt Bismarckstrasse 114, West Germany Phone (06151) 81764.

Circle (11) on Reply Card

**TWO MONITORS IN ONE
PORTABLE PACKAGE...**

THAT'S A NICE SWITCH.



The model above is pictured with the optional battery pack.

Tektronix introduces a new product to help improve your signal quality. The 1740 series portable waveform/vector monitor.

We know that in-studio or out on remote, space is critical. And the smaller the equipment is, the better. So we've combined our waveform and vector monitoring functions, and integrated them into one compact, go-anywhere package.

HALF THE RACK SPACE.

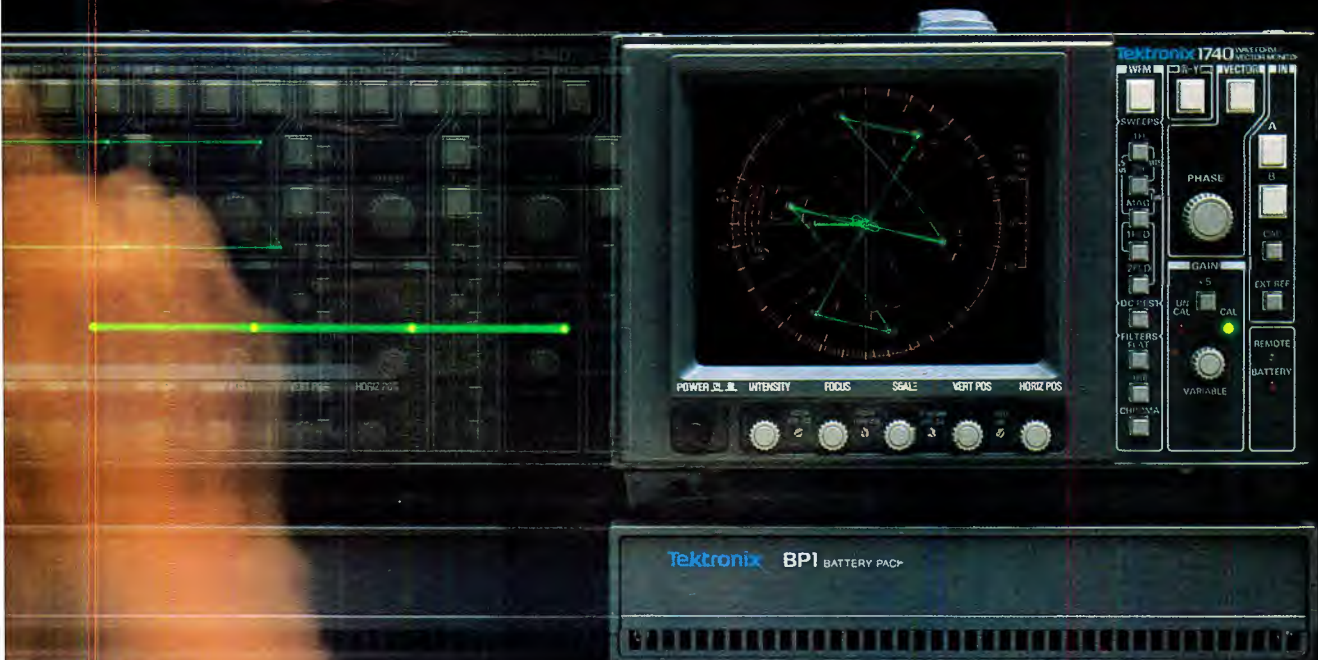
At 8 1/2 inches wide and 18 inches long, the 1740 series uses only half the normal rack width. That means you gain more usable space and more flexibility than ever.

To change from waveform mode to vectors or vice versa, just press a button. Couldn't be simpler.

There's a brighter CRT display on the 1740 series, too. Viewing is easy even in high ambient light.

And, because it operates on either AC or DC, the 1740 can go wherever you go.

TELEVISION PRODUCTS



TWO-IN-ONE ECONOMY.

Using one monitor where two were needed before lowers your equipment costs. And because the 1740 series is completely portable, it makes a sensible purchase for either studio or field use.

And there's more. The 1740 series operates on only 50 watts of power. And that means less heat build-up (which is important in crowded equipment racks).

And in addition, there's a single line display preset for monitoring VRS.

SEE FOR YOURSELF.

Now that you've heard about our new two-in-one tool, you should see one. Call or write us for a demonstration. We have field offices in most cities. Or you can call Toll Free 800-547-1512 (in Oregon 800-452-1877), or contact your authorized Tektronix professional video dealer.

And remember. You can depend on Tektronix for video monitoring equipment that works, and for technical support and service worldwide.

WORKING HARD FOR YOUR SIGNAL QUALITY.

Tektronix, Inc.
P.O. Box 1700
Beaverton, OR 97075

Tektronix
COMMITTED TO EXCELLENCE

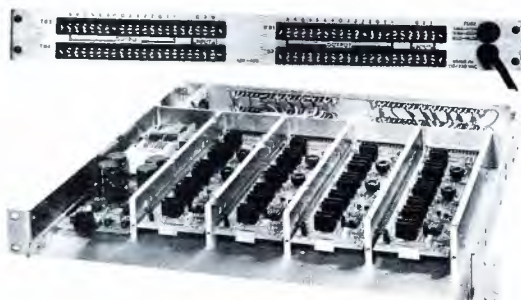
Circle (12) on Reply Card





You Can Trust HEDCO's Audio & Video DA's

**2 AUDIO
PLUS
2 VIDEO
OR
4 AUDIO
OR
4 VIDEO
DA's**



1 R.U. Distribution Frame

**4 AUDIO
PLUS
4 VIDEO
OR
8 AUDIO
OR
8 VIDEO
DA's**



2 R.U. Distribution Frame

**5 AUDIO
PLUS
5 VIDEO
OR
10 AUDIO
OR
10 VIDEO
DA's**



2 R.U. Distribution Frame

For complete information on HEDCO's full line of broadcast equipment, call or write:

HEDCO™

Hughes Electronic Devices Corporation
P.O. Box 1985, Grass Valley, CA 95945
916/273-9524 Telex: 364412

Circle (13) on Reply Card

business

EQUIPMENT SALES

California Microwave, Sunnyvale, CA, has announced that its subsidiary, **Satellite Transmission Systems**, received contract awards totaling \$2.7 million from Communications Satellite Corporation (COMSAT), Universal Antennas and R.R. Donnelley and Sons Company.

The COMSAT award of \$1.7 million is for the 11/14GHz synthesized ground communications equipment to be installed for COMSAT at Roaring Creek Station, PA, for international satellite message service.

The Universal Antennas award, valued at \$322,000, is to provide a turnkey telemetry tracking and command (TT&C) antenna subsystem for the Hughes Aircraft Corporation's TT&C station for the new satellite system in Mexico.

STS also received an order valued at \$750,000 from R.R. Donnelley & Sons Company for expansion of its 1.544Mbit/s data service to include receive-only earth stations at Spartanburg, SC, and Gallatin, TN.

A TA 110 NE UHF transmitter from **Townsend Associates**, Westfield, MA, has been installed in a new station, KBSA-TV, Channel 46. The \$1.4 million contract includes a microwave system, broadcast monitoring and test equipment, remote control equipment, installation by Townsend Associates personnel and an Andrew circularly polarized transmitting antenna and waveguide transmission system.

Townsend has also been awarded a contract for a 55kW UHF transmitter and ancillary equipment for WNDS/Channel 50, a new TV station in Derry, NH.

Broadcast Equipment Rental Company, Burbank, CA, has announced the first delivery on the West Coast of the Ampex Nagra VPR-5 VTR. Jointly developed by Ampex and Nagra's sound recorder manufacturer, Kudelski SA, the VPR-5 features include studio-type editing control in the field, quality audio technology and separate audio and video confidence tracks.

A new UHF TV station in Fort Walton Beach, FL, is scheduled to begin broadcasting later this year following installation of an **RCA** transmitter, antenna and studio equipment. Valued at approximately \$1.75 million, the equipment purchased from RCA's Commercial Communications Systems Division includes a TFU-36 JDA antenna, a TTU-55C 55kW transmitter and a 7m satellite receiving station, four TK-710 portable cameras and two TR-800 1-inch VTRs, as well as state-of-the-art switching and special effects systems.

Three more post-production facilities have recently taken delivery of Paint Box digital art/graphics/animation systems from **MCI/Quantel**, Palo Alto, CA. They are Producers Color, Detroit; Positive Video, Orinda, CA; and By Video, Sunnyvale, CA.

AFA Systems, New York, NY, has delivered a mobile TV system dubbed the MU12, to CBS. The MU12 consists of two trucks. One is a 46-foot production unit; the other is a 40-foot utility truck.

Sony Broadcast, through its Geneva branch office, has received a major order from the Swiss PTT for the purchase of more than \$2 million of ENG equipment for

Double Your Troubleshooting and Testing Productivity . . . Or Your Money Back!

Six-digit readout: Automatically tracks every CRT test. We call it digital autotracking. It's patent pending.

Bright dual-trace CRT: 60 MHz (– 3 dB); 100 MHz (– 12 dB).

Delta PPV, Time, Freq: Measure any part of a waveform for PPV, time or frequency using Delta measurements. Just dial in the waveform section you want to measure and push.

Simplify Freq ratio tests: Automatically compare input/output ratio of multiply/divide stages from 1:1 to 1:999,999 with the push of a button.



Autotracking DCV, PPV, Freq: Measure DCV to .5%; PPV to 2%; freq. to .001%. Just push a button for either Channel A or B.

One probe input: One probe input per channel for all measurements - digital and scope - with 5 mV to 2000 V measuring range. (2 lo-cap probes provided.)

Super sync: ECL provides rock-solid sync trigger circuits with only 4 controls; includes TV sync separators for video work.

U.S. Patent Pending
Financing Available

The first scope with push button digital readout. If you use general purpose oscilloscopes for troubleshooting or testing, we can double your present productivity with the SC61 Waveform Analyzer, the first instrument to turn every conventional scope measurement into an automatic digital readout.

No more graticule counting. Connect only one probe to view any waveform to 100 MHz. Then, just push a button to read DCV, PPV, frequency and time — automatically!

There are no graticules to count or calculations to make, which speeds every measurement.

The digital readout is from 10 to 10,000 times more accurate as well.

Plus you have everything you want to know about a test point, at the push of a button, which speeds troubleshooting tremendously.

A special Delta function even lets you intensify parts of a waveform and digitally measure the PPV, time or frequency for just that waveform section.

And it's neat. No more tangled leads, piles of probes or dangling cords. The SC61 is an entire test station in one unit.

The one and only. There are other scopes with digital readout, but none of them completely automate every conventional scope measurement so you can automatically analyze any waveform without counting one single graticule. Totally automatic waveform analyzing at the push of a button. It will make all the difference in your productivity.

Double your productivity. When we say the SC61 will double your productivity, we're being conservative. We've seen cases of

three, four, even ten time increases in productivity with this first-of-its-kind, automated oscilloscope. Every situation is different, however, so try the SC61 and judge for yourself. Here's our offer.

Money back guarantee. If the SC61 does not at least double your productivity during the first thirty days, you may return it for a full refund, including freight both ways.

Call today. Get the entire SC61 Waveform Analyzer story. Call toll-free today, and ask for our eight page color brochure. It could be the most productive call you make this year!

Phone Toll-Free
1-800-843-3338

Alaska, Hawaii, Canada and
South Dakota call collect
(605) 339-0100

SENCORE
3200 Sencore Drive, Sioux Falls, SD 57107

Circle (14) for information
Circle (15) for demonstration

ELECTRONIC TUBES



**All major brands
at the lowest prices.**

Transmitting, receiving, camera and cathode ray tubes, sockets, chimneys, capacitors and related components in stock for immediate delivery world-wide.

**AMPEREX • CEI • EIMAC • GE • HITACHI • ITT
JRC • MACHLETT • RCA • RAYTHEON • SYLVANIA
TOSHIBA • VARIAN • WESTINGHOUSE**

Calvert set new standards by supplying components with factory-backed guarantees at the lowest prices. We ship within 24 hours of order acceptance.

NEW CUSTOMERS—WE ACCEPT TELEPHONE ORDERS.
Inquire about our convenient Net 30 terms. We give special attention to new accounts and will expedite opening your account.

COAST TO COAST TOLL FREE NUMBERS:

To call NJ office: **800-526-6362** (except from NJ)
To call CA office: **800-421-7549** (except from CA)
800-824-6232 (from CA on y)

CALVERT 
ELECTRONICS, INC.

One Branch Rd., E. Rutherford, NJ 07073
201-461-8800 • TWX 710-929-016
Telex 4990274

355 Redondo Ave., Suite 6,
Long Beach, CA 90334
213-498-3504

1153



Circle (16) on Reply Card

Swiss Television. The order includes 25 BVP-330P series cameras, 19 BVU portable highband U-matic recorders, 27 BVU-800P/BVU-820P highband U-matic editing recorders, 11 BVT-800P time base correctors and associated equipment and accessories.

A.F. Associates Systems Division has been awarded a contract to design and build a film-to-tape/tape-to-film facility for Manhattan Transfer. The facility will house two color correction suites for film-to-tape transfers. These will be centered around the Rank Cintel Mark IIIC digital telecine and the Rank Ferrit magnetic sound system. The third suite will house a Teledyne Kinescope recording system for the transfer of tape in all formats to 35mm and 16mm film. Manhattan Transfer will have the capability to transfer videotape directly to 35mm negative. The facility also will be equipped with the new Ampex VPR-3 VTRs.

ABC Television Network has signed an agreement with **M/A-COM MVS**, Burlington, MA, to purchase a large assortment of microwave equipment and to lease an equivalent amount. This equipment will be used during ABC's coverage of the 1984 Winter and Summer Olympics. The products purchased and/or leased include more than a dozen M/A-COM portable 13GHz transmitters and receivers (MA-13FA) and various numbers of 7GHz antenna systems (MiniScan); 2GHz auto-tracking antenna systems (SuperScan); 2GHz central receivers (MA-2GUX); and 12GHz fixed transmitter and receiver systems (MA-12G).

Eureka Teleproduction Center has announced that it has added 3/4- to 1-inch editing to its production services. Two **Sony** BVU-820 VTRs with slo-mo and freeze frame, and two **Sony** BVT-800 TBCs add to the state-of-the-art equipment at its center in San Carlos, CA.

Digital Entertainment Corporation, Brookfield, CT, has announced the first major North American studio complex to purchase a complete digital audio recording and editing system. Lion Share Recording Studios of Hollywood has just signed an agreement with DEC to purchase a Mitsubishi Electric model X-800 32-channel digital audio recorder, two X-80 2-channel master recorders and the XE-1 digital audio electronic editing system.

Shook Electronic Enterprises, San Antonio, TX, is currently manufacturing a 45-foot production trailer for John Crowe Productions, Houston. The unit is expected to be completed by the end of the year.

TeleProductions, New Orleans, has purchased four **Sony** BVH-2000 1-inch VTRs with two digital time base correctors and two BVU-800/820 series U-matic VTRs. The Sony system's versatility is facilitating TeleProduction's on-line and off-line operation. Recent work at TeleProductions has included three 30-second commercials for Ford, a video segment for MTV by Stray Cats and two hour-long PBS specials for Audrey Barnes Productions focusing on the NAACP and Urban League Conventions.

Venevision, an independent TV and radio operator in Venezuela, has placed an order for four complete LDK 6 systems, including Vinten pedestals and Angenieux lenses. The order, valued at more than \$500,000, was the result of the combined activities of **Industrias Venezolanas Philips** and **Pye TVT Limited**, the Broadcast Company of Philips, who will deliver the equipment in the early part of December.

1-7-88

Small Surprise.



Now a color monitor with every feature you'd expect from BARCO joins our CM Production Series.

The respected BARCO CM Series is coming down in size. And our new small surprise, the CM 22, has the same features as the established 13" and 19" CM monitors, and more.

Put them in your remote vans. Use them in those tight spaces where the distance between viewer and monitor is limited, but the need is for the ultimate in color.

The CM 22 can operate on 110V or 220V mains and 12V local supplies and comes equipped with a fine pitch dot, black matrix in-line gun tube. The rack mount version makes it possible to install two 9" monitors in a single 19" rack. The switch mode power

supply allows stable performance in areas where the main supply may vary under certain conditions.

Features found in the 9", 13", and 19" CM models include: pulse cross; pre-set contrast, hue, saturation, brightness; automatic degaussing; scan format switch; set up switch; front accessible RGB cut off and gain controls. Modular construction allows for quick and easy maintenance.

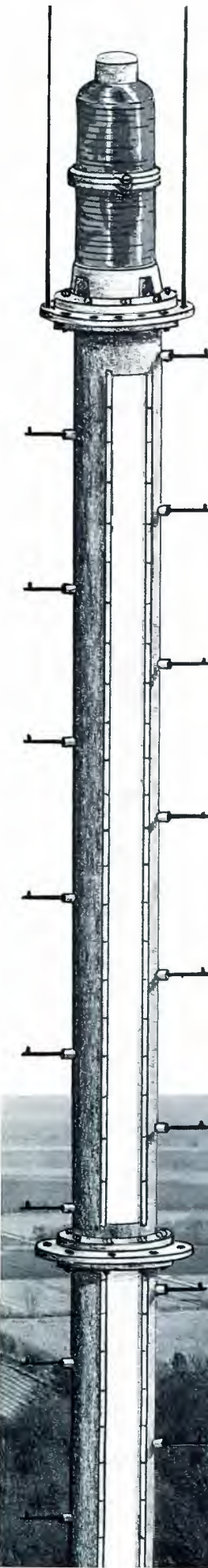
For more information on our small surprise, the CM 22, and the rest of the BARCO video monitor line, call Chris Golson at 201/882-3584.

When your image is everything...turn to BARCO. Available in the U.S...only from ELECTOR.

ELECTOR USA, INC.

In The U.S., Elector USA, Inc., 5128 Calle del Sol, Santa Clara, CA 95050 Phone: 408/727-1506 30 Chapin Road,
P.O. Box 699, Pine Brook, NJ 07058 Phone: 201/882-0584 In Canada, Electro & Optical Systems, Ltd., 31
Progress Court, Scarborough, Ontario M16 3V5 Phone: 416/439-9333

Circle (17) on Reply Card



New Harris Wavestar™...

The most reliable UHF slot antenna ever designed... because it's waveguide!

The new Harris Wavestar is the only slotted waveguide UHF antenna now available...the ultimate in design simplicity. No center conductor. No bullets. No insulators. Fewer parts mean fewer problems. And that means less off-air time and lower maintenance costs.

Additional advantages of waveguide over coax antennas include higher power handling capabilities and greatly increased safety margins to prevent arcing.

The Wavestar pattern performance is excellent by any standard. A highly circular omnidirectional pattern is available, as are cardioid and peanut directional patterns. All of these Wavestar configurations provide the smooth elevation patterns necessary for high signal strength and minimum ghosting over the entire coverage area.

The Wavestar is a low windload design for tower top or side mounting. High mechanical strength and rigidity minimize picture variations caused by wind sway.

Every Harris antenna is completely assembled and tested at the Harris antenna test range...the largest, most comprehensive facility of its kind.

The range is located in an area far from the pattern-distorting clutter of urban development. Situated atop a 230-foot bluff, with test transmitters located up to 3 miles away on flat, unobstructed bottom lands, the range offers ideal conditions for testing, approaching the "free space" situation of an installed antenna.

Here, theoretical azimuth and elevation patterns are verified with the most accurate and sophisticated test instruments available—translating the theory of a calculated pattern into the reality of actual antenna performance.

You can depend on Wavestar for top reliability. And you can be confident that your Wavestar antenna will be thoroughly tested by Harris to meet your exact pattern requirements.

Contact Harris Corporation, Broadcast Transmission Division, P.O. Box 4290, Quincy, Illinois 62305-4290. 217/222-8200.



Circle (18) on Reply Card

The propagation path

By Joe McCleary, chief engineer, KHTZ Radio, Los Angeles, CA

If you contemplate the construction of a microwave STL system, planning at the outset may prevent many unexpected complications. For a short path from 8-10 miles, erecting a dish at each end, connecting the transmitter and receiver electronics and firing them up may prove effective. But if your path is relatively long—20 or more miles—much more thought must be put into the project.

Because STLs have become a popular means of signal transportation between studios and transmitter sites, finding a usable frequency may be a problem in a major market city. Working with the local frequency coordinating committee, if one exists, is necessary.

Two steps toward developing an STL path are obtaining topographical maps from the US Geological Survey and buying path profiling paper, based upon a 4:3 K factor. The K fac-

tor in propagation work is the ratio of the effective earth radius to the actual earth radius.

The K factor

A microwave radio wave does not follow a geometrically straight line, but rather displays a trajectory best described as bending toward the earth. The radius of curvature for the trajectory is somewhat greater than the real earth radius of curvature. The variation from a straight line is caused by the tropospheric dielectric constant, which decreases with an increase in altitude.

Under normal meteorological conditions, the microwave beam may be drawn as a straight line on a fictitious earth representation using a radius of 4:3 that of the actual earth radius. Water vapor pressure and temperature usually decrease with altitude, causing a decrease in the index of re-

fraction. The tropospheric index of refraction is responsible for the speed of the microwave energy moving through the atmosphere. In a standard atmosphere, the upper part of the wavefront travels slightly faster than the lower wavefront portion, causing the radio wave to curve downward in varying degrees.

An infinite K factor indicates that the radio wave follows the actual curvature of the earth, and is referred to as the flat earth condition. Factors less than or greater than one (true earth) result in the beam curving away from or toward the earth, respectively, giving rise to the terms *earth bulging* and *earth flattening*. Under some conditions, the microwave beam may be forced to strike the earth, be reflected upward, refracted to earth again, etc., in a phenomenon known as a surface duct, giving rise to a propagation well beyond the radio horizon.

Continued on page 22

Why Panasonic RecamTM "The Making



When Dino De Laurentiis and producer Raffaella De Laurentiis got together with director David Lynch to film Frank Herbert's classic science fiction novel, "Dune," they knew it wouldn't be easy. But it wasn't just the eight sound stages, desert locations, a cast of up to

20,000 people and a crew of 900. Perhaps Raffaella De Laurentiis said it best: "Dune is the most technical picture ever made."

That's why it was no surprise that Panasonic Recam was selected to record "The Making of Dune." The reasons: Recam's picture quality

and technology. After all, Recam had already made headlines by recording ABC Sports' momentous ascent of Mt. Everest which was broadcast on "The American Sportsman." And "Benji," the new CBS television series, is also being recorded by Recam.

was selected to shoot of Dune."



David Lynch
Director of "Dune"

Panasonic helped capture all the action from "Dune" on Recam's 1/2-inch format which will later be transferred to 1-inch for television broadcast. All made possible by Recam's incredible YIQ M-format picture quality.

You can see "The Making of Dune"

in 1984. But you don't have to wait until then to see Recam. Call your nearest Panasonic regional office:
Northeast: (201) 348-7620
Midwest: (312) 981-4826
Southeast: (404) 925-6835
Southwest: (214) 258-6400
West: (714) 895-7200.

Circle (19) on Reply Card



Panasonic
AUDIO-VIDEO SYSTEMS DIVISION

In temperate climate zones, a K factor of 4:3 and a Fresnel zone clearance of 0.6 is generally sufficient for a reliable path. Figure 1 shows ray paths for several values of K factor. The scales are greatly exaggerated to make the difference in curvature more apparent.

Fresnel zones

The Fresnel-Kirchoff theory originally was developed to account for diffraction of light when

obstructed by a diaphragm (in a lens system) and/or transmission through apertures of various shapes and sizes. The theory may be applied to radio and sound waves and is based on the concept that any small element of space in the path may be considered a source of a secondary wavelet. Also, the radiated field can be built up by superposing all these wavelets (known as Huygen's Principle).

Fresnel zones pertain to a required path clearance and the required

height of transmitting and receiving antennas. The zones are made of concentric circles, pierced at their centers by the direct ray path. However, the infinite number of points, from which geometry shows that reflected rays might reach the receiving antenna one-half wavelength later than the direct ray, produces an ellipsoid of revolution. The transmit and receive antennas are located at the focuses of the ellipsoid, which would appear as an elongated football suspended between two poles. The ellipsoid describes the first Fresnel zone and should not be violated (entered) by obstructions.

THE LEGEND LIVES



AUDIO TAPE RECORDER/REPRODUCER LJ-12

1. Complete microprocessor control of all transport and audio functions resulting in unprecedented operational stability and flexibility.
2. SMPTE compatible with versatile accessory connector containing all vital signals, including RS-232 serial input and output.
3. Digital adjustment and storage of audio parameters eliminates trim pots and allows front-panel adjustment and multiple alignment settings in non-volatile memory (no batteries).
4. Most accurate vari-speed ever offered, with precise digital control of transport speed from 3 to 36 IPS, and real-time vari-speed correction of the tape timer display.
5. Simplicity by design - in operation and construction.

THE ORIGINAL SCULLYS



THE LJ. SCULLY MFG. CORP.
138 Hurd Ave., Bridgeport, Ct. 06604 U.S.A.
203/368-2332

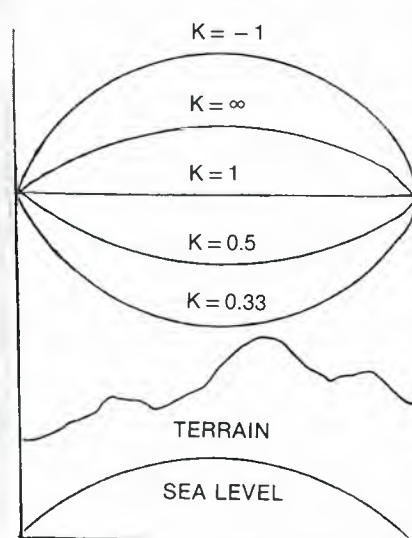


Figure 1. Ray paths for several values of K factor.

The first Fresnel zone is defined as the perpendicular distance from the direct microwave ray line to the ellipsoidal surface at a given point along the path. Mathematically it is calculated by:

$$FR = 17.3(d_1 d_2)^{1/2} f (d_1 d_2)^{-1/2} \text{ meters.}$$

As illustrated in Figure 2, d is the total distance between the transmitter and receiver ends of the path, with d_1 and d_2 indicating the distances between a specified point and the end points of the path. The frequency f is given in gigahertz.

The first zone is bounded by points for which the transmission path from the transmitter to the receiver is greater by one-half wavelength than the direct path. Also, second, third, fourth, etc., Fresnel zones exist and may be computed by multiplying the

Circle (20) on Reply Card

WQXI
Atlanta, GA

KGW
Portland, OR

KYA
San Francisco, CA

WKAT
Miami Beach, FL

KUBA
Yuba City, CA

KSRO
Sta. Rosa, CA

WYOU
TAMPA, FL

WCRJ
JACKSONVILLE, FL

WFAU
AUGUSTA, ME

WAJR
MORGANTOWN, WV

WING

KOFL
KARSPERZ
WISE
ASHEVILLE NC

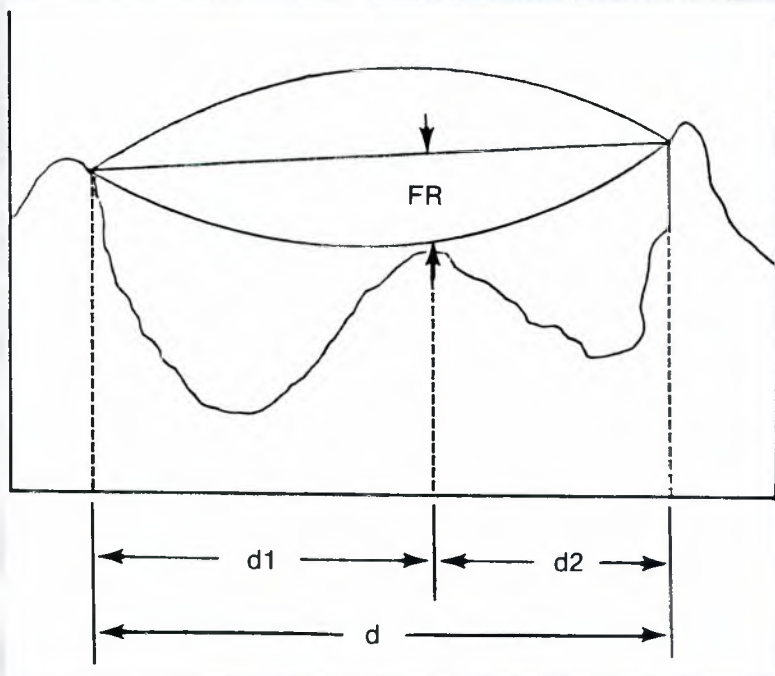


Figure 2. First Fresnel zone radius.

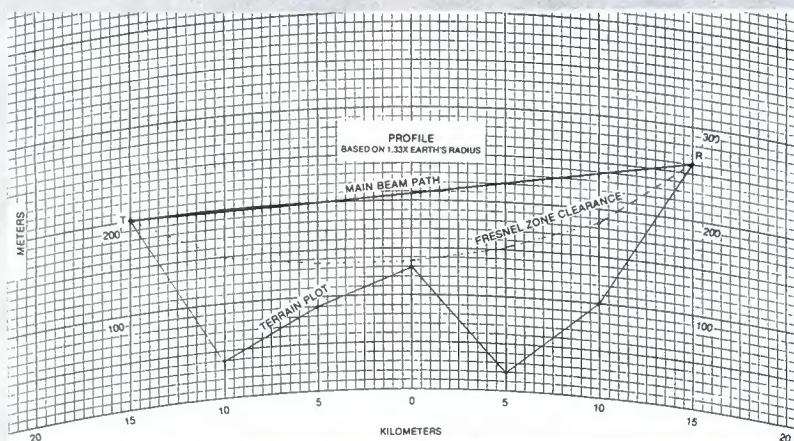


Figure 3. Terrain vs. first Fresnel zone clearance.

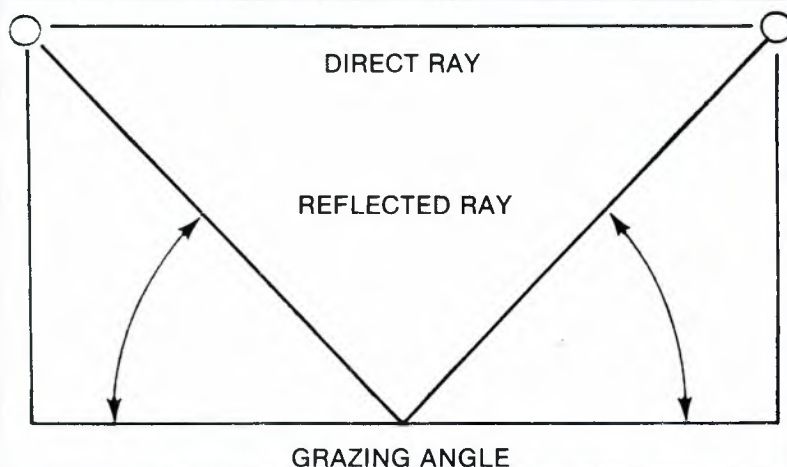


Figure 5. Illustration of grazing angle.

first Fresnel radius by the square root of the desired Fresnel zone number. For path calculations, the 0.6 Fresnel zone clearance generally is stipulated because terrain reflections will not add or subtract from the free-space path loss with that clearance value.

Reflections from the first zone and all odd zones are considered to add to the direct ray, while reflections from even zones subtract from the direct ray. When we say 0.6 first Fresnel zone clearance, we mean that any obstruction, such as a mountain ridge or building, should not protrude more than 0.4 into the first zone clearance.

In Figure 3, we have constructed a terrain plot with the first Fresnel zone clearance on 4:3 profile paper. Points are computed at 5km, 10km, 15km, 20km and 25km for the first zone curve using the formula for FR. It can be seen that we have first Fresnel zone clearance at midpath or 15km. Reflections will be blocked, and free-space attenuation loss can be obtained. We use the nomograph of Figure 4 to find the basic transmission loss in free space. Using a nearly realistic frequency of 0.4GHz for the 30km path, the free-space loss is approximately 114dB.

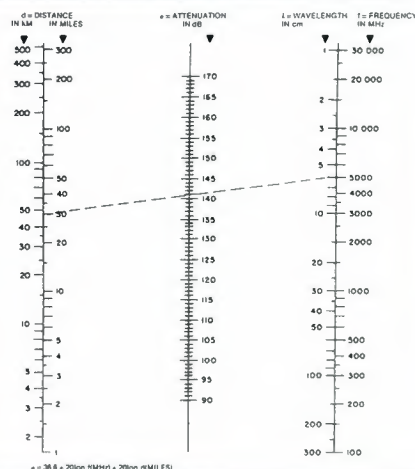
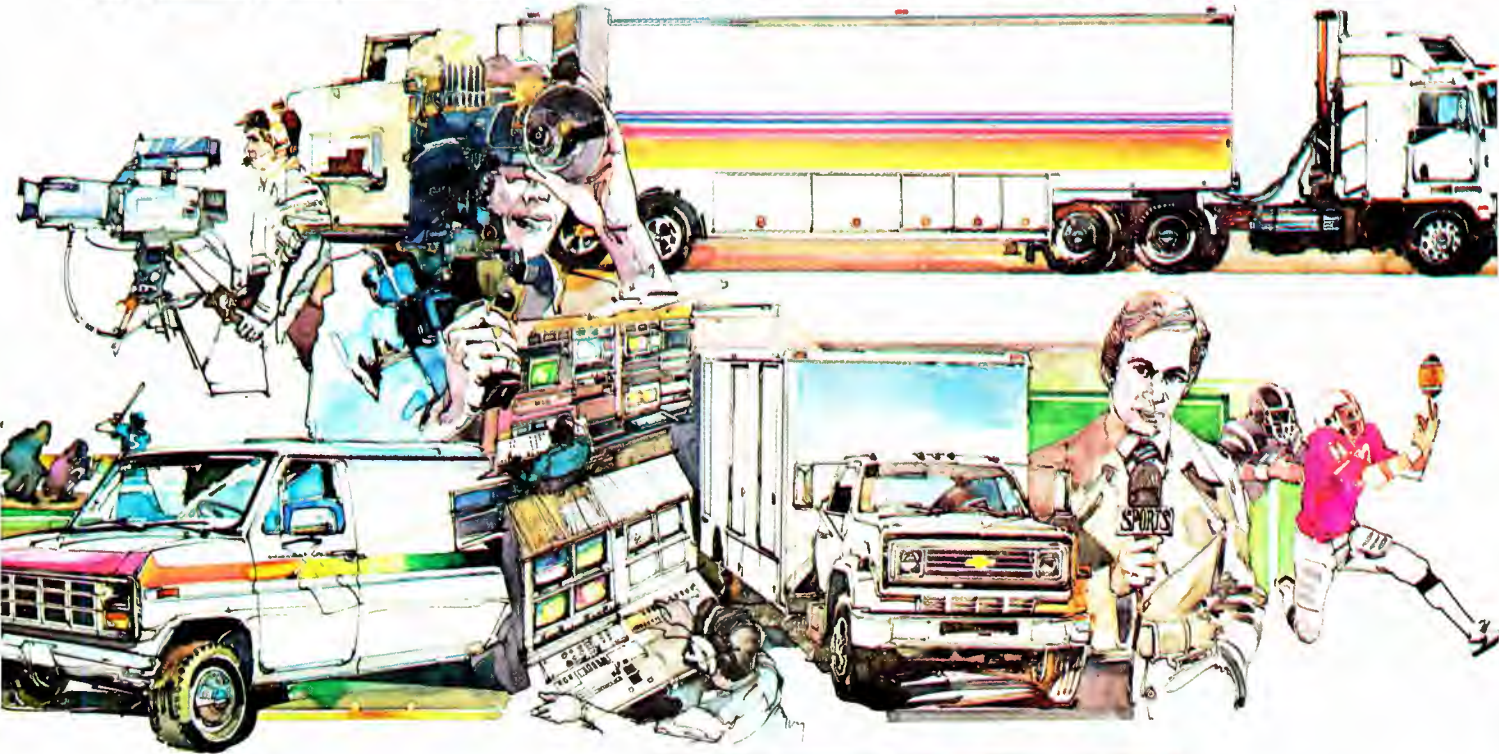


Figure 4. Nomograph to determine transmission loss in free space.

Reflections

Terrestrial reflections probably cause more problems in radio propagation than any other single item. The reflection point (or area) occurs where the incident and reflected rays of a reflected wave area are equal in angle for given antenna heights and past distance. This angle is called the grazing angle, shown in Figure 5. These reflection areas can move with a changing K factor. Grazing angles

MOBILE TELEVISION UNITS



32' VEHICLE WITH 22' BOX BODY
3 Hitachi SK91 SD3 with 14:1 lens and all the equipment required for studio and ENG use.

\$327,000



22' VEHICLE WITH 14' CUBE BODY
3 Hitachi FP22 S/3 with 10:1 lens, microprocessor for automatic set-up and all the equipment required for studio and ENG use.

\$203,000

Both Vehicles Include:

- **3 O'Conner** Fluid Heads, tripods, spreaders and dollies
- **3 Christie** Reflex 20 batteries and 1 charger for speedy 20 minute charge
- **1 Grass Valley** Production Switcher 1600-AN
- **1 Lerro** Character Generator System with **Chyron VP1** and **Sony SMC 70 Microcomputer**
- **2 Sony** 3/4" VTRs 5850/5800
- **1 Adda** TBC
- **1 Yamaha** 12 Input Audio Board
- Fully monitored—B&W and color, audio and video patching, on board power and air conditioning
- Prices include engineering, turnkey installation, manufacturers' warranty, delivery and training.

DESIGNED TO ACCOMMODATE 1" HITACHI VTRs - TRIAX ADAPTORS ALSO AVAILABLE



LERRO

ELECTRICAL CORPORATION

3125 N. Broad Street, Philadelphia, Pa. 19132

For more information, call Bob McTamney at (215) 223-8200

www.americanradiohistory.com

for most of the paths of concern, usually in terms of less than a degree, result in a 180° phase reversal for horizontal and vertical polarization.

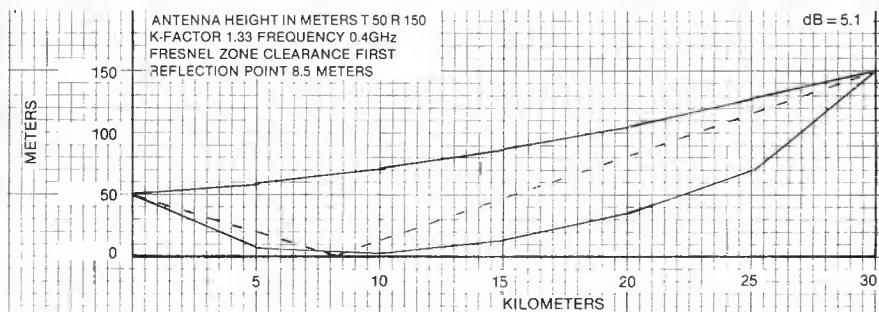
Previously we stated that the first Fresnel zone is bounded by points for which the transmission path from transmitter to receiver is greater by one-half wavelength and that reflections from this zone and all odd zones would add to the direct ray at the receive point. They add because the phase reversal occurs at the reflection point. The second Fresnel zone is bounded by points making a path length one wavelength longer, and therefore, after phase reversal at the point of reflection, the waves arrive out of phase at the receive antenna and subtract from the received signals.

If the first Fresnel zone clearance occurs at the reflection point, it is theoretically possible to realize a 6dB gain over the free-space path loss. If the second Fresnel zone clearance occurs at the reflection point, it is possible to have zero signal voltage at the receive antenna. Things are never that neat, however, and problems involv-

Figure 6(a).

ing reflections are complex. The nature of the terrain at the reflection point plays a major role in the form of the reflection.

Figures 6(a) and 6(b) show the effects of changing some of the parameters of path calculations. Both cases use a 4:3 K factor, 400MHz signals and a 30km path distance. In Figure 6(a), the second Fresnel zone clearance is allowed. Computations for the direct path and Fresnel zone points for 5km, 10km, 15km, 20km and 25km are plotted, along with a grazing angle of 0.413°. (Be aware that the relative scales are invalid for com-



Figures 6(a) and 6(b). Effect of reflections on received signal level in two hypothetical STL systems.

parison purposes.) After summing the losses caused by reflections (15.5dB) and adding the free-space loss of the path found earlier (114dB), we discover a total path loss of 129.5dB, which is less received signal than expected.

In contrast, Figure 6(b) changes the height of the transmit antenna from 95m to 50m. Because of the resulting change in reflection point and a restriction to the first Fresnel zone, a gain of 5.1dB over free-space loss caused by reflections is added to the

A no-nonsense solution for The new Harris 550 TBC.

This new TBC means business, and it's designed to solve the problems of your business.

Frustrated with TBCs that won't track during editing shuttle operations? The 550 tracks at 10X normal speed—now you can see the picture!

Ever wish your TBC's front panel controls were close

at hand? The 550's remote unit puts these controls at your fingertips, and it operates from as far away as 1000 feet.

Tired of the "bottom-of-the-picture-scramble" you have to contend with on some VTRs? The 550 cleans it up.

You have an "older" VTR and its tape wrap geometry seems to trip up the best TBCs you've tried? And you're



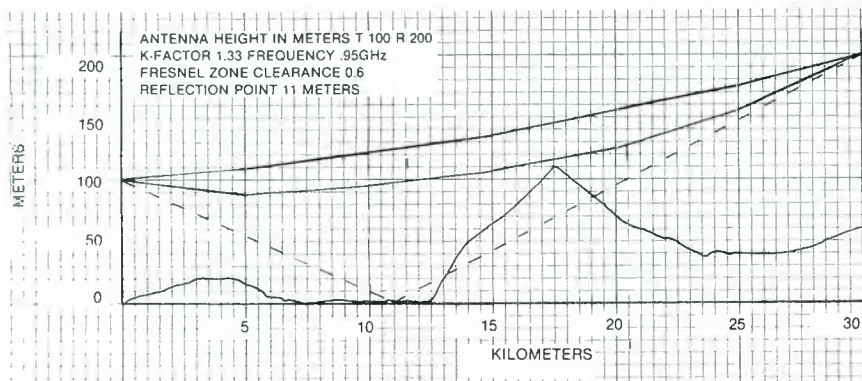


Figure 6(b).

occurs at 11km, but reflections are blocked by the peak. The grazing angle is 0.54°, and after vector summation provides a 1.4dB loss over free space.

Diffraction

If the beam of microwave energy strikes the edge of an object, diffraction comes into play. Diffraction means the breaking up of an electromagnetic wave into an interference pattern. The effect occurs whenever

114dB path loss for a total path loss of 108.9dB. We have gained signal by reducing the height of the transmit antenna.

Figure 7 illustrates another typical STL installation. With a transmit antenna at 100m and receive antenna at 200m, we set up a link for a 30km distance. The frequency will be 950MHz; K factor is 4:3. From the drawing you can see that a 0.6 Fresnel zone clearance is obtained at 17km from the transmitter at the site of an interfering peak. The reflection point

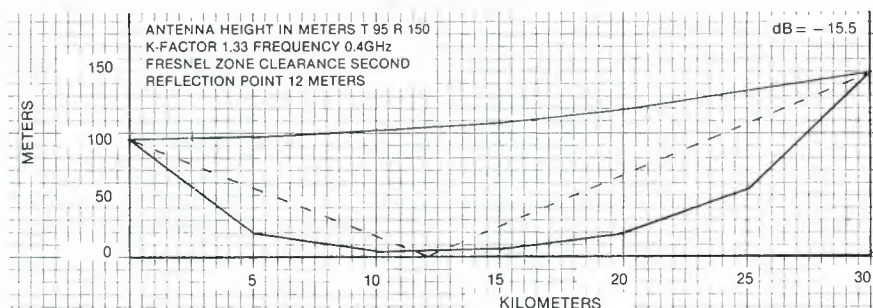


Figure 7. Plot of typical STL system showing blockage of possible reflections.

time-base error problems:

blessed with a mixture of 3/4" VTRs, some without 3.58 feedback? The 550 works with *all* heterodyne VTRs, not just the ones you *don't* have.

Your budget has just been cut, and it was too small to start with? You'll be pleased with the 550's low price.

More solutions? How about RS-170A; front loading

circuit boards; a proc amp with preset and adjustable controls; black burst output; RF or TTL DOC inputs, and the best specs you've ever tested in a TBC at this price.

Call us for a demo. You'll find the 550 has features and performance a professional needs. Then again, it should. We invented the digital TBC.



The 550's "put it anywhere" remote panel. Two will fit side-by-side in a 1 3/4" rack space.

Harris Corporation, Harris Video Systems Operation,
1255 E. Arques Avenue, Sunnyvale, CA 94086
(408) 737-2100 Telex: 4992172

Circle (22) on Reply Card



HARRIS

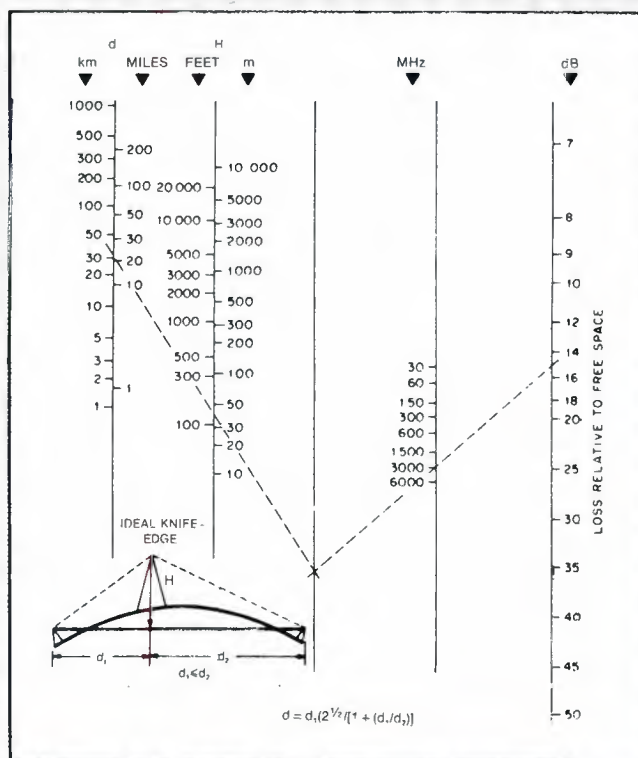


Figure 8. Knife-edge diffraction loss relative to free space.

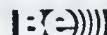
the wave is deflected at the edge of an electromagnetically opaque object, which could vary from a knife-edge-type obstruction to a sweeping edge, such as earth curvature. Diffraction propagation is frequently employed when the direct ray path is blocked.

An ideal knife edge is sharp and has a zero reflection coefficient. Loss caused by the edge depends critically on the shape of the diffracting edge. Because a natural obstacle, such as a mountain ridge, may depart considerably from the ideal knife edge, the diffraction loss in practice is usually 10-20dB greater than that estimated from nomographs such as the one shown in Figure 8, taken from the *Bell Systems Technical Journal*.

Editor's note:

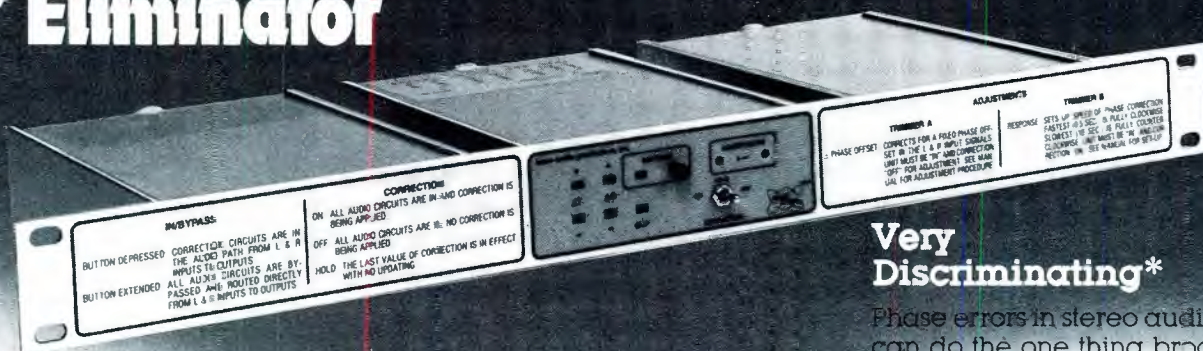
If this thumbnail sketch of propagation theory interests you, the following texts and handbooks are suggested for more in-depth study. Most STL equipment manufacturers also will be helpful in understanding the problems of planning your STL propagation path.

- *Radio Propagation Handbook*, Peter N. Saveskie, Tab Books.
- *Reference Data for Radio Engineers*, Howard W. Sams.
- *Electronic Engineers Handbook*, Donald G. Fink, McGraw Hill.



The Eliminator

Howe Audio Series 2100 Phase Chaser™



- ✓ Corrects phase errors in stereo sources
- ✓ Sophisticated cross-correlator system
- ✓ Accurate tracking of left and right channels
- ✓ Phase errors eliminated without any signal degradation.

... the Phase Chaser™ ... providing accurate, dynamic sound at an affordable price.



howe audio productions, inc.

3085 A Bluff Street
Boulder, Colorado 80301
303/444-4693

For more information: 800/525-7520

Very Discriminating*

Phase errors in stereo audio sources can do the one thing broadcasters hate ... drive away listeners. The PHASE CHASER™ is a unit specifically designed to eliminate phase errors in stereo sources, and is extremely efficient in tape source applications. Join the growing list of PHASE CHASER™ users, eliminate the phase errors, and keep your listeners.

*A unique feature of the PHASE CHASER™ is its ability to discriminate between a systematic time delay (such as a cart tape misalignment) and normal phase fluctuations in the music material.

Circle (23) on Reply Card

One of these performers has done 18 one-nighters in a row and is still fresh and raring to go.

Hint: He's the one without the guitar.

Not so long ago, still store systems were big and bulky beasts. They took forever to install and were hard to move. And they had to be handled with "white gloves" and plenty of TLC. We've taken a different tack. We believe a still store should be a small, rugged video black box capable of taking a little the knocks and scrapes the real world can dish out. Our compact 7-inch A42 digital still store recently hit the road as part of the

Simon & Garfunkel reunion concert tour. It assisted in the live video production. And it took abuse no still store had ever taken before. The A42 was thrown onto a truck, unloaded, set up, used at each concert, packed back up, and then tossed back in the truck again for the next one-night stand.

The A42 came through with flying colors—offering the latest innovations in still store technology, super reliability, space savings, and at a very affordable

price. If the A42 can do 18 one-nighters on the road, think what it can accomplish for you in your studio. Call today for full details or to arrange for an in-house demo: (415) 571-1711. Or write Abekas Video Systems, Inc., 319 Lincoln Centre Drive, Foster City, CA 94404.

Abekas
Video Systems, Inc.

Circle (24) on Reply Card

Two standalone Time Base Correctors (T-120D), an Effects Processor (E-120) and an Effects Control for a remarkably low price.



Now you don't have to pay a lot for an effects system that does a lot. The Microtime T²E-120 Digital Effects System. For A/B roll, Digital Effects and DYNAMIC TRACKING* capabilities.

Effects such as push off, push on, pull off. Square wipe, corner wipe, horizontal wipe, vertical wipe. Dissolves and fade to black. All effect rates are selectable by push-button. All wipe transitions have controlled rise and fall times to minimize ringing. And the system features a hand-held effects control with a 75-foot cable for convenient placement.

T²E-120 Digital Effects System.
At \$20,900, the most cost-effective effects.

- ☐ 16 H-line memory range, easily handles large gyro errors.
- ☐ 8 bit, 4x subcarrier digital design for high reliability and transparent performance.
- ☐ DT* operation with SONY* BVL-820 J-MATIC*, VTR plug compatible.
- ☐ Operates with all 1/2" and 3/4" heterodyne VTR formats, with or without 3.58 subcarrier feedback.
- ☐ Effects can be externally triggered from an edit controller or switcher.

The Microtime T²E-120 Digital Effects System. The effects maker with the price that's something special. For full information, contact MICROTIME, INC., 1280 Blue Hills Ave., Bloomfield, CT 06002. (203) 242-4242. TVX 710-425-1165.

MICROTIME
A Subsidiary of ANDERSEN GRG, JP

Circle (25) on Reply Card

*DYNAMIC TRACKING, SONY and J-MATIC are registered trademarks of Sony Corp.



Aural STL systems

By Jerry Whitaker, radio editor

Competition, new technologies and a more discriminating audience continue to push the radio broadcast industry to seek improved methods of signal delivery from the studio to the transmitter site. The author looks at some technical aspects of aural STLs and surveys systems shown at NAB '83.

When the studio and transmitter are not co-located, the STL provides the radio broadcaster an alternative to deliver program audio to the transmitter. Using microwave radio instead of Telco lines, the broadcaster has almost complete control over the transmission system. Not only is high quality audio performance possible, but also the capability for transmitting a composite stereo signal or the separate right/left channels, either with additional subcarrier signals, may be achieved, at a much lower cost than through the telephone line.

STLs in general

FCC regulations provide for 10 500kHz channels in the 950MHz spectrum for aural broadcast STL and intercity relays. Table I shows technical considerations of different equipment and operational arrangements. Regardless of the configuration, however, no more than one channel width is allowed. The transmitter's power output is limited to no more than necessary for reliable operation, and highly directional antennas must be used.

With the limited number of channel assignments available, stations must coordinate STL systems to ensure interference-free operation in urban areas. Many cities have frequency coordination committees, often set up by the SBE. Coordination takes into account the frequency, radiated power, direction of radiation, antenna polarization and potential of harmonic or subharmonic interference to or from the STL system.

STL systems require licensing using Form 313 application forms, which are available from any FCC field office

Table I.
950MHz STL technical characteristics

	SYSTEM CONFIGURATION Covered by Application	Frequency with Respect to channel center	Emission	Bandwidth
1	SINGLE STL - Monaural Use	On Center	110F3	120 kHz
2	SINGLE STL - Monaural Use with Type II Control	On Center	110F9	120 kHz
3	SINGLE STL - Monaural with 67 kHz SCA	On Center	230F9	240 kHz
4	DUAL STL - Stereo L or R channel I. or R channel	+125 kHz -125 kHz	110F3 110F3	120 kHz 120 kHz
5	DUAL STL - Stereo with Type II Remote Control System L or R channel & control L or R channel	+125 kHz -125 kHz	110F9 110F3	120 kHz 120 kHz
6	DUAL STL - Stereo & SCA L or R channel L or R channel & 67 kHz SCA	+125 kHz -125 kHz	110F9 230F9	120 kHz 240 kHz
7	DUAL STL - Stereo, Type II Control & SCA L or R channel & control L or R channel & 67 kHz SCA	+125 kHz -125 kHz	110F3 230F9	120 kHz 240 kHz
8	COMPOSITE STEREO STL - FM Stereo	On Center	226F9	236 kHz
9	COMPOSITE STEREO STL - FM Stereo & SCA (67 kHz)	On Center	270F9	280 kHz
10	COMPOSITE STEREO STL with Type II/C Radio Remote Control System	On Center	340F9	350 kHz
11	COMPOSITE STEREO STL with Type II/C Radio Remote Control System and program subcarrier channel	On Center	490F9	500 kHz

Courtesy of Moseley Associates

and most STL equipment manufacturers. Also, much more effort is required than simply pointing the transmitting and receiving antennas at each other and turning the equipment on. Much planning should precede applying for a license.

Path engineering*

The STL's purpose is to direct a signal from a fixed studio location to a fixed transmitter location. Because the studio and transmitter cannot be easily moved, the link must be engineered around these two fixed points. In many cases, the required STL path also will be the ideal line-of-sight path. In other cases, however, the required path will not provide acceptable performance, and special arrangements will have to be used, which may include a remotely located STL transmitter, fed via Telco loop from the studio, or a multihop relay system.

Using Telco lines to feed a remotely located STL transmitter introduces a host of familiar problems, such as differential phase error, noise, cross-talk, distortions, limited frequency

response and ever-present service delays. In some systems, using Telco loops to the STL is the only economical way to complete the link. Although a hybrid system is not the ideal, it is an improvement over an all-Telco link.

Multiple-hop STL systems present several problems, not the least of which is equipment cost. At least two transmitters and two receivers are required for a 2-hop composite or mono link. If dual-program channel or hot standby operation is desired, at least four transmitters and four receivers are needed. In addition to the extra equipment for a two-or-more-hop STL link, the cost and availability of space to locate the repeater link must be considered.

The performance of a multihop system generally is degraded by a predictable amount over a single-link arrangement. S/N, frequency response and differential phase/gain values usually will degrade by $10X \log N$ decibels, where N is the number of hops in the system. For this reason, it is necessary to measure the performance of the system as a whole on a regular basis, as well as to measure the performance of individual seg-

*See "The Propagation Path," which begins on page 19.

ments of the link. However, the same is true for a single-transmitter system fed by Telco lines.

Plans for any STL system begin with accurate, detailed US Geological Survey maps covering the proposed path. Note any natural obstructions (mountains, hills or vegetation) or man-made obstructions (buildings, water tanks, transmitting towers, etc.) in the proposed path.

With some idea of the terrain involved, a plot of the system is made with transmitting and receiving antennas located to provide a minimum of 0.6 Fresnel zone clearance on 4:3 earth profiling paper. The 0.6 Fresnel clearance value is valid for frequencies up to about 2GHz, but at higher frequencies a greater clearance is required.

If it is impossible to allow for the 0.6 Fresnel clearance zone, a minimum of 30 feet of clearance for the path should be provided above any obstruction. Paths between 0.6 Fresnel clearance and 30 feet, sometimes called *grazing paths*, require a greater free-space attenuation in the path design. An additional 2% of attenuation is



Photo: Merle Shuster

Shown is the Scala PR-450U transmitting antenna used in KPJ-FM's (Eureka, CA) studio-to-transmitter link. The hop is a 10-mile, line-of-sight path to the transmitter at Kneeland Mountain. A Moseley PCL-505C is used in the system.

found in paths up to 25 miles, 4% for 50 miles and 8% for 100 miles.

After the proposed path is drawn, visually check the area for any problems not shown on the maps that might degrade performance, such as newly constructed buildings or undocumented terrain features. Possible reflective surfaces should be examined as well. A large body of water, great for the AM transmission system, can cause severe problems for microwave links. Water is highly reflective to UHF frequencies, and if the surface of a lake is an even number of Fresnel zones from the true path, signal attenuation will occur at the receiver. Thick vegetation also provides substantial reflections, particularly when wet. Changing antenna height at the transmission or reception site is a solution to such conditions.

A margin of safety

Because variable weather factors are encountered, a margin of protection must be provided for the STL path. Figure 1 illustrates the recommended fade margin for a 950MHz

Continued on page 36



QUANTUM
AUDIO LABS, INC.

A GOTHAM COMPANY

1909 Riverside Drive
Glendale, California 91201
Telephone (213) 841-0970

SERIES 22 BROADCAST/PRODUCTION MODULAR CONSOLES

PLEASE WRITE FOR
OUR COLOR BROCHURE



Circle (26) on Reply Card

YEC/PHOTRON VS-1000 SYNC/TEST SIGNAL GENERATOR



STANDARD FUNCTION: Sync, Color Bar, Linearity, Convergence, Level Control

OPTION: Pulse & Bar (Sin²), Multiburst & Sweep

FEATURES: Five signal generators

RS-170-A standard

Stable subcarrier (accuracy $\pm 10\text{Hz}$ or $\pm 1\text{Hz}$)

Genlock/Internal sync generator

Low profile (1.7") and light weight (18 lbs)

Better cost performance

Also available: SG-1000 Dual Sync Generator

ED-1000 Color Encoder/Decoder

DA-1000 Distribution Amplifier

FS-1000 Frame Sync Encoder

Call for more information

USA

Hoffman
Video Systems

800 West Pico Boulevard
Los Angeles, California 90015
(213) 749-3311

Canada

m.s.c.

m.s.c. electronics ltd.

254 wildcat rd. downsview, ont.
(416) 661-4180 Telex 06-23494

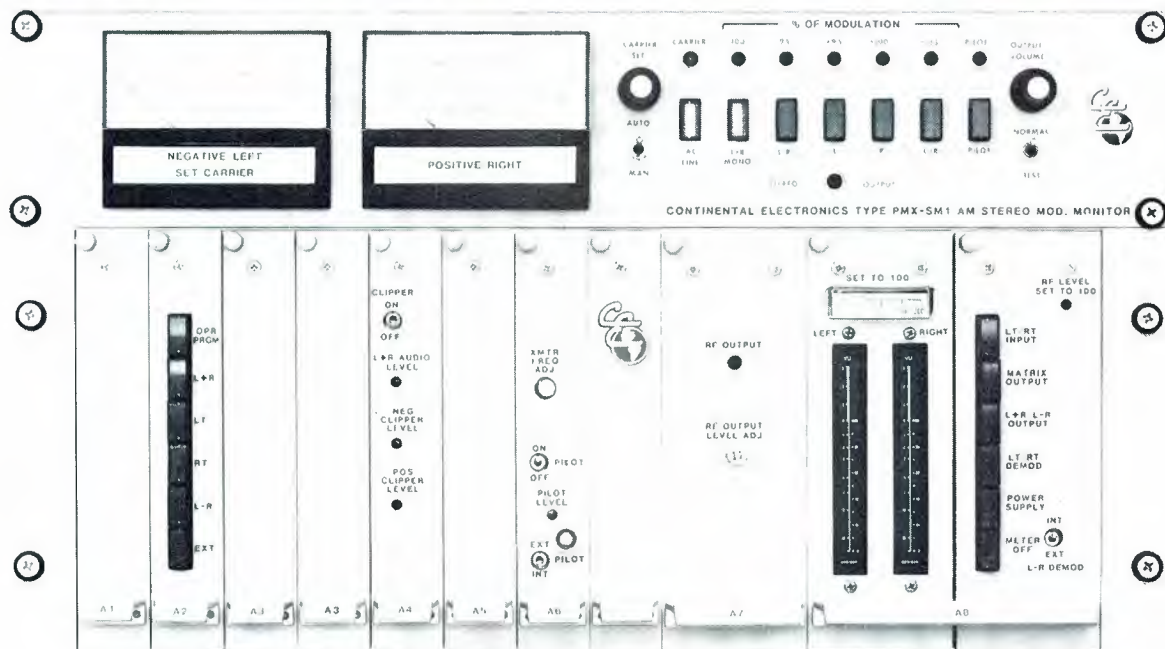


J. OSAWA & CO., LTD.

2-8, Shibaura 4-chome, Minato-ku, Tokyo 108, Japan
Tel. 03-455-0111 Telex J 23881 OSAWAIMP

Circle (27) on Reply Card

Your winning combination for AM Stereo



Is AM Stereo ready to move up?

Market-place decisions notwithstanding, the recent introduction of receivers able to decode signals from any of the four systems in use today makes it easier for broadcasters to move ahead with AM Stereo plans.

Which system is #1?

The PMX (Magnavox) System was first selected by the FCC to be the Industry Standard for AM Stereo. We established the system's viability during the 1979 NAB Show. The politically-inspired "market-place" decision hasn't affected the technical performance of the PMX System one bit.

Hearing is believing.

With the PMX System, AM Stereo music sounds like FM Stereo music. So it makes for higher listener appeal and better numbers: For audience and the bottom line.

The Winning Combination

Our Type 302A Exciter, developed for the PMX System, and our new Type PMX-SM1 AM Stereo Modulation Monitor give you a superior package for AM Stereo broadcasting.

We've built a world-wide reputation for high-quality AM transmitters that offer unmatched

on-air reliability with complete transparency.

Ultimately, the day-to-day operation of your AM Stereo System will depend upon equipment and service.

We stand on our track record of providing the best of both.

If you're considering AM Stereo, or if you just want more facts, give us a call. You can't lose.

Continental Electronics Mfg. Co.
PO Box 270879, Dallas, Texas 75227.
Phone: (214) 381-7161

Continental Electronics



© 1983 Continental Electronics Mfg. Co./5452

Circle (28) on Reply Card

COLOR.

Scotch®

3M

UCA 60
Videocassette

Color Plus



Professional Use

3M

The difference between standard videocassettes and Scotch® Color Plus $\frac{3}{4}$ " Videocassettes will be obvious to you right from the start.

Scotch Color Plus delivers exactly what its name implies. Bright, brilliant color for your $\frac{3}{4}$ " mastering or editing needs.

Behind this dramatic color improvement is our unique Scotch Color Plus oxide that exceeds industry standards for color and video signal-to-noise. So you get a crisp, colorful picture, with significantly fewer dropouts.

But brilliant color is only part of the story. The special magnetic formulation

"Scotch" is a registered trademark of 3M ©3M, 1983.

PLUS.



designed for the new generation of U-matic recorders reduces headwear to the lowest in the industry.

Most important of all, every Color Plus Videocassette is consistently made under the highest quality standards, which has made 3M the leading manufacturer of professional use video tape.

For more information about Color Plus $\frac{3}{4}$ " Videocassettes, call 1-800-328-1684 (1-800-792-1072 in Minnesota). We'll send you details on the $\frac{3}{4}$ " tape that lives up to its name.

Magnetic Audio/Video Product Division/3M.

SCOTCH COLOR PLUS $\frac{3}{4}$ " VIDEOCASSETTES.



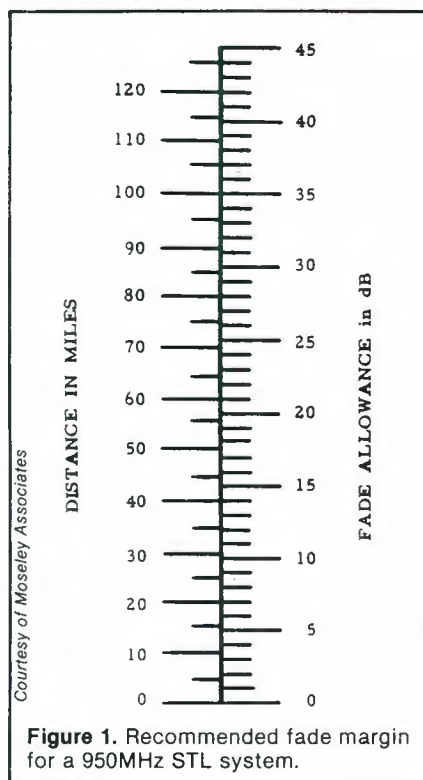
3M hears you...

3M

system. If a multiple-hop arrangement is used, the fade margin from the chart applies to each segment of the overall link.

The greatest energy loss from the transmitter to the receiver is caused by free-space attenuation. For a distance N in statute miles separating the transmit and receive sites and a frequency of operation of F GHz, the free-space attenuation A is given by:

$$A = 96.6 + 20\log F + 20\log N.$$



Courtesy of Moseley Associates

MOSELEY ASSOCIATES, INC. (Santa Barbara Research Corp.)

SYSTEM CALCULATIONS

Reference Number _____ Prepared By _____ Date _____

CUSTOMER _____

SYSTEM GAINS

1. Transmitter Power Output (Model # _____) _____ dBm

2. Transmitter Antenna Gain (Antenna Type _____) _____ dBi

3. Receiver Antenna Gain (Antenna Type _____) _____ dBi

4. Total Gain _____ dB

SYSTEM LOSSES

5. Path Loss (Line # _____) _____ dB

6. Transmission Line Loss (Total Ft. _____ / _____ m) _____ dB

7. Connector Loss (Total) _____ dB

8. Other Losses _____ dB

9. Total Loss _____ dB

SYSTEM CALCULATIONS

10. Total Loss (Line # _____) _____ dB

11. Total Gain (Line # _____) _____ dB

12. Effective Received Signal _____ dB

13. Minimum Signal Required for _____ dB SNR (Model # _____) _____ dBm

14. Fade Margin _____ dB

Figure 3. Path engineering worksheet.

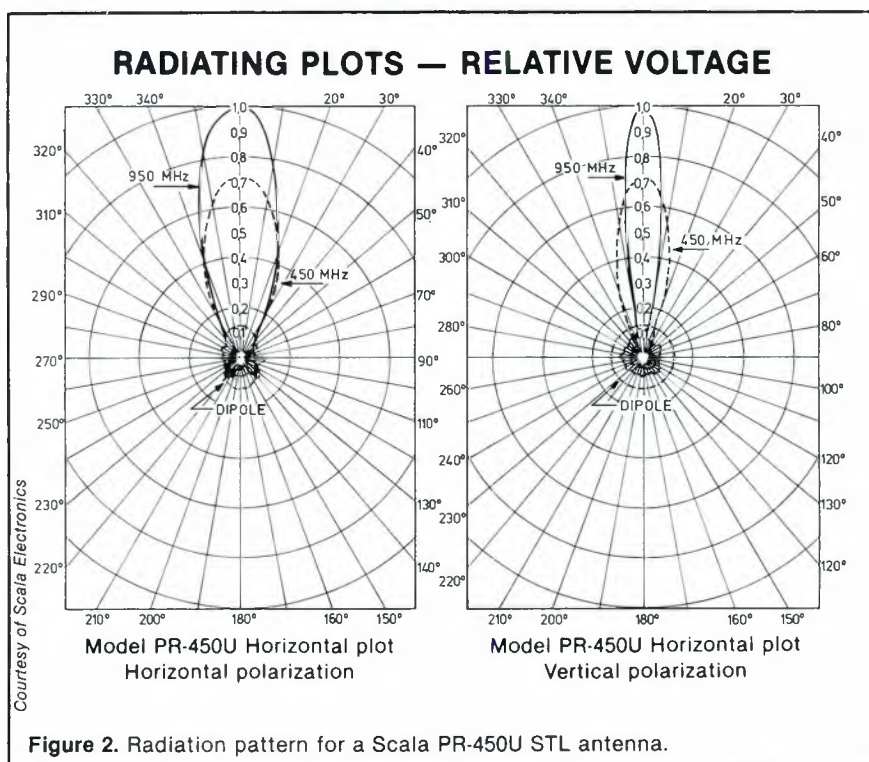
High gain transmitting and receiving antennas used in STL systems provide additional passive gain needed for the system to operate reliably. A high gain antenna provides a high effective radiated power (ERP) in the direction of the radiation and helps prevent interference to other stations using STLs on adjacent frequencies. Given enough physical separation, two stations in a particular market can use the same STL frequency. Such sharing of frequencies has become necessary in some highly congested urban areas. For the arrangement to

horizontal polarization.

While planning the STL path, you must account for all gains and losses, starting with the transmitter. For easiest calculation, the transmitter's output power must be known in decibels. With transmitter power P_0 in watts, the output power in decibels dBm is given by:

$$\text{dBm} = 30 + 10\log P_0.$$

For signal accounting, any loss in receive and transmit feeder line connectors also must be considered. A



work, however, the antennas used must have very high gain, directivity and front-to-back ratios.

Typical radiation patterns for STL antennas are shown in Figure 2. The Scala PR-450U antennas, to which these drawings apply, may operate to 1GHz. A gain greater than 18dB is specified at 950MHz with a maximum VSWR of 1.2:1 at the specified operating frequency. A front-to-back ratio of 20dB is standard, with higher ratios available. For horizontal or vertical polarization, the antenna handles 100W of input power.

Another method of isolation to avoid interference is cross-polarization. As much as 25dB isolation is possible if one station uses vertical polarization, while the second uses

reasonable value for the usual components for 1/2-inch foam dielectric line is 0.5dB.

An engineering path form, as shown in Figure 3, simplifies the calculation of the STL system's fade margin. Once all gains and losses are listed and totaled, the engineer easily can determine whether the proposed system will be a firm link or a marginal one. A link that operates on the edge of the allowable fade margin eventually will encounter problems. Normal component aging in the receiver or transmitter can increase the S/N ratio to an unacceptable level. New construction could degrade the path. Unusual weather in the area or antenna icing may cause increased system noise and even complete loss of signal for a time.



The ENG/VCR news team that will take you to the top.

Meet the ideal news team.

The camera is the proven, compact HL-83. The VCR, our new M-format HM-100, or any high performance $\frac{3}{4}$ " U-matic or 1" VTR of your choice. All are totally compatible with the HL-83 by means of the separate Y and I/Q (with optional system adapter) and encoded NTSC video outputs.

The HL-83 is extremely compact and well balanced. It's about the size and weight of competitive one-tube cameras—yet, it's a high performance three-tube, prism optics design. And it uses proven, readily available components. Inside are $\frac{2}{3}$ " Plumbicon* or Saticon** pickup tubes coupled to

advanced Ikegami circuitry that delivers usable pictures in low light with up to 18 dB of gain. Automatic white balance corrects colorimetry over a wide color temperature range with the touch of a single button—there's no need to fumble with filters.

And with the HL-83's low-power requirement (16W), you can keep on shooting for up to 3 hours with an on-board Nicad battery.

The HM-100 VCR captures the image intact with a very respectable luminance/chrominance S/N ratio of better than 47/48 dB. Audio is better than 50 dB. This flexible, lightweight recorder (9.0 lbs) can be carried on a shoulder strap or mounted on-board

for use as a one-piece system.

Add the available ML-79/83 Microlink ENG microwave system for go-anywhere flexibility. Or set up for EFP with a full feature multicore base station and a 4.5" viewfinder. There's also provision for future systems capability with the optional system adapter. Ikegami never stands still.

Put together the HL-83 camera system of your choice. Then head straight to the top.

Ikegami

HL-83 Camera Systems

Ikegami Electronics (USA) Inc., 37 Brook Avenue Maywood, NJ 07607.

Northeast: (201) 368-9171 ☐ **Midwest:** (219) 277-8240 ☐ **West Coast:** (213) 534-0050 ☐ **Southwest:** (713) 445-0100 ☐ **Southeast:** (813) 884-2046

*TM of N.V. Philips **TM of Hitachi, Ltd.

Circle (29) on Reply Card

November 1983 **Broadcast Engineering** 37

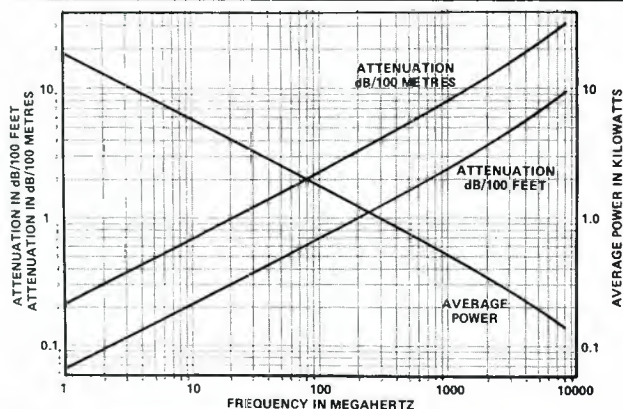


Figure 4. Power handling and attenuation ratings for Andrew 1/2-inch foam dielectric coax.

Thus, an adequate margin of safety should be allowed. If the transmitter allows an adjustment of the output level, acceptable performance should be achieved with approximately 85% of full power. Unforeseen changes can be compensated without the need for system modifications by allowing the 15% overhead capability.

Different types of transmission line can be used from the transmitter or the receiver electronics to the respective antenna. One type often used is 1/2-inch foam dielectric coaxial cable, such as Andrew Corporation LDF4-50 heliax. The power handling and attenuation characteristics of this cable are shown in Figure 4. Although 1/2-inch foam coax is the smallest size cable that should be considered for the main runs from transmitter or receiver equipment to the antenna, larger sizes of coaxial cable and even waveguide materials may be used, particularly for higher frequencies. Coax, such as RG-8/U, is not acceptable, however.

Installation hints

The transmission line is perhaps the easiest part of the STL system into which losses can be introduced during installation. The line should not be bent more than recommended by the manufacturer, because excessive bending will result in a kink in the outer conductor/shield of the coax. A kink will cause a change in the characteristic impedance of the line at the point of the kink. As the characteristic impedance changes, the VSWR of the cable presented to the transmitter increases. An increased VSWR will create a greater signal loss in the link.

The transmission line and connectors must be watertight, where exposure to the elements is possible. Connectors sealed with a silicon dielectric compound and wrapped with a good-quality tape or heat-shrink material should provide reliable operation. If moisture works its way into the connector, signal loss and VSWR problems are likely.

Grounding of transmission lines for the STL is suggested at the point the lines enter equipment buildings and where the lines start up the tower if the height of the antenna is greater than 10 feet. The grounding will help prevent high voltage transients, caused by lightning, from entering the equipment buildings. Inside the building, pigtailed of flexible coax may be used to connect the line to equipment,

Continued on page 42

THE NEW STANDARD FOR TV DEMODULATORS

Model EKF2/D



- 20mV – 1.5V input for Precision Transmitter-Site Monitoring
- Unique 2-Way Tuning: AFC Tuning across the complete broadcast range (Channels 2-63)
- PLUS
- One Crystal (any channel) for high-accuracy (All included! No plug-ins or modifications necessary)
- Demodulation Modes: Switchable Envelope/ Synchronous Demodulation
- Switchable Sound-Trap
- Zero-Reference Pulse
- Built-In Speaker for Direct Audio Monitoring
- Available from stock



Send for our new catalog

ROHDE & SCHWARZ

13 Nevada Drive, Lake Success, N.Y. 11042 • (516) 488-7300 • Telex 96-0072



Circle (C) on Reply Card

Front row view for everyone

General Electric Professional Large Screen Video Projection

With General Electric's exclusive system for bright, sharp professional-quality pictures, up to 25 feet wide, General Electric Professional Large Screen Video Projectors are making presentations more dramatic, more productive, and more convenient.

Whether videotape, live transmission, TV programming or data direct from your computer, the pictures projected can be seen by everyone in the room, all at once, even when room lighting is provided so viewers can take notes and refer to written material.

The color projectors show every viewer the same accurate color reproduction. An exclusive General Electric system registers the colors for you, eliminating time-consuming manual adjustments.

Portable and flexible, General Electric projectors are being used in a great variety of applications, including both rear and front projection. Ask our applications experts whether yours can be added to the growing list, which includes:

Education: Medical, dental, engineering, computer science instruction.

Business: Sales meetings, industrial training, product presentations, real-time display of computer-generated data, teleconferences.

Entertainment: Theatre television, closed-circuit TV events, overflow crowds, special effects.

Television Production: Backgrounds for news programs, special effects, data display, program previewing.

Call or write: General Electric Company, Projection Display Products Operation, Electronics Park 6-206, Syracuse, NY 13221. Phone: (315) 456-2152. TWX 710-541-0498.



View from ringside transmitted live to guests in Caesar's Palace lounge.



View from spacecraft transmitted live from NASA to sell-out planetarium crowd.



View from finish-line projected in racetrack lounge is preferred over grand stand by many patrons.

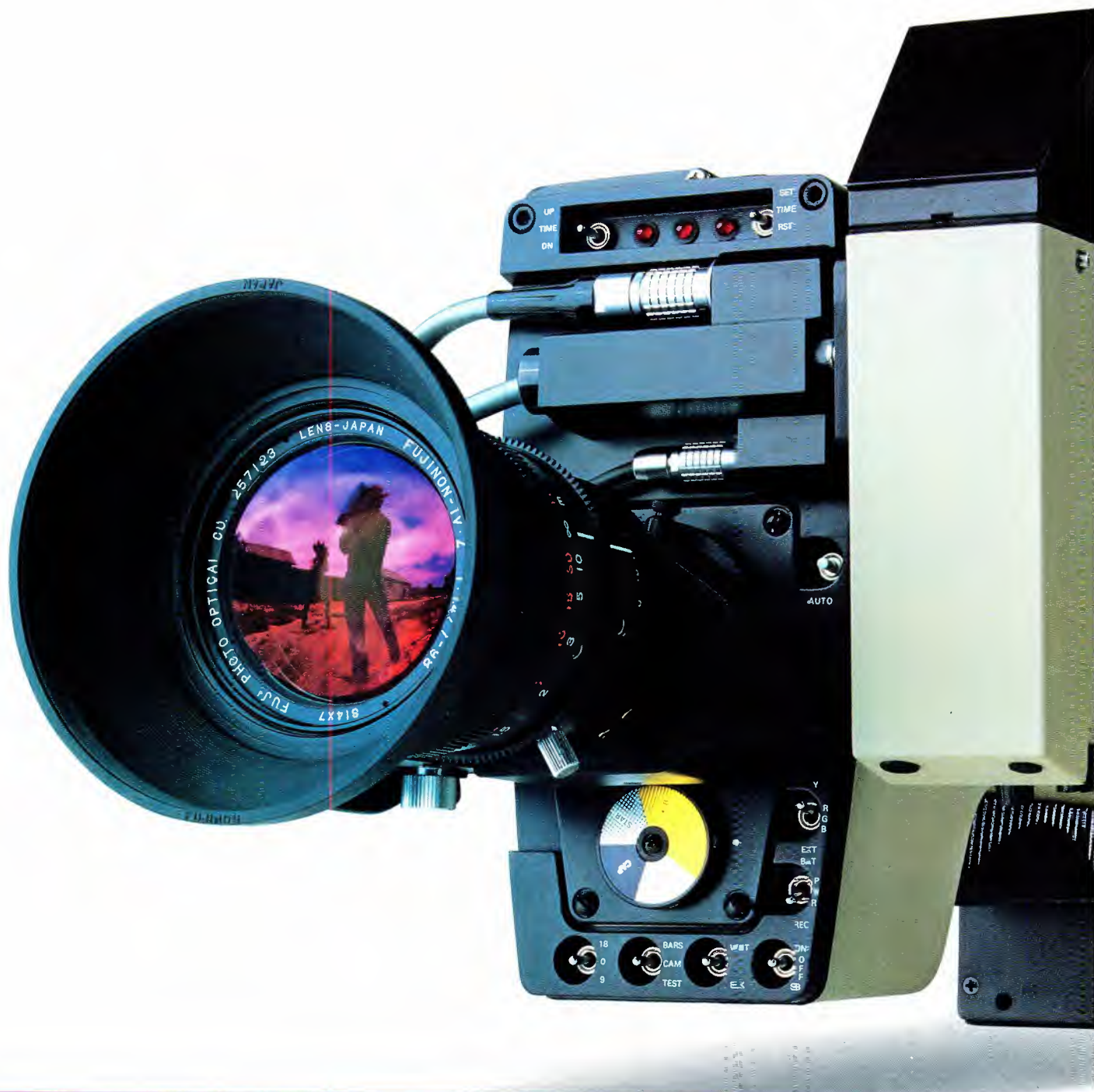


View from armchair at home is duplicated between races to draw extra admission fee at racetrack lounge.

GENERAL  ELECTRIC

Circle (31) on Reply Card

If your HL-79 beats we'll



our TC-90S, give you the TC-90S!

Comparison. The real test. When you have to make a choice between two superb competitors, it usually comes down to a shoot out—a side-by-side objective comparison of those features and capabilities that mean the most to you.

FREE

Harris has made a substantial investment in the TC-90S—because we knew that we could design and manufacture an American camera with features that would make it the new industry standard. We wouldn't make this offer unless we were sure we had succeeded.

So look over these TC-90S features and read our offer. Then, if you want a shoot-out, let us know. We're ready.

The Facts

1 Colorimetry

Mixed-field LOC, half-inch diode gun tubes, and an advanced new beam splitter provide winning colorimetry and better registration than larger tubes.

2 Smart Package™

Exclusive microprocessor time code generation lets you record SMPTE and VITC time code *as you shoot*, so editing hassles disappear. Automatic encoder balance, auto registration, diagnostics and camera status (in English) keep your camera out of the shop and in the field where it belongs.

3 Automatics

Auto registration
Auto beam control
Auto encoder balance
Auto iris
Auto white balance
Auto black balance
Auto scan failure protection

4 Gain Tracking

The TC-90S maintains black level under all conditions to eliminate color shift, even with changes in gain.

5 Noise

Minimal apparent noise at +18 dB gain for superb low light level performance.

6 Weight

The TC-90S, with standard lens and battery, and including the viewfinder, weighs less than the HL-79, similarly equipped. No more "sagging shoulder" feeling, and your pictures will show it.

7 Profile

You can see to the right! Even when you're shooting, you have an unobstructed view to the right over the top of the camera.

8 Price

The TC-90S, with microprocessor, tubes, batteries and a 15:1 zoom lens—a top-of-the-line camera—is list priced under \$30,000!

9 24 Hour Service

Call us. 24-hours-a-day, 7 days a week. Our telephones are constantly manned by service engineers, and we're ready when you need help.

The Challenge

The details of the shoot-out are simple: We must have on file the coupon below filled out by the camera-person at your facility, and a letter signed by your chief engineer or general manager on your organization's letterhead, requesting the shoot-out and stating that you are in the market for a new ENG camera. Then, if your current model Ikegami HL-79 (or an HL-79 you secure for the shoot-out) meets all, and exceeds one or more, of the TC-90S features given above, we'll leave without our camera—it's all yours.

There's More

To those of you who believe that time is the true test of a product, we'll make another offer: Forget about filling out coupons and writing letters—call us today and order a TC-90S. Then use it in the field for 30 days. If it doesn't live up to our specifications, we'll refund your money.

Either way, the TC-90S is a winner. In a shoot-out, or on your shoulder.

OK Harris, prove it!

Mail to: Mark Gray, Director of Marketing,
Harris Corporation, Studio Division,
P.O. Box 4290 Quincy, IL 62305,
(217) 222-8200 TLX 404347

CAMERAPERSON

STATION OR COMPANY

ADDRESS

CITY

STATE

ZIP

TELEPHONE

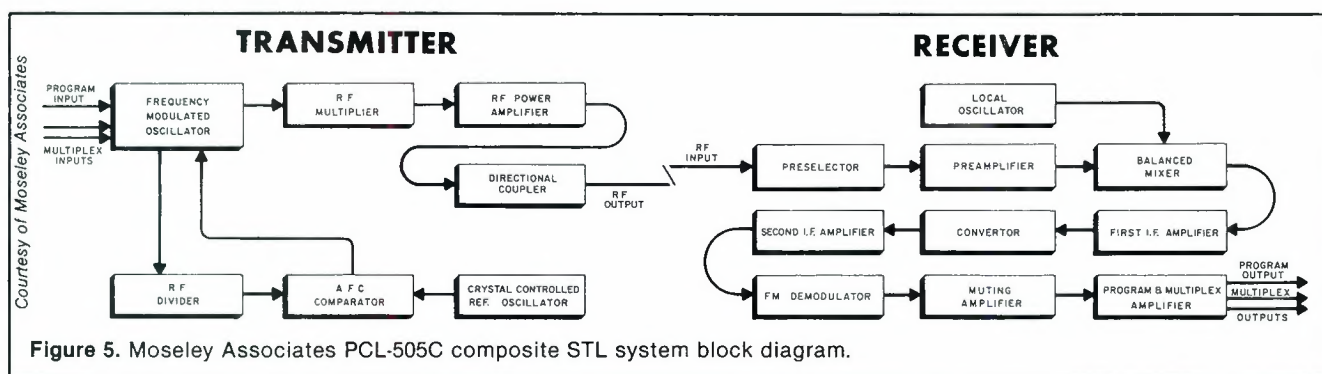
Hurry, our incredible offer expires January 31, 1984.
And good luck. Your HL-79's going to need it.



HARRIS

Circle (32) on Reply Card

November 1983 **Broadcast Engineering** 41



but the lengths should be no more than 18 inches.

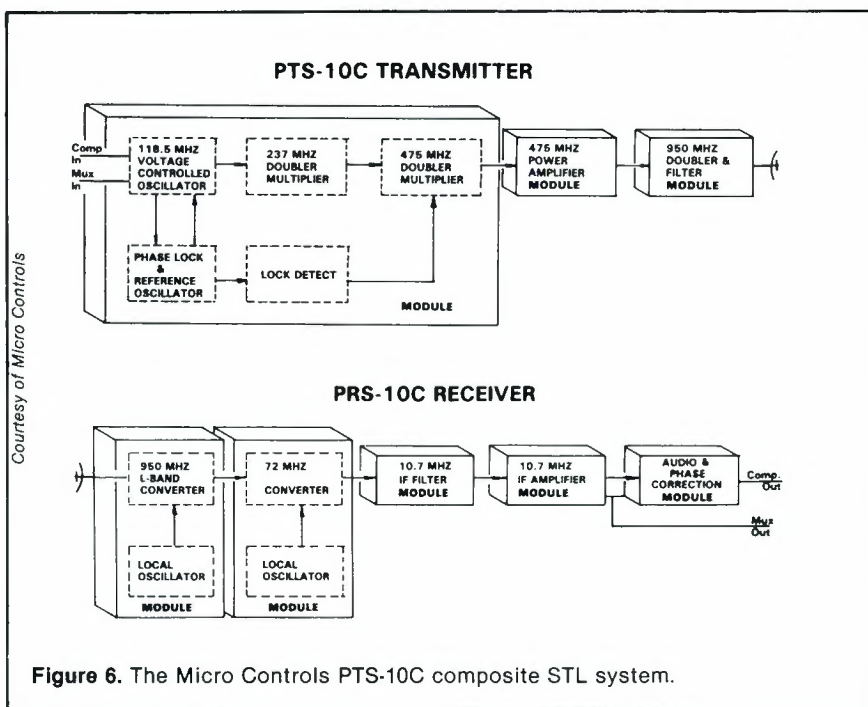
If the STL transmitting antenna is mounted on an insulated-base AM radiator, an isocoupler is suggested. The isocoupler passes the STL frequency signal with greater than 90% efficiency, while presenting a high impedance to the AM band. Isocouplers are available in various frequency and power ranges. Installing the isocoupler may change the base impedance of the AM tower slightly, requiring the impedance to be measured and the antenna tuning unit to be retuned, if necessary. Unless the engineering staff is well-versed in such activities, a consultant should handle the adjustment task.

When an FM or TV transmitting antenna is nearby, the STL receiver antenna should be as far away from the radiating elements as possible to prevent desensitizing the microwave receiver.

Dual or composite systems

Aural STL equipment on the market offers various features, controls, prices and specifications. One major difference in equipment design involves the dual-channel or composite system concept. In a dual system, one transmitter handles a monaural program channel bandwidth of 30Hz-15kHz and a multiplex bandwidth of 24-85kHz. The composite system program channel extends from 30Hz-75kHz with the multiplex channel from 106-220kHz.

In the dual system, two transmitters and two receivers are required for stereo program transmission. One antenna usually can be shared by the dual system, if an added loss of a signal combiner and separator can be tolerated. By using a composite link, however, a single transmitter and receiver deliver the entire baseband signal (stereo plus SCAs, if used).



Phase shifts and differential frequency response problems that may occur with dual systems are eliminated. The dual system has an added benefit, a continuously operating backup in case one of the two link systems fails. The cost of a composite system with a hot standby unit for redundancy will be approximately the same as the dual system, however.

Product survey

Designs of STL transmitters and receivers vary widely from one manufacturer to another, but some generalizations apply in composite systems, such as the Moseley PCL-505C (Figure 5) and the Micro Controls PTS-10C (Figure 6). Audio is applied to a frequency-modulated oscillator (FMO), which is locked on frequency by an AFC circuit. A master crystal oscillator serves as a frequency reference,

with a specified frequency stability of greater than 0.0005%, as required by FCC rules. The direct FM output of the oscillator is multiplied two or more times and applied to the final power amplifier. Low-pass filtering and directional couplers follow the output of the PA, with protection and power control circuits monitoring the system's output and operating drive and overload circuits.

The receiver typically is a double-conversion system, using crystals in both conversion local oscillators. A preselector at the receiver input removes out-of-band energy. Following the IF amplifier chain, a demodulator recovers the transmitted signal and bandpass filters pick off the program and multiplex outputs.

A new generation of STL systems has been developed for high performance in the crowded 950MHz band

The Comark "S" Series

We just made every other UHF transmitter obsolete.

Broadcast engineers and managers agree. Without a doubt, Comark's new "S" Series UHF television transmitters—from 10kW through 220kW—represent a world class product. Integrating high efficiency, reliability and low cost, each model incorporates state-of-the-art technology to achieve a unique combination of unparalleled features:

- Broadband (no tuning), high power, field proven, exciter system featuring dual channel (redundant) operation as well as Comark's CM-100S Broadcast Modulator with IF S.A.W. filter.
- External cavity, full-band, klystron power amplifiers, combining highest efficiency and compact size.
- Space efficient, mechanical and electrical layouts, fully engineered for maximum EMI/RFI isolation and overall operator convenience.

- Fiber optic telemetry for all floating high voltage metering functions, incorporated into a complete latched fault and status display system.
- Clean, fully isolated, high voltage compartments, with double-filtered air cooling and front access. (No exposed high voltage in klystron areas.)

All Comark "S" Series models are available with advanced system options, including beam current pulsers, motorized RF switching systems, E.D. and ICPM correction systems, and the services of Comark's 24-hour field operations group.

Contact Comark's Sales Office for detailed specifications and further information.



10kW/30kW/55kW
model shown

COMARK

Engineering and Sales Offices
Rt. 309 and Advance Lane
Colmar, PA 18915
(215) 822-0777
Telex: 846075

International Headquarters
Rt. 57, Feeding Hills Road
Southwick, MA 01077
(413) 569-5935

Circle (43) on Reply Card

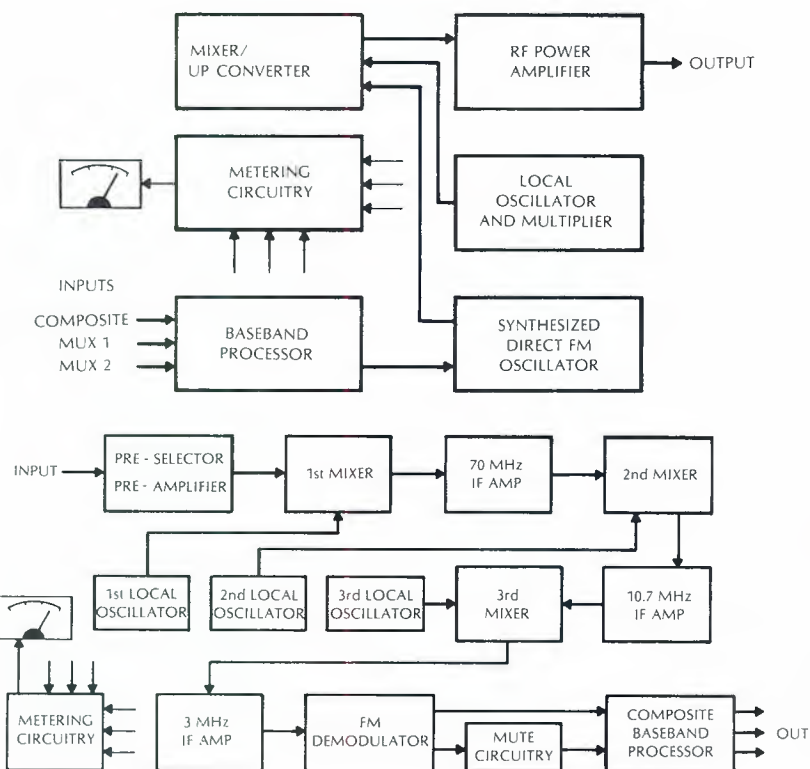


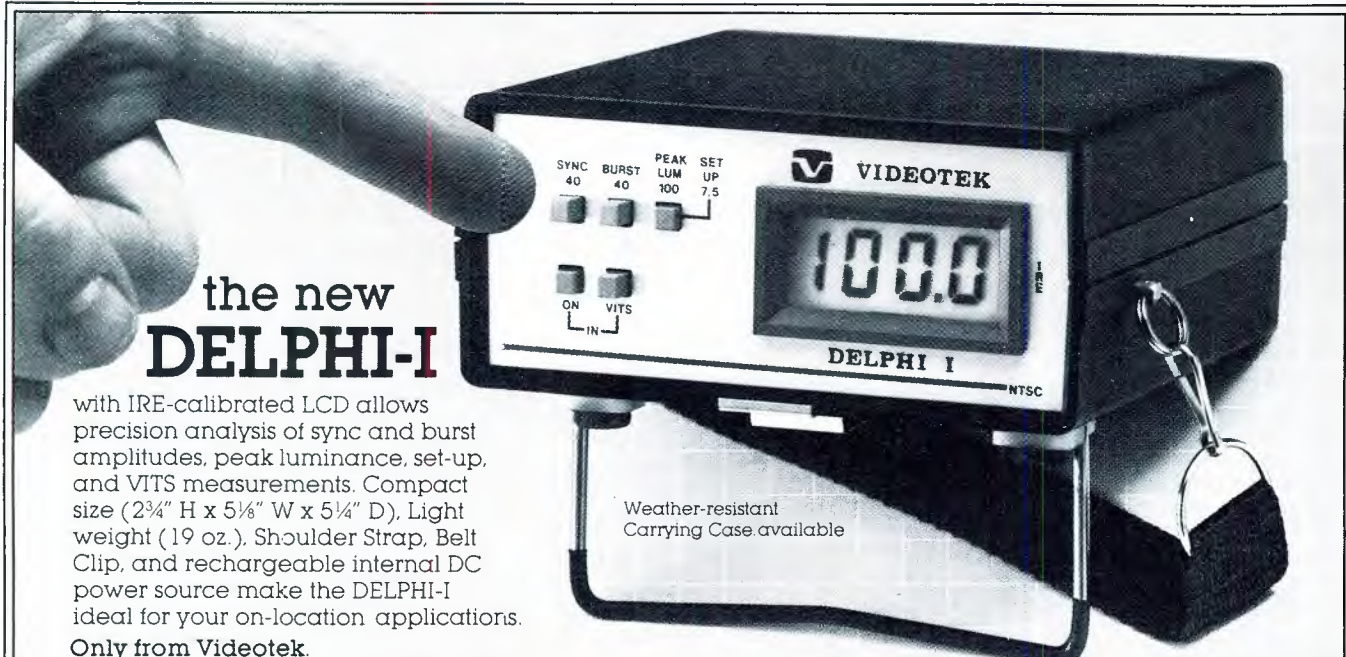
Figure 7. Moseley Associates PCL-606C composite high performance STL system block diagram.

found in most urban areas. One of them, the Moseley PCL-606, departs from traditional circuitry with digital techniques. (See Figure 7.) Audio is applied to a baseband processor that feeds the FMO, consisting of a synthesized reference oscillator. Frequency and phase of the direct FM oscillator are controlled by the reference. Frequency conversion to the STL band is accomplished by a double-balanced mixer, instead of the usual multiplier. A front-panel multimeter and LEDs indicate system status.

The PCL-606 receiver uses a PIN-diode attenuator circuit to reduce adjacent signal intermodulation products caused by input signal overloads. The bandwidth of the receiver IF can be changed to optimize the trade-off between selectivity and distortion. Triple-conversion with a digital pulse-counting demodulator allows the configuration to give good out-of-band rejection and S/N ratio figures, both vital to high performance in a crowded band.

TFT offers the high performance market STL, the model 8300, shown in Figure 8. Similar in design to the TFT

the first portable Digital Waveform Monitor...



**the new
DELPHI-I**

with IRE-calibrated LCD allows precision analysis of sync and burst amplitudes, peak luminance, set-up, and VITS measurements. Compact size (2 3/4" H x 5 1/8" W x 5 1/4" D), Light weight (19 oz.). Shoulder Strap, Belt Clip, and rechargeable internal DC power source make the DELPHI-I ideal for your on-location applications.

Only from Videotek.

Weather-resistant
Carrying Case available

PROGRESS·BY·DESIGN

125 North York Street, Pottstown, PA 19464, (215) 327-2292, TWX: 710-653-0125
9625 North 21st Drive, Phoenix, AZ 85021, (602) 997-7523, TWX: 910-951-0621



VIDEOTEK INC.

Circle (34) on Reply Card

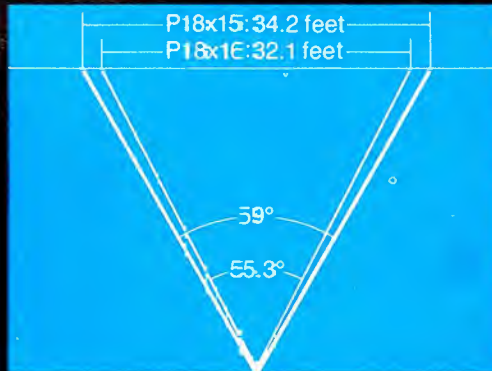
New Standards

The Widest Angle, The Highest Performance

Canon engineers have done it again, advancing the optical state-of-the-art so far forward that new standards must be considered.

The Canon P18 x 15 BIE offers the widest angle of any broadcast television zoom lens: 59° plus incredible edge-to-edge sharpness, fidelity and sensitivity throughout its 15X range.

Every one of these superb lenses will be supplied with both 1.5X and 2X built-in extenders and a pattern projector. Options include manual, semi-servo or full servo operation.



The Canon P18 x 15 is the most versatile studio lens ever made, setting new standards for years to come.

P18 x 15 BIE F2.1 for 30mm Cameras* KEY SPECIFICATIONS

- Focal length: 15-270mm
- Max. Relative Aperture: 1:2.1 (15-218mm)
- Angular Field of View: 59° x 45.8° at 15mm
- Minimum Object Distance: 0.6 meter (2 feet)

* Also available: PV18 x 11 BIE F1.6 for 25mm Cameras



Canon Studio Standards



Canon®

Optics Division

Canon USA, Inc., Head Office: One Canon Plaza, Lake Success, N.Y. 11042 (516) 488-6700
 Dallas Office: 2035 Royal Lane, Suite 290, Dallas, Texas 75229 (214) 620-2641 Chicago Office: 140 Industrial Drive, Elmhurst, Ill. 60126 (312) 833-3070
 West Coast Office: 123 Paularino Avenue East, Costa Mesa, Ca. 92626 (714) 979-6000
 Canon Canada, Inc., 3245 American Drive, Mississauga, Ontario L4V1B8, Canada (416) 678-2730

© 1983 Canon U.S.A., Inc.

Circle (35) on Reply Card

www.americanradiohistory.com

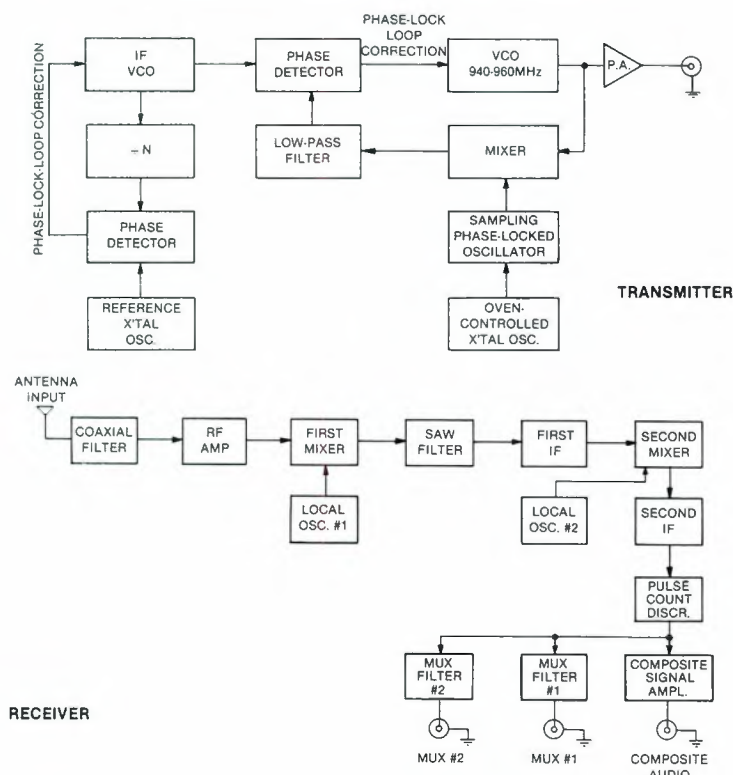


Figure 8. Block diagrams of the TFT transmitter and receiver systems.

STL equipment manufacturers

For more information about STL products and accessories, use the following list of manufacturers, with Reader Service Numbers for your convenience.

American Laser Systems	330	Leasametric	350
Andrew	331	Loral Microwave Communications	
Anixter Communications	332	Terracom	351
Antennas for		M/A-COM Video Systems	352
Communications	333	Marti Electronics	353
Artel Communications	334	McMartin Industries	354
Avantek	335	Micro Controls	355
Bayly Engineering Ltd.	336	Modulation Associates	356
Broadcast Microwave		Moseley Associates	357
Services	337	NEC America, Broadcast	
Cablewave Systems	338	Equip. Div.	358
Coastcom	339	Nurad	359
Comad Communications	340	Omni Spectra	360
Comark Industries	372	Power Pak Systems	361
Continental Electronics Mfg.	341	R.F. Technology	362
DYMA Engineering	342	RHG Electronics Laboratory	363
GTE Lenkurt	371	Rockwell Int'l. Commercial	
HN Engineering	343	Elec. Operations	364
H2A Communications	344	C.N. Rood B.V.	365
Harris Broadcast Div.	345	TFT	366
Harris Broadcast Microwave	346	Telcom Research	367
Hughes Aircraft Microwave		Tepco	368
Communications Products	347	Townsend Associates	369
International Microwave	348	Versa Count Engineering	370
Lang Video Systems	349		

7700 series STL, the 8300 is intended for dense RF environments. The 7700 is recommended for less-congested applications.

Baseband audio is fed into an intermediate frequency voltage-controlled oscillator (VCO), which is phase-locked to a 10MHz temperature-compensated reference crystal oscillator (TXO). The IF-modulated signal is mixed up to half the 950MHz operating frequency, using a crystal VCO also locked to the 10MHz reference. An advantage of the 10MHz oscillator is the capability for checking it against WWV for accuracy.

The final transmitter stages consist of a filter, frequency doubler and power amplifier. Mixing in the transmitter by Moseley and TFT achieves signal conversion to the operating frequency with an improved S/N performance of the system.

In the 8300 receiver, a selectable bandwidth design is based on a surface acoustic wave (SAW) filter, allowing the unit to operate in a crowded or quiet RF environment. The SAW filter exhibits precise passband control with good attenuation of adjacent channels and linear phase response across the selected channel. The receiver preamplifier reduces the system's sensitivity to protect the first stage against overloading. Triple-conversion with crystal oscillators for each stage prepares the signal for a pulse-counting discriminator to demodulate the baseband signal. Filters separate the program and multiplex channels.

During the past year, Micro Controls introduced a new system of interest to the FCC and broadcasters. The ULX-2001 Uniphase link/exciter uses a standard MCI PTS-10C wide-band composite STL transmitter at the studio and a unique receiver and FM multiplex exciter at the broadcast transmitter site. The system directly drives the main transmitter IPA stage, without using a separate exciter. Figure 9 shows the receive system in block form.

Audio input to the Uniphase system at the STL transmitter location is never reconverted to audio or stereo baseband until it reaches the listener's receiver, to reduce degradation of program quality caused by demodulation by the STL receiver and subsequent remodulation in the exciter. An emergency modulation input at the STL receiver allows direct audio input to the exciter section, if required.

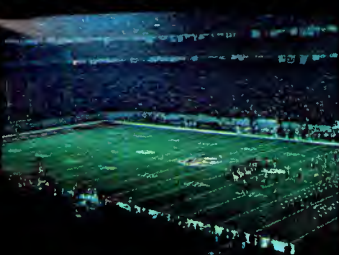
The signal, modulated to a 75kHz deviation with stereo and SCA sources, is heterodyned down from

40 to 1

Canon PV40 x 13.5B IE: THE OLYMPIAN

Canon moves you a giant step forward with a 40X broadcast quality zoom lens. An incredible new lens that allows you to cover a stadium at wide angle or fill the frame with the quarterback's eyes.

Never before has a single lens provided this much flexibility and sensitivity, with remarkably little change in effective aperture throughout its entire 13.5mm-540mm* range. Built-in extenders let you go all the way to 1080mm and each lens is diascoped-equipped for modern microprocessor-



controlled cameras.

We call it The Olympian. Not only because it is ideally suited for sports coverage but also because of the dedication and team effort required of our optical and electronic engineers in making this lens a reality.

Enlarge a dollar bill forty times and it covers an area twenty feet long and eight feet wide. Now think about what you could do with the Canon PV 40 x 13.5B IE!

*1" cameras. Also available in 30mm plumbicon.



Canon®

Optics Division

Canon USA, Inc., Head Office: One Canon Plaza, Lake Success, N.Y. 11042 (516) 488-6700

Dallas Office: 11311 Stemmons Freeway, Suite 1, Dallas, Texas 75229 (214) 620-2641 Chicago Office: 140 Industrial Drive, Elmhurst, Ill. 60126 (312) 833-3070

West Coast Office: 123 Paularino Avenue East, Costa Mesa, Ca. 92626 (714) 979-6000

Canon Canada, Inc., 3245 American Drive, Mississauga, Ontario L4V1B8, Canada (416) 678-2730

© 1982 Canon U.S.A., Inc.

Circle (36) on Reply Card

www.americanradiohistory.com

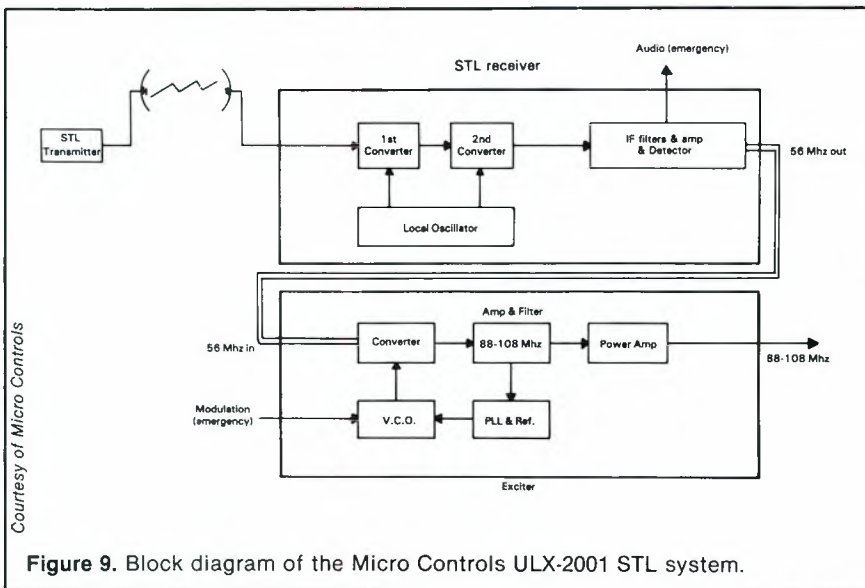


Figure 9. Block diagram of the Micro Controls ULX-2001 STL system.

the 950MHz carrier to an IF frequency of 10.7MHz, where adequate adjacent channel rejection can be attained. The IF signal is then sampled and upconverted twice to the station's operating frequency. Filtering follows each upconversion state with local oscillators for the first and second mixer stages being crystal-controlled.

Because FCC rules require that the FM transmitter's carrier frequency be dependent on only one frequency source, the Uniphase link/exciter includes a PLL circuit tied to a TXO to drive the last conversion stage. Following conversion to the FM band, the signal is filtered and amplified to approximately 20W output into a 50Ω load. The commission presently is licensing the Uniphase equipment on a one-by-one basis while studying the system's gain performance. Stations receive a 60-day temporary authorization to install the ULX-2001, during which time an audio proof and other measurements are made. Following final FCC approval, the system is licensed, just as any other STL and exciter. Systems have been operated with a received signal of 300μV to

date, but the Uniphase is not being recommended for STL links with a marginal path.

Micro Controls also offers the PTS-10CD STL system, a 3-channel unit designed for AM stereo or receive-only satellite installations. The unit features left, right and remote control channels. PLL and VCO designs are based on a crystal reference.

Marti Electronics' STL-8 provides monaural plus subcarrier transmission in the 950MHz band. Because the STL-8 is available only in monaural configuration, two STL-8s are required for stereo operation. Dual-system advantages over the composite type include near immunity to stereo separation degradation in the STL link, automatic backup protection and the availability of an additional subcarrier channel for remote control functions.

The STL-8 transmitter uses a direct FM modulator, varactor final stage, solid-state oven with high accuracy crystal and fault protection circuits. The receiver is crystal-controlled with double conversion.

Marti's STL-10 is a monaural link

with two available multiplex channels for voice or data relay. A stereo STL still would require two units. The STL-10, however, features user-selectable audio pre-emphasis with special low-pass filters to eliminate overshoot on complex waveforms. Metering monitors forward/reflected power, main-channel peak modulation, subcarrier modulation, V+ power and three RF stages. An accessory plug is provided for external dc power from a battery, solar cell panel or any single-polarity source.

The STL-10 receiver incorporates a helical resonator preselector stage and computer-designed bandpass filters for high selectivity with optimum phase and group delay. A sensitivity switch adds an optional 10dB of attenuation for RF interference rejection. Three IF bandwidths are accommodated to meet domestic or international requirements. Similar to the transmitter, the receiver includes test metering and external dc powering, making it ideal for remote sites.

Looking ahead in STLs

All STLs discussed previously have been 7-15W units intended for transmission on medium- or long-distance paths. Power Pak Systems, formerly Micro Control Associates, introduced a system at NAB'83 that used a 1.5W transmitter, designed for hops of approximately five miles. Although the system is not yet available, it will be based on plug-in cards that allow a variety of configurations. A 15W power amplifier will be an option for those wishing to transmit on longer paths.

Other future innovations presumably will involve digital systems, provided that bandwidths can be overcome. The digital system should be more immune to interference problems of the high density areas with little or no degradation of program signals when multiple-hop systems are required.

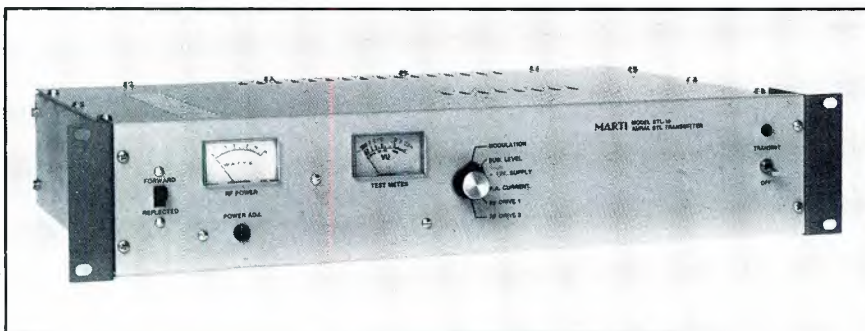
Editor's note:

More information may be found in these publications. Also, additional information may be obtained from manufacturers.

- *NAB Engineering Handbook*, Sixth Edition, "Microwave Engineering for the Broadcaster."
- "Studio-Transmitter Link Applications Guide," Terry Lloyd, TFT.
- "Radio Telemetry Return Link System Considerations," Moseley Associates Tech Note #228.
- "Microwave Path Evaluation," Moseley Associates Engineering Report.

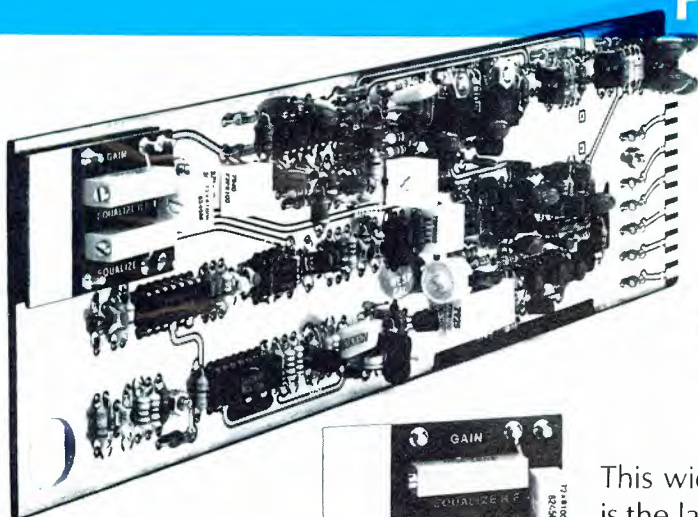
Acknowledgement

The author thanks Moseley Associates, TFT, Scala Electronics and Andrew Corporation for assistance in preparing this report, which was prepared while he was chief engineer of KRED/KPDJ in Eureka, CA.



Marti Electronics STL-10 transmitter

HIGH PERFORMANCE



Video Equalizing Amplifier VEA-662

\$265.00

This wideband, six-output amplifier is the latest addition to our comprehensive line of distribution equipment. It features differential input,

soft backporch clamping and easily set, continuously variable equalization from zero up to 300 meters (1000 feet) of Belden 8281 or equivalent coaxial cable. Delay trim and common mode hum null controls are also provided. A unique feature of this ultrastable, low power amplifier is a removable sub-module which contains the operational controls for gain and equalization. This allows instant, adjustment-free amplifier substitution.

Here are some prominent SPECIFICATIONS

Input

Return loss > 54 dB to 5 MHz
 > 46 dB to 10 MHz
 Common mode rejection > 60 dB to 1 kHz

Outputs

Return loss > 40 dB to 5 MHz
 > 36 dB to 10 MHz
 Output isolation
 Signal (3.58 MHz) > 48 dB
 Load < 0.05 dB/load at 10 MHz
 < 0.15°/load at 3.58 MHz
 Output DC < ±25 mV at back porch

Timing

Delay 25.4 ns (32.7° at 3.58 MHz)
 Adjustment range typically 6° at 3.58 MHz

Power Requirements

Total power
 dissipation < 2 W

Performance

Frequency response < ±0.02 dB to 5 MHz
 < ±0.1 dB to 10 MHz
 +0 -0.2 dB at 15 MHz
 typically -0.6 dB at 20 MHz
 Differential phase < 0.1° 10% to 90% APL
 Differential gain < 0.2% 10% to 90% APL
 H tilt < 0.25%
 V tilt < 0.25%
 S/N ratio > 70 dB to 20 MHz
 (rms noise/0.714 V)
 unweighted

Equalization

Range 0 - 300 m (0 - 1000 ft)
 Belden 8281, Northern
 Electric 728, or equivalent
 Response < ±0.05 dB to 5 MHz
 < ±0.15 dB to 10 MHz
 typically -0.2 dB at 15 MHz
 typically -1.0 dB at 20 MHz

***Compare price and performance . . .
 then give us a call.***

Leitch Video of America, Inc.
 825k Greenbrier Circle
 Chesapeake, VA 23320
 Tel.: (804) 424-7920
 Telex II: 710 882 4342

LEITCH

Circle (37) on Reply Card

Leitch Video Limited
 10 Dyas Road
 Don Mills, Ontario M3B 1V5
 Tel.: (416) 445-9640
 Telex: 06 986 241

In the past ten years,
computers have gotten smarter,
cameras have gotten simpler,
ovens have gotten quicker,
beer has gotten lighter,
bodies have gotten leaner,
athletes have gotten richer,
hi-fi has gotten higher,
radio has gotten stronger,
studios have gotten smaller,
towers have gotten taller,
movies have gotten longer,
cars have gotten shorter,
film has gotten faster,
outerspace has gotten closer
and blue jeans have gotten classier.

Now it's our turn.

In the past 10 years, the Premium Line from ITC has seen refinements, but no major changes. Frankly, it hasn't needed any. The Premium Line has been a dependable workhorse that's found its way into more studios than its next two competitors combined.

But we couldn't leave well enough alone. So this year, the Premium Line gives way to the Delta Series, a new generation of cartridge machines that offers you more than ten years worth of improvements.

It's mechanically better. The cart guides are improved. There's a crystal-referenced servo capstan motor with a vapor-honed non-magnetic shaft. Modular construction makes alignment and service convenient. High-speed recue is standard. And the Delta III gives you three

independently removable decks.

It's electronically better. There are new, high performance components, including NE5500 Series amplifiers. There's an exclusive ITC/3M playback head for smooth frequency response and improved signal-to-noise. We've added a toroidal power transformer with fully regulated and protected power supplies. And a digital cue tone detector controlled by a powerful microprocessor.

And it's physically better because it's smaller. The whole unit is only one-third rack width (5 $\frac{5}{8}$ "'). The enclosure is made of $\frac{1}{4}$ -inch milled or cast aluminum, for stability. And the panel inserts are made of Lexan®.

Of course, we left in all the good things that made the

Premium Line so popular. The $\frac{1}{2}$ -inch tool plate aluminum deck. Durable, high quality switches. And a solenoid-actuated, chain-and-sprocket pressure roller assembly. All backed by our famous two-year warranty on parts and factory labor, plus a 30-day guarantee of satisfaction. If, for any reason, you're not completely satisfied, you can return the unit within 30 days of purchase and we'll refund your money in full.

The good things are still there. But what you'll notice are the improvements. We think they were worth the wait.

For more information, or to place an order, call us collect from Alaska, Hawaii or Illinois, at 1-309-828-1381. From the rest of the U.S., call the following.

Toll-free number:

1-800-447-0414.

1983

1973



INTERNATIONAL TAPETRONICS CORPORATION

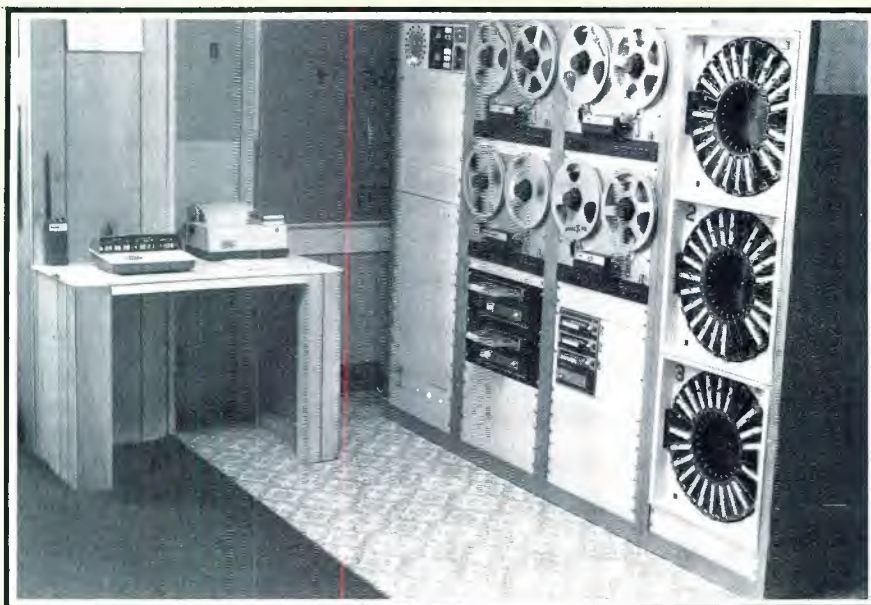
3M hears you...

3M

Case study:

Automation at WWJM—efficiency on a budget

By Mark Bohach, chief engineer,
WWJM, New Lexington, OH



Shown is the WWJM automation system. On the table at left is the controller keyboard and log printer for the system.



The Radio Shack model 1 computer and less expensive printer are shown. Disc drives for the system are on a lower shelf of the table.

In these days of high technology, total station automation is an easy task. However, small to medium market radio stations cannot always afford \$20,000 traffic-billing systems or \$70,000 program automation systems. Low cost automation alternatives are needed. WWJM has found one such alternative.

Before becoming automated, WWJM was a typical small to medium market radio station. Annual programming staff turnover was more than 50%. Payroll costs were excessively high. The air staff was inexperienced, which gave the station a poor air sound. To correct for inefficiency and poor air content, WWJM's owners decided to use automation. In 1981, WWJM purchased a Radio Shack TRS-80 model I 16K Level II for payroll and billing, easing the office staff's paperwork load and making billing more efficient. Later that year, the station purchased a used Cetec-Schafer 902.5 program automation system from a radio station in Indiana. Using this system stabilized the air sound and gave WWJM a consistency it previously never had.

The 902.5 was eight years old when WWJM put it into service early in 1982. Unfortunately, the system's memory was not flexible enough to handle complicated format changes well, and it also had reliability problems. Intermittent failure caused the system to be off the air for several hours at a time. Although the air sound improved greatly with the automation, continuing problems forced the station to look for a more reliable system.

After checking the cost of a new program automation system and finding it unaffordable, and wanting to avoid potential problems with another used system, the station looked for a midpriced alternative. After looking into available equipment and programming sources, the station selected Broadcast Automation Sales and Service, a subsidiary of Century 21 Programming of Dallas. Broadcast Automation purchases and rebuilds used automation equipment and Century 21 provides complete automation formats. After discussing the specifics of automation with Century 21's staff, WWJM chose a rebuilt automation system, accompanied by Century 21's Top 40 music format (Z Format).

The system WWJM purchased, a rebuilt Cetec-Schafer 903, provided the memory capacity and functions needed. With the memory, the station

EVEN THE HAIRIEST SITUATION CAN'T SHAKE UP THE FIRST 3-CHIP CAMERA.



Some gripping news from NEC: the ENG camera has come of age. Our new SP3 packs so many features into 7.3 lbs., it's a small wonder.

With three CCD chips instead of tubes, the SP3 can take all the abuse your crew dishes out, and never needs registering. It produces broadcast quality pictures with over 500 lines of resolution. And better still, you can use it with any format — VHS, Beta,[™] or 3/4 inch.

To find out more about the SP3, the most newsworthy camera around, call NEC at 1-800-323-6656. In Illinois, call 312-640-3792.

NEC

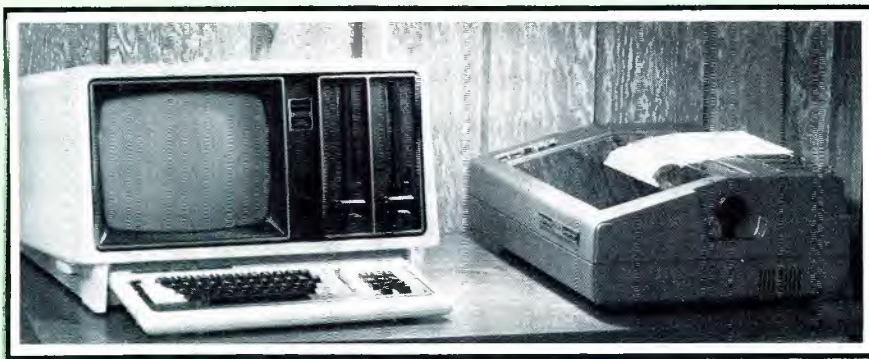
IMAGINE WHAT WE'LL DO NEXT

NEC America, Inc., Broadcast Equipment Division
130 Martin Lane, Elk Grove Village, Illinois 60007



Circle 39 on Reply Card

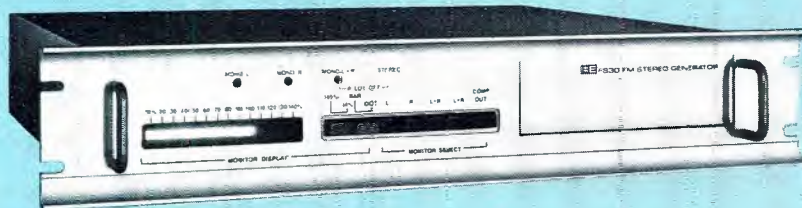
www.americanradiohistory.com



The Radio Shack model 12 computer, shown with its more expensive printer, features built-in disc drives.

More Than A Claim! Best By Test

BE's FS-30 Stereo Generator For FM



Here's What Customers Say...

"Best tested out of four!"..... KNIX-Phoenix, AZ
 "Greatest separation ever!"..... WQRS-Detroit, MI
 "People hear sounds never heard before!"..... KLAZ-Little Rock, AR
 "Amazing separation, very happy!"... WCCO-Minneapolis, MN
 "Perfect match with FX-30, very pleased!"..... KEZK-St. Louis, MO
 "Listeners claim noticeable difference"..... Wisc. Ed. Net., Madison
 "Love it. Well built. Easy to install"... WPCH-Atlanta, GA
 "Sound separation best ever!"..... WINQ-Winchendon, MA
 "Sounds exceptionally clean!"..... KIOU-Corpus Christi, TX
 "Fantastic sound!"..... WMEZ-Pensacola, FL
 "We don't want our competitors to know what gives us our new unique sound!"..... *Call letters withheld by request.*

For more information on the Model FS-30 FM Stereo Generator, call or write Joe Engle at:



**BROADCAST
ELECTRONICS INC.**

4100 N. 24th ST., P.O. BOX 3606, QUINCY, IL 62305-3606, (217)224-9600, TELEX: 25-0142

Circle (40) on Reply Card

purchased four new Otari ARS-1000 reel-to-reel decks, three SMC-250RS cart carousels and a time announcer unit. It also interfaced a Harris CC-III (Criterion Compact, Triple-deck) into the system. WWJM purchased all necessary equipment and received complete training for its staff at a cost less than half that of a new system. In addition, Broadcast Automation purchased its old system.

Traffic

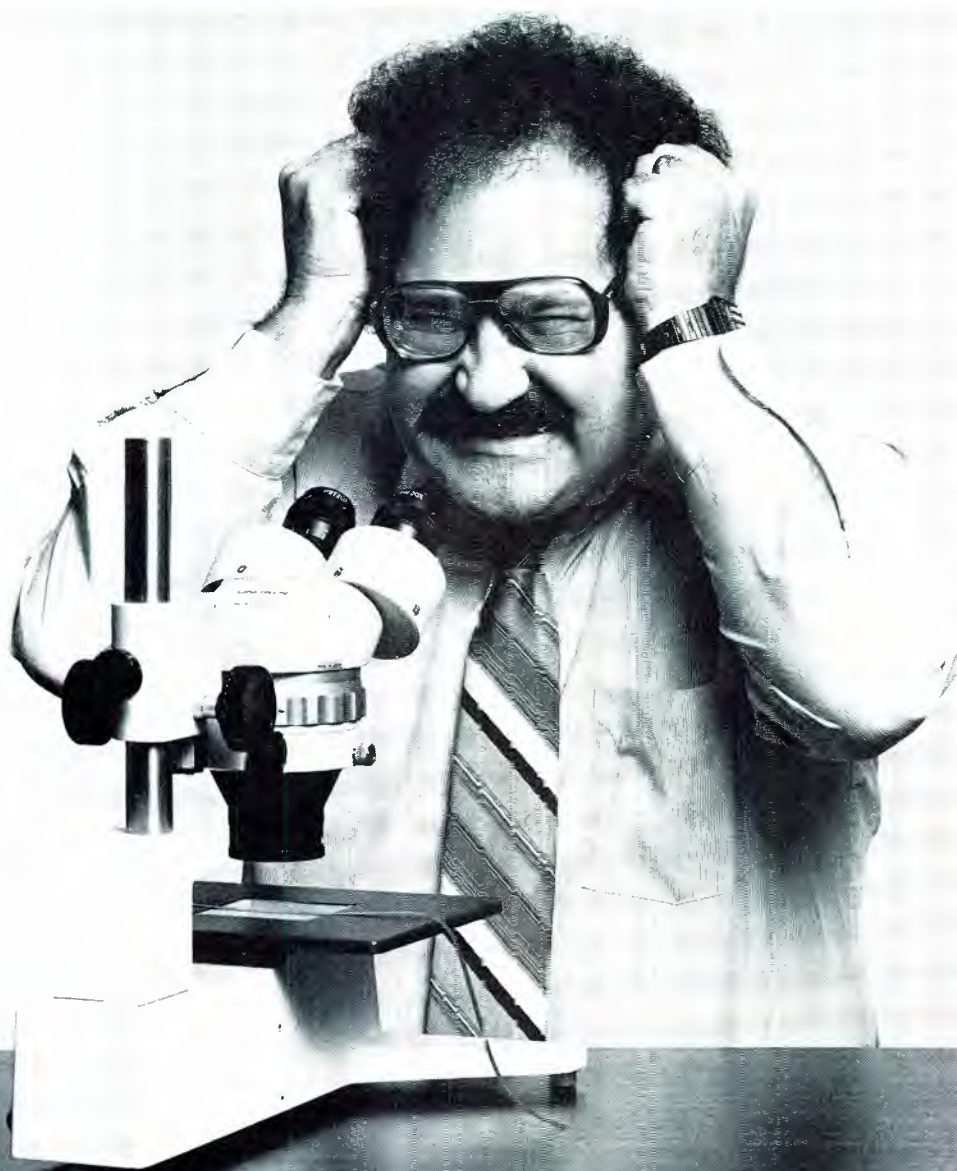
The next step toward total automation came in traffic. Automation's special programming requirements meant that any software used would have to be tailored to an automation system. The computer had to be capable of scheduling commercials from carousels without running the same carousel back to back. Radio Management Systems Corporation, Johnstown, OH, markets such a software package designed to run on a Radio Shack TRS-80 model 12. The cost for a complete logging-billing system, with a capability for more than 400 active accounts, 16 dayparts, accounts receivable and affidavits, was less than \$6000. With the system, the time spent per day to update accounts and print a complete log was about 20 minutes. WWJM also kept the original TRS-80 model 1 for payroll and audience research.

The ATS

The final part of the automation trilogy is an automated transmitter system (ATS). WWJM, currently investigating available ATS systems, has made tentative plans to go on to an ATS system in early 1984 to operate the station between midnight and 6 a.m. This would eliminate the need for a night operator because the building would be unoccupied during this period. At this time, the station can implement a new ATS system for approximately \$4000.

Final notes

WWJM now sounds like a first-class major market operation. Maximum efficiency has been achieved at a relatively low cost, and only four programming employees are needed to run the station. In 1981, seven employees were required to handle the same job. Now more efficient, one office person can do, in less time, what three people did in 1981. Furthermore, all employees have been cross-trained to handle all duties in WWJM's operation, thereby providing backup at each position. Technical ability has not been a major consideration in hiring new employees, because the equipment was selected to be user-friendly and most people can be trained to operate it. **I-Z=))))**



When he spots volcanoes Arthur blows his top.

At 400x magnification, microscopic imperfections in the oxide coating of audio tape look like volcanoes. And when Arthur Constantine, our VP Sales, sees them, "K-A-B-O-O-M." He'll ship whole pallets back to suppliers rather than let an inch get into cartridges we ship to you.

The same thing happens every time Arthur discovers poor surface bonding, ragged edges

or spotty lubrication. "K-A-B-O-O-M."

The tape we accept from our suppliers must meet our specifications. And our specs are tough to meet. That's why seven out of ten radio stations around the world use Fidelipac Tape Cartridges. The most rugged, most reliable audio cartridges there are.

We simply will not compromise on quality.



FIDELIPAC®
BROADCAST TAPE PRODUCTS

Fidelipac Corporation □ P.O. Box 808 □ Moorestown, NJ 08057 □ U.S.A. □ 609-235-3900 TELEX 710-897-0254 □ Toll Free 800-HOT TAPE

Circle (41) on Reply Card

With low key lighting, differential lag can be a problem. Amperex Plumbicon tubes with built in bias light increase the speed of response of the layer, and lag is virtually eliminated.



Comet tailing and loss of detail in highlights are minimized by using the Amperex patented Diode Gun or anti-comet tail (ACT) tube. Both solve this problem by providing high beam current to stabilize highlights.



High audio levels can produce the annoying problem of microphonics. Amperex attacked this at its source, and all Amperex Plumbicon tubes have a unique mesh designed to prevent the build-up of mesh vibrations—not just to dampen them.



Six of TV's toughest shots and how

The problem of image retention. By reexamining layer physics and semiconductor properties Amperex developed a new extended red layer. Now you can include brilliant reds in your scene without concern for image retention.



Low output capacitance Amperex Plumbicon tubes help maintain high signal to noise performance. This helps prevent loss of detail and increased video noise in low light areas of high contrast scenes.



Because of special photoconductive layers for each color and an optimized electron optics design, the Amperex Plumbicon provides the highest resolution for each image format. This resolution is measurably higher than earlier tubes.



Amperex Plumbicon® camera tubes handle them.

Ordinary pick up tubes can handle ordinary TV shots. But when you have to contend with low light levels and bright highlights...the glare of reds and the blare of trumpets...you need the extended performance of Amperex Plumbicon camera tubes.

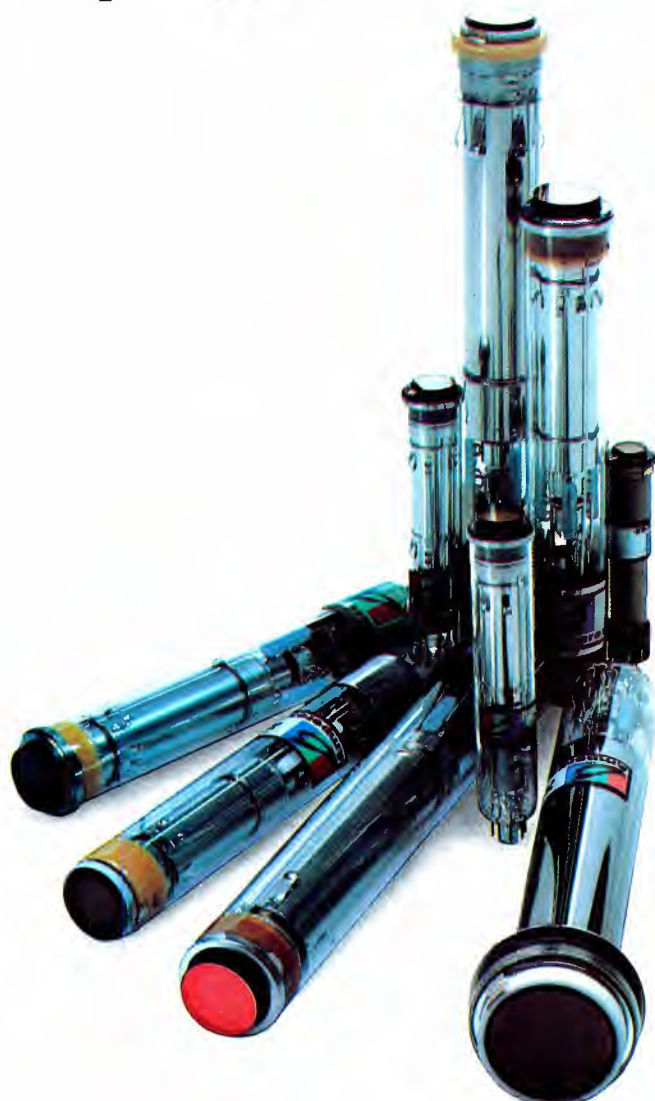
Amperex invented and refined the pick up tube technology that makes it possible to handle the 6 toughest shots in TV. Since the original Plumbicon cameras were introduced, your business has become more competitive, more demanding. Camera designs have become more complex. That's why we continued to invest in improving the performance of the Plumbicon. That's why we offer today's range of extended performance Plumbicon tubes.

Today, virtually every TV camera system — domestic or imported — is designed to use the Plumbicon tube. And that makes the handling of the toughest shots in TV very easy. Simply specify Amperex Plumbicon pick up tubes.

For more information call or write Amperex Electronic Corporation, Slatersville Division, Slatersville, Rhode Island 02876. (401) 762-3800. Made in Rhode Island, U.S.A. Delivered to you in twenty-four hours or less.

Amperex®
WE MAKE IT HAPPEN

A NORTH AMERICAN PHILIPS COMPANY



Circle (42) on Reply Card

Case study: Using the Commodore Automate-64 at KSDB-FM

By David T. MacFarland, associate professor, radio and television, Manhattan, KS

KSDB-FM, Manhattan, KS, used to have a severe problem. The station, a non-commercial educational FM licensed to Kansas State University, and operated by students in the department of journalism and mass communications, used to have to sign off when student operators went home for vacations, such as Thanksgiving, Christmas, Easter, before and after the summer session, and whenever their football team won more than two in a row. Concerned that it was not in the public interest to be off the air so much, Lee Buller, a department professor, George Scheets, the department's electronics engineer, and I began designing an automation

system for KSDB last spring. Initially, we designed it around a Commodore VIC-20 home computer, but then we upgraded it to a Commodore 64. We chose Commodore's line because it was inexpensive, and both models we selected offered a "user" port that made it easy to listen and talk to the outside world.

It did not take long for Scheets to design a unique circuit for the VIC-20/64 that allowed the computer to talk both directions at the same time, controlling up to 15 external devices with reliability. Automate-64 interface boards include a 25Hz tone decoder for reel-to-reel sources, an EOM tone decoder for cart sources, and sets of

flip-flops, relays, power supplies and protection circuits. They include FET switching equipment to join and leave a network or remote, an adjustable silence sensor and a dc-controlled attenuator for smooth fade-outs.

The hardware of automation systems is the glamour part of the business. That is, perhaps, truer today with the capability of running a radio station with an inexpensive home computer. But the professional representatives of computer hardware lines and radio station automation equipment invariably say that the first rule of purchasing equipment is: First decide what you want to do; second, find the programming or software to do it; and third, then, and only then, buy the hardware to run the system. Otherwise, you might end up with cumbersome, expensive or incompatible mismatches.

As of September 1983, Buller, Scheets and I were on version 39 of the software program. We have made that many revisions to incorporate these features in the Automate 64

- adds flexibility of a 400-event time file and four 200-event format files. The four format files can be combined to form an 800-event format file or "day-parted" to change formats as the day progresses. All files can be repeated endlessly.
- prompts the user in simple English during format and time file input routines, and allows replay using easily remembered abbreviations (not number code).
- controls up to 15 audio sources (up to six cart machines, six reel-to-reel decks, two remote or network lines and the fader).
- works with a station's present audio source and control equipment.
- allows you to enter only the events you want to occur—no need to bypass hundreds of pre-programmed awaits that you cannot use on a slow day.
- runs any kind of music rotation and any kind of spot/PSA clusters.
- permits resetting of the format file to the first event every hour to follow a format clock, or only resetting of the first event when all format events have been played.

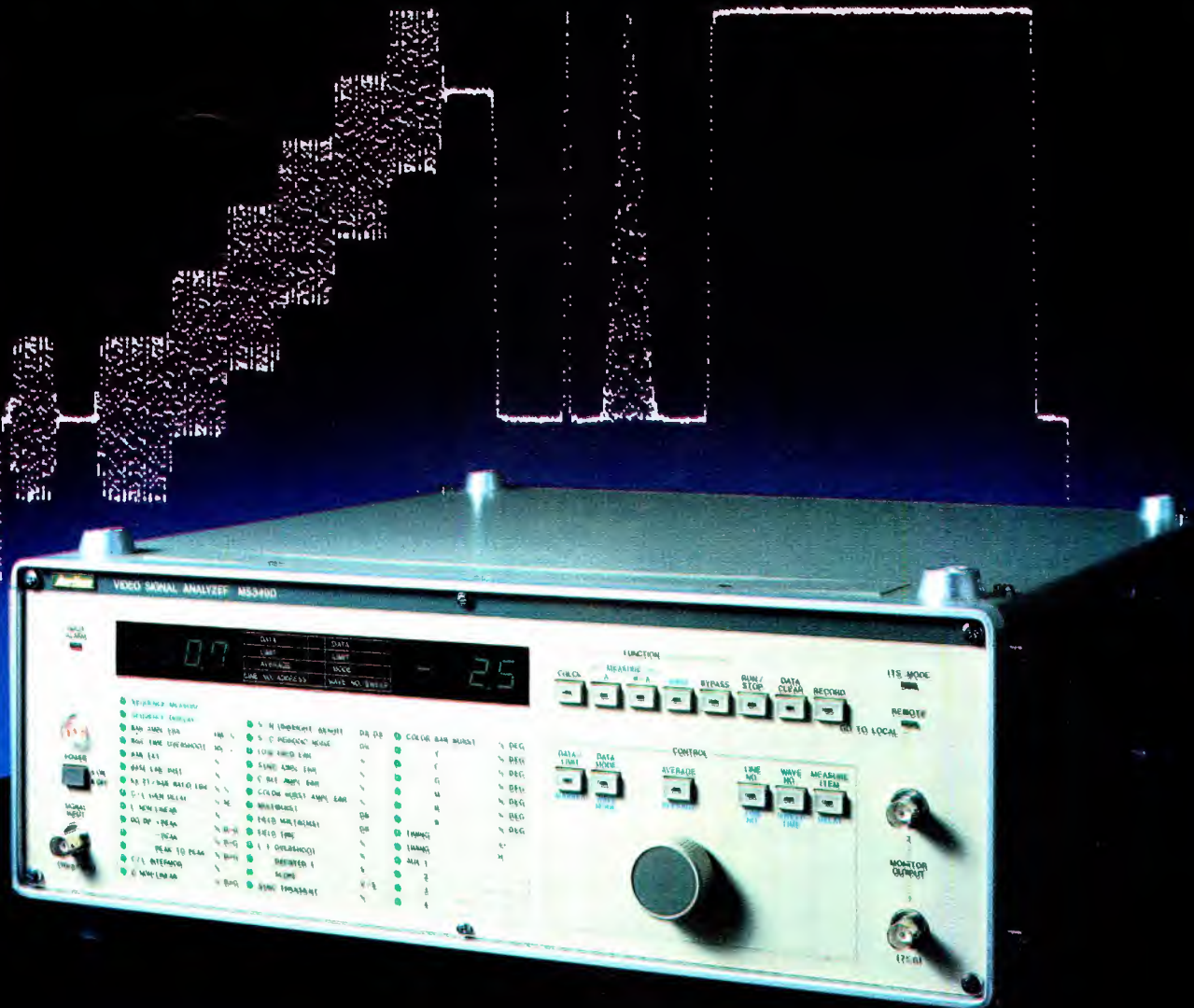


The author (right) checks the running screen display of the Automate-64 system in the KSDB-FM control room. Co-developers of the system, George Scheets (left) and Lee Buller, watch the system go through its paces.



The power supply, unique logic circuitry and relays of the Automate-64 system fit in a 2-inch-high standard rack.

PICTURE-PRETTY VIDEO



Anritsu's Video Signal Analyzer

Here's the economical new Video Signal Analyzer that's making everyone from broadcast engineers to maintenance technicians sit up and take notice. This compact instrument can analyze over 40 different CCIR- and FCC-recommended test signals.

At the studio or in the field

The Video Signal Analyzer MS349D is ideal for monitoring signals from pickup locations or in the broadcast studio. It features direct digital readings of waveform distortion and S/N ratio, allows comparison of measured data to preset limits, and even has a 10ns resolution wave

memory for tracking down those elusive ghosts.

Along the transmission line

The Video Signal Analyzer can be used for measurements along all kinds of transmission lines: satellite links; terrestrial microwave lines; submarine cable, CATV and industrial TV systems; even optical transmission links. A GPIB interface helps make it ideal for unattended far-end monitoring.

Part of a great team, too

The addition of the sophisticated Anritsu MG311 Signal Generator turns the MS349D into an analyzer system for complete end-to-end video measurements. And when a printer is added, the MS349D can

reproduce both measured data and the actual video signal, to make sure your video is always looking good.

To see for yourself just how pretty video can be, contact your Anritsu representative.

*Better Instruments for
Better Communications*

Anritsu

ANRITSU AMERICA, INC.

128 Bauer Drive, Oakland, NJ 07436, U.S.A.
Phone: 201 337-1111

Telex: 642-141 ANRITSU OKLD

Circle (33) on Reply Card

www.americanradiohistory.com

We've got you covered!

Cetec CP Antennas mean superior signal coverage throughout your service area!

Television Antennas, both circularly and horizontally polarized, including The Spiral omnidirectional CP/TV and ring-panel directional CP/TV; horizontally polarized slot antennas, and corner reflectors.

FM/CP Radio Antennas of every type and power, including very low and very high-power antennas, the all-purpose JSCP Series B, and many others, all customized to your specifications.

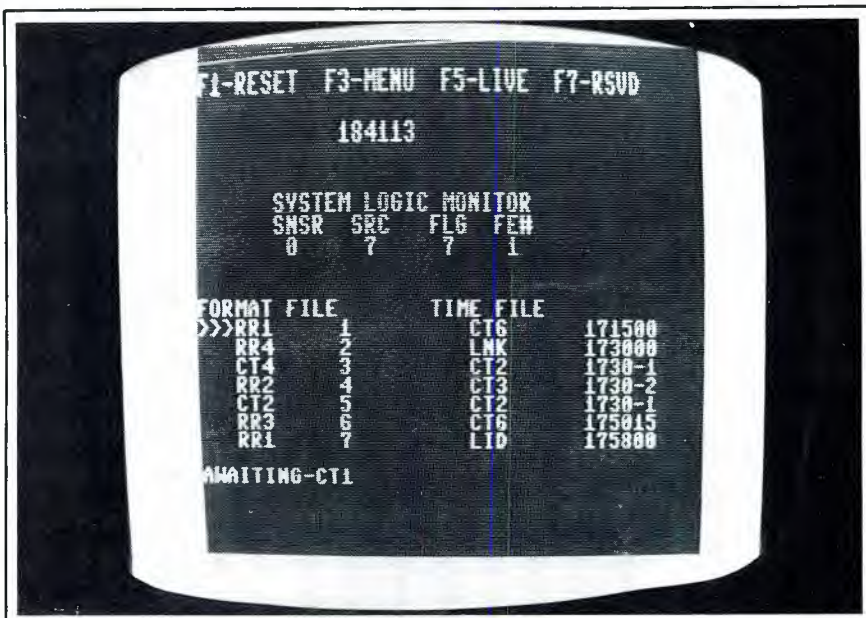
JSCP Series B



Cetec Antennas

6939 Power Inn Rd, Sacramento, CA 95828
(916) 383-1177 Telex: 377321

Circle (44) on Reply Card



An early Automate-64 running display screen. Lines show system options, 24-hour time clock, a check on the computer's logic, current and upcoming events in the format and time files, and prompts for time events waiting to play.

- permits changes to time or format files at any time, no matter what is playing.
- enables fast automatic recovery from most types of miscues, plus instant manual reset.
- saves user-defined time and format files on tape for fast reloading.
- joins networks or remotes at exact times or with network cue tones.
- prints a log, if desired.
- runs standard syndicated music tapes or station-brewed music and chatter.
- allows operator to go live at any time, then to resume automation from the keyboard or with a tone.
- allows flexibility in the amount of tightness of production to suit the format, or even the time of day.
- automatically controls the operation of the silence sensor to pause longer during network and remote feeds as protection against dropout or scheduled pauses.
- allows linked events ahead of real time events (such as legal IDs preceding network joins).
- handles joins of real time events differently depending on preceding event. (In other words, when joining a network, if voice cart is playing, system waits for cart to finish; if music is playing, music is faded to join on time.)
- provides a clean, easily understood monitor display of system status, showing current format event, next format event, pending time event, next time event, any time events waiting to execute, status of system logic and prompts to the user for resetting, going live or making format and time file changes.

Because Automate 64 meets all these specifications, a station using the system does not sound automated. While running an announced album rock format on KSDB-FM during summer vacation, the station continued to get calls asking the DJ to play requests, even though Scheets was the only person around.

The concept of a user-friendly system has gotten a lot of attention from designers of the Automate-64. Logical abbreviations, such as RR2 for reel-to-reel deck 2, and CT3 for cartridge deck 3, are used in the format file input routine. Similarly, the time file input routine uses such terms as NTJ for a network join, and LID for a legal ID.

The user is guided by on-screen prompts for all input and operating functions, so that even the neophyte student operator can make the system work. A different screen display keeps the operator informed of where the system is in the time and format files, and displays the internal clock for comparison. Prompts telling the operator which function keys to press to see the menu, to reset the system or to go live are also displayed.

Commercial broadcasters that have watched the system operate generally are impressed with its capability, and two have offered to buy a system as soon as one becomes available. A commercial system of the type used at KSDB should prove popular with small market stations that have never before been able to afford automation. The total system, including the Commodore 64 computer, the interface boards and the software package, costs about \$2500. **!-?-))))**

THE ULTIMATE VTR. FAST, YET GENTLE. SOPHISTICATED, YET SIMPLE.



THE REMARKABLE VPR-3.

Meet the classic one-inch Type "C" VTR. Light years ahead in technology. With everything you want in one machine. We call it the VPR-3.

VPR-3 has it all. Just look into its exclusive features. Gentle air-guided and vacuum-controlled tape handling. Tape acceleration to 500 inches per second shuttle in one second with one-hour reels. "Fail-safe" dynamic braking. Fast synchronous lockup. The ability to run with three-hour to "spot" reels



without adjustment. Superior built-in audio features. Simpler operation using a fluorescent display screen and soft-key-driven menus. And extensive diagnostics.

Get all details from your nearest Ampex sales office, or call us today.

AMPEX

Ampex Corporation • One of The Signal Companies

Atlanta 404/451-7112 • Chicago 312/593-6000
Dallas 214/960-1162 • Los Angeles
213/240-5000 • New York/New Jersey
201/825-9600 • San Francisco 408/255-4800
Washington, D.C. 301/530-8800

Computing for broadcasters: An STL path analysis program

By Robert L. Chamberlin,
United Technimedia, Park City, UT

This microcomputer program is designed to assist broadcast engineers in path analysis, selection of cost-effective antenna systems, troubleshooting existing systems and relocation of existing systems. The software also provides license application data for the latest version of FCC Form 313.

Calculations within the program are based on a clear path, free of obstructions, grazing and Fresnel zone attenuation. Adjustments may be made to compensate for such factors by adding to the fade margin. Reference material for compensations is available in the NAB Engineering Handbook or the ITT Radio Engineers Handbook. The fade margin, a safety allowance for the effects of precipitation, heating effect, sunspots, etc., varies with manufacturers, but generally 20dB is considered safe.

The program can help engineers plan, purchase equipment and apply for FCC licenses. It may be used to study the effects of various types of coaxial cable and lengths, thus possibly avoiding remote control of an STL transmitter by properly choosing low loss coax. Various types of antennas may be checked by the software to find the most cost-effective antenna system. Calculations allow data to be entered for different transmit and receive antennas.

The program data assists system troubleshooting. For example, a directional wattmeter could be used to verify calculated line losses. Poor original design of the system also could be identified.

A visual inspection should always be made to ensure that the path is free of obstructions. Check with local planning and zoning departments to be sure your clear path will remain clear. A consulting engineer should be retained if there is evidence of critical obstructions.

All calculations required to prepare FCC Form 313 are provided. The form requests information about antenna input power, effective radiated power and azimuth bearing. The program tabulates the information only if the path is calculated to be acceptable.

The software is written to operate

0 'STLPATH.BAS

```

1 '      FREE SPACE STL PATH STUDY ROUTINE
2 '      By Robert L. Chamberlin
6 CLS: CLEAR 500: K=57.2958
10 INPUT"TITLE OF STUDY";AS
20 GOSUB 500
30 INPUT"TRANSMITTER COAX CABLE LOSS (DB)";C1
35 INPUT"RECEIVER COAX CABLE LOSS (DB)";C2
40 INPUT"FADE MARGIN (DB)";FM
50 INPUT"RECEIVING ANTENNA GAIN (DB)";RA
60 INPUT"TRANSMITTING ANTENNA GAIN (DB)";TA
70 INPUT"RECEIVER SENSITIVITY FOR DESIRED SNR (DBM)";SN
80 INPUT"TRANSMITTER POWER OUTPUT (WATTS)";TP
90 INPUT"TRANSMITTER FREQUENCY (MHZ)";F
100 'CALCULATE PATH LOSS FOR ISOTROPIC RADIATOR IN FREE SPACE
110 'PL=36.6 + 20 LOG F (MHZ) + 20 LOG D (MILES)  COMMON LOG
120 PL=36.6+20*(LOG(F)/2.30259)+20*(LOG(SM)/2.30259)
130 'CALCULATE TRANSMITTER POWER IN DB
140 '10 LOG P/1 MW = DBM  COMMON LOG
150 PDB=10*(LOG(TP/.001)/2.30259)
160 'CALCULATE SIGNAL INPUT TO RECEIVER
170 RS=ABS(PDB)-ABS(C1)-ABS(C2)-ABS(PL)+ABS(RA)+ABS(TA)-ABS(FM)
175 'CALCULATE POWER INPUT TO ANTENNA
180 PA=TP/EXP(C1*2.30259/10)
185 'CALCULATE EFFECTIVE RADIATED POWER
190 ERP=PA*EXP(TA*2.30259/10)
200 LPRINT:LPRINT:LPRINT:LPRINTTAB(37-LEN(AS)/2)AS:LPRINT:LPRINT:LPRINT
210 LPRINT"LENGTH OF PATH: ";SM;" MILES"
220 LPRINT"FREQUENCY OF TRANSMITTER: ";F;" MHZ"
230 LPRINT"TRANSMISSION LINE LOSS: ";-ABS(C1);" DB"
235 LPRINT"RECEIVER COAX LINE LOSS: ";-ABS(C2);" DB"
240 LPRINT"RECEIVING ANTENNA GAIN: ";+ABS(RA);" DB"
250 LPRINT"TRANSMITTING ANTENNA GAIN: ";+ABS(TA);" DB"
260 LPRINT"FADE MARGIN: ";-ABS(FM);" DB"
270 LPRINT"PATH LOSS: ";-ABS(PL);"DB"
280 LPRINT:LPRINT"NET SIGNAL TO RECEIVER ANTENNA TERMINAL: ";RS;" DBM"
290 LPRINT"NET SIGNAL REQUIRED FOR ADEQUATE SN/SNR: ";-ABS(SN);" DBM"
300 IF -ABS(SN) > RS THEN LPRINT" *** CAUTION INADEQUATE SIGNAL ***":END
310 LPRINT:LPRINT"LICENSE APPLICATION DATA:"
315 LPRINT"TRANSMITTER POWER OUTPUT";TP;"WATTS"
320 LPRINT"ANTENNA POWER INPUT: ";PA;"WATTS"
330 LPRINT"EFFECTIVE RADIATED POWER: ";ERP;"WATTS"
339 ' IF BEARING AND DIST ARE KNOWN DELETE LINES 340 TO 730
AND CHANGE LINE 20 TO READ " 20 INPUT"PATH DISTANCE IN MI";SM
340 LPRINT"TRANSMITTER NORTH LATITUDE: ";D(1);M(1);S(1)
350 LPRINT"      WEST LONGITUDE: ";D(2);M(2);S(2)
360 LPRINT"RECEIVE SITE NORTH LATITUDE: ";D(3);M(3);S(3)
370 LPRINT"      WEST LONGITUDE: ";D(4);M(4);S(4)
380 LPRINT"RADIATION LOBE BEARING: ";BRG;"DEG TRUE"
400 END
499 '      GET COORDINATE DATA
500 PRINT"COORDINATES OF STL TRANSMITTER ANTENNA"
510 INPUT"LATITUDE (D,M,S) N: ";D(1);M(1);S(1)
520 LA(1)=D(1)*M(1)/60+S(1)/3600
530 INPUT"LONGITUDE (D,M,S) W: ";D(2);M(2);S(2)
540 LO(1)=D(2)*M(2)/60+S(2)/3600
550 PRINT"COORDINATES OF RECEIVE ANTENNA (D,M,S)"
560 INPUT"LATITUDE (D,M,S) N: ";D(3);M(3);S(3)
570 LA(2)=D(3)*M(3)/60+S(3)/3600
580 INPUT"LONGITUDE (D,M,S) W: ";D(4);M(4);S(4)
590 LO(2)=D(4)*M(4)/60+S(4)/3600
600 '      CALCULATE DISTANCE AND BEARING OF RADIATION
610 A=LO(1)-LO(2);B=LA(1)-LA(2)
620 C=COS(LA(1)/K)*COS(LA(2)/K)
630 D=C*COS(ABS(A/K))*COS(ABS(B/K))-C
640 E=ATN(SQR(1-D^2)/D)
650 SM=E*K*60*1.1508
660 F=SIN(ABS(A/2)/K)*COS(((LA(1)+LA(2))/2)/K)/SIN(E/2)
670 IF INT(F)=1 THEN F=90: GOTO 690
680 F=ATN(F/SQR(1-F^2))*K
690 IF A>0 AND B<0 THEN BRG = F: GOTO 730
700 IF A <= 0 AND B > 0 THEN BRG=180-F: GOTO 730
710 IF A < 0 AND B > 0 THEN BRG = 180 + F: GOTO 730
720 BRG=360-F
730 RETURN

```

FIXED, MOBILE & REMOTE BROADCAST AUDIO MIXERS.

\$12,000 is too much! Yet, you need high quality and reliability in your small broadcast audio mixers. Take a serious look at a SAM-82 high-quality broadcast mixer, at less than half of that price. Built by a \$40 million company, this flexible 8 in/2 out professional mixer is suitable for demanding applications within TV, video and mobile studios. Over 800 SAMs are in use by quality-conscious European broadcasting and recording facilities.

Need both studio and remote mixer? We designed the attractive "quick-install" desktop console mount for the SAM-82. Disconnect XLRs and remove SAM-82 from console mount, and in 2 minutes you have a compact full facility remote mixer designed for "on-the-road" punishment. When you return from the field, just reconnect in 2 minutes, and you have an attractive console mixer again. Battery pack is available. Direct output option makes SAM-82 ideally suited for CMX type post-production facilities. Please call or write.



SAM-82 shown in attractive "quick-install" desk top console



SAM-42

6 inputs, 4 balanced and floating Mic/Line channels with 48V phantom supply, 2 Tape/Monitor inputs, 3 outputs, balanced and floating, 2 Main and 1 Aux. outputs, 2 monitor channels, Talkback channel and test oscillator. Powered by internal battery pack. Size is approx. 11 x 11 x 3 inches. Introductory price \$2,995.



SEEM PLUTO

Compact "personal" broadcast audio mixer. 3 inputs. Mono output Headset monitoring. Return talkback. Commentator's feed. All ports balanced. Built-in limiter with warning tone in operator's headset. 48V phantom power available. Size is approx. 8 x 8 x 3 inches. Price \$1,475.



SAM-82

12 inputs, 8 are balanced and floating Mic/Line channels with 48V phantom supply, 2 Echo/Line return channels, 2 Tape/Monitor returns, 6 outputs, all balanced and floating, 2 are main outputs, 2 aux. outputs, 2 monitor channels, Talkback output and test oscillator. Rear multipin connector enables two SAM-82s to be used as 16 in/2 out mixer. Size is approx. 18 x 13 x 3 inches. Introductory price \$4,975.

In Canada: (416) 868-0528
GERR Electro Acoustics Ltd.

DIGITAL ENTERTAINMENT CORPORATION

A SUBSIDIARY OF MITSUBISHI ELECTRIC SALES AMERICA INC.

Headquarters: 69 North St. • Danbury • CT 06810 • (203) 744-3226
New York City: Suite 1530 • 555 W. 57th St. • New York • NY 10019 • (212) 581-6100
Los Angeles: 733 N. Fairfax Ave. • Hollywood • CA 90046 • (213) 468-0817/651-1699

Circle (46) on Reply Card
www.americanradiohistory.com



VIDEO PROBLEMS?

SEE US FIRST



FIRST WITH SOLUTIONS

We manufacture a wide range of products designed to interface, monitor, and improve your video system. VAC can show you how to achieve the video quality you demand in your individual application.

FIRST WITH RELIABILITY

VAC products have been proving their reliability throughout the video industry for over twelve years. And with a nationwide dealer network of over 160 representatives, you can depend on personal service.

FIRST WITH SAVINGS

Best of all, you don't have to wait until next year's budget. The low cost and immediate availability of VAC equipment can enhance your system today.

CALL US TOLL-FREE TODAY

(800) 821-0426

FOR LOCAL SERVICE OR
TECHNICAL ASSISTANCE

Video Aids of Colorado
2450 Central Avenue
Boulder, Colorado 80301
(303) 443-4950

WE HAVE YOUR SOLUTIONS

SEE FOR YOURSELF

Circle (47) on Reply Card

```
LENGTH OF PATH: 11.3051 MILES
FREQUENCY OF TRANSMITTER: 951.5 MHZ
TRANSMISSION LINE LOSS: -1.5 DB
RECEIVER COAX LINE LOSS: -2.5 DB
RECEIVING ANTENNA GAIN: + 18.5 DB
TRANSMITTING ANTENNA GAIN: + 18.5 DB
FADE MARGIN: -20 DB
PATH LOSS: -117.234 DB
```

```
NET SIGNAL TO RECEIVER ANTENNA TERMINAL: -65.7826 DBM
NET SIGNAL REQUIRED FOR ADEQUATE SN/SNR: -70 DBM
```

LICENSE APPLICATION DATA:

```
TRANSMITTER POWER OUTPUT 7 WATTS
ANTENNA POWER INPUT: 4.95562 WATTS
EFFECTIVE RADIATED POWER: 350.834 WATTS
TRANSMITTER NORTH LATITUDE: 40 46 59
WEST LONGITUDE: 111 57 57
RECEIVE SITE NORTH LATITUDE: 40 36 59
WEST LONGITUDE: 111 57 57
RADIATION LOBE BEARING: 180 DEG TRUE
```

Figure 1. Computer printout for an acceptable STL installation.

```
LENGTH OF PATH: 11.3051 MILES
FREQUENCY OF TRANSMITTER: 951.5 MHZ
TRANSMISSION LINE LOSS: -1.5 DB
RECEIVER COAX LINE LOSS: -2.5 DB
RECEIVING ANTENNA GAIN: + 12.5 DB
TRANSMITTING ANTENNA GAIN: + 12.5 DB
FADE MARGIN: -20 DB
PATH LOSS: -117.234 DB
```

```
NET SIGNAL TO RECEIVER ANTENNA TERMINAL: -77.7826 DBM
NET SIGNAL REQUIRED FOR ADEQUATE SN/SNR: -70 DBM
*** CAUTION INADEQUATE SIGNAL ***
```

Figure 2. Computer printout for an unacceptable installation.

on most versions of BASIC. Uncommon function calls have been avoided. Your version of BASIC must include the following math functions: LOG*, EXP, ATN, SIN, COS, X* and SQR. If the distance and bearing are known, or determined with another Great Circle program, you may delete lines 339-720 and change line 20 to read 20 INPUT "PATH LENGTH IN MILES"; SM. The bearing and distance, calculated by the Great Circle method, will work in the Northern Hemisphere

with any latitude-longitude combination, including direct N, S, E or W lines.

This simple program is designed to assist engineers in evaluating an STL path, but should be considered a tool, not a decision maker. It will not replace sound judgment and careful study. Using the program may help avoid installing a marginal system, by providing an easy means by which various equipment may be studied.

Two samples of the program output are shown. Figure 1 illustrates an acceptable STL installation, with license application data also printed. In Figure 2, inadequate parameters have suppressed the license

! : (-)))))

*Computer functions LOG and EXP are natural log functions. If a calculator is used, be sure to use the natural log function or remove the conversion factor of 2.30259 from lines 120, 150, 180 and 190. Trig functions are computed in radians.



**Amid the hostility, the confusion, the competition,
one microphone stands above the crowd.**

The SM63.

No matter how rough things get in the field, the Shure SM63 Omnidirectional Dynamic Microphone gives your crew the whole story with a lot less handling noise than any microphone in its class. When Shure's engineers developed the SM63 and SM63L (with longer handle), their objective was to create a high-output, lightweight microphone perfect for the needs of electronic news journalists.

With the SM63's patented internal mechanical isolation system reducing undesirable handling noise, its high output and smooth extended frequency response lets your story come through crisp and clear. Its omnidirectional polar pattern prevents boominess that is often encountered during close miking situations. And its overall lightness makes continuous hand-held ENG/EFM assignments less fatiguing, without sacrificing ruggedness. Even its profile is small and elegant so it won't obscure faces on camera.

The output of the SM63 is a full 6 dB higher than comparable hand-held interview microphones.

And there are even more precision-engineered refinements. A highly effective internal humbucking coil rejects strong magnetic fields encountered around lights and other broadcast situations. And when things get really tough, the Shure-developed *VERAFLEX*[®] grille is virtually impervious to rust, moisture and dents. This system includes a highly effective internal anti-wind and -pop filter; and for more adverse conditions, a dual-density two-layer windscreen also is supplied.

The Shure SM63. The hard-working microphone for the working press.

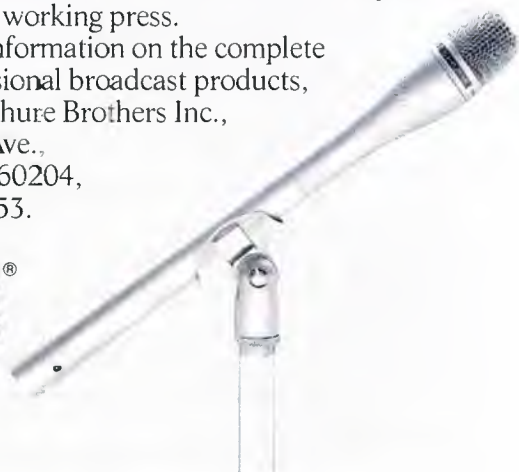
For more information on the complete line of professional broadcast products, call or write Shure Brothers Inc., 222 Hartrey Ave., Evanston, IL 60204, (312) 866-2553.

SHURE[®]

THE SOUND OF THE PROFESSIONALS[®]...WORLDWIDE

Circle (48) on Reply Card

www.americanradiohistory.com



**Adda, Ampex,
Harris, and Quantel
all make excellent
Still Stores.
But more and more
the choice is Harris.**



1 Harris' new IRIS Composition Station (ICS) solves your video production problems with these exclusive features:

- Compression and Positioning
- 2X expansion
- Variable size
- Infinite border and background color
- Soft border capability
- H & V inversion
- Cut-and-paste
- Removable memory modules
- Single joystick control

Adda doesn't. Ampex doesn't. Quantel doesn't.

The ICS is sophisticated enough to complement an artist's imagination, yet simple enough for use in the hectic pace of on-air production. And it's based on Harris' new *four frame* synchronizer, the 650.

Here's why.

2 Harris' IRIS II offers you simultaneous access by up to six users, without costly networking of separate systems.

Adda doesn't. Ampex doesn't. Quantel doesn't.

Now when you want to expand, you can—cost effectively. Your system can grow just by adding inexpensive user stations.

3 IRIS II lets you title stills from each user station.

IRIS II gives you character generation with multiple fonts. It lets you title stills directly from *each* user station without tying up expensive character generation equipment.

4 IRIS II solves your still sorting and locating problems with an integral library.

In fact, IRIS II offers the most powerful search routines of *any* still store. Its library is also accessible by each user station, and has a capacity of over 80,000 stills.

5 Problems with identifying stills are eliminated.

You can get complete information on *all* the stills in your list, with full description, date, sequence, and I.D. information.

You also have the power you need to manipulate list order through addition, deletion and change of position. And, you can also link and loop your lists.

6 IRIS II gives you the storage flexibility you need for future planning.

IRIS II interfaces with the largest variety of storage drives of any still store. Several types of fixed and removable drives give you the capability of over 17,000 on-line stills. No other still store offers this flexibility. Period.

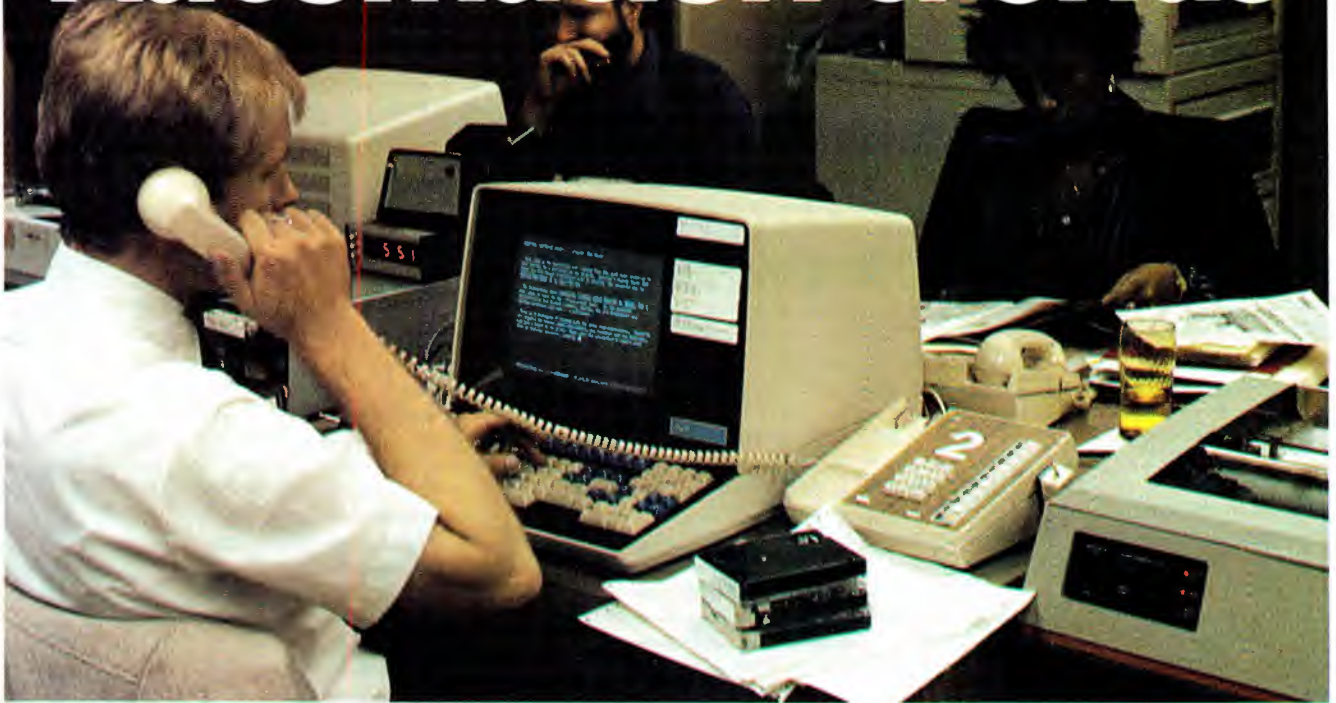
We think you get the idea. *We build the most powerful, and the most flexible, still store there is.* Whatever your business, if your problem is storing and manipulating video images, the best choice is the Harris IRIS II.

For more information about this superior solution to your video problems, call Dave Fabian, Product Manager at (408) 737-2100, or contact **Harris Corporation, Harris Video Systems, 1255 E. Arques Ave., Sunnyvale, CA 94086 Telex: 4992172**



HARRIS

Automation trends



One of several terminals used in the automated newsroom of KIRO, Seattle. When completed, both radio and television will be linked into the system. Radio is already linked, and television is being linked as this issue goes to press.

By Bill Rhodes, editorial director,
and Carl Bentz, television editor

Microprocessors, small computers and PCs (personal computers) are the topics of conversation everywhere. There is no exception in the field of broadcasting.

Dedicated microprocessors allow machines to improve speed and accuracy in performance and offer features that have never before been practical. Self-diagnostics for performance and maintenance keep systems in check. Engineers with home computers can patch through to their station units to monitor progress, check the status of systems and do design work without leaving the comfort of their homes. Various departments, such as news, business, avails, logs and programs, can be automated, giving the creative people more time for performing other tasks. Field staffs can tap the plant systems to speed up sales and communications.

Articles elsewhere in this issue describe a variety of automation techniques that two small market radio stations have put into use to address their unique problems. But, they represent only the tip of the iceberg. Thousands of other stations—both radio and television—also have shifted to automation in recent years, all to varying degrees depending on their

Table I. BE Buyers' Guide listings		Number of companies listed	
Category listed	Year	1978	1983
1. Automated testing systems	.....		13
2. ATS (Automated Transmission Systems)	18		10
3. Automation, audio production	.....		19
4. Automation, equipment control, radio	28		28
5. Automation, equipment control, TV	30		42
6. Automation, lighting control	11		14
7. Automation, newsroom systems	.....		15
8. Automation, program control	39		42
9. Automation, program logging	28		35
10. Automation, projector	7		6
11. Automation, switching	33		37
12. Automation, systems, business	.....		26
13. Automation, tape control, cartridges	28		27
14. Automation, tape control, reel	27		28
15. Automation, transmitter logging	15		12
16. Automation, video display terminal	2		14
17. Automation, video testing	.....		6
18. Automation, videotape machine	16		29
19. Weather display systems	.....		10

situations. Here, **BE** looks at other automation trends with special emphasis on how a few selected broadcasters have adapted computers for their operations.

Measuring the impact

The impact of microprocessors and computers on broadcasting is difficult to measure. But we see the evidence of this impact in the new hardware exhibited at industry trade shows, in many broadcasting articles and in

new equipment literature.

As an indicator of the scope of this market trend, we compared this year's September Buyers' Guide with its counterpart of five years ago. The results are shown in Table I.

Table I shows the number of companies currently providing equipment in the various categories. It also shows five categories of automation equipment plus weather display systems, which were not part of our directory five years ago.

World's most accommodating camera.

You'd expect the Ikegami HK-322 to make beautiful, crisp, color-true pictures. It does. You'd also expect it to offer the latest in computer set-up convenience with its third generation microprocessor control plus comprehensive operational automatics and 8 scene files and 8 lens files. It does that too. But what you might not expect, is just how incredibly flexible the HK-322 is.

Consider that you can specify 30mm or 25mm Plumbicons,* and for each size select standard, Anti Comet Tail or diode gun operation. The same holds true for cabling. You choose from triax, multicore or, if you'd like, specify an HK-322 version that's compatible with your existing TV 81 cable. You also have a choice of optional camera control configurations.

There are also some unique features such as trim files that compensate for differences between the internal pattern projector and the external scene caused by chromatic aberrations in the lens.

Finally, compare its performance to any other camera. An honest resolution of 800 lines at center, a practically noiseless S/N ratio of up to -58 dB and a virtually unmeasurable .05% registration error over the entire raster.

Best of all, the HK-322 is ready right now to fit into your idea of an ideal studio/field camera. Without compromise, but with plenty of accommodation.

Contact Ikegami. See for yourself. Ikegami Electronics (USA) Inc. 37 Brook Avenue, Maywood, NJ 07607

*T.M. of N.V. Philips

Northeast: (201) 368-9171
Midwest: (219) 277-8240
West Coast: (213) 534-0050
Southwest: (713) 445-0100
Southeast: (813) 884-2046

Ikegami HK-322

Circle (51) on Reply Card



Tests & measurements

Automated measurement systems are becoming more common, improving measurement accuracy and reducing time for engineers to take readings. The Tektronix 1980 ANSWER system checks almost every parameter of the video path. In conjunction with the 1910 programmable test signal generator, the measurements could free all but one of the VBI lines from test signals, leaving the others available for text and data transmissions. For audio, TEK offers the SG5010 generator and associated signal analyzer, both GPIB-compatible.

Sound Technology provides innovative test systems for tape recording equipment. Introduced at the 1983 NAB exhibit, the 1510A gives completely automated testing of tape recorders, as well as other audio systems. The

1510A is programmable through the GPIB bus.

Marconi's bus-compatible 2305 modulation monitor performs programmable measurements on AM, FM and PM signals from 0.5MHz-2GHz. Represented by Marconi, the Amalgamated Wireless Australasia (AWA) S1100 system requires four seconds to make 38 separate measurements on any audio transmission system, wired or otherwise, between the test transmitter and test receiver.

Rohde & Schwarz products include an IEC 625-1 bus-compatible system for audio- and video-quality measurements. For radio and TV installations, and even multiple-station applications, this package may combine with a TEK 4051 or TEK 4052 intelligent terminal for greater flexibility.

Other automated stations

With the recent installation of the NewStar system from Integrated Technology/Colorgraphics Systems in the newsroom at WKYT-TV, Lexington, KY, the speed of composing news stories increased by about 50% over the previous use of typewriters, according to news director Bob Speaks. After the equipment was installed, Speaks encouraged his staff to work with its terminals as much as possible. One month later, the typewriters were taken away, leaving the staff with the computer for all composing, editing, filing, organizing and script generation. Although the staff has become familiar with the system since early August, the NewStar system will not be put into the full production mode until Colorgraphics Systems electronic teleprompter units are available late this year.

When **YOU** want
NICKEL CADMIUM

RELIABLE AND INEXPENSIVE

PE 200
Kwik Klip®

PRB 200
Keyhole Mount



**Rugged
Compact
Built-in
Charger**

also available in 12 volt 2.2AH

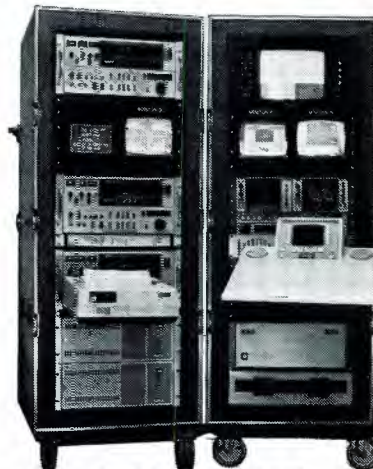
YOU want
PERROTT

a name you can depend on

7201 Lee Highway, Falls Church, Va. 22046 (703) 532-0700

Circle (132) on Reply Card

LAUMIC HAS THE EDGE IN VIDEO EDITING EQUIPMENT



Now you can **RENT** a CMX Portable
3 machine system from Laumic Company

"THE EDGE"™ computer assisted editing system with internal memory, re-edit, list ripple, time code/pulse count editing, auto assembly, floppy disk, printer, GPI and built-in A/V dissolver; interfaced with ADDA's TWIN TBC and DIGITAL EFFECTS SWITCHER; WAVEFORM & VECTORSCOPE; 3 SONY 5850's SYNC GEN.; and VIDEO & AUDIO MONITORS.

It's yours for short or long term rental. Call today.

**SALES, SERVICE AND RENTALS OF JVC, SONY,
HITACHI. INDUSTRIAL/BROADCAST VIDEO
EQUIPMENT SYSTEMS DESIGNED AND INSTALLED.
LAUMIC COMPANY, INC.**

306 EAST 39th STREET, NEW YORK, N.Y. 10016 • TEL. (212) 889-3300

Circle (80) on Reply Card

Simply Stated, COMTECH Performs. Here's Why—

Maximum Gain/Antenna Size Ratio.

Comtech Antennas consistently out-perform other antennas of similar size. You get more efficient reflective energy concentrated in a smaller area.

Meets Future Satellite Spacing Requirements.

A Comtech Antenna is designed to stay interference free with optimized sidelobe performance and a superior carrier to interference (C/I) ratio. Sidelobe performance is critical in view of reduced satellite spacing. Comtech Antennas are ahead of time in this area.

Dual/Triple Feed Options.

Comtech 3.8 and 5 Meter Antennas provide crystal-clear simultaneous transmissions from up to three adjacent satellites. Dual/Triple feed retrofit is available.

Installation Simplicity.

The 3-piece fiberglass panels (3.0, 3.8 and 5.0 meter) go together swiftly to form an accurate parabolic reflective surface utilizing Comtech's unique splice-strap design. Comtech's polar or EL/AZ mounts are simple to install and aim.

Automated Pointing System.

In addition to manual and motorized drive systems, you can specify a fully automated microprocessor-controlled drive system.

Transportable Antennas.

Low-profile 3.8 and 5 meter transportable versions are available. Both units also have uplink capability.

Complete TVRO Communications Systems.

Comtech designed and produced components include down converters, low noise amplifiers, agile satellite receivers, RF modulators, combiners and headend systems. These products are available individually or as complete systems from one single source—Comtech.

Price and Delivery.

When it comes to performance, reliability and high-tech quality, Comtech Antennas are one of the best buys on the market today and are available from stock.

Technical Assistance and Service Backup.

When you purchase a Comtech product, you are purchasing the finest engineering and service backup team in the country.

At Comtech Antenna performance comes first. You have our name on it. Call **Comtech Antenna Corporation**, 3100 Communications Road, St. Cloud, Florida 32769.

(305) 892-6111



3.0 and 3.8 Meter



3.8 and 5.0 Meter Dual/Triple Feed



5.0 Meter



7.3 Meter

OUTSTANDING RECEPTION WITH A PERFORMANCE GUARANTEE.

COMTECH Antenna Corporation

A Subsidiary of Comtech Telecommunications Corp.

Circle (53) on Reply Card

Inputs to the NewStar system at WKYT come from various sources. NewScope and a high speed AP wire service, received on a newly installed satellite receiving system, bring in the bulk of non-local material. For local stories, nine terminals, operating at a 9600-baud rate, are available in the station facilities. A 10th terminal is interconnected via a 1200-baud modem and microwave links at a news bureau office in Frankfurt, KY, the state capitol. All terminals include complete word processing

capabilities, and may be used to file completed stories in the main CPU hard disc memory. Any terminal also may be used to retrieve material from the memory. Additional inputs may soon come from reporters equipped with the new Radio Shack portable terminal via telephone lines.

WKYT is no newcomer to computerization. The weather department has used a Colorgraphics LiveLine III weather display system for some time. Up to 15 levels of data are brought in from

the WSI weather service, with each level individually controllable to meet the station's production requirements for color and format. Steve Arnold, systems manager for the station, said that the WSI service actually could provide an overkill on information, as there was far more data than could ever be used in a 3½-minute weather segment. Usually, only an isotherm map and super-satellite photographs are used from the service.

Much of the station's business functions are handled by an IBM-based computer with software by Columbine of Golden, CO. An IBM System 34, with continuous updates, was installed in April 1978 and currently provides basic traffic functions, accounts receivable and general ledger, with plans to add accounts payable and payroll. Consideration is being given to updating to a System 36, as the current system's six terminals and two printers constantly are busy.

The automation system at WISH-TV 8, Indianapolis, IN (BE April 1983), does not yet include a newsroom system. The station does have the BIAS traffic system from Data Communications Corporation, Memphis, TN, as well as minicomputers, for accounting functions, word processing and the feature film file records. Not only does the computer system allow chief engineer John Demshock to access files for engineering purposes from his personal computer at home, but also an interface to the BIAS equipment provides conversation to a DDC MCA Master Control Automation unit that controls Grass Valley Group 400 and 1600 series automation switching equipment. Simultaneously, the BIAS business system is accessible to the sales force through personal computers via telephone lines, should they need to look at sales records or wish to input sales information from the field. New software added since the article about WISH includes fixed assets accounting. IBM PCs are planned for more word processing functions.

Recent updating of station facilities at KMBC-TV 9 and KSHB-TV 41, both in Kansas City, MO, include the Grass Valley Group M200 master control automation system. Various levels of automation in the M200 series include the M204 equipment that has been updated with a random access control capability for various still-store units. GVG equipment already has been interfaced to the DCC BIAS, Kaman Science/BCS and Station Business Systems computers. An interconnect currently is under development by Columbine and several others.

\$1000.00 STL TRADE-IN

Another FIRST from TFT—from now through December 30, 1983—we will give you \$1000.00 for *any* STL (operating or NOT), when you buy the NEW Model 8300 STL!

Model 8300 STL

The Leading Edge of STL Technology—

- Greater than 75 dB Signal to Noise Ratio
- Greater than 50 dB Stereo Separation
- SAW Filter Receiver Design
- Selectable IF Bandwidth
- Selectable RF Gain

Call any TFT Representative or John Leonard directly for details on this Trade-in Deal



3090 Oakmead Village Drive, Santa Clara, CA 95051
Phone: 408-727-7272 TWX: 910-338-0584

Circle (54) on Reply Card

Continued on page 75



And now
a
message
on
Yamaha's new
RM1608
recording
mixer.

STEREO

FUNCTION

MULTI

2TRK

MXD



RM1608

SPECIFICATIONS

TOTAL HARMONIC DISTORTION (T.H.D.)

Less than 0.1% at +4dB *output, 20Hz to 20kHz (all Faders and controls at nominal)

HUM & NOISE (20Hz to 20kHz) $R_s = 150$ ohms (INPUT GAIN "–60")

- 128dB Equivalent Input Noise (E.I.N.)
- 95dB residual output noise: all Faders down.
- 80dB (84dB S/N) PGM Master volume control at maximum and all CH PGM assign switches off.
- 64dB (68dB S/N) PGM Master volume control at maximum and one CH Fader at nominal level.
- 73dB (77dB S/N) STEREO Master Fader at maximum and all CH STEREO level controls at minimum level.
- 64dB (68dB S/N) STEREO Master Fader at maximum and one CH STEREO level control at nominal level.
- 80dB (70dB S/N) ECHO SEND volume at maximum and all CH ECHO volumes at minimum level.
- 75dB (65dB S/N) ECHO SEND volume at maximum and one CH ECHO volume at nominal level.

CROSSTALK

- 70dB at 1kHz: adjacent Input.
- 70dB at 1kHz: Input to Output.

MAXIMUM VOLTAGE GAIN (INPUT GAIN "–60")

- | | |
|--------|----------------------------------|
| PGM | 74dB: MIC IN to PGM OUT. |
| | 24dB: TAPE IN to PGM OUT. |
| | 34dB: ECHO RETURN to PGM OUT. |
| | 14dB: PGM SUB IN to PGM OUT. |
| STEREO | 74dB: MIC IN to STEREO OUT. |
| | 24dB: TAPE IN to STEREO OUT. |
| | 34dB: ECHO RETURN to STEREO OUT. |

- | | |
|-------------|-------------------------------|
| ECHO
C/R | 70dB: MIC IN to ECHO SEND. |
| | 74dB: MIC IN to C/R OUT. |
| | 24dB: 2 TRK IN to C/R OUT. |
| STUDIO | 74dB: MIC IN to STUDIO OUT. |
| | 24dB: 2 TRK IN to STUDIO OUT. |

CHANNEL EQUALIZATION

±15 dB maximum

HIGH: from 2k to 20kHz PEAKING. MID: from 0.35k to 5kHz PEAKING. LOW: from 50 to 700 Hz PEAKING.

HIGH PASS FILTER –12dB/octave cut off below 80Hz.

OSCILLATOR Switchable sine wave 100Hz, 1kHz, 10Hz

PHANTOM POWER 48V DC is applied to XLR type connector's 2 pin and 3 pin for powering condenser microphone.

DIMENSION (W x H x D) 37-1/2" x 11" x 30-1/4" (953 mm x 279.6 mm x 769 mm)

Hum and Noise are measured with a –6dB/octave filter at 12.47kHz; equivalent to a 20 kHz filter with infinite dB/octave attenuation.

*0dB is referenced to 0.775V RMS.

•Sensitivity is the lowest level that will produce an output of –10dB (245mV), or the nominal output level when the unit is set to maximum gain.

•All specifications subject to change without notice.

The specs speak for themselves. But they can't tell you how natural, logical and easy the RM1608 is to work. All the controls and switches are logically arranged to help you get the job done quickly and accurately.

And in the tradition of Yamaha's sound reinforcement mixers, the RM1608 sets new standards of reliability as well as ease of operation. For complete information, write: Yamaha International Corporation, P.O. Box 6600, Buena Park, CA 90622. In Canada, Yamaha Canada Music Ltd., 135 Milner Ave., Scarborough, Ont. M1S 3R1.

Circle (55) on Reply Card



Table II.

Expanded listings for six categories from Table I that were not in the **BE Buyers' Guide** five years ago.**Automated testing systems**

A.D. Data Systems	(455)†
Amber Electro Design	(456)
Asaca/Shibasoku	(457)
Datatron	(458)
Marconi Instruments	(459)
Narda Microwave	(460)
Ortofon Instruments A/S	(461)
Pinzone	(462)
Polarad Electronics	(463)
Rohde & Schwarz	(464)
Sound Technology	(465)
Tektronix	(466)
UREI	(467)

Automation, audio production

Audio Kinetics	(468)
Central Dynamics	(469)
Century 21 Programming	(470)
Clyde Electronics Ltd.	(471)
Datatronix	(472)
Harrison Systems	(473)
King Instrument	(474)
Kinotone	(475)
Microprobe Electronics	(476)
Rupert Neve	(477)
Quad-Eight Electronics	(478)
Richmond Sound Design Ltd.	(479)
Solid State Logic	(480)
Station Research Systems	(481)
Studio Systems	(482)
Systemation	(483)
Trident (USA)	(484)
Valley People	(485)

Automation, newsroom systems

BASYS	(486)
Beston Electronics	(487)
Colorgraphics Systems	(488)
Computer Concepts	(489)
Data Communications	(490)
Harris Broadcast	(491)
Integrated Technology	(492)
Interface Data Systems	(493)
Kaman Sciences/BCS	(494)
McInnis, Skinner & Associates	(495)
Phoenix Systems/Briner Chase	(496)
Quanta	(497)
Studio Systems	(498)
Telesource Comm.	(499)
UMC Electronics	(500)

Automation systems, business

Paul Adams & Assoc.	(501)
Anacomp, CMS Div.	(502)
CBSI-Custom Business Systems	(503)
Central Dynamics	(504)
Central Dynamics Ltd.	(505)
Cetec Broadcast	(506)
Columbine	(507)
Computer Concepts	(508)
Data Communications	(509)
Datatron	(510)
Gill Management Services	(511)
Groton Computer	(512)
Harris Broadcast	(513)
Integrated Technology	(514)

Jefferson Data Systems	(515)
Kaman Sciences/BCS	(516)
MIS Div. Whitedove Showsystems	(517)
MPB Technologies	(518)
Magnicom Systems	(519)††
The Management	(520)
Microprobe Electronics	(521)
Phoenix Systems/Briner Chase	(522)
RTI-Research Tech. Int'l.	(523)
Register Data Systems	(524)
Video Masters	(525)

Automation, video testing

A.D. Data Systems	(526)
Asaca/Shibasoku	(527)
Grumman Aerospace	(528)
Pinzone	(529)
Rohde & Schwarz	(530)
Tektronix	(531)

Weather display systems

Arvin/Diamond	(532)
Colorgraphics Systems	(533)
Denrad Technical	(534)
Dubner Computer Systems	(535)
Environmental Satellite Data	(536)
Interand Telestrator	(537)
Kavouras	(538)
McInnis, Skinner & Associates	(539)
Texas Electronics	(540)
WSI	(541)

* Parenthetical listings are those added from **BE** records. All others were checked on computer forms by the manufacturers. Also, data has been updated since the *Buyers' Guide* was printed.

† Use the Reader Service Card to request manufacturers' literature.

†† Magnicom Systems — formerly Station Business Systems.

A complete listing of these categories and companies providing equipment for them is provided in Table II. Reader Service Numbers are included so that you can request literature on any systems appropriate to your station. Data on equipment for the remaining categories may be obtained by using the September 1983 issue (pages 137 and 138).

Radio

Radio stations have led the way in automation trends. In the other automation articles in this issue, two small stations describe how they have implemented automation on their own. But most stations have taken advantage of the wide spectrum of equipment available from manufacturers specializing in serving radio and TV broadcasters.

Over the years, we have published many articles on how radio broad-

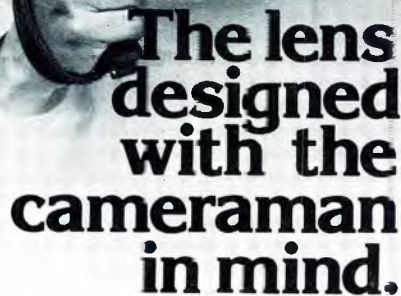
casters' stations have undertaken automation within their stations. One station worth mentioning is KCBS in San Francisco. (See **BE** July 1981, page 20.) The efforts at KCBS represent milestones in automation. First, KCBS boasts of being the world's first broadcast station, but remains a leader in adapting new technologies. Second, we showed slides of photos used in this article to broadcasters in China. They became excited about adapting these new techniques in their stations. And finally, Larry Cooper, who wrote the article, has since moved to CBS Radio in New York to revamp operations there.

The CBS Radio shift to automation is barely underway, with only five terminals and four printers. These currently are being used to let editors scan the wire services for bulletins and urgent notifications in keeping feature stories up to date.

Planning is in progress to expand this embryo system to 20 terminals, with schedules calling for 1984 implementation. Under full operation, CBS Radio will collect wire service data and inputs from CBS exclusive reports with computer processing and editing. When in operation, typewriters will be machines of the past.

In appearance, the New York CBS Radio system resembles the KCBS system shown on the cover of the July 1981 issue of **BE**. However, considerable advances have been made in the equipment and software, and the latest technology will be used in the final system.

Plans also are under way to automate the CBS Television newsroom operations. This system, interlinked with the CBS Radio system, will have some 60 terminals and will be capable of being linked to all CBS news bureaus worldwide.



This lens is packed with conveniences that help the cameraman get the most out of every situation. It has a pistol-grip with built-in iris control that has all controls available within a thumb's touch. It has a generously sized rocker control that makes it easier to control the zoom. And because the iris and zoom electronics are in a weather-resistant housing, there are no shorts from moisture in the field.

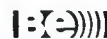
The lens can power zoom from 9mm to 126mm. Or with the 2X built-in extender from 18 to 252mm. With the low distortion 6.3mm, to 9mm aspheric lens attachment, it can power zoom on the super wide angle shots. Schneider broadcast lenses are available throughout the United States and Canada from:
Tele-Cine Corp.
400 Crossways Park Drive
Woodbury, NY 11797
(516) 496-8500

Schneider

14X ENG/EFP

Circle (50) on Reply Card

Station automation remains a high interest area at trade shows. Seven exhibitors at the 1983 NRBA convention included equipment for program and business automation, while a new entry into full automation for satellite-programmed or live-assist use, the Systemation (Decatur, IL) cassette automation, was found in a hospitality suite. The Systemation concept uses a Wintek computer to drive up to 63 cassette machines from a CBM Vic-20 terminal. The system requires a modification to microprocessor-controlled cassette transports to interface properly. A production system "hard sectors" a cassette to allow up to 70 30-second spots, while the operations system searches out the proper spot and signals when it's ready to play. The low cost system was shown with Sansui and Revox equipment, but other units, including a TASCAM cassette deck, are applicable, according to Steve Bellingier, Systemation president and designer. More than 30 of the systems currently are in use in the United States and New Zealand.



More stations have purchased our electronic newsroom than any other!

KPRC-TV, Houston
CBS Radio, New York
WKYT-TV, Lexington
WRC Radio, Washington
WKOW-TV, Madison

KCBS Radio, San Francisco
WGN-TV, Chicago
WGN Radio, Chicago
KIRO-TV, Seattle
KIRO Radio, Seattle

KVOA-TV, Tucson
WTVF-TV, Nashville
... and **more**
to be announced
soon!



Our Integrated Technology **NewStar** wins as the fastest, most flexible, most reliable newsroom computer system in the world today!

Bulletin: Post-Newsweek's top rated WJXT-TV buys Newstar — call us for details.

ColorGraphics Systems, Inc.



Integrated Technology Division
5725 Tokay Blvd., Madison, WI 608-274-5786

Circle (74) on Reply Card

www.americanradiohistory.com



Reel-to-reel audiotape recorder roundup

After World War II, American Radio broadcasters were still skeptical about using magnetic tape to time-delay and produce network programs. The rugged design of the Ampex model 200 (produced in 1948), as well as financial and political support from Bing Crosby, turned industry skepticism about magnetic recording into widespread confidence. Shown in this 1948 photo is Harold Lindsay, model 200 chief designer, doing a final check on Serial #1 of the model 200.

By Roger Karwoski, operations manager, KBIA, Columbia, MO, and Carl Bentz, television editor*

The world's first magnetic recorder, called the Telegraphone, used wire. It was built in 1898 by Valdemar Poulsen in Copenhagen.

Sometimes, to fully appreciate what technology affords us today, it's useful to look at where we were yesterday. And so, I dug deeply into my old stockpiles of odds and ends and found some past issues of **Broadcast Engineering**. I found an informative article in the December 1964 issue titled, "Audiotape Equipment," by

*Karwoski prepared the introduction, and Bentz assembled the coverage of manufacturers' equipment.

When **YOU** want
NICKEL CADMIUM

PE 52
Lighting or
Camera

28.8 volt 4 AH
or
14.4 volt 8 AH
in one unit

dual output belt



with
four
hour
built-in
charger

Versatile • Rugged • Economical

YOU want
PERROTT
a name you can depend on

7201 Lee Highway, Falls Church, Va. 22046 (703) 532-0700

Circle (58) on Reply Card



STANTRON
VIDEO
CENTER



CABINET CONSOLES • VTR/VCR RACKS
MODULAR DESK CONSOLES • DUBBING RACKS •

for • VIDEO PRODUCTION • POST-PRODUCTION • EDITING • ENG • EFP

"ALL-NEW" STANTRON VIDEO CENTER, designed to complement YOUR VIDEO EQUIPMENT. Modular "add-on" features allow maximum flexibility and versatility in creating console arrangements. Write or call for **FREE STANTRON VIDEO CENTER CATALOG #200**.

mailing address: P.O. Box 9158VC
No. Hollywood, CA 91609 U.S.A.

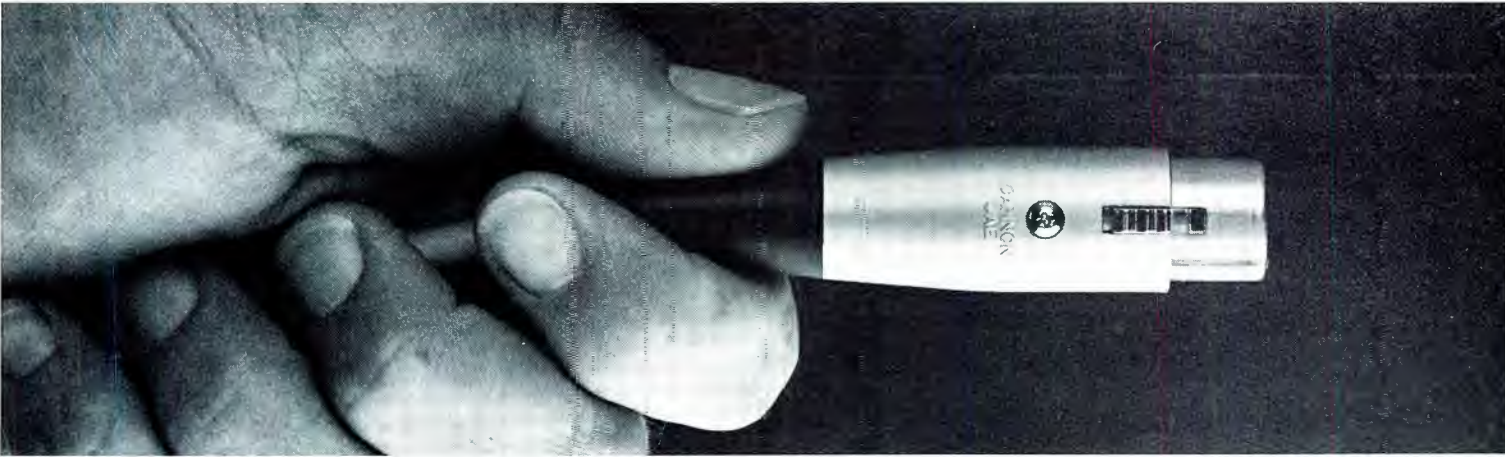
STANTRON

Toll Free: 1-800-821-0019
No. Calif. Toll Free: 1-800-821-0020
So. Calif. please call 1-213-875-0800
TWX: 910-499-2177

factory: 6900-6918 Beck Ave., No. Hollywood, CA 91605

Circle (59) on Reply Card

Protect your investment with a cannon.



An audio connector by any other name is simply not an ITT Cannon audio connector. Which is precisely why so many audio engineers continue to specify Cannon® connectors for use with their audio equipment.

The XLR, the new XLB and XLA series are small, rugged, quick-disconnect connectors designed for use in audio/video and other low level circuit applications where reliability, quiet operation, elimination of mechanical interference and ease of use are necessary. Four different plug styles are available.

The EP connector is ideally suited to applications where extreme ruggedness and versatility are required. The new AP connector is a

Audio Connectors from Cannon



popular choice for heavy duty audio applications and is interchangeable and intermateable with the EP series. Both the EP and AP series may be used where as few as 3, or as many as 18, contacts are required.

The APLNE and AXLNE are specifically designed to handle the special needs of mains and other power supply applications.

For more information, please contact International Products Marketing Manager, ITT Cannon, a division of International Telephone and Telegraph Corporation, 10550 Talbert Avenue, Fountain Valley, CA 92708, (714) 964-7400.

CANNON ITT
The Global Connection

Circle (60) on Reply Card

Thomas Haskett. The article summed up features and performance of the then-current state-of-the-art tape equipment. Some interesting facts worth noting include these excerpts:

"Today (1964), nearly a hundred firms manufacture commercial audio machines..."

"Although some stations use the same control room for both air and recording, because of studio recorders' high cost and continuous use, they are usually installed in a separate recording control room. Remote controls permit their takeover by master control."

"While all (studio recorders) employ the NAB characteristic, which furnishes treble boost in recording and bass boost in playback, NAB standards are for full-track mono, and make no provision for stereo. Hence, most recorders permit the user to optimize equalization according to use."

"At least four manufacturers offer transistors in the electronic section."

"One new machine...has provision for switching any record head to temporary playback during recording, thus allowing sound-on-sound and other special effects."

"A recently developed accessory permits changing the playback speed of a tape without altering pitch of the recorded signals...It uses a multiple-head assembly which rotates in the direction of tape travel; thus, reel-to-reel tape speed may be varied while the rotating assembly holds head-to-tape speed constant."

"...hysteresis-synchronous motor driving capstan (and some with three motors)."

"...a machine with a low flutter figure often applies high stress to tape during shuttling. For precise applications, you might best use such a recorder for recording or playback, rewinding on a separate machine."

Overall typical electrical performance of 1964 vintage recorders is shown in Table I.

Today, of course, improvements in frequency response, distortion, signal-to-noise, etc., have been made because



In this 1947 photo, Jack Mullin (left) shows Murdo MacKenzie, Bing Crosby's technical producer, how to edit tape using a pair of scissors. Shown is the Ampex model 200 prototype. In 1945, Mullin had sent two German AEG Magnetophons and 50 reels of BASF/Agfa tape home to San Francisco, where he modified them with ac bias and other improvements. Mullin's Magnetophons later inspired that first Ampex machine.

of better tape formulations, quieter electronics, better heads and improved solid-state circuitry. From a price standpoint, after factoring in inflation over the past years, today's machines are a better bargain than ever.

But, what would be the greatest area of improvement in tape recorders during the last 10-20 years? I put that question to several vendors at the SBE Central States Convention held in St. Louis in September. The answer I heard most often was "operator convenience." The best explanation I got was from Dave Velsma of Audio Broadcast Group. He offered the analogy of air conditioning in cars: several years ago, auto air conditioning was considered a luxury. Today more and more cars owners consider

it a necessity.

So it is with tape recorders: features that were considered a luxury 10 or 20 years ago (if they were offered at all!), today are considered by producers and operators as necessities. High tape stress is no longer necessary to get good wow-and-flutter figures; stretched tapes are almost a thing of the past. Today's machines handle tape gently, yet quickly. Many models offer constant tension designs that optimize tape handling, head wear and electrical performance. The advent of microprocessor control has given us almost-digital machines. On some models, everything is made digital except the audio. These advanced models are a cross between a computer and a tape deck.

What follows is a roundup of today's audio recorders, which feature better sound and easier operation, all at competitive prices.

Reel-to-reel roundup

Analog audio reel-to-reel recording equipment manufacturers were contacted to provide information for this listing of models currently available in the marketplace. The listing is presented in a format similar to the **BE** Spec Book, to be used for initial comparisons—not final purchasing decisions. Reader Service Numbers are provided for access to detailed information on the equipment listed.

Continued on page 84

Table I.

	Studio recorder ± 2dB, 30-18kHz at 15ips	ac portable ± 2dB, 40-12kHz
Frequency response		
Signal-to-noise (full track)	50-60dB	greater than 55dB
Distortion	1%	
Wow-and-flutter	less than 0.1%	less than 0.2%
Timing accuracy	± 0.2%	± 0.2%
Price range	\$730-\$10,000	\$525-\$1255

MEK-1000

MULTI EFFECT KEYER



Make a splash on the screen Add some flash to your titles

NTI's new Multi Effect Keyer **MEK 1000** can provide a lightning halo effect around your titles that up to now involved an expensive, difficult, and time-consuming process. The **MEK 1000** is the world's first unit that delivers this stunning effect digitally and instantly to either title character input or chroma key signals. The **MEK 1000** can also color each individual character in your titles differently. Again, digitally and instantly.

In addition, you get all the functions of a conventional Downstream Keyer. An independent edge generator lets you select any desired color. Edge, Shadow, Outline and Edge Softness and Thickness are also fully selectable. You also get such features as Auto Transition, Key Blink, Master Fade to Black, and a Selecta-

ble 10 Wipe Pattern with three scanning directions. All operations are input from a compact control panel. The **MEK 1000** is a powerful creative tool for on-air applications or in the editing suite. And just by adding an optional crosspoint module, you obtain the features of a production switcher. Call NTI America for a free demonstration. You'll be impressed. And so will your viewers.

Tools for Creators



NTI America, Inc.

1680, North Vine Street, Los Angeles, California 90028 Phone: (213) 462-8945

Inquiries from sales representative are invited.

Circle (62) on Reply Card

AUDIO RECORDER, Reel-to-Reel

Manufacturer	Leavers Rich	Lyrec Manufacturing A/S	MBI/AHB
Model/Series	Proline 1000SC	Free Editor "FRED"	Series M
Number of Tracks	1, 2	2	24
Tape Width (inches)	1/4	1/4	2
Tape Speeds	A/B/C	B/C	C/D
Variable Speed Range	Yes	7.5-45ips	7.5-60ips
Reel Size Max/Hub Type	11"	14"/NAB, DIN, CINE	10.5"/NAB
Number of Heads	.....	1	3
Capstan Motor Type	dc servo	dc servo	dc servo
Reel Motor Type	dc servo	dc servo	dc servo
Metering Types	VU	.....	VU
Equalization	NAB, DIN	NAB, CCIR	NAB, CCIR
Editing Function	No	Yes	Yes
SMPTE/Editor Interface	No	No	Yes
Tape Timer	Mechanical	Electronic	Electronic
Cueing Feature	.....	Search cue, zero; Auto-locate	Search cue, zero; Auto-locate
Input Connection	.....	.....	Bal floating
Output Connection	.....	.....	Bal floating
AF Response ($\pm$ dB/Hz)	1/100-10k, 15ips	1/60-18k, 15ips	1/60-16k, 15ips
Harmonic Distortion	1%, 15ips	.....	.....
S/N Ratio (R-to-P)	58dB, 2-TR, 15ips	68dB, 15ips	63dB, RMS A wtd 15ips
Crosstalk (Adj. Tracks)	$\times$ +55dB, 1kHz	-40dB, 510nWb/m, 1kHz	-46dB, 1kHz
Related Models	Proline 1000 Proline 2000	.....	.....
Reader Service Number	411	412	413

(5) Ref with 1kHz and Ampex 456 tape.



You don't need a special diversity receiver to solve your wireless microphone dropout problems

- Only Swintek offers multi-antenna RF switching diversity that can be used with any Swintek or most VHF/UHF receivers thus providing true RF switching diversity for much less than a dedicated diversity receiver.
- The Model RFSD switches RF instead of audio, thereby, virtually eliminating transients (clicks and pops) normally found in most conventional dual diversity receivers.
- Contains narrow band frequency modules that discriminate between adjacent channels allowing many closely spaced frequencies to be used on a set.
- Plug in module allows frequency to be changed in the field.

All Swintek Mark 1L, 2L and Q/AC receivers can be supplied with the RFSD as an internal option. Call or write for your free catalog that details the RFSD and Swintek antenna products.

Swintek—the proven performers.

Swintek
TELECOMMUNICATIONS DIVISION

1180 ASTER AVENUE, UNIT J / SUNNYVALE, CA 94086
(408) 249-5594 / TELEX 172-150 SWINTEK SUVL



Model RFSD
3 1/2" W x 1 3/4" H x 5 1/4" D

Circle (63) on Reply Card

Microdyne's New Multiple Feed System Lets You Receive Up To Five Satellites



With new programming constantly being added, you may want to pick up programs from several satellites. Previously, this would involve the expense of another dish. Now with Microdyne's new multiple feed system you may be able to add programming from additional satellites at about 1/5 the cost of a new dish.

The MSF-16 Multiple Satellite Feed System can receive up to five satellites on the same parabolic reflector when the satellites are located in close proximity. In a TVRO system designed with adequate margins, the MSF-16

will provide quality pictures on all feeds.

Existing Microdyne/AFC antennas can be easily retrofitted to accommodate this new system. Only the spars and brackets of the feed support hardware must be changed — no other antenna changes are required. This simple modification can be done by the user or by Microdyne field service personnel.

Even if you purchased your existing antenna from another manufacturer, it may still be possible to modify it for use with the Microdyne

Multiple Satellite Feed System. Please give us a call.



So, whether you are planning a new system or expanding an existing installation, the MSF-16 can provide increased capability while saving both the cost and the real estate required by a second dish.

We have prepared a brochure to help you to determine if the MSF-16 is suitable for your system. For a free copy, write on your company letterhead to Microdyne Corporation, TV Sales, Dept. F, P.O. Box 7213, Ocala, FL 32672.

Microdyne Corporation

P.O. Box 7213 • Ocala, FL 32672 • (904) 687-4633 • TWX: 810-858-0307

Circle (64) on Reply Card

November 1983 **Broadcast Engineering** 87

AUDIO RECORDER, Reel-to-Reel

Manufacturer Model/Series	MCI/Sony JH-110B Series	JH-24 Series	Mechlabor/ Electrolmplex 300 Series	Nagra/Kudelski T-Audio
Number of Tracks	3	1, 2, 4	2	1, 2
Tape Width (inches)	1" C Video	1/4, 1/2	1/4	1/4
Tape Speeds	9.606ips	B/C/D	B/C	A/B/C/D
Variable Speed Range	6-11.2ips	± 20%	No	± 6%
Reel Size Max/Hub Type	10.5"/NAB	14"/NAB	11.8"/NAB, AEG	11.8"/NAB, AEG
Number of Heads	3	3	.....	4
Capstan Motor Type	dc servo	dc servo	ac	dual dc servo
Reel Motor Type	dc servo	dc servo	ac	.....
Metering Types	VU	VU	.....	VU
Equalization	NAB	NAB, IEC	NAB or CCIR	NAB, CCIR
Editing Function	No	Electronic	No	Servo ctl option
SMPTE/Editor Interface	Yes	Yes	No	Option
Tape Timer	Electronic	Electronic	.....	Electronic
Cueing Feature	Auto-locate	Auto-locate	Manual w/cue amp	Yes
Input Connection	Bal	Bal	.....	Bal floating
Output Connection	Bal	Bal	.....	Bal floating
AF Response (± dB/Hz)	0.75, - 1.5/30-20k	0.75, - 2/30-24k, 15ips	1.5, - 3/36-24k	1/30-20k
Harmonic Distortion	.....	<0.52%, 1020nWb/m	0.35%	0.7% NAB, 15ips
S/N Ratio (R-to-P)	61dB	>64dB, 2-Tr	67dB, 15ips	>73.5dB NAB, 15ips
Crosstalk (Adj. Tracks)	.....	.....	.....	< -40dB, 10kHz
Related Models	JH-110C-8 8-Track	.....	.....	.....
Reader Service Number	416	417	418	419

THE MOST FAMOUS PICTURE IN HISTORY WAS SHOT WITH AN ANGENIEUX TV LENS

On July 20, 1969 over 600 million people watched as man first set foot on the moon. The lens which brought the excitement back to earth was an ANGENIEUX.

More recently, the most watched TV spectacular ever, "The Winds of War," was shot with an Angenieux lens.

Now you may ask, what makes Angenieux so special. Perhaps it's our reliability. We're dependable enough to have been selected by NASA for all its space to earth transmissions. We even give NASA a 50 mission guarantee on every Angenieux lens. Or maybe it's our innovation. After all, we pioneered the retro-focus lens and the world's first 10 to 1 zoom lens.

Or maybe it's our wide selection of lenses that broadcasters and production houses count on for top performance.

Before you buy your next broadcast lens, look at Angenieux.

We'll make you famous, too.



angenieux

FOR MORE INFORMATION ON OUR WIDE RANGE OF PRODUCTS
CONTACT THE FOLLOWING ANGENIEUX BROADCAST SALES OFFICES

**North/South
Americas** 12901 SW 74th St.
Miami, Florida 33183
Tel. (305) 386-1740
Telex 80-8045 Intelac-Mia.

Canada 190 Don Park Road.
Markham, Ontario L3R-2V8
Tel. (416) 495-5454

**Remainder
of World** Opticam S.A., Case Postale 91
1211 Geneva 17, Switzerland
Tel. (22) 362266
Telex. 27670-Opti-CH

Circle (65) on Reply Card



A NEW DIMENSION IN MASTER CONTROL SWITCHING

Utah Scientific, the industry's number 1 supplier of routing switchers, has now applied its talents to an allied area—Master Control Switching. Designed for immediate conversion to stereo and/or station automation, Utah Scientific Master Control Switchers are designed to deliver superior performance today while accommodating your future needs as well.

- Two models: two bus and three bus
- The industry's best performance specs
- Full preset capability with "goof-proof" single-button execution
- Integral edge, shadow, cut-line and color matte
- 28 direct inputs plus two assignable from panel
- Alphanumeric readouts for assignable inputs
- All-digital interconnect via RS-422 lines
- Top quality switches
- Stereo-ready—just add the matrix and one card
- All panel functions software controlled
- Machine control for two telecines and ten VTR's included
- Available with or without station automation system
- Preroll times individually assignable and user alterable
- Full audio over/under capability
- Separate 8 x 3 audio only matrix included
- Four large LED VU meters

UTAH SCIENTIFIC
a DYNATECH company

1685 West 2200 South
Salt Lake City, Utah 84119

Telephone: (801) 973-6840
Toll Free: (800) 453-8782
TWX: 910 925 4037

Circle 66 on Reply Card

Digital reel-to-reel

Particularly in the area of audio mastering, where other formats will ultimately be used as the consumer distribution media, digital reel-to-reel recording systems continue to command a growing share of the recording market. The interest in digital stems from a wide dynamic range (over 90dB), a low noise figure (also in the 90dB region) and low distortion (typical-

ly less than 0.05%). Additional benefits include improved overall product quality when multiple generations are involved in production mixdowns. Editing also is simplified electronically when working from digitally mastered material.

A tentative agreement by digital audio system manufacturers has resulted in a common sampling

frequency of 48kHz with a 16-bit linear quantization. Pulse-coded modulation (PCM) also is generally the standard recording signal format. In order to make recorders more compatible with other digital equipment, for example, digital disc and VHS-based cassette systems, other sampling frequencies usually are offered.

The following companies currently offer digital recording equipment. For complete details, Reader Service Numbers are given.

Mitsubishi Electric

Marketed by Digital Entertainment Corporation, the X-80 series recorder offers two digital audio, one mono analog cue and one SMPTE time code channels on 1/4-inch tape. The 15ips tape speed is standard with variable speed options. The X-800 system records 32 digital audio, two analog cue, one SMPTE code and two auxiliary digital data channels on 1-inch tape with a nominal speed of 30ips and $\pm 10\%$ speed variation. The 48kHz sample rate is joined by a 50.4kHz rate for other equipment compatibility. Various synchronizers and the XE-1 editor interface with the recorder.

In Europe, the equipment is available through AEG-Telefunken as the MX-80 and MX-800. For more information, circle (380) on Reply Card.



Mitsubishi X-800

Sony Corporation

The PCM-3324 records 24 PCM audio, two analog cue, one control and two external data channels. At the 48kHz sample rate, the tape speed is 72.38cm/s or about 29ips, giving a recording time of 60 minutes on a 14-inch reel. A second sample rate of 44.1kHz is included in a system compatible with the Studer units. Synchronization of two recorders allows recording capability to 48 channels with a remote control/editing console. Interfacing to various VTRs is available for video post-production. A cross-fade plan on editing virtually eliminates signal discontinuity effects created by punch-in/punch-out. For more in-

Harris MSP-90 Audio Processors...



MSP-90
TRI BAND AGC



MSP-90*

Build listener loyalty with a stand-out signal

Listener fatigue is an audience killer. The "dirtier" the signal, the higher the tune-out rate—no matter how loud you are.

Harris MSP-90 Audio Processors deliver superior performance and consistently cleaner, louder signals. And today's highly selective listeners can tell the difference!

The MSP-90s are easily field adjustable. Positive switch settings allow for critical performance standards—with any desired format. Harris'

modular concept permits location at both studio and transmitter for typical AM installations, or convenient grouping for FM-TV-multiplex systems.

That audience can be yours for a song—if the song is loud and clean. For more information about the Harris family of MSP-90 Audio Processors, write Harris Corporation, Broadcast Products Division, P.O. Box 4290, Quincy, Illinois 62305-4290. 217-222-8200.

*AGC amplifier, AM and FM limiter combinations available.



Circle (67) on Reply Card



For 10 seasons now, you've taken the performance of Shure's remote mixers for granted. We haven't. Announcing the new Shure M267.

Over a decade ago, Shure introduced the M67 Microphone Mixer. Designed to provide on-location audio for major sporting and news events, the M67 became the most well known and widely used remote mixer in the broadcast industry.

Then came the new Shure M267. One look will tell you why we moved ahead.

Here are all the improvements audio engineers have asked for.

Every channel on the mixer now has a mic/line level switch for maximum flexibility. There's also a built-in limiter to keep the M267 from overloading at critical moments. The unit contains a built-in battery pack that utilizes three standard 9-volt batteries. Simplex (phantom)

power and a peak LED are standard, too.

The M267 oscillator provides a clean 1 kHz tone, and is located on the front of the unit for simple access. The headphone output is also on the front and includes a level control.

And IC design, along with active gain controls, provides greater headroom and quieter operation.

For location work or even studio post-production, the M267 carries on Shure's reputation for reliability and ruggedness.

After all, just because you create one legend doesn't mean you can't build another.

For more information on the complete line of mixers, call or write Shure Brothers Inc., 222 Hartrey Ave., Evanston, IL 60204, (312) 866-2553.

SHURE®

THE SOUND OF THE PROFESSIONALS®...WORLDWIDE

Circle (68) on Reply Card

www.americanradiohistory.com

AUDIO RECORDER, Reel-to-Reel

Manufacturer	Nagra/Kudelski	Otari Corporation			
Model/Series	E Portable	MX5050 BQ-II	MTR-10	MTR-90-II	MX 7800
Number of Tracks	1	2, 4	2, 4	8, 16, 24	8
Tape Width (inches)	1/4	1/4	1/4, 1/2	1, 2	1
Tape Speeds	B	A, B, C	A, B, C, D	C/D	B/C/D
Variable Speed Range	No	± 0.2%	± 20%	± 20%	± 15%
Reel Size Max/Hub Type	10.5"/NAB	10.5"/NAB	10.5"/NAB	14"/NAB	10.5"/NAB
Number of Heads	3	4	.....	.....	.....
Capstan Motor Type	dc servo	dc servo	dc servo	dc servo	dc servo
Reel Motor Type	.....	ac sync	dc servo	dc servo	ac servo
Metering Types	VU	VU	VU	VU	.....
Equalization	NAB, CCIR	NAB	NAB, IEC	NAB, DIN, IEC, CCIR	NAB, IEC
Editing Function	No	No	No	Electronic	Yes
SMPTE/Editor Interface	Yes	No	Note 6	Note 6	Yes
Tape Timer	.....	Electronic	Electronic	Electronic	Electronic
Cueing Feature	Yes	No	Search zero;	Search zero;	Search zero
	.....	.....	Auto-locate	Auto-locate	.....
Input Connection	.....	Unbal Active	Bal Active	Bal Active	.....
Output Connection	.....	Unbal Active	Bal Active	Bal Active	.....
AF Response (± dB/Hz)	250-15k	2/30-20k ⁷	0.5-2/55-26k ⁸	1.5-3/42-29kHz ⁹	.....
Harmonic Distortion	<0.9%	0.7%	0.2%	0.1%	0.7%, 185nWb/m, 1kHz
S/N Ratio (R-to-P)	62dB wtd	66dB 3% THD	75dB 3% THD	75dB, 3% THD	72dB unwtd, 30ips
Crosstalk (Adj. Tracks)	n.a.	-55dB, 1kHz	-45dB, 12kHz	-55dB, 1kHz	50dB, 185dB, 1kHz
Related Models	.....	MX5050B-II	.....	.....	.....
	.....	5050 Mark III ⁸	.....	.....	.....
Reader Service Number	421	422	423	424	425

(6) Adams-Smith, Audio Kinetics, BTX, Convergence and EECO interfaces available. (7) Ref. to 250nWb/m, 15ips. (8) 5050 Mark III is 2, 4, 8-track and does have auto-locate cueing. (9) Ref. 250nWb/m, 30ips.

Manufacturer	L J Scully	Solidyne s.r.l.	Soundcraft	Stellavox	
Model/Series	Mfg. Corp. LJ-7	GMS-202	Electronics SCM760	SP8 Portable	TD88
Number of Tracks	2	2	24	1, 2, 3	8 max
Tape Width (inches)	1/4	1/4	2	1/4	1/4, 1/2, 16mm
Tape Speeds	A, B, C, D	A/B/C	C, D	B	A/B/C/D, 24/25ips
Variable Speed Range	3-36ips	± 20%	+ 10%, - 50%	± 10%	Yes
Reel Size Max/Hub Type	11.5"/NAB, EIA	10.5"	.....	5"	14"/NAB, DIN, CINE
Number of Heads	5 positions	.....	.....	3 or 4	.....
Capstan Motor Type	dc servo	dc servo	dc servo	dc servo	dc servo
Reel Motor Type	dc servo	dc servo	dc servo	.....	Patented
Metering Types	VU, peak LED	.....	.....	.....	.....
Equalization	NAB, IEC	NAB, IEC, CCIR	NAB, DIN, IEC, CCIR, AES	Option	NAB option
Editing Function	No	Yes	.....	No	No
SMPTE/Editor Interface	Via accessory conn	CP-900	Type D only	SQS Option	Yes
Tape Timer	Electronic	Electronic	Electronic	Mechanical	Electronic
Cueing Feature	Search zero	Search cue, zero;	Search cue, zero;	No	No
	.....	Auto-locate	Auto-locate	.....	.....
Input Connection	Bal Active	.....	Bal Active	Bal	Bal floating
Output Connection	Bal Active	.....	Bal Active	Bal	Bal floating
AF Response (± dB/Hz)	1, - 2/30-24k ¹⁰	- /to 15k	1, - 2/40-20k ¹¹	2/30-18k	2/30-20k
Harmonic Distortion	0.75%	0.05%, 400Hz	.....	2%	1%, 15ips
S/N Ratio (R-to-P)	65dB 510nWb/m	74dB ANSI wtd	.....	67dB	65dB, 15ips
Crosstalk (Adj. Tracks)	- 60dB	60dB, 1kHz	- 55dB	45dB, 1kHz	.....
Related Models	.....	.....	.....	.....	.....
Reader Service Number	426	427	428	429	430

(10) Ref. 200nWb/m, 1kHz, 15ips. (11) Ref. 320nWb/m, 1kHz, 15ips.

How to Build a Better Compact Professional Recorder

Follow this step-by-step guide to build your own rugged, reliable, high-performance professional recorder.

1. For your design team, hire the same engineers responsible for world's premier multi-track recorder, the **STUDER A80C**.
2. Employ meticulous Swiss and German craftsmen for all fabrication and assembly.
3. Use solid aluminum alloy die-castings for transport chassis and headblock.
4. Use the finest Swiss and German machine tools for milling, drilling, and tapping.
5. Use only professional-grade mechanical and electronic components.
6. Make your own audio heads to ensure the highest quality.
7. Apply gold plating to audio switching contacts.
8. Include the following standard features: Balanced and floating +4 inputs and outputs • Calibrate/uncalibrate switches • Self-sync • Tape dump • Edit mode • Full logic transport control • Servo controlled capstan motor • Front panel input and output mode switching • Universal power supply • Rack mount.
9. Provide the following options: Rugged, steel-legged console • Transport case • Monitor panel • Remote control • Variable speed control • Balanced mike inputs.
10. Support your finished product with a worldwide parts and service network.

If you can do all of this for under \$2100*—by all means go ahead! (Even Dr. Willi Studer would be proud of you.) But first, we suggest you consult with your **Revox Professional Products** dealer. He'll provide you with a ready-built **PR99**...so you can concentrate on building your reputation as an audio professional.

STUDER REVOX

Studer Revox America, Inc. • 1425 Elm Hill Pike • Nashville, TN 37210 • (615) 254-5651

*Manufacturer's suggested list price \$2095.00. Contact dealer for further pricing information.

Circle (69) on Reply Card

The ENGINEER'S audio processor..... designed for PROGRAMMING!

Our 250 gives you the ultimate in audio processing with advanced programmable circuitry offering total control of your broadcast sound.

Multiple presets can be custom tailored for different program sources, for changing formats during a broadcast day or for other programming variables. The result? Uncompromised audio quality for each program source or format. No more tweaking for the best sound. The 250 lets you adjust any processing function digitally and with complete repeatability.

Gated A.G.C., 5 band compression, graphic equalization and peak limiting may be manually formatted *OR* put under computer control.



The 250 has been designed to meet the present and future demands of quality audio in AM stereo, FM stereo and TV stereo.

To make your job easier and your sound SUPERIOR, call today to arrange for a hands-on demonstration in your station.

Inovonics Inc.

503-B Vandell Way, Campbell, CA 95008
Telephone: (408) 374-8300

MAGNETIC RECORDING • AUDIO PROCESSING • AUDIO INSTRUMENTATION



Circle (70) on Reply Card

ROHN®

QUALITY TOWERS ON YOUR HORIZONS

No matter what your requirements, there is a ROHN Tower on your horizon. We will use our state of art design and engineering techniques to build your tower. ROHN Towers are tailored to fit your present and future needs. When your horizon needs a tower of any size or style. Write . . .

QUALITY STEEL PRODUCTS BY

ROHN

6718 West Plank Road
P.O. Box 2000
Peoria, Illinois 61656
U.S.A.



Circle (71) on Reply Card

formation, circle (381) on Reply Card.



Sony PCM-3324

Studer Revox

An 8-channel, 1/4-inch format is offered in the A808PCM recorder, listed as compatible with Sony equipment. Input/output interfacing is compatible with that proposed by the EBU. Both 48kHz and 44.1kHz sampling to 16-bit quantization are used. For remote control, audio control, level metering and autolocator functions, individual control units may be used separately or combined into a Studer remote stand. For more information, circle (382) on Reply Card.



Studer A808PCM

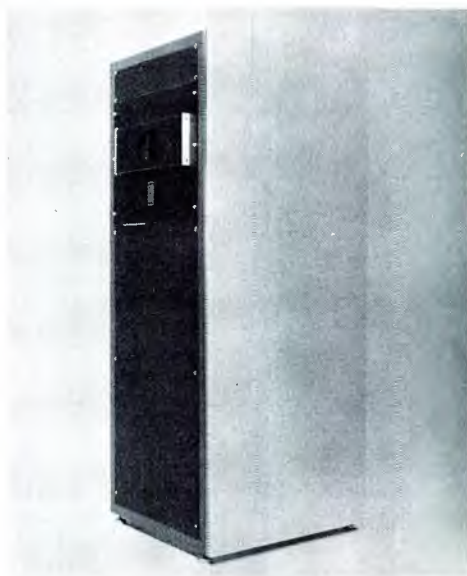
3M Company

Equipment from 3M provides four digital channels on 1/2-inch tape or 16- and 32-channel formats on 1-inch material. The typical tape speed for 48kHz sampling is 43.2ips with $\pm 10\%$ speed variation. As with the others, the system's response is $+0.5\text{dB}$ and -3dB from 10Hz-20kHz. 3M spec sheets claim THD and IMD at less than 0.03%. Electronic editing provides complete control over the record and play machines. For more information, circle (383) on Reply Card.



THE NEW HCF-ONE TELECINE CAMERA...

**It looks as good on air as it does on
your bottom line.**



The Hubbard Communications, Inc. Telecine color camera was designed to replace older, large or small image systems... at a significant saving.

A high performance unit in every respect, the camera utilizes Hitachi-developed electronics employing 2/3 inch electro-statically focused/magnetically deflected Saticon* tubes with low lag and negligible image retention characteristics.

Camera setup, auto white/auto black and horizontal/vertical centering are controlled by a microcomputer which also provides limited fault diagnostic functions. For ease of installation an optical alignment and grey scale transparency setup system is provided.

Call or write for more information, specifications and an introductory price that will look good on your bottom line.

*Hitachi Trademark

HUBCOM
HUBBARD COMMUNICATIONS, INC.

10383 Oak Street N.E.
St. Petersburg, FL 33702-1894
(813) 577-7759 TWX: 810-863-0417

AUDIO RECORDER, Reel-to-Reel

Manufacturer	Studer Revox America				TASCAM
Model/Series	A810	PR99	A800 Mk III	32	58
Number of Tracks	1, 2	1, 2	8, 16, 24	2	8
Tape Width (inches)	1/4	1/4	1, 2	1/4	1/2
Tape Speeds	A, B, C, D	A/B C/D	C, D	B/C	B, C
Variable Speed Range	± 45%	± 30%	± 45%	± 12%	± 15%
Reel Size Max/Hub Type	11.1"/NAB, EIA, DIN IEC, CCIR, AEG, CINE	10.5"/NAB, DIN	14"/NAB, EIA, DIN	10.5"/NAB, EIA	10.5"/NAB
Number of Heads	3	3	3	3	3
Capstan Motor Type	ac servo	ac servo	ac servo	dc servo	dc servo
Reel Motor Type	2 ac servo	2 ac servo	2 ac servo	dc	servo ctrl dc
Metering Types	VU/PPM switchable	VU, peak LED	VU	.....	VU, peak LED
Equalization	NAB, CCIR	NAB, CCIR	NAB, CCIR	NAB	IEC
Editing Function	Yes	Yes	Yes	Yes	Dump
SMPTE/Editor Interface	Yes	No	Yes	No	Yes
Tape Timer	Electronic	Manual	Electronic	Electronic	Electronic
Cueing Feature	Search cue, zero; Auto-locate	No	Search cue, zero; Auto-locate	Search zero	Search cue, zero; Auto-location option
Input Connection	Bal Xfmr or Active	Bal Xfmr	Bal Xfmr or Active	.....	Bal Active
Output Connection	Bal Xfmr or Active	Bal Xfmr	Bal Xfmr or active	.....	Bal Active
AF Response (± dB/Hz)	1/20-30k ¹²	2,— 3/30-22k ¹³	2/30-20k ¹²	.....	3/40-24k ¹³
Harmonic Distortion	1%	0.1%	1%	0.8%, 250nWb/m 1kHz	0.8% Note 14
S/N Ratio (R-to-P)	72dB 2-Tr, Ref + 6dB	66dB, 500nWb/m	70dB 8Tr, 1020nWb/m	68dB, NAB A wtd	69dB NAB wtd
Crosstalk (Adj. Tracks)	— 70dB	— 60dB 225nWb/m	— 40dB, 80Hz-12kHz	50dB, 250nWb/m 1kHz	≤ — 55dB, 1kHz
Related Models	.....	.....	.....	34 — 4-Track 38 — 8-Track	Model 48 Model 44 1/4" 4-Track
Reader Service Number	431	432	433	434	435

(12) Ref. 510nWb/m, 1kHz, 15ips. (13) Ref. 250nWb/m, 1kHz, 15 ips. (14) 3% THD is Ref + 13dB, 1kHz.

Manufacturer	TASCAM	Technics/Panasonic	Telex Communications		Trident
Model/Series	52	RS-10A02	Model 3000	1400	TSR Series
Number of Tracks	2	2	1, 2, 4	1, 2, 4	24, 16
Tape Width (inches)	1/4	1/4	1/4	1/4	2
Tape Speeds	B, C	A, B, C	A, B, C	A/B/C & 1%	C/D, B/C option
Variable Speed Range	± 15%	± 6%	No	No	8-42ips
Reel Size Max/Hub Type	10.5"/NAB	10.5"/NAB, EIA	10"/NAB	10"/NAB, EIA	14"/NAB
Number of Heads	3	3	To 4	.....	.....
Capstan Motor Type	dc servo	dc servo	ac sync	dc servo	dc servo
Reel Motor Type	dc servo ctl	dc	ac sync	ac	dc servo
Metering Types	VU, peak LED	.....	.....	.....	VU
Equalization	NAB, IEC, CCIR	NAB, IEC, CCIR	NAB, EIA, DIN, IEC, CCIR	NAB, EIA	.....
Editing Function	.....	.....	.....	.....	.....
Editing Function	Dump	No	Dump	Yes	Yes
SMPTE/Editor Interface	Yes	No	No	No	Yes
Tape Timer	Electronic	Mechanical	Mechanical	.....	Electronic
Cueing Feature	Search cue, zero;	.....	Search cue	Search cue	Auto-locator
Input Connection	Bal Active	.....	Bal Xfmr	.....	Bal
Output Connection	Bal Active	.....	Bal Xfmr	.....	Bal
AF Response (± dB/Hz)	2/30-24k ¹³	3/20-20k, 7.5ips	3/30-18k ¹⁵	.....	2/40-20k, 15ips
Harmonic Distortion	0.8% Note 14	0.8% 185nWb/m	0.2% 160nWb/m	1%	0.5%, 1kHz 250nWb/m
S/N Ratio (R-to-P)	70dB NAB wtd	67dB A wtd	55dB 160nWb/m	60dB NAB wtd	63dB, 15ips 520nWb/m
Crosstalk (Adj. Tracks)	.....	- 60dB, 1kHz	50dB 250nWb/m	50dB	- 50dB, 1kHz
Related Models	Model 42 with mic/line input mixing	.....	.....	.....	.....
Reader Service Number	436	437	438	439	440

(15) Ref 160nWb/m, 1kHz, 7.5ips.

The new Saticon II camera tube. Clearly superior to lead oxide.

Compare the unretouched photos below and see for yourself how the new RCA Saticon* II camera tube reduces specular high-light memory, without red trail.

You no longer have to choose between lead oxide's good handling of highlights and Saticon's well known superiority in other critical performance factors. Now it's a whole new ball game.

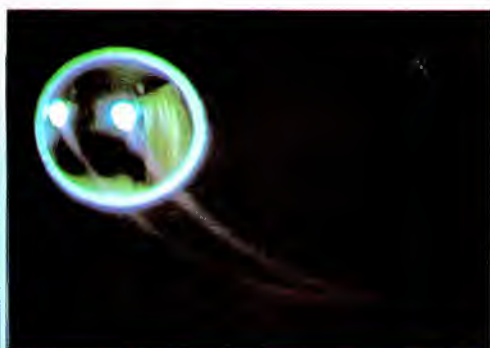
Computer-aided deposition and advanced material purification technologies have given Saticon II a considerably improved photo-conductor. Your benefits: less highlight trail, reduced highlight memory (as much as 75% less than that experienced with earlier Saticon tubes), improved resistance to image burn.

What's more, you still get all of the recognized advantages of Saticon: high resolution,

distortion-free colors, very low lag, and extremely long tube life. And Saticon II is backed by a warranty that's second to none. RCA offers full replacement for any failure in normal use for six months, compared with only two months for Plumbicon™.

Your choice is now clear. For more information on the complete Saticon line, contact your RCA distributor or write to RCA Camera Tube Marketing, New Holland Avenue, Lancaster, PA 17603. Or call (800) 233-0155. In Penna., phone collect to (717) 397-7661. Overseas, contact RCA Brussels, Belgium. Sao Paulo, Brazil. Sunbury-on-Thames, Middlesex, England. Paris, France. Munich, W. Germany. Hong Kong. Mexico 16 DF, Mexico.

*Used by permission of trade mark owner.



Good. Plumbicon XQ1427.

Photograph of direct reflection of flood lamps, produced by camera with CTS circuitry. Note highlight memory with red trail.



Better. Saticon II BC4390.

Same subject and conditions as in photograph at left. Note reduced highlight memory without red trail.



RCA

Circle (57) on Reply Card

AUDIO RECORDER, Reel-to-Reel

Manufacturer	United Research Labs	VIF International	Tandberg of America
Model/Series	Auto-Tec Model S	VIF450 ¹⁶	TB15 20A SE
Number of Tracks	4	2, 4	2, 4
Tape Width (inches)	1/4, 1/2	1/4	1/4
Tape Speeds	A/B/C/D	A, B	A/B, 1-7/8ips
Variable Speed Range	No	No	No
Reel Size Max/Hub Type	10.5"/14" option	14"/NAB	7"
Number of Heads	.....	2	.....
Capstan Motor Type	ac hyst sync	ac sync	2-pole asynchronous
Reel Motor Type	ac induction	ac sync	.....
Metering Types	.....	None	.....
Equalization	NAB	NAB	NAB
Editing Function	Yes	No	No
SMPTE/Editor Interface	No	No	Yes
Tape Timer	No	No	Mechanical
Cueing Feature	No	No	.....
Input Connection	.....	n.a.	.....
Output Connection	.....	Bal Xfmr	.....
AF Response ($\pm$ dB/Hz)	.....	+1,0/50-15k	.....
Harmonic Distortion	0.5%	n.a.	3% 370nWb/m 1kHz
S/N Ratio (R-to-P)	66dB A wtd	55dB 2-Tr	57dB
Crosstalk (Adj. Tracks)	70dB, 1kHz, 185nWb/m	n.a.	50dB 370nWb/m 1kHz
Related Models	.....	.....	.....
Reader Service Number	441	442	443

(16) Designed for background music, play-only, auto-reverse.



Affordable Random Access Video Cart Systems

Cost effective, modular, and expandable



Component Switching and Processing

Modified 3/4" U-Matic Players with

Y-C/DOC outputs or 1/2" Type M with YIQ outputs are switched through our vertical interval Matrix Switcher into a component TBC.

Automatic Directory Reading

Cassettes are loaded randomly into any empty deck. They rewind automatically to the head and the directory, containing a 4-digit reel ID number with precise start and finish times of each segment according to their location with reference to SMPTE time code is read into memory. The status indicating ID found and VTR location is displayed on the terminal.

Send for Brochure

Lake Systems Corporation,
55 Chapel Street, Newton,
MA 02160 617/244-6881



Any Tape Format

Choose from 1" Type C, 3/4" U-Matic, 1/2" Type M, or any combination.

1000 EVENTS Or more with 68K Multi-Event Programmer and Disc Drive.

The computer identifies, searches out, and activates tape segments to be cued and aired in the order scheduled.

Lease Plans Available

LA-KART
LAKE SYSTEMS CORPORATION

Prices Start at \$89,900

Circle (73) on Reply Card

Quality Reliability Performance

"Exceeds all my expectations. Great performance and range. Unexpected power and performance." That's three experienced broadcasters talking about the new Andrew TRASAP™ UHF-TV transmitting antennas recently installed at their stations.

Here are some important features that convinced them to buy TRASAP™:

- Unique traveling-wave slotted array design
- Excellent null fill
- Up to 2.5° beam tilt without loss in gain
- High power rating with reserve capability
- Very low VSWR
- Fiberglass radome for protection from the elements
- And there's more! Obtain complete information in Bulletin 1083 or contact your Andrew Sales Engineer

ANDREW

ANDREW CORPORATION
10500 West 153rd Street
Orland Park, IL 60462
Telephone (812) 349-3300
Plants and representatives
throughout the world



Chester Smith
Owner/Manager
KLOO, Modesto, CA



Wayne Smith
Chief Engineer
Channel 66, Chicago



Robert Porter
Director of Engineering
Spanish Int'l. Network

Circle (75) on Reply Card

P196 13 00 31 Mon Nov29 P196 ELECTRA

INDEX

HEADLINES	101	LEISURE	165
News	102-23	Features	166-8
News index	124		
WEATHER/TRAVEL		ENTERTAINMENT	170
	125-9	What's On	171
SPORTS	130	TV programs	172-4
stories	131-144	Bestsellers	176-7
standings	145-9	Reviews	178
		Movie guide	179
NEWSFLASH	150	YOGI'S PAGES	
		Puzzles	181-6
BUSINESS	151	For kids	187-9
stories	152-6		
currency	157-8	CONSUMER	190-1
grain report	159	Food prices	192
statistics	160	Recipe	194
stocks	161-4	ROUND-UP	199

Electra's index.

P171 13 12:37 Mon Nov29 P171 ELECTRA 3/3

WHAT'S ON

THIS WEEK Nov 29-Dec 3

CINCINNATI ART MUSEUM FILM SERIES
Fire Over England, Thursday 8pm.

TOYS FROM THE ATTIC EXHIBIT Warren County Historical Society in Lebanon, Wednesday through December 31, 9am-4pm. Tuesday-Saturday and noon-4pm Sunday. Admission is \$1.50 for adults and 50 cents for children.

Zino's Before or after the show. Always delicious - 3 locations - more in a moment.

Local-interest items are combined with advertisements.

P126 12 24 58 Mon Nov29 P126 ELECTRA

IRA JOE'S FORECAST

TODAY
morning fog
sunny
high 57

TONIGHT
variable
cloudiness
low 38

TOMORROW
morning sun,
chance of
afternoon
showers
high 57

EXTENDED OUTLOOK 127



Taft teletext weather is tied into WKRC's broadcast weather show and weatherman "Ira Joe."

Taft airs affordable teletext

By Bebe F. McClain, president, B.F. McClain Productions, Asheville, NC

For more than a year, Taft Broadcastings' Cincinnati TV station, WKRC-TV, has been airing a 100-page teletext magazine in the vertical blanking interval using the British World Standard system. Looking

back, Taft is amazed at its low startup and operating costs, the ease of generating text and the great interest aroused in local advertisers. Taft's experience can be helpful to other broadcasters desiring to produce tele-

text programming.

One of the main concerns Taft believes it has dispelled is the idea that stations should not enter into teletext until a standard is adopted in the United States. Taft knows that the

Winsted

THE PERFECT MATCH
for your video equipment

ROLLING CABINETS

Double your
tape storage
space!



Store up to 161 of the 1/4" videocassette tapes in each of these space-saving cabinets. Units move effortlessly on low-profile steel tracks to give you easy access to cabinets positioned behind them. Similar storage systems available for 1"-2" video tapes, cartridges & film.

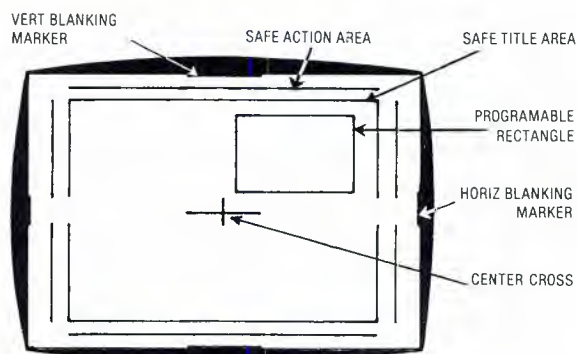
For full-line catalog of video consoles, tape and film trucks, film and videotape storage systems call toll-free or write

THE WINSTED CORPORATION

9801 James Circle, Minneapolis, MN 55431 • (612) 888-1957

PHONE TOLL-FREE **1-800-328-2962**

THE LAST WORD IN SAFE AREA GENERATORS SA-101



- Five separate video channels
- Legal blanking markers
- Action/title areas displayed simultaneously
- Remote pattern selection, black/white, on/off for each channel
- Digitally generated
- Drift-free
- 10 rectangles can be programed from remote panel—any size, any position and stored in internal memory for display on any channel

broadcast video systems Ltd.

1050 McNicoll Avenue, Agincourt, Ontario M1W 2L8
Telephone: (416) 497-1020 Telex: 065-25329

Circle (79) on Reply Card

Circle (137) on Reply Card



Only the beginning

A thing of beauty . . . this Dynair System 21.

Begin with this single, high density frame using as few as 10 inputs and 10 outputs. Select combinations of video, audio, time code, data, tally, or machine control switch modules.

Grow sensibly, easily and cost effectively to impressive matrices of one thousand inputs and one thousand outputs of every module type by simply adding frames and modules.

Grow into high definition TV. If this possibility is in your future, without changing a thing. Bandwidth of the System 21 is already 30 MHz.

Write or phone. We would like to send you additional information. Give us a chance to begin with you as you upgrade your plant.

DYNAIR

5275 Market Street, San Diego, CA 92114 U.S.A. Phone (619) 263-7711 TWX (910) 335-2040

Circle (78) on Reply Card

THE SOURCE

For all your equipment needs



- AKG • Amperex • Ampex
- Atlas • Audiopak
- AudioTechnica • Belden
- Broadcast Electronics
- CRL • CSI • Crown
- Cablewave Systems • DBX
- Deltalab • Electro-Voice • EXR
- Fidelipac • Inovonics
- Jampro-Cetec • JBL • Leader Instruments • Lexicon • 3-M
- Marti • Micro-Trak • Nortronics

Orban Associates • Otari • Phelps Dodge • Revox • Russco

• Shure • Sola • Staco • Stanton • Surcom • Tapco

• Technics • Telex • Urei • VIF and many more.

Call us for fast shipments
from stock

305-651-5752

Telex: 51-4733 ELECTREX MIA



ELECTREX COMPANY © 1983

18680 N. E. 2nd Avenue, Miami, Florida 33179

Circle (76) on Reply Card

AM BROADCASTING · HIGH FIDELITY

Are these terms mutually exclusive?

☐ YES ☐ NO ☐ DON'T KNOW

Suprisingly, many broadcasters may not know that the correct answer to this question is no. Large sums of money are spent each year to purchase new transmitters, new studio equipment, new audio processing equipment and to modify antenna systems for improved AM sound. Unfortunately, until now, there has been no such thing as a professional quality AM monitor receiver. As a result, the perceived fidelity of an AM signal has been severely restricted by receiver performance.

Potomac has developed the SMR-11 Synthesized Monitor Receiver which will let you hear and measure the quality of your transmitted AM signal ... perhaps for the first time. Features include: Crystal Stability; 60 dB Signal to Noise Ratio; Audio Frequency Response ± 0.5 dB, 20 Hz to 8 kHz; Total Harmonic Distortion less than 0.2% (95% Modulation) at audio frequencies above 40 Hz ... please write for complete descriptive brochure.



**THIS DIAL WILL TUNE YOU IN TO THE
NEW SOUND OF AM BROADCASTING**

POTOMAC INSTRUMENTS

932 PHILADELPHIA AVE.
SILVER SPRING, MD. 20910
(301) 589-2662

Circle (77) on Reply Card

production equipment, which represents a significant investment, remains essentially the same no matter what system is adopted. Primarily, the decoding device and/or some transmission equipment (depending on the requirements to decode before or after the signal reaches the TV set) will differ among the various standards.

Although Taft would be able to easily and inexpensively convert from the World System, if another standard were to prevail, it thinks that US broadcasters will reach the same conclusion as it did, after investigating various teletext possibilities. Some of the networks disagree with the company, but Taft has taken the stance that, to be successful, teletext should be generated locally. Therefore, Taft does not want the vertical blanking interval, the last piece of TV real estate, to become subject to network control, especially with the long-range plans of the networks being unclear.

No matter what standard the marketplace ultimately embraces, Taft has proven that stations in medium-sized markets can create their own 100-page teletext magazine with an investment less than the price of a good color camera.

Choosing the World System

John Owen, vice president of TV engineering, and Terry Connelly, vice president of news operations for Taft, looked intensively at all teletext systems before they decided the system widely used in England (often called the British System, or, as it has come to be known, the World System) would be best from technical and programming viewpoints.

Of greatest importance to Taft was that the BBC and Britain's Independent Television (ITV) have been successfully using the teletext system for six years. In comparison, the French Antiope system, although greatly publicized through CBS experiments, has yet to become a commercial venture; and the Telidon system is reaching a few thousand viewers, primarily in Canada. However, more than two million TV sets in 14 countries are equipped with decoding devices based on the World System. Sony, Panasonic, Sanyo and Philips are providing TV sets with built-in decoders to consumers in England, Australia, Germany and elsewhere. Now Zenith offers a set-top decoder using the World System for the US market.*

*At the Summer CES convention in June 1983 in Chicago, General Electric (in a private showing) displayed a TV system with built-in teletext adapter.

Harris 9000 Program Automation...

Smooth sound for a rough market

CKJY-FM broadcasts in the highly competitive Detroit market. Program Director Ronald Burgoyne believes that the Harris 9000 Program Automation System is an essential element in programming strategy:

"I am extremely pleased with the Harris 9000 System. Our sound is much smoother and more consistent. The flexibility and reliable operation in all areas is astounding. The Harris MULTI-FILE™ System, permitting unlimited format variations, is of extreme importance to me in programming the station."

The tight format and "live" sound of Harris 9000 Program Automation are provided by a host of features, including ability to provide voice tracking; voice-over; time announce and back-timing; real-time program update for news, weather, EBS, contests, and more.

For more information, contact Harris Corporation, Studio Division, P. O. Box 4290, Quincy, Illinois 62305-4290. 217/222-8200.



Ronald Burgoyne: "The Harris 9000 System is an asset to any station."



Circle (81) on Reply Card

The difference is what you don't hear



Each inner conductor has 40 strands of small diameter (.00315") copper wire that provide maximum flexibility and avoid breakage.

"Star-Quad" configuration with 4 inner conductors provides a substantial improvement in rejection of EMI.

Polyethylene insulation is a better dielectric than rubber insulation, thereby reducing capacitive coupling for improved high frequency response.

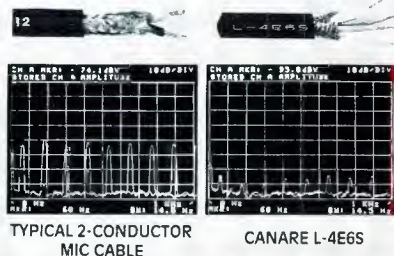
Cotton filler acts as strain relief and also reduces handling noise by preventing changes in stray capacitance.

Very high density, braided shield blocks most static and other noise.

Tough yet very flexible jacket can be unpacked from extreme cold and used immediately. The brittle point is -56°F (-49°C).

Available with a satin finish in 10 attractive colors to aid channel identification and/or to complement visual appearance. Fits standard XLR connectors.

You don't hear the fluorescent lights, motors, SCR dimmers, static, buzz, hum and handling noise with Canare L-4E6S. This shielded professional microphone cable is immune to electro magnetic noise due to its unique Star-Quad configuration. Compared to the leading 2-conductor microphone cable, Canare L-4E6S offers 10 times more rejection of the worst source of EMI...impulse noise from SCR dimmers. This cable blocks the noise, but not the program. Its low series resistance and low capacitance give L-4E6S extended frequency response, in mic runs of over 300 feet the 3 dB downpoint is at 50 kHz.



CANARE

CANARE CABLE, INC.
6733 VINELAND AVE. / NORTH HOLLYWOOD, CA 91606
(213) 506-7602 / (213) 980-8092

Circle (82) on Reply Card

P118 12:15:40 Mon Nov29 P118 ELECTRA



TRI-STATE
news

■ **COLUMBUS** Commuters scrambled again for rides this morning as the bus drivers' strike enters its second week. Talks between the city and the drivers' union broke off Friday and have not been rescheduled. The main problem now is a dispute over sick pay for the drivers.

■ **OHIO LOTTERY** The winning number in Saturday's daily game: **066**. The winning Pick-4 number: **7073**.

Headlines 101 Round-up 199

A regional news page generated at Taft.

The World System, with its 24 lines of 40 characters each, was designed for broadcast situations. Its synchronous format interfaces with the broadcast signal and, because the text is transmitted in 30 groups of 32 characters, there is little problem if slight interruptions occur during a broadcast. More than likely, only a few characters would be affected. Even in Cincinnati, where an uneven terrain creates a TV transmission nightmare, users are experiencing 100% reliability in teletext reception with rabbit ears.

During evaluation of proposed systems, Taft found the NABTS system, being experimented with at NBC and CBS, to be more advantageous to those employing cable transmission. Because NABTS uses an asynchronous format, any disturbance to the broadcasted signal could knock out all the text.

The capability for digitizing graphics by placing artwork on a copystand, as opposed to drawing on an electronic palette, was another convincing factor for Taft, as was the easy inclusion of closed captioning. Over all, the World System seemed to be more flexible and less costly—a more suitable choice for the typical TV station. After its operating experiences, Taft still thinks that its original assessment was correct.

Taft's Electra magazine

The teletext magazine generated for WKRC-TV/Channel 12, Cincinnati, is more a newspaper than a magazine. Although it is touted as 100 pages, it

P125 12:20:51 Mon Nov29 P122 ELECTRA



in brief

■ **WASHINGTON** US park police say the first tourists to arrive yesterday morning at the grave of President John F. Kennedy found a badly burned body at the site. One report suggests it was actually lying in the eternal flame. An autopsy will be conducted today.

■ **NEW JERSEY** After two years without a job, 30-year-old George Epp became a cab driver in Atlantic City. Early this morning he began to play the slot machines during his break. After 20 minutes and \$30, he won \$250,000 - the biggest payoff in history.

Round-up 199 News Index 124

A national news page generated at Taft.

usually runs closer to 125, because many pages have up to nine cycling subpages. With the all-important news, there are many features and advertisements, just as in a newspaper.

To view the text, you push the Text button on the TV's special remote controller, a part of the decoder package placed atop the set. The "cover page" appears with the headline of the top story of the day, the time, date and a partial index, listing the pages where news, sports, business and a full index can be found. It is interesting that the same page numbers are always used for the main categories, such as news, weather, stock reports, business, etc. Viewers tend to memorize these numbers and soon do not need to refer to the index. The first 65 pages are used for these high interest items, which are continuously updated throughout the day. The maximum length of a

INDUSTRY STANDARD

CHAPTER II

The New Otari 1/4" Two Channel 5050B-II

The best selling professional two track audio recorder has finally been improved. We've added the refinements you asked for: The inputs and outputs of the new B-II are transformerless, balanced. The elapsed time indicator is a real-time hours/minutes/seconds L.E.D. display—tape accurate at all speeds. The built-in oscillator provides both 1kHz and 10kHz calibration tones. And we added a low frequency adjustment to the reproduce equalizers.

Behind the clean, new look of the B-II are the same features, performance and reliability you expect from our famous 5050B. We didn't change the rugged quarter-inch thick deckplate or the cast aluminum frame. We kept the switch selectable NAB/IEC equalization, +4dBm/-10dBu output levels, half-track and quarter-track playback heads and three standard reference fluxivity levels. And, of course, the B-II still features three tape speeds, XL type connectors, front panel record equalization and bias adjustments, variable speed, "dump edit" function, and an integral splicing block.

The 5050B-II has been engineered like no other tape machine in the world. When you check out the specifications you'll know why we say it's the best \$5,000.00 tape recorder available for under \$2,500.00. When you work with it, you'll know that we've just raised the industry standard.

OTARI Technology You Can Touch.

Otari Corporation, 2 Davis Drive, Belmont, CA 94002
Tel: (415) 592-8311 Telex: 510-376-4890

Circle (83) on Reply Card



© 1982 Otari Corporation

A teletext commercial designed for Sears at Taft requires no fancy graphics.

P186 13:30:56 Mon Nov29 P186 ELECTRA

BACK TO SCHOOL



TI-35 calculator \$17.99

10 pencils with eraser tops 59cents

Eraser Mate 2 pen, erasable ink 59cents

Electric typewriter with correction \$159.99

YOU CAN COUNT ON **SEARS**

This Should Settle It... Smallest Size/Biggest Sound!

HME's New System 85 Hand-Held Wireless Microphone System



HME just designed an all-new system around the superb Shure SM85 element. We did so well that Shure Brothers Engineering verified its audio performance as being identical in all respects to the SM85.

Here's what you get for features:

- World's smallest professional hand-held using standard long-life 9 volt battery. Battery status LED included.
- All-new receiver . . . shadow switches and annunciator lamps for

simple, easily-understood operation.

- Mike mute switch on side of transmitter, RF carrier switch on bottom . . . no confusing them. Plus, the mute switch can be easily disabled.
- Advanced squelch circuit provides silent quieting whenever the transmitter/receiver link is broken. No more audible dropouts.



h m e
HM ELECTRONICS, INC.

6151 Fairmount Ave.
San Diego, CA 92120
Phone (619) 280-6050
Telex: 697-122



Circle (56) on Reply Card

news report is 70-80 words. The text can be superimposed over the regular program on WKRC.

The last 35 pages are devoted to book and movie reviews, jokes, special events, TV listings, kids' stories, classified and advertisements. Because the system is interactive, puzzles also are offered. Questions are answered by pushing a Reveal button on the controller.

Taft's system has the capability for producing 16 independent 100-page magazines. This capacity is used to backlog stories and to prepare holiday editions. A library of features and graphics, such as maps and pictures of celebrities, can be stored in memory. These graphics are produced from monochrome or color drawings or photos under an inexpensive monochrome camera. The resulting image may be modified using a light pen on the screen. Color can be assigned to any part of the graphic.

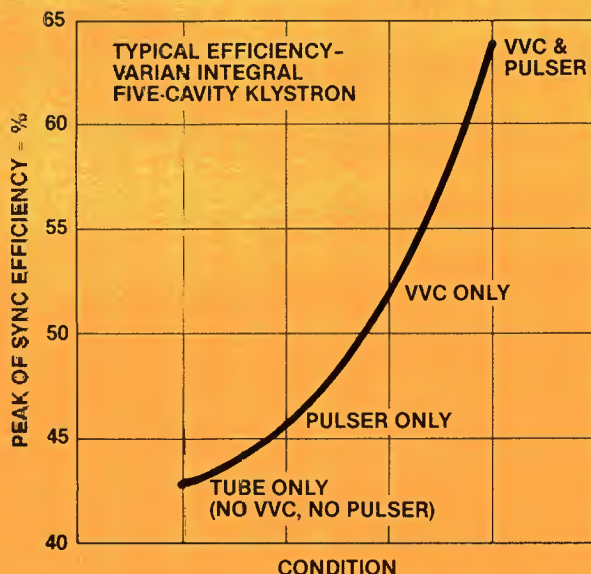
Another special feature allows viewers to read the normal-sized text, or switch to a mode that displays the page expanded to twice the original size, but separated into two consecutive pages, thus helping the visually impaired.

Audience appeal

During the test period, Taft and Zenith placed dozens of decoders into Cincinnati-area homes, periodically moving them, to discover a great deal about the use and appeal of teletext. Viewers did not often use the mode with the text superimposed over a transmitted program. They found graphics to be relatively unimportant, taking up too much room on the page. The audience seemed to want teletext for information, not for the sophistication of network graphics. It would seem that teletext is emerging as its own medium, not another TV program. The audience evidently is able to accept this more readily than many broadcasters who long to incorporate the capabilities offered by a 525- or 625-line system.

Taft found that viewers want the news delivered to them in capsule form the moment they get home. The only faster means than teletext of acquiring this updated news might be to install one's own UPI or AP terminal at home. Viewers want the closing prices of stocks at 4:15 p.m.—ahead of the evening news and tomorrow's newspaper. And, they like having the full list of major stocks and local-interest stocks *Electra* offers, as opposed to brief presentations given by both the national and local news.

Because viewers want TV listings,



Obtain the highest UHF efficiency with Varian's new Variable Visual Coupler.

Broadcasters realize up to 64% efficiency from integral cavity "H" tubes.

At Varian, "H" stands for High Efficiency which the VA953H and VA 946H Series integral five-cavity tubes deliver. From a stand-alone tube, typical efficiency is 43% peak-of-sync. Add a mod-anode pulser and increase efficiency to 46%. Attach a variable visual coupler and, without pulsing, improve efficiency up to 52%. With the variable visual coupler installed and the pulser operating, 62% to 64% peak-of-sync efficiency can typically be obtained.

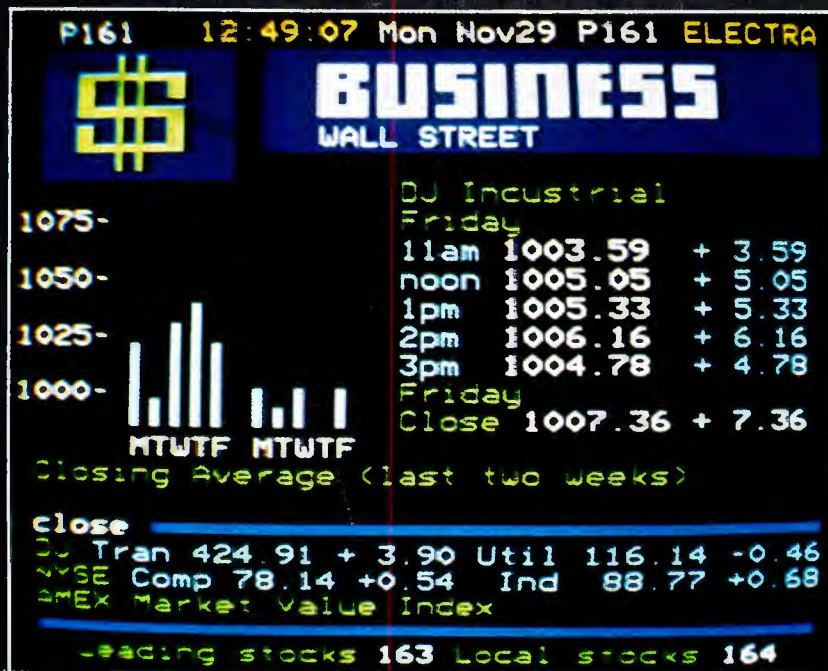
Improved efficiency reduces operating cost.

The payback period realized over the cost of installation of a Varian variable visual coupler can be surprisingly short. Considering the rising cost of electric power, broadcasters will make a sound investment with the inclusion of variable visual couplers.

For more information on efficiency improvement, contact your original equipment manufacturer or Varian Microwave Tube Division.

Varian Microwave Tube Division
611 Hansen Way
Palo Alto, California 94303
Telephone: 415 • 493-5675





The *Electra* stock report is updated throughout the day.

sports and weather, Channel 12 uses cross-promotional efforts to direct the audience to follow up by watching scheduled programs. For example, to promote WKRC's own sports program, the sports section of *Electra*, "Denny's Picks," refers to WKRC's sportscaster. And the weather is listed as "Ira Joe's Report" after Channel 12's popular number-one-rated weatherman. Also, daily program information is given only for Channel 12 to encourage follow-up viewing and to keep people in Cincinnati tuned to WKRC.

Local vs. national

The test period confirmed to Taft that a key to success lies in generating the text locally. Taft's writers edit stories used on the air and work directly from UPI and AP wire stories. UPI, a believer in the teletext concept, provides international, national and state news, sports and financial stories to the operations that, in turn, supply end users (TV stations, etc.) with pre-prepared information. The items are delivered in a condensed word format, justified and centered, ready for direct broadcast or computer reformatting. Contelvision, Manassas, VA, offers this UPI service to broadcasters and cable operators.

Condor THE PREMIER DIGITAL DISPLAY CLOCK FOR BROADCAST TIMING

ET SERIES-ELAPSED TIMERS

ET 500
3 1/2 in. digits

ET 505
2 in. digits



COUNTS UP • COUNTS DOWN • DISPLAYS TIME OF DAY •

- Functions may be switched back and forth without disruption • Remote Control Panel with Push Button Setting Switches allows Easy Time Setting from a distance • Bright LED Displays • Select Display Size — 3 1/2 inches or 2 inches • Simple to operate and to select desired function • Optional Time Base will continue all functions in the event of power failure • Panel mount available • Walnut, brushed aluminum or gold finished frames.



OTHER MODELS AVAILABLE
WITH COUNT UP ONLY
WITH COUNT UP/TIME OF DAY
WITH COUNT DOWN/TIME OF DAY

Condor EASY READING DIGITAL DISPLAY CLOCKS

"C" Series - 3 1/2" LED Display

- Large 3 1/2" high display • 31 LED lamps per digit • Viewing possible from 100 feet away or more • Bright red numbers in black background • 12- or 24-hour format • 4-digit (hours, minutes), or 6-digit (hours, minutes, seconds) • Walnut, brushed aluminum, or gold finished frames • Panel mount available • Dim: 4-digit (18-3/8" x 5-3/8" x 1 1/2"), 6-digit (27-3/8" x 5-3/8" x 1 1/2").

"2" Series - 2" LED Display with similar features as above

CALL OR
WRITE FOR
COMPLETE
CATALOG AND
SPECIAL
INDUSTRY
PRICES



FELDMAR Watch and Clock Center

WORLD'S LARGEST SELECTION OF STOPWATCHES,
CHRONOGRAPHS, FINE WATCHES AND CLOCKS
9000 W. PICO BLVD. Dept. BE
LOS ANGELES, CA 90035 (213) 272-1196

Circle (85) on Reply Card

STL

PRECISION



MAGNETIC TEST TAPES

STANDARD TAPE LABORATORY, INC.

26120 EDEN LANDING ROAD #5, HAYWARD, CALIFORNIA 94545 • (415) 786-3546

Circle (86) on Reply Card

WE GAVE THE WORLD VIDEOTAPE. NOW THE WORLD HAS GIVEN US AN EMMY.



In 1956, we pioneered the development of videotape.
In the years since, we've refined, redesigned, perfected it.
This year, for our performance over all those years, Scotch®
videotape has been given an Emmy. It is an award unprecedented
in the history of the industry. It is gratefully accepted.

THE WORLD WATCHES SCOTCH®

VIDEOCASSETTES

®Scotch™ is a registered trademark of 3M © 1983 3M Co

The Emmy is presented by the National Academy of Television Arts and Sciences

3M

BEHIND THE LENS OR IN FRONT,



TIFFEN FILTERS ARE THE INDUSTRY'S FIRST CHOICE.

Most major manufacturers of video cameras install Tiffen filters as original equipment in the filter wheel behind the lens.

Most major TV stations and studios use Tiffen filters in front of the lens.

Why? Because cameras are only as good as their components. When quality components are required Tiffen filters meet all the requirements.

They're rugged, reliable, precision-made. And the performance is always outstanding.

Superior technology and quality craftsmanship combine to make Tiffen filters the industry's first choice.

Tiffen Makes Filters For:

Ampex	Harris	Rank Taylor Hobson
Angenieux	Ikegami	RCA
Canon	IVC	Schneider
Fernseh	Marconi	Thompson
Fujinon	Norelco	And Many Others
GE	Phillips	

Write for new
Professional Brochure and Price List.

TIFFEN®

Professional Products Division
90 Oser Avenue, Hauppauge, NY 11788
(516) 273-2500 TELEX 96-7748

Circle (87) on Reply Card



Hilary Goodall, manager of Taft Teletext, joins colleagues in the operations area.



A sample of closed captioning on the Taft teletext system.

Although Taft thinks the UPI service will be a good resource, it plans to continue generating most of the 100 pages itself. Taft's belief in maintaining local control is one of the reasons it does not wish to surrender this vertical interval to the networks. Just as national, all-day radio programs have never been able to compete with local stations, Taft thinks that national teletext will be of little interest compared to local information interspersed with national interest items.

Taft is encouraging other local stations to begin their own teletext services. Connelly said, "The best way to foster creativity in our own people is by having competition. Local competition would be a great incentive."

Easy startup

Owen readily admits that he was a

bit intimidated by the new technology. His initial impression was that teletext was complicated, highly technical and that teletext writers had not been born. But because Taft has never hesitated to enter new fields of technology (among the first to downlink and uplink), the station tackled teletext and found it to be a paper tiger. Owen said, "We set up the equipment one day and were on the air the next."

Taft hired a managing editor of teletext from the BBC, Hilary Goodall, who, in turn, hired three journalism graduates from area colleges. These four people, scheduled in shifts, seven days a week, have no problems creating 100 pages and updating stories many times each day. The graduates, with no experience in computers, much less teletext, have

Economy & quality

For excellence of color and resolution, the Philips LDH6200 14" color monitor uses the most recent hi-brightness tube with a precise on self-converging in-line gun.

Among the many selectable features with front panel access are a switchable time constant facility, horizontal split screen (for color matching between A and B inputs), underscan and contour enhancement.

High quality, excellent color matching and stability combine with low cost to make the LDH6200 the color monitor of choice for television systems.

The modular LDH6200 – another quality with economy product from Philips.

Reader enquiry no. **100**



For further information use the reader reply nos or send the coupon to:
PHILIPS TELEVISION SYSTEMS, INC.

900 Corporate Drive, PO Box 618, Mahwah, New Jersey 07430, U.S.A.
Tel: 201-529-1550 Telex: 37-62558

Canada: Electro & Optical Systems Ltd., 31 Progress Court, Scarborough, Ontario, Canada M1G 3V5 Tel: (416) 439-9333 Telex: 065-2543*

Please send me further information on

☐ LDH6200 Color monitors Inquiry no. **100**

I would also like to know more about

☐ LDK4210/01 Sync. Pulse Generators **101**

☐ LDK14SL – ENG/EPF/studio cameras **102**

☐ LDK14 RGB – EPF/studio chroma-key cameras **103**

Name

Organisation

Address

BE 21183



PHILIPS



Goodall uses a simple, monochrome camera to digitize graphics from the copystand, then to add color.

personnel found was overcoming the initial fear and starting to produce. After the writers developed the knack of brevity, they found themselves becoming creative generating graphics and actually producing drawings with no training or prior experience.

Terry Connelly, Taft vice president of news, shows Zenith set-top decoder and remote control unit now offered for sale in Cincinnati.



trained themselves to compose brief (70-80 word) stories at the keyboard. Then they press one button to transmit the story, or another one to place it in memory.

This effort at Channel 12, the first commercial teletext operation in the country, is no longer an experiment. It is a functioning venture to produce income. The biggest obstacle that Taft



It speaks for itself.

The Orban 622B Parametric Equalizer has achieved near-legendary status in the broadcast industry for good reason. It is the most flexible, musically-useful equalizer on the market today. And, it offers the broadcaster unlimited versatility in production room sweetening as well as the capability to be used on the program line to tailor the sound of the station.

The 622B combines full, 4-band parametric EQ along with tunable notch filters to offer extraordinary control. Our "constant-Q" design provides -40dB attenuation while allowing gentle broadband EQ as well. This means that the 622B can greatly reduce equipment requirements in the production studio.

The demanding broadcaster will also appreciate Orban broadcast-quality construction, stability, reliability, and responsive customer service. Call or write today for details.

orban Orban Associates Inc. 645 Bryant St.
San Francisco, CA 94107 (415) 957-1067
TLX: 17-1480

Circle (52) on Reply Card

IN THE BATTLE OF THE ROUTING SWITCHERS, THERE'S A NEW HEAVYWEIGHT CHAMPION.

	3M Series H 128 x 32	Fernseh TVS-TAS 2000	Grass Valley GL 440	Grass Valley Horizon	Utah Scientific AVS-1
VIDEO					
Crosstalk Video to Video	-65/4.43	-60/4.43	-60/5	-60/5.5	-60.4.4
Hum & Noise (0-4.2 mHz)	-75	-75	-65	-75	-
(IRE WEIGHTING)	-82	-	-	-	-75
Frequency Response (dB to mHz)	±.1/5.5	±.1/5.5	±.1/5	±.1/5	±.1/5
Diff Gain (10-90%)	3.58	.1%	.1%	.25%	.1%
Diff Phase	.1°	.1°	.25°	.1°	.12°
AUDIO					
Crosstalk (dB/kHz) Audio to Audio	-38/20	-85/15	-80/15	-80/15	-75/20
Hum & Noise (dB below out) / FILTER	-122/15k	-109/1	-92/15k	-104/15k	-109/15k
Freq Resp ³⁰ Max Out (dB/dBm)	±.1/30	±.2/24	±.1/24	±.1/24	±.2/24
Over Freq Range	20-20k	30-15k	20-20k	30-15k	30-15k
Com Mode Rej Ratio (dB)	-80	-75	-80	-65	-70

*Data not available

Data based on manufacturers specification as of 4/83

Compare our Series H Hybrid Switching Systems to the competitors and the advantages are easy to see. If you'd like to compare a few more specs, call us toll-free at 1-800-328-1684. In Minnesota, call toll-free

1-800-792-1072. Outside the continental U.S., call International Operations collect at 1-612-736-2543. You'll be knocked out by all our advantages. Broadcast and Related Products Division.

3M hears you...

Circle (90) on Reply Card

3M

SAVE
\$340⁰⁰

DIGITAL AUDIO DELAY

BLEEPMATE™ 675/II

\$1285

\$1625

NAB Sale

Now you can buy this solid-state simplicity for hundreds less than many tape delays cost.



Comex's new Bleepmate-675/II a simple yet sophisticated, fixed, 6-second solid-state delay, has no moving parts (so technical and on-air talent aren't bothered by endless tape/head upkeep). And the 675/II has a broad $\pm$ 1dB, 20Hz to 7.5KHz response. Its low price makes systems redundancy practical, too.

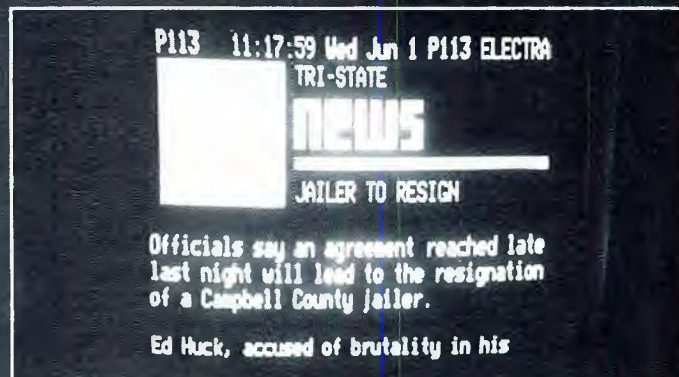
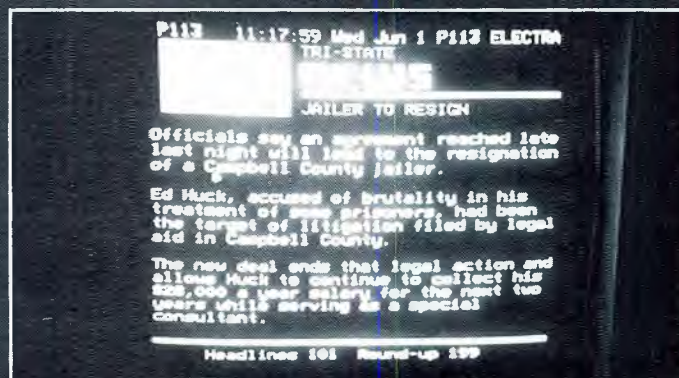
- Limited offer.
- Call or write now.
- Sale ends
12-31-83

Comex Systems
2 Columbia Drive
Amherst,
N.H. 03031

(603) 889-8564
Telex 953120

COMEX
SYSTEMS
A Division of the Successor Corporation

Circle (91) on Reply Card



News on *Electra* as it normally appears can be expanded in display size. Each expanded page displays two screen pages.

Investment can vary

Taft invested \$50,000 in the teletext venture. The money bought a computer, two terminals and peripheral gear to put a 100-page magazine on the air. Even if standards were to change many times, most of this origination equipment still could be used. The investment increases as embellishments are added. For graphic capability, add \$25,000, and for 3-color text, add \$10,000.

Now, for approximately \$180,000, Taft thinks it has as sophisticated a system as anyone would ever need. Included with the computer are four terminals, full graphics, color, all the monitors and peripherals. Add to this the salaries of a manager and a few writers, plus area to house the department, usually one room. Going into its second year of teletext operation, Taft can advise others wishing to take the teletext step.

Zenith agrees with Taft

On June 23, 1983, Zenith offered decoders to the general public priced around \$300. These decoders install easily onto any Zenith receivers manufactured since 1982. Zenith, as the first US manufacturer to provide the decoders, is showing confidence in the World System. Zenith plans to market receivers with built-in decoders for about half the cost of the

present external set-top decoder. Both types of decoders use hand-held remote controllers to change stations and to bring up teletext or closed captioning.

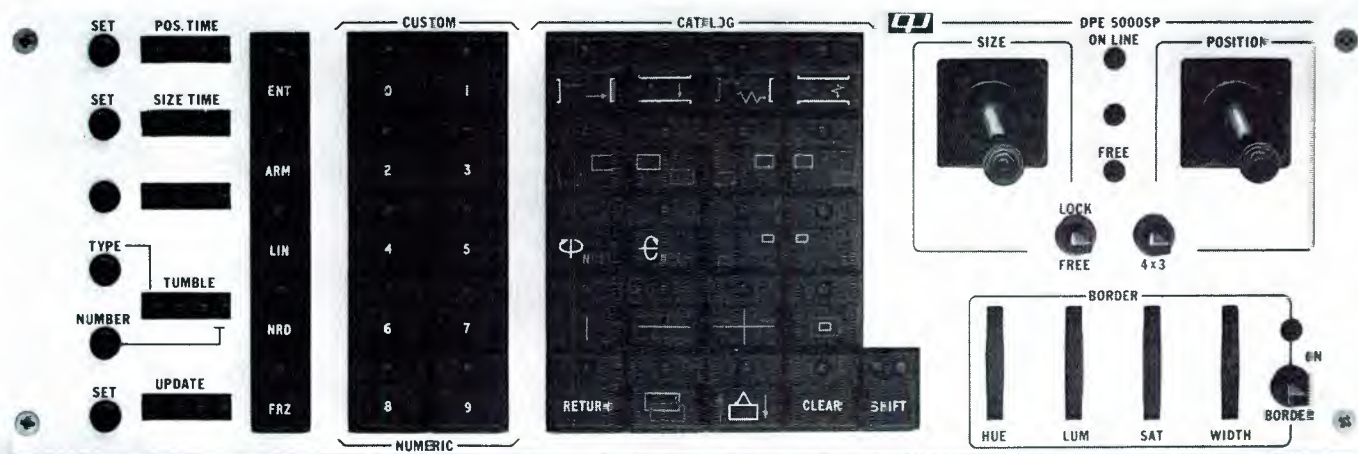
Zenith spokesman Bill Thomas said the company plans to expand the offering of decoders based on the success in Cincinnati. Because it is using its normal distribution system to sell the decoders, Zenith expects to use the Cincinnati market as a model for future distributions and sales training.

A corporate commitment

The venture into teletext is not merely an experiment by one station in Cincinnati, but rather is part of an organized plan by a broadcasting corporation. Taft owns seven commercial TV, five AM radio and six FM radio stations. Aware of alternatives to television competing for viewing audiences, Taft also owns four theme parks and has interests in film and cable ventures.

Taft thinks that broadcast stations can and will lose some of their audiences if they do not present other offerings—especially ones that do not require that the viewer leave the TV set or even change the channel. Electronic journalism is here and Taft wants its audience to remain with it and not go elsewhere for fast news and information. Others seem to

The Quantel DPE 5000/SP.



Now every broadcaster can afford digital effects.

The Quantel DPE 5000/SP makes digital effects affordable by every broadcaster. Every facility.

This exciting single- or multi-channel system gives you infinite compression. Zoom expansion. Variable picture positioning. Freeze and update. Variable border generation. Horizontal squeeze. Vertical squeeze. Even picture splits.

Not bad for a unit that's only 8 3/4 inches high. Perfectly sized for your studio—or mobile unit.

But you get more. Like pre-select of picture position, size, and transition rate. A choice of linear moves or camera-line Quantel-style moves. Noise reduction. And "Digiflip" tumble-flip.

And more yet! Forty moves instantly selectable at the touch of a button—30 pre-programmed and 10 of your own creation.

And now, with "Multilink," you can connect up to five SPs into a multi-channel system. Or use an SP to add a second channel to your DPE 5000. That's flexibility.

On top of all this you get Quantel's superior picture interpolation for the smoothest moves available.

"SP" stands for "special performance." Almost an understatement. Call your local MCI/Quantel office for details. Or get in touch with us directly at 415/856-6226. Micro Consultants, Inc., P.O. Box 50810, Palo Alto California 94303.



MCI/QUANTEL
The digital video people

MCI/Quantel, "Digiflip," and "Multilink" are trademarks of Micro Consultants, Inc.

Circle (92) on Reply Card



A research engineer at the Zenith Technical Center in Glenview, IL, tests a new decoder developed for sale to consumers in the Cincinnati area.

agree. Broadcast groups, such as Bon-neville, Group W and Keycom, also have adopted the World System.

Taft has decided it is in its best interest to offer to help train those wishing to enter the field. A videotape about its teletext operation is available to those interested. Taft has offered assistance to those wishing to come to its headquarters in Cincinnati for instruction.

Taft believes in teletext and the World System because of the reaction in Cincinnati and the worldwide success of that system. Owen summed up the corporate attitude, saying, "The future of teletext in Cincinnati is very good. We expect growth of the system and the viewer use of this new technology, because it is easily installed and easily operated. It should be considered immediately for use by other broadcasters at the local level. Once they discover how easy it is, they will wonder why they hesitated."

||:~:~)))))

Until now, no component video system on Earth has been complete.

Shintron 390. The world's first and only component video switcher and editor-interface.

Now your M-format, BetaCam, or Quarter-Cam tapes can receive the full range of editing, effects, and other post-production techniques used on standard NTSC materials. Never possible before, because there was no such thing as the Shintron 390.

The Shintron 390 is the first switcher that can handle the three separate video component channels simultaneously; for M-format (Y, I, and Q),

BetaCam (Y, R-Y, and B-Y), and for general purpose (R,G,B). It can be driven by time code, and its special Convergence port along with a standard RS-422 port permit direct interface with most professional editors. And, its two independent microprocessors make it smart enough to perform a wide variety of intelligent, programmable functions.

The Shintron 390 is the missing link. Without it, no component video system is complete. Call now for more information.



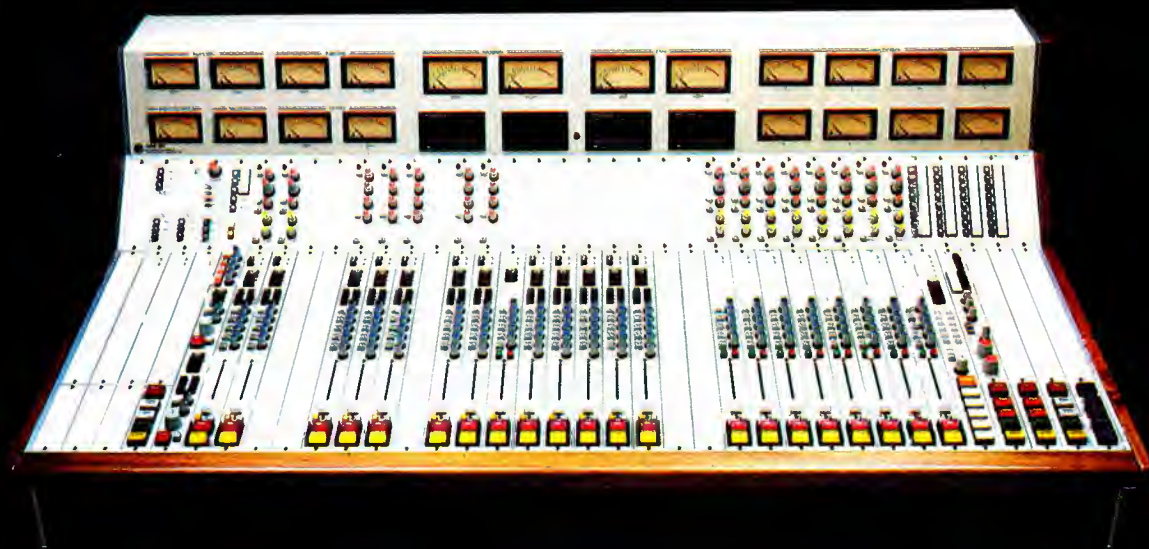
Shintron 390 lets you mix, wipe, key, edit, and post-produce component video tapes with the same flexibility of NTSC systems.

SHINTRON

SHINTRON Company, Inc.: 144 Rogers Street, Cambridge, MA 02142/Tel: (617) 491-8700/Telex: 921497
Shintron Europe: 198 Avenue Brugmann, 1180 Brussels, Belgium/Tel: 02-347-2629/Telex: 61202

A NEW WORLD CLASS BROADCAST OPERATIONS BOARD

ABX



Announcing the only world class BROADCAST OPERATIONS CONSOLE ... the ABX. The famous quality of the 3MX air console is now available in this unique air/production masterpiece. ABX features modular design implemented with aerospace technology. Mainframes of 18, 26 and 34 inputs provide microphone and stereo line inputs, 4 or 8 tracks and 2-mix, slate and talkback, multiple telephone inputs with mix-minus, stereo cue, solo-in-place and complete A/B logic for remote machine control. All inputs may

have stereo equalization or mono equalization and filtering. Four sends and returns add echo and processing to the recording chain as desired.

The ABX is truly a new world class console designed to be equally at home with all music formats, talkradio and broadcast production needs. And the best news is its sound. No compromise in performance, features or construction were allowed. Write or phone toll-free for your brochure.

PACIFIC RECORDERS & ENGINEERING CORPORATION

2070 Las Palmas Drive • Carlsbad, CA 92008 • 619-438-3911 • Telex: 181777

Call toll-free 800-874-2172

Circle (93) on Reply Card

athena

6000

The Most Cost-Effective Telecine Projector Available

The ATHENA 6000 is designed to meet professional requirements in NTSC, PAL and SECAM countries.

- Automatically phase-locks to NTSC, PAL or SECAM field rates
- Unlimited hold time in still frame mode
- 1-2-4-6-8-12-24 frames per second, forward or reverse, totally without flicker
- Remote control option
- Two-year parts and workmanship warranty
- Modular assembly/easy maintenance

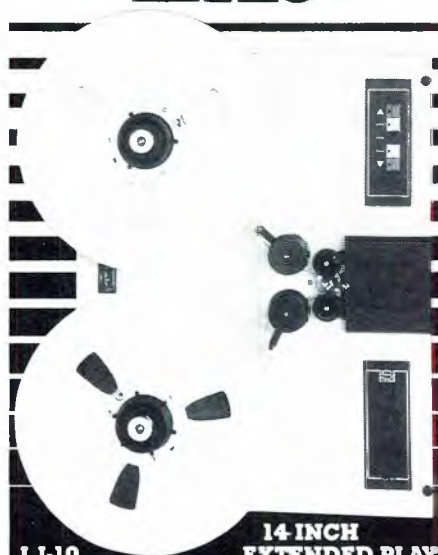


For more information contact:

L-W INTERNATIONAL 6416 Varlei Avenue,
Woodland Hills, California 91367 U.S.A.
Telephone: 213/348-8614

Circle (94) on Reply Card

THE LEGEND LIVES



LJ-10

14 INCH
EXTENDED PLAY
REPRODUCER

THE ORIGINAL SCULLYS

LJScully

THE L.J. SCULLY MFG. CORP.
138 Hurd Ave., Bridgeport, Ct. 06604 U.S.A.
203/368-2332

Circle (95) on Reply Card

news

Harris exciter back in operation

The FCC granted temporary authority allowing AM radio stations using the Harris STX-1 AM stereo exciter to resume stereo broadcasting pending the company's type-acceptance test.

A month ago, the commission had requested that Harris inform the 71 stations using the AM stereo exciter to cease transmission in stereo.

"The granting of the special temporary authorization (STAs) came after the FCC's type-acceptance laboratory completed their initial review of the Harris type-acceptance application recently submitted along with actual measurements on Harris' AM stereo exciters, which was provided to the FCC Science & Technology labs," Peter Carney, Harris' spokesman, said.

Rao awarded diode-gun patent

Amperex Electronic Corporation recently honored Dr. N.V. Rao, technical manager of its Imaging Products Group, who has been awarded US Patent Number 4,388,556 for his invention of the diode gun for use in TV pickup tubes.

L.A. Arpino, Amperex vice president, presented Rao with a bronze plaque reproducing the patent award.

Rao's patent was applied for in 1977 and granted in June 1983. The first production diode gun was introduced at the NAB Convention in 1978 and revolutionized the TV broadcasting industry because of its improved resolution, lag performance, handling of highlights and dynamic range.

Skyband DBS system receives FCC go-ahead

Harvey L. Schein, president and CEO of Skyband, has announced that action recently taken by the FCC cleared the way for the startup of Skyband's direct satellite-to-home TV service. Skyband will be the first nationwide service to offer premium TV programming to rural, non-cabled homes across the United States beginning late this year.

The FCC action came in connection with an application filed by Satellite Business Systems to lease five channels of its newest satellite to News Satellite Television Ltd., a wholly owned subsidiary of Rupert Murdoch's News International.

By deciding that the satellite-to-home service is not broadcasting, the FCC freed it from complying with such broadcasting laws as the equal time provision and the fairness doctrine. The commission decided that

the proposed service falls within the category of "hybrid communications." In other words, the service exhibits characteristics of both broadcasting and point-to-point services and need not be subject to broadcast regulation.

Monitor Award for engineering achievement

The 1983 Video Production Association's Monitor Award for engineering achievement has been presented to Lexicon for introduction of the model 1200 time compressor and in recognition of its contribution in digital processing.

USCI signs agreement for bias traffic system

Data Communications Corporation signed United Satellite Communications, Northvale, NJ, for the BIAS (Broadcast Industry Automation System) traffic system, beginning in September.

USCI represents the first DBS service in North America. Backed by the Prudential Insurance Company, the service planned to begin multichannel transmission by midmonth.

USCI will provide programming on five channels, three of which will be advertiser-supported. The contract calls for the BIAS system to automate scheduling for all five channels with billing and other accounting functions for the commercial channels.

AM stereo briefs

Delco Electronics has announced its intention to build AM stereo radios for selected Buick Motor Division 1984 models. The radios will receive AM stereo broadcast signals using a C-QUAM decoder IC.

In September, 1050 CHUM became Toronto's first AM stereo station. CHUM selected the Kahn/Hazeltine independent side-band stereo system.

Continental Electronics Manufacturing Company has signed a sharing agreement with NAP Consumer Electronics Corporation to manufacture and market Magnavox PMX AM stereo equipment needed by AM radio stations to transmit stereo programming.



In the world of audio production, tension is a killer. Draining creative energy and making tight deadlines impossible. If you're still trying to do today's job with yesterday's technology we've just solved one of your headaches. Our prescription is a dose of our deuce, the TASCAM 42.

Everything you've considered to be a must is there, and a whole lot more. Balanced and unbalanced, with individual connector to interface with broadcast automation equipment and SMPTE control, the 42 fits in anywhere.

To more precisely control tape tension, and yours, our rugged transport is built with a full computer control on all three motors. Our autolocator function with Return-to-zero and Search-to-cue doesn't just start putting on the brakes when it hits the mark, it stops on the dime.

You also get a positive/negative real time counter and a precision splicing block mounted just below the plug-in fixed mount head assembly, where it belongs. That translates to faster, more accurate editing, and the peace of mind that comes with it.

To learn more about the hottest half-track in the under \$2,500 class see your TASCAM dealer or write TASCAM Production Products, 7733 Telegraph Road, Montebello, CA 90640, (213) 726-0303.

Copyright 1983-TEAC Corporation of America

HOW TO RELIEVE TENSION IN THE CONTROL ROOM.

TASCAM
TEAC Production Products

Circle (96) on Reply Card

November 1983 **Broadcast Engineering** 119

Perfect Audio for your video!



The **Logitek** AUDIORACK

- A complete broadcast-quality console in a 19" rack or tabletop mount
- Dual-source monitoring plus cue and talkback
- Built-in distribution amplifiers
- Excellent reliability; user-replaceable parts

**CALL US TOLL-FREE AT
800-231-5870**

(Texas, Alaska, Hawaii call collect 713-782-4592)

Logitek Electronic Systems, Inc.

3320 BERING DRIVE • HOUSTON, TEXAS 77057 • (713) 782-4592

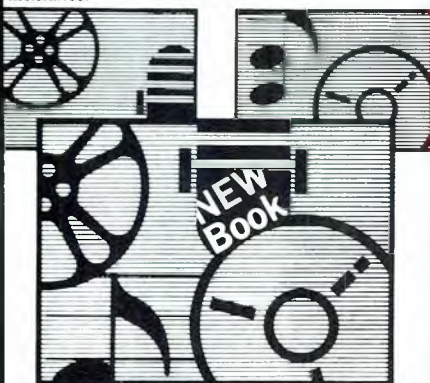
Circle (97) on Reply Card

Videotape Editing

Videotape Editing-Communicating With Pictures And Sound answers every videotape editing question:

When to edit? When to (and when not to) use a dissolve or wipe? How to cut? How to use complex sync roll editing and audio sweetening? How to affect the mood and pace of a show? Why and how to perform computer editing without losing creative control? It even takes the mystery out of time code and user bits.

Beginning editors, experienced pros, film editors and media managers will all appreciate *Videotape Editing*. This new book is your guide through the world of videotape editing including time code and computer assistance.



Videotape Editing-Communicating With Pictures And Sound By Michael D. Shetter

• 165 pp. • 144 illus. • 6"x9" Hardbound
\$32.20 (\$34.00 in IL)

Order Today! • Major Credit Cards Accepted
Brochure Available • (312) 364-1900 Ext. 825

SE Swiderski Electronics
Audio/Video Engineers

1200 Greenleaf Ave. • Elk Grove Village, IL 60007 • (312) 364-1900

Circle (98) on Reply Card

associations

NRBA

National Radio Broadcasters' Association

1705 De Sales Street, NW
Washington, DC 20036
1-202-466-2030

NRBA reiterates plea for deregulation

Testifying before the House Subcommittee on Telecommunications Oct. 6, NRBA's new president, Bernie Mann, called for the complete deregulation of radio and for the ending of all radio regulation except technical.

The House Subcommittee on Telecommunications, led by Chairman Tim Wirth (D-CO), at press time planned to reach a consensus and to have a "broadcast reform" bill ready for mark-up by late October.

NRBA convention report

- Oct. 4-7, 1983
- New Orleans, LA
- Attendance—4500
- Exhibitors—83
- Hospitality suites—68
- Discussion groups—47

When radio broadcasters met at the 1983 NRBA Convention, AM stereo continued to be a hotly discussed topic. Much of discussion centered on the FCC's recent orders to cease using the Harris system, a move that was reversed soon after, while the commission considered questions of type acceptance.

Motorola invited attendees to listen to its system while seated in a new Buick automobile, which was part of its exhibit. Continental Electronics Manufacturing Company announced the assumption of manufacturing of transmission and monitoring facilities for the Magnavox PMX equipment, while Kahn Communications showed a line of reception systems. Sony stressed the SRF-A100 AM stereo receiver, and Broadcast Electronics showed a prototype of a Motorola system AM stereo exciter.

The use of SCA subcarriers captured the attention of many broadcasters. Besides the possibilities of data or audio services as extra revenue sources, paging systems were highlighted by Reach, BBL Industries and Motorola Communications & Electronics.

Jim McKinney, FCC Mass Media bureau chief, outlined benefits of recent rule changes to the Daytime

Broadcast Association meeting. McKinney also took part in the Docket 80-90 panel discussion and advised broadcasters that as many as 1500 new FM stations ultimately will result within the next five years, from rule changes. The docket has been controversial, because of the possibility of reclassifying some FM stations if certain power and antenna height requirements are not met.

Notable events and comments included:

- Keynote speaker, Mark Fowler, FCC chairman, after receiving a standing ovation, stressed the 80% reduction in paperwork that has resulted from FCC deregulation of radio broadcasting, but said that the broadcasters must work with the FCC to achieve complete First Amendment freedom.
- Walter Cronkite, recipient of the 1983 NRBA Golden Radio award, warned against excessive compression of news to make clever headlines. Cronkite expressed a grave concern about possible distortion of information and indicated that it would be better to do no news at all, rather than to distort the information presented to the public.
- WFMT-FM, Chicago, was cited by the Armstrong Memorial Research Foundation for its continued excellence in engineering.
- Abe Voron, executive vice president of NRBA, was honored by the executive board of directors when a memorial educational fund was established in his name. In announcing the fund, Bob Herpe of the board lauded Voron's unceasing dedication to the causes of the broadcasters.



National Association of Broadcasters

1771 N Street, NW
Washington, DC 20036
1-202-293-3570

FCC asked to investigate AT&T retroactive billing

The NAB has asked the FCC to act promptly on a complaint by WLWT-TV, Cincinnati, and to investigate other instances in which stations have been improperly charged by AT&T for use of Type 7004 interexchange channel service.



MAGNA-TECH

THE SOUND HEARD AROUND THE WORLD

**Magnetic Film
Recorders and Reproducers
for Television and Film
Sound Post-Production**

HIGH SPEED

Telecine Magnetic Followers
Video Tape-Film Interlock
Electronic Looping
Dubbing Systems
16 and 35mm Electronic Projectors
Total Facility Engineering

WORLDWIDE SALES OFFICES

Paris
Hi-Fidelity Services
4 Rue Semard
75009 Paris, France

Sydney
Magna-Techtronics (Aust.)
PO Box 150
Crows Nest NSW 2064
Australia — Telex 24655

Johannesburg
General Optical Co., Ltd.
15 Hulbert Road
Johannesburg 2001,
South Africa

Rome
Alberto Sciarretta
Via Siria 24
Rome 00179
Telephone 7943618

Brussels
A.R.C.
Rue de Boisdé Linthout 45
1200 Brussels Belgium

Hong Kong
Paul Yang and Associates
901 Star House
3 Salisbury Road
Kowloon, Hong Kong

Bombay
Capt. P.K. Vishwanath
234/4 Rama Baug,
Deodhar Road
Bombay 400 019, India

Kehl West Germany
Zenon GMBH
Postfach 1743
Hauptstrasse 128
Kehl am Rhein
Tel: 07851/2991
Telex: 753537

London
Branch & Appleby
42 High Street
Harrow-on-the-Hill
Middlesex HA1 3LL,
England

Kuala Lumpur
Kinematronika Sdn. Bhd.
2852, Jalan Selangor/
Persekutuan,
Federal Hill
Kuala Lumpur, Malaysia

Caracas
Cine Materiales srl
Apartado Postal 61.098
Caracas 106 Venezuela

MAGNA-TECH ELECTRONIC CO., INC.

630 Ninth Avenue, New York, N.Y. 10036

Telephone (212) 586-7240

Telex 126191

Cables "Magtech"

Circle (99) on Reply Card

Wide Eye I & II

Low-cost, lightweight,
wide-angle lens
attachments for your
ENG/EFP video zoom lenses.



- Front-mounted *Wide Eye I & II* readily convert most video zoom lenses into *ultra wide-angle* fixed focal-length lenses with no loss in light transmittance.
- Made of high-quality **optical glass** with multiple anti-reflective coatings.
- *Wide Eye I* increases the widest angle of the zoom lens by about 35% with minimal distortion. *Wide Eye II* increases it by about 50% for a "fish eye" effect.
- Easily attached to most professional ENG/EFP zoom lenses which feature macro and/or adjustable back-focus.
- Ruggedly constructed. Supplied with Naugahyde pouches featuring Velcro closure and belt loops.



Rental • Sales • Service



Film/Video
Equipment
Service Co.

1875 So. Pearl St., Denver, CO 80210 • 303/778-8616

Circle (104) on Reply Card

CONNECTORS AND MICROPHONE CABLES	BLANK-LOADED AUDIO CASSETTES
TAPES & CASSETTES from AMPEX AGFA BASF MAXELL TOK 3M	EMPTY REELS AND BOXES
NAB BROADCAST CARTRIDGES	CASSETTE BOXES, LABELS, ALBUMS
ACCESSORIES	

Ask for our
44 PAGE CATALOG
of

**PROFESSIONAL
SOUND RECORDING
& DUPLICATING SUPPLIES**

Recording Supply Div. of Polyline Corp
1233 Rand Road, Des Plaines IL 60016
(312) 298 - 5300

35

Circle (105) on Reply Card

Last September, AT&T raised its rates but failed to properly notify at least 12 TV stations of the retroactive increase until months after the new tariff went into effect. NAB urges the commission to undertake an investigation of the matter in order to determine the precise scope of the illegal conduct. NAB said that although some stations have paid under protest, others have refused to pay the charges pending an FCC decision.

The association said that had stations been properly notified, as required by FCC rules, they would have had the opportunity to avoid the "severe economic impact of the retroactive rate increase by either budgeting for the new rates or switching to an alternative transmission service."

Radio Marti bill passes

In a major victory for radio broadcasters, the Senate recently passed the *Broadcasting to Cuba* bill, encompassing the NAB's Voice of America amendment to protect US stations from Cuban retaliatory interference. NAB President Edward O. Fritts issued the following statement on the unanimous consent action on Capitol Hill:

"The vote by the Senate is a major victory for radio broadcasters and the public. The bill places Radio Marti under Voice of America jurisdiction, on the VOA frequency, operating in compliance with VOA standards. It will ensure a more objective, accurate and balanced standard of broadcasting with a less likely possibility of Cuban retaliatory action.

"This legislation is a tribute to the effectiveness and persuasiveness of American radio broadcasters. Capping months of effort, over 300 telegrams from stations across the country were delivered to the Senate within the last week. Their persistence has helped assure interference-free maintenance to our system of broadcasting. Further, the bill strongly encourages the administration to pursue resolution of any existing and future Cuban interference problems."

SMPTE

Society of Motion Picture & Television
Engineers

862 Scarsdale Ave.
Scarsdale, NY 10583
1-914-472-6606

New Fellows elected

The board of governors of the SMPTE, upon the recommendation of

the Fellow Membership Award Committee, under the chairmanship of Charles E. Anderson, Ampex Corporation, has conferred the distinguished grade of Fellow Member upon the following individuals:

- **John L. Baptista**, director of Processing Technology, MGM Laboratories. He holds responsibility for the areas of processing efficiency, chemical use efficiency and silver recovery optimization.
- **Bernard L. Dickens**, senior staff engineer, CBS Technology Center. He is responsible for the determination of performance criteria for analog component recorders in broadcast video recording systems.
- **Leo Diner** of Carmel Valley, CA, founder of Diner Films. His ability to understand engineering problems and to create innovative cinematic equipment and put it to practical use in his work enabled him to design and build laboratory equipment often not available in the marketplace.
- **Joseph Flaherty, Sr.**, who began his career as an engineer with WDAF, one of the original NBC Radio Network stations, in 1925.
- **Ronald N. Haig**, consultant to the motion picture field.
- **Thomas E. Mehrens**, senior broadcast engineering specialist at Sony Broadcast Products Company.
- **Michael J. Milne-Smith**, technical manager of Rank Film Laboratories, England. He is responsible for the company's technical operations.
- **Kerns H. Powers**, staff vice president, Communications Research, for RCA Laboratories.
- **John P. Pytlak**, photographic engineer and group leader of the Motion Picture Pilot Laboratory and Motion Picture Applications Technology Groups for Eastman Kodak Company.
- **Donald C. Rogers**, vice president of the Academy of Motion Picture Arts & Sciences.
- **Charles A. Steinberg**, executive vice president and chief operating officer at Ampex Corporation in Redwood City, CA.
- **Michael J. Strong**, senior sound engineer for World Wide Pictures.
- **Hirozo Ueda**, senior managing director of Fuji Photo Film Company, Ltd.
- **Howard E. Wilkinson**, regional engineer for production facilities for the Canadian Broadcasting Corporation's Ontario region. He is involved in the planning and realization of production facilities for radio, TV and film operations.

||:~::~|||

Quad-Eight Automated Custom
Console, Alfred Hitchcock Theatre,
Universal Studios.

Thoroughbred

The lineage of the
248 Component Series
includes the largest and
most sophisticated audio
consoles in the world. **248** -
a manufactured console with
custom capabilities and an
uncompromised heritage —
Quad-Eight quality and
experience!



quad/eight electronics

11929 Vose Street, North Hollywood, California 91605

Telephone: 213-764-1516

Telex: 662-446 QUADFATHER LSA

FREE 32pg Catalog & 50 Audio/Video Applic.

PWR SUPP. EQ,
PHONO, MIC,
TRANS. ACN,
TAPE, VIDEO,
LINE, OSC.

Stereo/Mono Pwr Ampl.

Video & Audio Dist. Ampl.

8-in/2-out, 12-in/4-out, 16-in/4-out
TV Audio & Recd Prod Consoles

OPAMP LABS INC (213) 934-3566
1033 N Sycamore Av LOS ANGELES CA, 90033

Circle (112) on Reply Card

HEAD RE-CONTOURING

Standard 24 hour service. All Mfg'r's & Trk formats: Audio, Video, & Still Storage. Full line of replacement heads & accessories are also available. Send for FREE brochure.

RESTORATION
15904 STRATHERN ST. #23 • VAN NUYS, CA 91406
(213) 994-6602

Circle (113) on Reply Card

BLACKWRAP™

FLEXIBLE MATTE BLACK ALUMINUM

Heavy Duty, .002" Thick, Form Holding
Coated 2 Sides, 12"x 50", 24"x 25", 36"x 25"

THE GREAT AMERICAN MARKET
826 N. COLE AVE. HOLLYWOOD • CA 90038 213/461-0200

Circle (114) on Reply Card

Replacement Tape Heads For:

MCI - 24 & 16 Trk - Any Model

In stock & ready for immediate delivery
24 Trk = \$1550. ea. 16 Trk = \$1375. ea.
Mfg. by APPLIED MAGNETICS, Belgium
Many other replacement heads available
SPRAGUE MAGNETICS, Inc.
Tel: (213) 994-6602 / Tlx: 66-2922

Circle (115) on Reply Card

NOW SAFE AREA, SAFE TITLE AND CENTRE LINES ARE AFFORDABLE: \$1095

8 independent loop thru video channels, each can have any combination with digitally derived stability

DATA SHEET ON REQUEST

Maric Industries Ltd., 2978 Pasture Circle
Port Coquitlam, B.C. V3C 2C2 Canada

Circle (116) on Reply Card

Replacement Tape Heads For:

MCI - 1/4" & 1/2" - 2 Trk - JH110A or B

In stock & ready for immediate delivery
1/2" = \$380 each 1/4" = \$180 each
Mfg. by WOELKE, Germany
Many other replacement heads available
SPRAGUE MAGNETICS, Inc.
Tel: (213) 994-6602 / Tlx: 66-2922

Circle (117) on Reply Card

HEAD RE-LAPPING AND NEW HEADS FOR AMPEX

Worn cartridge and reel to reel heads re-contoured and re-lapped for original performance. Send for free brochure.

R. K. Morrison Co.
819 Coventry Road • Kensington, CA 94707
(415) 525-9409

Circle (118) on Reply Card

Replacement Tape Heads For:

MINCOM - M-79 - 24 Trk Recorders

In stock & ready for immediate delivery
24 Trk = \$1550. each
Mfg. by APPLIED MAGNETICS, Belgium
Many other replacement heads available
SPRAGUE MAGNETICS, Inc.
Tel: (213) 994-6602 / Tlx: 66-2922

Circle (119) on Reply Card

new literature

Consolidated Electronic Wire & Cable

-Buying guide: "The Complete Guide to Electronic Wire and Cable," (80 pages).

Circle (585) on Reply Card

Alexander Manufacturing Company

-Catalog: "Replacement Batteries," (12 pages).

Circle (586) on Reply Card

Biddle Instruments

-Catalog: "Electrical Testing and Precision Measuring Instruments," (12 pages).

Circle (587) on Reply Card

Ledex

-Data sheet: "DTMF System, Model 2212."

Circle (588) on Reply Card

Integrated Computer Systems

-Catalog: "Digital Processing Courses."

Circle (589) on Reply Card

Kilovac

-Data sheet: "Model KC-28 High Voltage Relay," (2 pages).

Circle (590) on Reply Card

Howard W. Sams & Company

-Book: *Basics of Audio and Visual Systems Design*, (125 pages), \$15.95.

Circle (591) on Reply Card

Mercury Wire Products

-Technical monograph: "Understanding and Applying Shielding Specifications for Wire And Cable," (8 pages).

Circle (592) on Reply Card

Analog Devices

-Technical journal: "Analog Dialogue," (28 pages).

Circle (594) on Reply Card

BE STATEMENT OF OWNERSHIP

Statement of Ownership, Management and Circulation (Act of August 12, 1970; Section 3685, Title 39, United States Code).

- 1A. Title of publication: Broadcast Engineering
- 1B. 338-130
2. Date of filing: Sept. 22, 1983
3. Frequency of issue: Monthly except in November, when 2 issues are published.
- 3A. Number of issues published annually: 13
- 3B. Annual subscription price: _____
4. Complete mailing address of known office of publication (Street, city, county, state, zip code): 9221 Quivira Road, Overland Park, Johnson County, KS 66215.
5. Location of the headquarters or general business offices of the publisher (not printers): 9221 Quivira Road, Overland Park, Johnson County, KS 66215.
6. Names and complete addresses of publisher, editor, and managing editor. Publisher (Name and Address): Cameron Bishop, 9221 Quivira Road, Overland Park, KS 66215. Editor (Name and Address): Bill Rhodes, 9221 Quivira Road, Overland Park, KS 66215. Managing Editor (Name and Address): Rhonda L. Wickham, 9221 Quivira Road, Overland Park, KS 66215.
7. Owner (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual must be given. If the publication is published by a nonprofit organization, its name and address must be stated.) Intertec Publishing Corp., 9221 Quivira Road, Overland Park, KS 66215.
8. Known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages or other securities (If there are none, so state): None.

	Average No. Copies Each Issue During Preceding 12 Months	Single Issue Nearest To Filing Date
A. Total No. Copies Printed (Net Press Run)	41,017	45,325
B. Paid Circulation		
1. Sales through dealers and carriers, street vendors and counter sales	--	--
2. Mail subscriptions	427	477
C. Total Paid Circulation	427	477
D. Free Distribution (including samples) by mail, carrier delivery or other means	38,449	44,117
E. Total Distribution (Sum of C and D)	38,876	44,594
F. Copies Not Distributed		
1. Office use, left-over, unaccounted spoiled after printing	2,141	731
2. Return from News Agents	--	--
G. Total (Sum of E and F should equal net press run shown in A)	41,017	45,325

I certify that the statements made by me above are correct. (Signature of editor, publisher, business manager, or owner.)

CAMERON BISHOP

For additional advertiser information, use the Reader Service Card in the back of the magazine.

How to avoid spending too much on too little mixer.

Introducing the Ramsa WR-8210A.

When you sit down in front of the new Ramsa WR-8210A, you'll discover a level of performance, ease of operation and flexibility you'd expect to find in more expensive mixers.

In fact, one of the more innovative design features of the WR-8210A is it lets you record, overdub and mixdown without having to repatch.

The flexible send system allows you

to simultaneously send a cue signal to the studio as well as a mixdown signal to the control room.

In order to give you the tone control you need, the three-band variable frequency equalizer will balance the highs, midrange and lows. And the electronically balanced Mic inputs will keep unwanted noise from coming between you and your sound.

What's more, Ramsa's Phantom Mic Power provides you with up to 48 V DC to drive condenser microphones.

And to keep an eye on everything, the four LED bar graph meters are designed for quick response and easy reading.

The Ramsa WR-8210A. Not only is it one of the easiest high-performance mixers to use, but its price makes it easy to own.

RAMSA



Please send me more information about the Ramsa WR-8210A.

Name _____
PLEASE PRINT

Address _____

City _____ State _____ Zip _____

Phone () _____

Return Coupon To: Panasonic Industrial Company, Professional Audio Systems, One Panasonic Way, Secaucus, N.J. 07094.

BE

Panasonic
PROFESSIONAL AUDIO SYSTEMS

Circle (106) on Reply Card

www.americanradiohistory.com

Camralite™



VARIABLE INTENSITY 'OBIE' LIGHT CONTROLS FACIAL SHADOWS

- VARIABLE AREA REFLECTOR
- KEEPS CONSTANT COLOR TEMPERATURE
- LIGHT WEIGHT
- MOUNTS ON ANY FILM OR VIDEO CAMERA FOR CLOSE-UP WORK
- COMPLETE ACCESSORIES

WRITE OR CALL FOR
INFO ABOUT HANDY
CAMRALITE KIT

THE
GREAT  AMERICAN
MARKET

826 N. COLE AVENUE HOLLYWOOD CA 90038
213/461-0200

Circle (123) on Reply Card

new products

Transmitter

American Uplinks recently introduced a new mobile satellite transmitter. Mounted on a 24-foot diesel truck, the new unit is lighter, smaller and more agile than systems mounted on tractor-trailer rigs. The unit offers 3-port feed, allowing it to receive satellite signals in two polarities and transmit in one polarity using its 5m Comtech antenna mounted on a detachable trailer.

Circle (310) on Reply Card

Videotape reloader

The videocassette tape loader/reloader/reviewer from Audico loads the exact tape lengths directly into U-matic VHS and Beta housings. The reload feature automatically removes old tape without taking the housings apart, thus enabling their convenient reuse. The whole process takes about two to three minutes.

Circle (311) on Reply Card

Accessories

To complement its KY-310U professional video camera, JVC Company of America is now marketing several key accessories, including remote control unit, studio viewfinder and shotgun microphone. The accessories are compatible with JVC ProCam series video cameras as well.

Circle (308) on Reply Card

Camera light



Frezzolini Electronics has introduced the new Frezzi Mini-Fill, a 75W, 12V camera light that weighs only 13 ounces, including attached 3-foot cable and plug. It mounts directly to video and cine cameras, tripods or

hand-grips. The light-head has a standard tungsten-halogen 3200° K bulb mounted in a reflector and provides approximately 40 minutes of intense light per charge.

Circle (313) on Reply Card

Video camera

Sony Video Communications has set pricing and availability of its new color video camera, the DXC-M3. The 3-tube, ultracompact unit will have a suggested end user price of \$6990 and is available for immediate delivery. The unit has ultrahigh resolution of 650 horizontal lines, geometric distortion of less than 1.5% in all zones and a signal-to-noise ratio of 57dB.

Circle (314) on Reply Card

Equalizer

The Pro-Graph PEQ-1 16-band equalizer from Polyfusion Electronics allows programming of 64 response curves in memory. A display screen, comprised of the lighted graticule and a 240-LED matrix, indicates the attenuation of each band center when a stored program is recalled.

Circle (315) on Reply Card

Data links

Lightwave Communications has announced the development of the second in a series of fiber-optic RS-232C data links. The FO-232LD optical modem extends the operating distance of the original FO-232 from 1.25 to 2.5 miles. Both units are used for the transmission of asynchronous data via fiber-optic cable at speeds up to 100kbits/s. Each system is completely plug-to-plug compatible with existing RS-232C 25-pin connectors meeting EIA RS-232C and CCITT V.24.

Circle (316) on Reply Card

Wireless microphone receiver

Cetec Vega's new model R-42 Pro Plus wireless microphone receiver offers switch-selectable DYNEX II, a new audio processing technique. System dynamic range with DYNEX II is typically 108dB, A-weighted. Even with DYNEX II switched out, the ultralow noise receiver has a 92dB signal-to-noise ratio. Highest adjacent-channel rejection is achieved with 16 poles of IF filtering.

Circle (320) on Reply Card

Cable

Belden Electronic Wire and Cable has designed a hybrid wire and optical fiber duplex cable for use with

antonbauer Pro Pac 90™

The *professional* VTR battery.



Exclusive Features:

- **Value...**the Pro Pac 90 is a long life, dependable performer...it is not a conventional throw-away VTR battery.
- **100% computer tested...**a printout of test results is delivered with each battery.
- **100% overcharge protection...**every cell is individually monitored; the danger of overcharging is eliminated.
- **Triconn™ connector...**includes cell monitor output for safe and dependable charging. (Patent Pending)
- **High Impact molded case...**special ribbed construction protects NiCad cells from damage.
- **Accessible fuse...**professional design includes snap-in fuse and spare fuse.
- **Special premium grade fast charge NiCad cells.**
- **Direct replacement for Sony BP-90 VTR battery.**



Lifesaver 8 Hour Quad, LSQ4, can charge any combination of up to 4 Pro Pac 90 VTR batteries or Snap-On™ batteries. The Pro Pac 90 can also be safely charged in one hour with the Lifesaver Fast Charger, LSFC. The Lifesaver chargers prolong battery life and keep batteries fully topped indefinitely.



*The quality standard
of the video industry.*

Anton/Bauer, Inc. □ One Controls Drive, Shelton, CT 06484 □ 203-929-1100

Circle (107) on Reply Card

www.americanradiohistory.com

The Professionals



A complete new line of cartridges built to the exacting standards of professional requirements...

The famous Stanton 881S set a new standard of performance for world professionals and audiophiles alike. Now built to the same careful standards, Stanton introduces three new cartridges—881E, 880S and 880E. The 881E includes the calibrated perfection of the 881S but with an elliptical stylus. The 880S and 880E maintain the same high standards of performance, in applications where calibration is not of prime importance.

The "Professionals" a series of four cartridges featuring all the famous Stanton performance features at different price levels, designed for every budget requirement.

For further information write to Stanton Magnetics Inc., Terminal Drive, Plainview, N.Y. 11803



Circle (108) on Reply Card

Frezzi™ "High-Tech" fast-charge all-purpose battery.

Full 4aH capacity provides longer run-times for VTRs, cameras & lights. Direct replacement for your old BP-90s.

For information call (201) 427-1160

Frezzolini Electronics Inc.

7 Valley St. Hawthorne, N.J. 07506 • TWX: 710-988-4142



NEW
exclusive

Extra output connector for portable lights.

Made in U.S.A.

Battery Pack Model FBP-90FC

Circle (109) on Reply Card

When accuracy Counts... Count on Belar for AM/FM/TV MONITORS



BELAR
AM MODULATION MONITOR



BELAR CALL ARNO MEYER (215) 687-5550
ELECTRONICS LABORATORY, INC.
LANCASTER AVENUE • DORSET, DEVO. PA. 19333 • BOX 826 • (215) 687-5550

Circle (110) on Reply Card

computer terminal systems. The cable is composed of one optical fiber and two 20 AWG tinned copper conductors with one 20 AWG tinned copper drain wire.

Circle (317) on Reply Card

Transformers

Multiproducts International has introduced a new line of telephone coupling transformers. Designed for use with telephone equipment, modems and a variety of other communications products, the new transformers measure less than 1" x 1" x 1" and are available in 600Ω/600Ω and 600Ω/900Ω impedances.

Circle (300) on Reply Card

Editing console

A new editing console from Winsted Corporation has an adjustable monitor bridge that provides a choice of height selections. The model 3500E editing console is designed especially for the new Type C 1-inch compact VTRs. The top cabinet with 14 inches of rack space holds a 12-inch monitor, waveform monitor and vectorscope, as well as associated video equipment.

Circle (301) on Reply Card

Cable clips

Lynx has recently introduced its new line of cable clips, the Lynxclips. Used to secure cable in the CATV, interconnect and telecommunications industries, the clips are molded from high impact natural or weather-resistant black plastic to ensure that it will not shatter on installation. The nails are made from high carbon, annealed steel, which gives them added durability.

Circle (302) on Reply Card

DBS antenna

M/A-COM has introduced a 1.2m DBS antenna system for home and commercial use. The antenna, composed of 1-piece compression molded fiberglass, is packaged with mount off-set feed and pre-tested cable kits. The unit is designed for 12GHz Ku-Band and meets the new 2° spacing requirement. The mount design is adaptable to slanted and flat roofs, as well as ground installations.

Circle (303) on Reply Card

Image correction amplifiers

Siegel-Electronics has updated new models of image correction amplifiers—the ICA series 1105 through 1108. These units currently offer RGB color correction, two lines of delay for vertical enhancement and 200ns of delay for horizontal enhancement, camera/tape switcher, RS-170A sync generator and optional RGB inputs and outputs.

Circle (304) on Reply Card | :X(-:)))

When you hear this orchestra live and in Hi-Fi,

ANT 8227E WAK



ANT is also in the play.

The highest quality the present-day technology can provide is required when transmitting high-grade orchestral performances. The numerous studio facilities, system components and completely furnished outside-broadcast vehicles delivered by our company fulfill these requirements.

We were right from the start active in the development of sound-broadcast and studio technology and made our technical contribution in these fields. Also today, sound-studio technology remains one of the most important areas of activity of our renamed company, whose equipment you knew until now under the label of TELEFUNKEN.

Other activity areas of ANT Nachrichtentechnik in Backnang, West Germany, are: multiplex systems – radio-relay systems – telecommunication cable systems – communication satellites and earth stations – special communication systems.

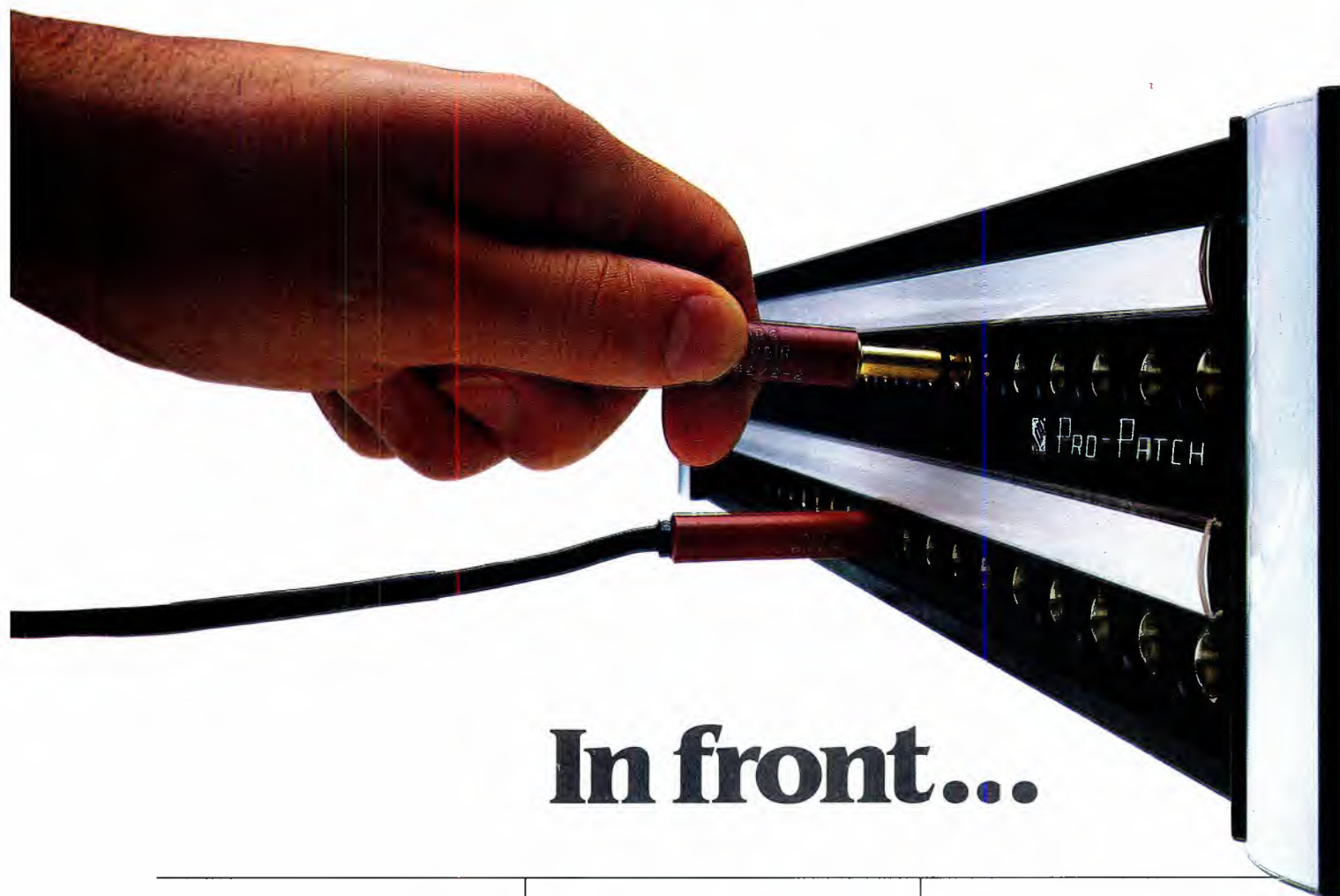
Reasons enough to maintain the connection with us.

ANT Nachrichtentechnik
Gerberstrasse 33
D-7150 Backnang
Telephone (0 7191) 13-1 · Telex 7 24 406-0

ANT
Nachrichtentechnik

Circle (111) on Reply Card

PRE-WIRED JACKFIELDS



In front...

Your engineering staff has more important things to do than soldering patch panels. That's why you'll find a big advantage in ADC's 100% pre-wired Pro-Patch™ jackfields and Ultra-Patch™ panels. Featuring ADC's new split cylinder contacts, these units allow for fast, reliable, hassle-free installation.

Fully assembled, computer tested and ready to hook up, Pro-Patch and Ultra-Patch completely eliminate labor intensive soldering or crimping operations.

In fact, hooking up to the back of a Pro-Patch unit is

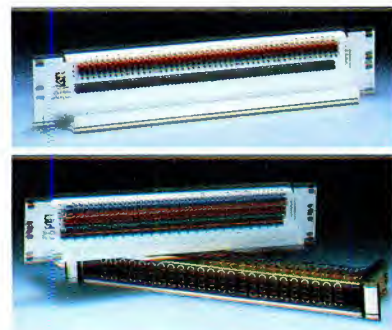


Pro-Patch jackfields and Ultra-Patch panels cut installation time from hours to minutes and allow circuit or normalizing configuration changes in seconds.

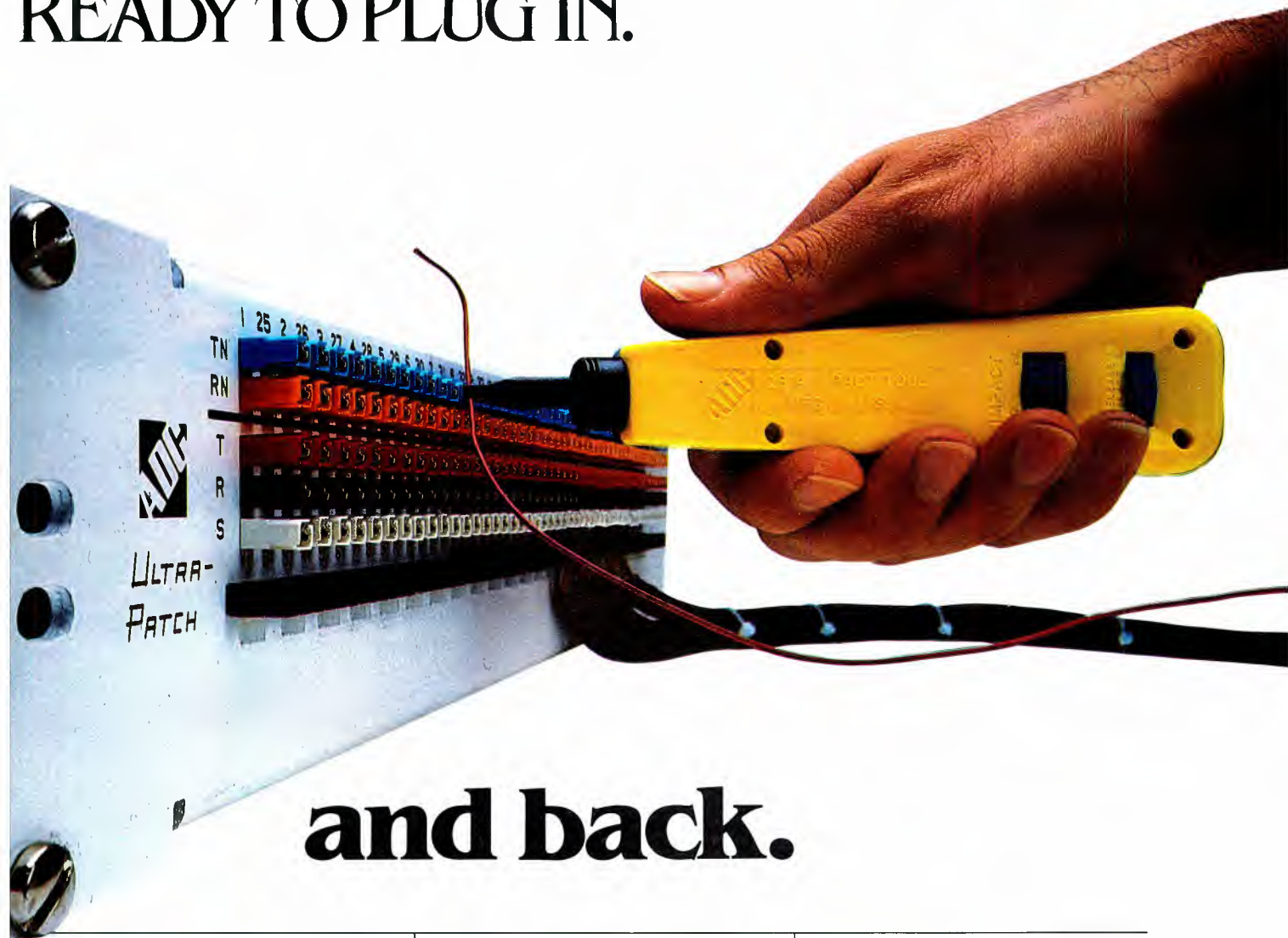
almost as easy as plugging into the front. Just a push on a special hand tool bares a wire, locks it into a split-cylinder contact inside an insulated

housing and trims off excess length.

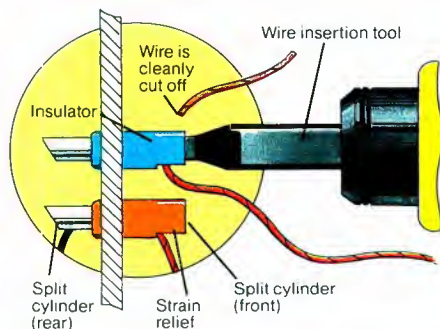
Since their introduction last April at NAB, Pro-Patch jackfields and Ultra-Patch panels have appeared in virtually every segment of the Broadcast industry.



READY TO PLUG IN.



and back.



ADC's unique split-cylinder system features contacts that will accept 22, 24 or 26 AWG solid or stranded wires. The cylinders are housed in plastic insulating modules and are recessed to virtually eliminate shorting at the contacts. Both sides of the contact have two-wire capability providing for four gas-tight terminations per contact. The cylinders are also rated for a minimum 100 cycles and are easily replaceable. Triple strain relieving is provided on all units.

Pro-Patch and Ultra-Patch — as well as many custom configurations incorporating the split-cylinder contacts — are fast setting the stage for a new industry standard of wire termination.

For more information on these truly state-of-the-art audio patching systems — or our over 300 other standard audio and video patching systems — write or call ADC Magnetic Controls Co., 4900 West 78th Street, Minneapolis, Minnesota 55435, (612) 893-3000.

Custom orders welcome.



ADC Magnetic Controls Co.
4900 W. 78th St., Minneapolis, MN 55435

Circle (130) on Reply Card

Technology Or Price

A fully remote controlled FM transmitter with features for total automation and satellite feed.

A transmitter with micro-processor based digital diagnostics, built-in alarm points, a memory, even the ability to talk to the factory's computer.

All of this with a super-low distortion exciter, in a totally solid-state one kilowatt transmitter. Or, a single tube 3.5 kilowatt.

Get both from QEI, the FM people. For more information call John Tiedeck at 609-728-2020



The New 695T1KW



QEI Corporation

Box D / Williamstown, NJ 08094

Phone (609) 728-2020

Telex II (TWX) 710 942 0100

Circle (126) on Reply Card

people

The Tektronix Communications Division has announced key reassignments within its Television Products Business Unit. **Larry Kaplan** has been named business unit general manager. Kaplan replaces **Chuck Barrows**, who has been named strategic business and engineering development manager for the Communications Division. **Austin Basso**, 17-year Tektronix veteran, has been named national sales manager. **Steve Kerman**, a 23-year Tektronix veteran, has been named marketing manager. Both Basso and Kerman will report to Kaplan.

Thomson-CSF Broadcast has announced the appointment of **John W. "Bill" Park** as vice president of marketing and sales. Park joins Thomson-CSF from the Sony Corporation, Broadcast Products, where he was vice president of marketing. At Thomson-CSF, he will be responsible for all sales, marketing and service functions of its line of professional broadcast products.

Two executives of the Mutual Broadcasting System have been selected to chair committees of the National Association of Broadcasters for the coming year. **Martin Rubenstein**, president and chief executive officer of Mutual, will serve a second term as chairman of the First Amendment Committee, which identifies issues affecting broadcasters' freedom of speech and press. **William Wisniewski**, vice president for communications services, was appointed chairman of the Broadcast Engineering Conference Committee after serving as chairman of its Engineering Achievement Award subcommittee in 1982.

MAP AUDIO DISTRIBUTION AMPLIFIERS

Model 7833 Shown



A Complete Family of Rack Mounting Self Contained Audio Distribution Amplifiers

- OUTPUT NOISE: -90 dBm
- DISTORTION: TYP. 0.1% LINE IN
- OUTPUT LEVEL: +20 dBm PER CHANNEL
- ISOLATION: 80 db BETWEEN OUTPUTS AND OUTPUT TO INPUT

FEATURES

- ☐ Transformer coupled floating MIC input
- ☐ Balanced bridging line input
- ☐ 8 balanced transformerless outputs
- ☐ 16 balanced transformer less outputs
- ☐ Adjustable gain
- ☐ Metered input & output (switchable)
- ☐ "Softknee" variable 30dB compressor

MODEL NOS.

	7821	7822	7823	7833
☐ Transformer coupled floating MIC input			☒	
☐ Balanced bridging line input	☒	☒	☒	☒
☐ 8 balanced transformerless outputs	☒		☒	☒
☐ 16 balanced transformer less outputs		☒	☒	
☐ Adjustable gain	☒	☒	☒	☒
☐ Metered input & output (switchable)	☒	☒	☒	☒
☐ "Softknee" variable 30dB compressor			☒	☒



**MODULAR
AUDIO PRODUCTS**

A UNIT OF MODULAR DEVICES, INC.
50 Orville Drive ■ Airport International Plaza
Bohemia, New York 11716 ■ 516-567-9620

Circle (138) on Reply Card

**Don't wade through 1,000
different product brochures...**

Use BE's 3rd Annual Spec Book instead

**Watch for it
in November!**

Broadcast Engineering's **Spec Book** is the industry's only available single-source broadcast equipment reference encyclopedia. **Spec Book** is designed to save you time by providing reliable specs for making easy equipment comparisons. On nearly 1,000 different products. And, based on your input from last year's edition—and your suggestions for enhancing **Spec Book '83**—this year's **Spec Book** will be more comprehensive than ever before. Offering you valuable reference data, like:

- ***Comprehensive category listings**—of available broadcast and broadcast-related equipment. Including manufacturer names, model numbers, product specifications and special features for each listed model.

- ***Reader service numbers**—for each listed product. So you can request additional manufacturer information quickly and easily.

- ***How-to editorial**—hands-on technical articles designed to help you stay informed on the latest technology. Expertly edited by a field-experienced, first-phone licensed engineer.

All in a convenient, easy-to-read format.

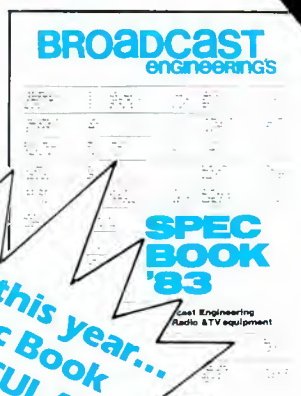
Now—something to make Spec Book even more valuable...

The 1983 Spec Book SPEC*TACULAR reader contest!

You've told us that **Spec Book** is a big winner with you. And here's how **Spec Book** can make you a big winner—of a \$1,000 digital audio disc player!

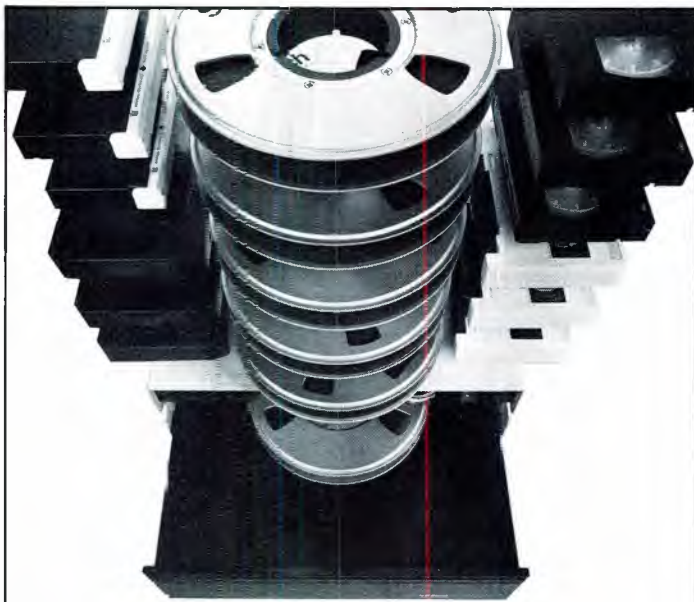
On the front cover of the forthcoming November issue you'll see 25 sections of equipment specs carefully selected from inside the issue. If you can match the cover specs with their exact location inside **Spec Book**, you can win a digital audio disc player valued at \$1,000.

You'll find complete contest rules and an entry blank inside the **3rd Annual 1983 Spec Book**. Don't miss your chance to win a state-of-the-art digital audio disc player—enter the **Spec Book SPEC*TACULAR** contest! Coming to you in November.

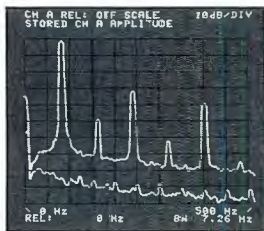


BROADCAST
engineering

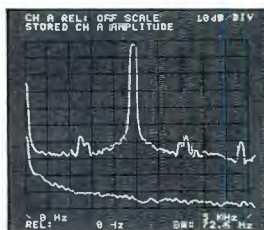
Spec Book



VIDEOTAPE ERASURE MADE SIMPLE



To erase today's tapes . . . particularly 1-inch C-Format 3/4- and 1/2-inch cassettes . . . you need twice the erasure power to eliminate all residual signals of low-frequency recordings.



Videomax TD-800 tape demagnetizer has enough power to erase the most persistent videotape . . . even audio and time code . . . at a full 80 dB. That's 10 dB more than any 1-inch VTR.



A simple, innovative design at a very compact price.

Make the most from your investments; send for the TD-800 brochure, and see our results!

videomax TD800 TAPE DEMAGNETIZER

CMC TECHNOLOGY CORPORATION
733 North Pastoria Avenue Sunnyvale, CA 94086
(408) 245-3342 TLX 910-3790012

Circle (124) on Reply Card

Andrew V. Juettner, Jr. has been appointed director of engineering of Townsend Associates. Juettner was formerly vice president of engineering of Harris' Broadcast Products Division.

C. F. Rockhill, vice president, sales and marketing of Moseley Associates, has announced the appointment of **Weldon Squyres** as manager of international sales. Squyres, formerly with Ampex Corporation's International Division, will be responsible for the sales of all Moseley manufactured products through a distributor network of 44 representatives in more than 80 countries.

Acquis Ltd. has announced the appointment of **Max Morgan** as distributor sales manager. Morgan will be based in the Acquis Ltd. office in London, and will be responsible for all distributor sales in the United Kingdom, Europe, Africa, Far East and Australia.

Dr. John J. Guarrera, who has served as the National Computer Graphics Association's (NCGA) treasurer during the last year, has been elected president of the association beginning Oct. 1, 1984. He will serve this year as NCGA president-elect. Last year's president-elect, **Ellen M. Knapp**, took office as president on Oct. 1. NCGA members also elected **Morris L. Samit** as a vice president; **Dr. Phillip S. Mittelman** as treasurer; **Gary Romans** as secretary; **Dr. James D. Foley** as the new academia representative, **Joel N. Orr** as consulting representative, and **Dale Christensen** as a government representative.

Ira Porter has been appointed regional sales manager for Dearborn Wire & Cable Company's newly opened office and warehouse in Chino, CA.

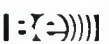
Greg Gambill and **David Diels** have been named district managers for MCI/Quantel. Former district managers **Paul Fletcher**, **Charles Martin** and **David Dever** have been promoted to regional managers.

Clear-Com Intercom Systems has appointed **Gerow D. (Gerry) Brill** as national sales manager. Brill will conduct a series of dealer/consultant seminars throughout the country, highlighting Clear-Com's new broadcast systems and interfaces.

Franklyn R. Beemish of Editel, New York, has been elected to the board of directors of A.B.P. Systems and will join the company as corporate vice president.

Sharp Electronics Corporation has announced the appointment of two new regional sales managers in the company's Professional Products Division. **Ron Parker** has been appointed sales manager of the division's Southern region, and **Paul Insko** has been named sales manager of the Midwestern region. In their new positions, they will be responsible for the sales and marketing of Sharp Broadcast Video and A-V products within their own regions.

Conrac Corporation announced that **Warren O'Buch** has been named president of the company's Conrac Division located in Covina, CA. O'Buch joined the Conrac Division in May 1982 as director of marketing. He had previously held finance, manufacturing and marketing positions with Hewlett-Packard Corporation.

Comtech Antenna Corporation has announced the appointment of **Thomas C. Christy** to director of marketing. Christy will assume responsibility for the overall marketing activities of the corporation. 

calendar

Nov. 28-Dec. 1

GLOBECOM '83, *The Global Telecommunications Conference*, will be held at the Town & Country Hotel & Convention Center in San Diego. It will feature 48 technical sessions covering more than 20 topics. The technical program includes two sets of coordinated topic sessions: encryption and interactive communications and television. For more information, contact Dr. Estil Hoversten, general chairman, M/A-COM Linkabit, at 619-457-2340, or Jane Riley, registration chairman, Burroughs, at 619-451-4901.

Jan. 23-25, 1984

The Hyatt Regency in New Orleans will be the site of OFC-84, a topical meeting on optical fiber communication. Topics will range from basic research to hardware manufacture and systems development and applications. For more information, contact, OFC-84, c/o Optical Society of America, 1816 Jefferson Place, NW, Washington, DC 20036.

Feb. 9-14, 1984

"The Road to the Future" will be the theme of the 21st Annual NATPE (*National Association of TV Program Executives*) International Conference at the Moscone Center in San Francisco. Two futurists, John Naisbitt and Robert Waterman, Jr., each with a best seller on the book lists for the past year, have been signed to make special presentations. Joan Rivers will headline the Iris Awards evening. For more information, contact NATPE, Suite 1205, 30 E. 42nd St., New York, NY 10017, 212-687-3484.

Feb. 10-11, 1984

The 18th Annual SMPTE TV Conference will be held in the Queen Elizabeth Hotel in Montreal. For more information, contact the SMPTE, 862 Scarsdale Ave., Scarsdale, NY 10583.

March 12-14, 1984

The Fifth Annual Fiber Optical Communications short course will be offered by the Center for Professional Development of Arizona State University's College of Engineering and Applied Sciences. The course is designed for those entering the fiber-optics industry—systems and component designers, manufacturing engineers, engineering managers, marketing managers, sales engineers, teachers, and others who require an understanding of optical waveguide communications. More information is available from the ASU Center for Professional Development at 602-965-1740.

April 25-27, 1984

EDS '84, the 1984 *Electronic Distribution Show and Conference*, will be held in the Las Vegas Hilton Hotel, Las Vegas, NV. For the first time in the convention's 47-year history, distributors are invited as exhibitors. For more information, contact Electronic Industry Show Corporation, 222 S. Riverside Plaza, Suite 1606, Chicago, IL 60606; 312-648-1140.

April 29-May 2, 1984

The NAB 62nd Annual Convention and Exhibition will be held at the Convention Center in Las Vegas, NV. The show, which features radio seminars, discussions of TV trends, exhibits and demonstrations, will bring all the latest equipment under one roof. For more information, contact: NAB Convention Information, 1771 N St., NW, Washington, DC 20036.

Perfect Timing

PROGRAMMABLE CLOCKS

CONTROL TIME THE EASY,
ECONOMICAL WAY



750 L SERIES

One or Two Events,
Thumbwheel Programming
\$330-410



780 SERIES

Up to 96 Events Stored
in Random Access Memory
\$1250-1725



ES 790

1000 Events, Microprocessor-
Based, 32 Output Channels
\$2190

Many More Units Available
Contact Us or Our Dealers
We'll Be Happy to Help!

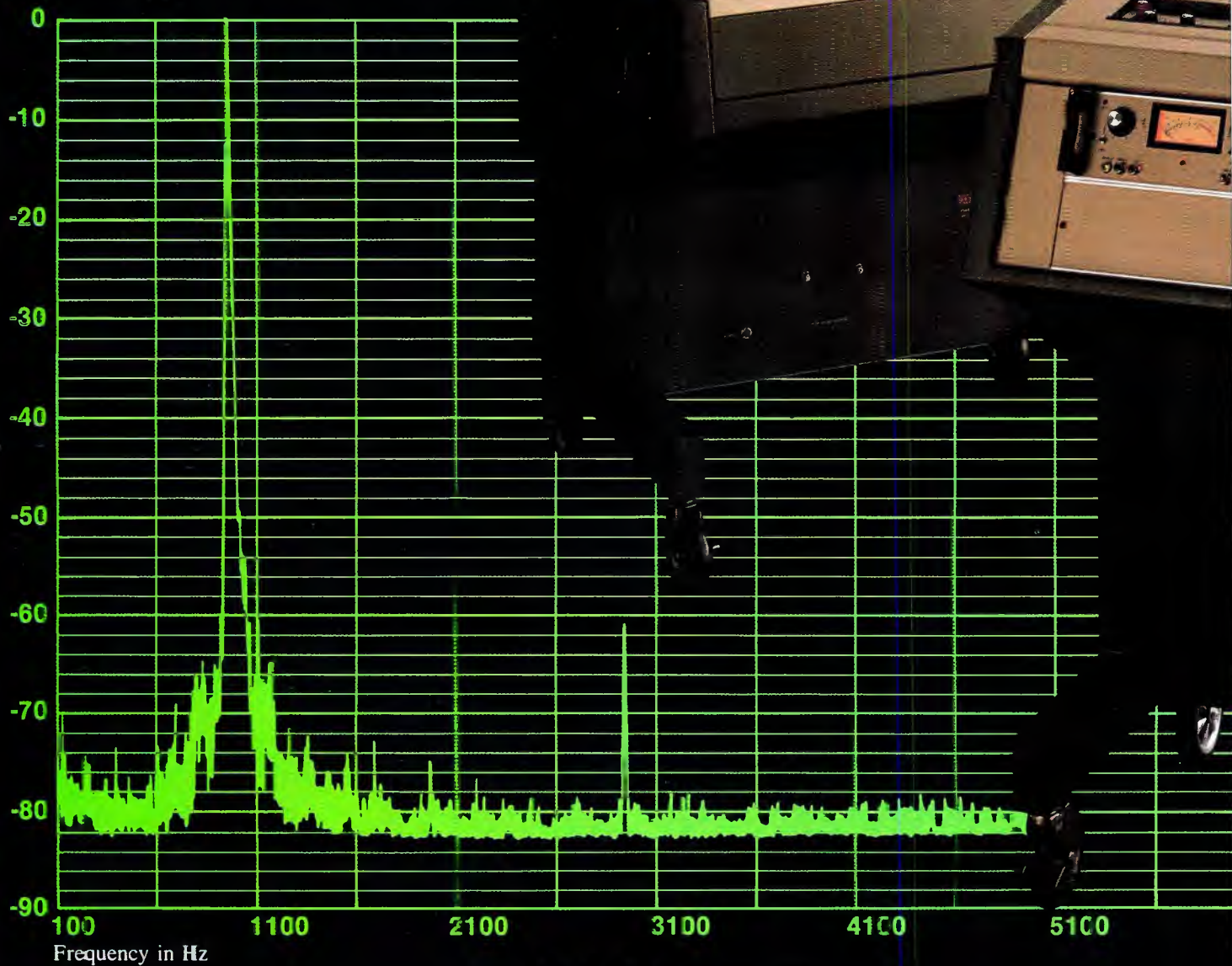


(213) 322-2136

142 Sierra St., El Segundo, CA 90245

Circle (127) on Reply Card

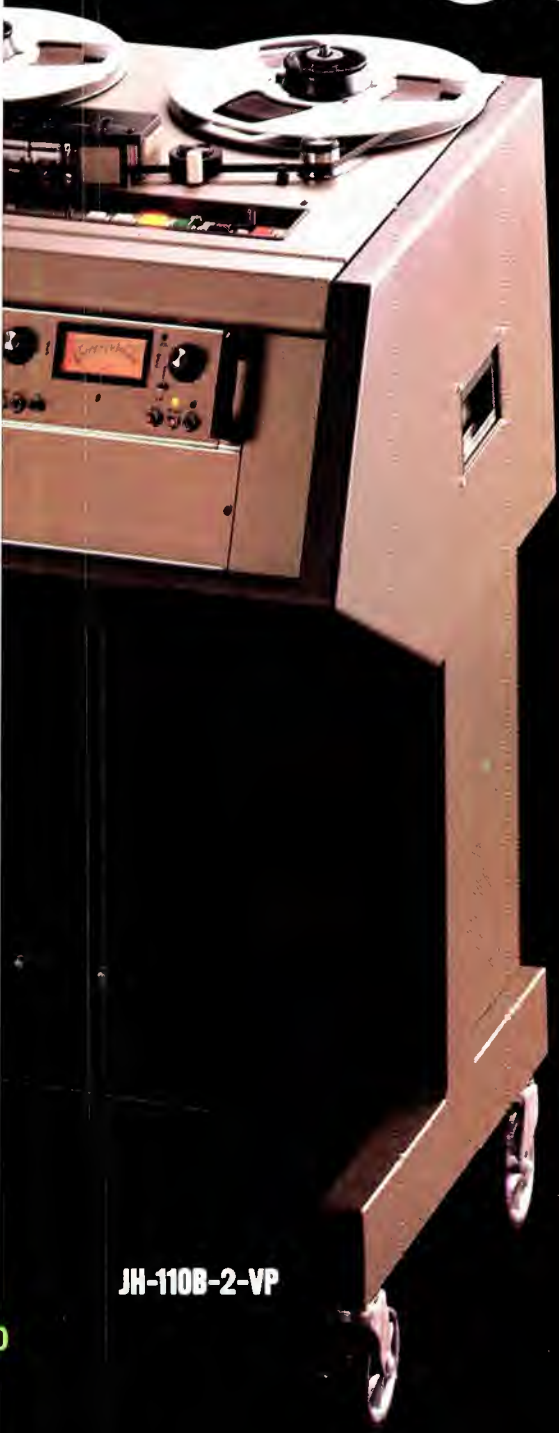
Amplitude in dBm



DISTORTION/PURITY OF SIGNAL

JH-1108-2-HP

DOES MCI REALLY OUTPERFORM THE REST?



In a world filled with claims and counter claims for high performance audio products, sometimes it's hard to separate opinion from fact. That's why MCI has provided complete graphic proof of all important tape recorder/reproducer performance characteristics. Now available in a handy Engineering Notebook, these curves and their accompanying methodology form the standard by which all other tape recorders must be judged.

If performance matters in your broadcast or teleproduction application, don't be fooled by "simple specmanship." And if you want to decide for yourself how the JH-110 Series measures up to comparable units, just ask Sony Broadcast to arrange for a demonstration.

Does MCI really outperform the rest? We'll let you decide. For your free copy of the Engineering Notebook and more information about our demonstrator program, call Tony Dean, Eastern Regional Sales Manager, Audio Products, (305) 771-3997, or Holmes Ives, Western Regional Sales Manager, Audio Products, (213) 841-8711.

SONY
Broadcast

JH-110B-2-VP

© 1983 Sony Corp. of America. Sony is a registered trademark of the Sony Corp.

Circle (129) on Reply Card

CHINA

An Exclusive Invitation

Broadcast Engineering invites you to join this high level delegation.

You and a limited number of other select international broadcast executives and equipment manufacturers will have a rare opportunity to meet with China's top broadcast station and equipment manufacturing officials and specialists. You will participate in one of the most complete technical tours of the Chinese broadcast industry ever organized. And the first such tour ever offered to the entire broadcast industry.

Sponsored by BROADCAST ENGINEERING in cooperation with The Ministry of Broadcasting and Television, this exclusive technical tour delegation is open to international broadcast station executives, consultants, equipment manufacturers and prominent educators.

Itinerary:

Organized with your needs and interests in mind, the itinerary includes each Chinese city visited. Delegates will have the opportunity to talk frankly with Chinese broadcast facility and plant operators at the plant and facility sites.

visits to key technical facilities in

China Broadcast Tour Cities:

- Beijing
- Shanghai
- Guangzhou
- Hong Kong

Some China Broadcast Tour Highlights:

- Radio Peking
- Broadcast Technical Institute
- Central Broadcasting Station
- R&D Foreign Language Dept.

- Shanghai Radio and Television
- Guangzhou Radio and Television
- Broadcast equipment factories
- And more

NEW Date:

14 day tour departs
May 23, 1984

Tour Leader:

Cameron Bishop, Publisher, Broadcast Engineering, Intertec Publishing Corp.

Contact:

George H. Roman, Roman Specialty Tours, P.O. Box 1607, Lafayette, CA, 94549 USA (415) 284-9180

Special Note:

The number of tour delegates will be strictly limited. Persons interested in participating should inquire early.



Mail to:

China Broadcast Tour

Roman Specialty Tours
P.O. Box 1607
Lafayette, CA 94549 USA

Please send me without obligation information about the
CHINA BROADCAST TECHNICAL TOUR:

Name _____ Title _____

Company Name _____

Address _____

City _____ State or Province _____

Country _____ Postal Code _____

Telex _____ Telephone _____

Sponsored by **BROADCAST**
engineering

Ask
About the
Early Registration
Discount!

May 15-18, 1984

Communications 84, an international exhibition, will be held in Birmingham, England. A 3-day conference program, organized by the IEE, will complement the exhibition activity. For more information, contact Kallman Associates, US Representative, 5 Maple Court, Ridge-wood, NJ 07450; 201-652-7070.

May 14-17, 1984

The International Conference on Communications (ICC-'84) will be held in Amsterdam, the Netherlands. Topics include communication switching, communication networks, radio communications, and satellite and space communications. For more information, contact Dr. T.A.C.M. Classen, Secretary ICC-84, Philips Research Laboratories, WY-2, 5600 MD Eindhoven, the Netherlands.

I=:~)))))

Editorial

Continued from page 8

wish to do so; it must select some and reject others. Charles Firestone (of the UCLA Law Project) put it simply, "As long as there is not free entry in and out, there isn't a marketplace."

Finally, are Federal regulations of any kind an unconstitutional abridgement of the First Amendment? The best answer is that the Supreme Court several times has said, "No, they are not."

I personally believe broadcasting's fairness doctrine is not a restraint on the First Amendment, but a stimulus to it. It is not censorship of broadcasting, but rather the public's best protection against censorship.

Let me hasten to say that I am a businessman and that I am heartily in favor of governmental deregulation in the many areas where I think it would prove beneficial. I think, for example, that a wide variety of FCC technical regulations are outmoded and unnecessary—and that broadcasters are fully capable of determining how best to equip and maintain their physical plants. I believe in the marketplace. I think that a reliance on the marketplace will often, and even usually, make all our lives more productive, more free and more fair. It's just that I don't think it will always do that.

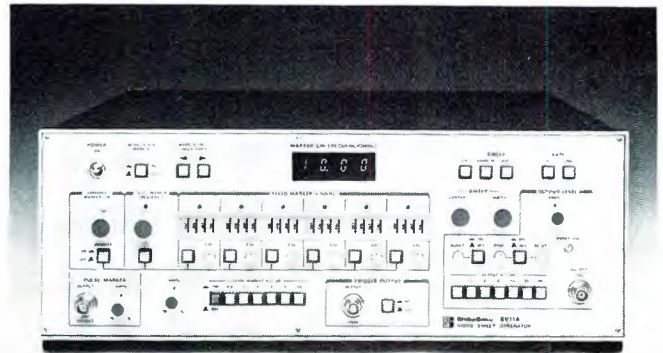
There are many other issues of broadcast regulation we broadcasters must consider. Foremost among these, in my opinion, is affirmative action to increase participation in the broadcast and cable world by women and racial minorities. None of us can be indifferent to the recent spectacle of the Christine Craft case. None of us can be satisfied when we attend a network affiliates' meeting and look around and have the truth thrust upon us. Ours is an industry that, at the top and near the top, is still a world of white, well-to-do men.

We have to address problems like that, but I'm afraid we can't ask the nation to rely merely on our own virtue and wisdom. Granted, we can't rely on the FCC either. The commission can't do the job alone. But fortunately, there's a third leg on the tripod. Because of the regulatory framework that many would now have us abandon, there is a way for outside parties to be heard. Because there is a regulatory framework, we broadcasters can all be faced with important truths. The public's right of access is far too precious, I think, for us blithely to throw it away while we chase after such phantoms as a "totally free marketplace of information abundance."

I believe that American broadcasters have, on the whole, and especially in TV journalism, served this country well. But I do not see how our past service within a system of public accountability can prove that very system now to be unnecessary. The need to protect the public interest by a system of checks and balances isn't obsolete.

I=:~)))))

THE TRUE MEASURE OF PERFORMANCE



ASACA/SHIBASOKU SV11A Video Sweep Generator

The SV11A measures frequency response on high resolution, wide-band color video equipment. It has a frequency band ranging from 100 kHz to 30 MHz. You also get a choice of two amplitude ranges: wide range covering the whole band in one sweep, and narrow range centered on a particular frequency. Sweep signals may be selected by the switching V sweep of the built-in sync signal and power line frequency. A variable marker and six fixed marker waves are built-in and may be set to desired frequencies.

- Generates sweep (0.1–30 MHz), Wide sweep width (3–30 MHz), Narrow sweep width (1–10 MHz).
- 6 pre-settable fixed frequency markers plus variable marker with digital readout.
- 22.5 db level marker can be inserted to 0.5 db steps, facilitating readout.
- Composite sync signal and VD signal available.
- On-off switch for sync signal, color burst signal and setup.
- CW output.
- Available in NTSC; PAL B, M, N; and SECAM systems.

Measure your performance with the best.

ASACA/SHIBASOKU SV11A. Wide band video sweeps up to 30 MHz.

For complete specifications, write:



ASACA/SHIBASOKU CORP OF AMERICA
12509 Beatrice Street, Los Angeles, California 90066
Sales, Service: (800) 423-6347 • (213) 827-7144

Circle (125) on Reply Card

professional services

VIR JAMES P.C.
CONSULTING ENGINEERS
Applications and Field Engineering
Computerized Frequency Surveys
3137 W. Kentucky Ave. — 80219
(303) 937-1900
DENVER, COLORADO
Member AFCCE & NAB

**STEIGER, HURRAY &
ASSOCIATES INC.**
Broadcast Technical Consultants
ANTENNA SYSTEM SPECIALISTS
6816 Westview Drive
Cleveland, OH 44141
(216) 526-7187

EVANS ASSOCIATES
CONSULTING TELECOMMUNICATIONS ENGINEERS
AM-FM-TV-CATV-ITFS-LPTV SATELLITE
216 N. Green Bay Road
Thiensville, Wisconsin 53092
Phone: (414) 242-6000 Member AFCCE

ATLANTIC RESEARCH CORPORATION
Jansky & Bailey
Telecommunications Consulting

Member AFCCE
5390 Cherokee Avenue
Alexandria, Virginia 22314
(703) 642-4000



dataworld inc
AM • FM • TV • LPTV
Computerized
Allocation Studies/Directories
1302 18th St., N.W., Suite 502
Washington, D.C. 20036
(800) 368-5754 (202) 296-4790
Established 1971

R. L. HOOVER
Consulting Telecommunications
Engineer
11704 Seven Locks Road
Potomac, Maryland 20854
301-983-0054
Member AFCCE

**D. L. MARKLEY
& Associates, Inc.**
CONSULTING ENGINEERS
206 North Bergen
Peoria, Illinois 61604
(309) 673-7511
Member AFCCE

CHARLES F. KOCHER, P.E.
Consulting Radio and TV Engineer
Allocation Engineering
Antenna Systems
27235 Berkshire Drive
Southfield, Michigan 48076
(313) 357-2304
Member AFCCE

Radiotechniques

RADIO CONSULTING ENGINEERS
STATION DESIGN AND SERVICE
ELECTRONIC PRODUCT DESIGN
Edward A. Schober, P.E.
402 Tenth Avenue, Haddon Heights, NJ 08035
(609) 546-1841



RADIO ENGINEERING CO.
CONSULTANTS
NORWOOD J. PATTERSON
BOX 420
SANTA YNEZ CA 93460
(805) 688-2333
Serving Broadcasters over 35 years

MIDWEST ENGINEERING ASSOCIATES
Consulting Engineers
150 Wesley Rd.
Creve Coeur, Illinois 61611
Phone (309) 698-3160
F. W. Hannel, P.E.
Member AFCCE

SINCE 1952 **MSI** Tel. 201-627-7400
**MICROWAVE SERVICES
INTERNATIONAL, INC.**
SATELLITE AND TERRESTRIAL SYSTEMS
CONSULTANTS • ENGINEERS • CONSTRUCTORS
FREQUENCY COORDINATORS
VICTOR J. NEXON, PE 266 W. MAIN ST.
PRESIDENT DENVILLE, NJ 07834
MEMBER AFCEE

**BROADCAST ENGINEERING
SERVICE COMPANY**
TV-FM-AM Field Engineering —
Emergency Maintenance — Turnkey Installation —
System Design — Survey and Critique —
Interim Maintenance or Chief Engineer
B E S COMPANY
100 Star Trail, New Port Richey, Fla. 33553, 813-868-2989

SMITH and POWSTENKO
Broadcasting and Telecommunications
Consultants
2000 N. Street, N.W.
Washington, D. C. 20036
(202) 293-7742

McCLANATHAN & ASSOCIATES, INC.
Consulting Engineers
APPLICATIONS & FIELD ENGINEERING
TURNKEY INSTALLATIONS — RADIO & TV
DIRECTIONAL ANTENNA DESIGN
P.O. Box 750
PORTLAND, OREGON 97207
Phone: 503/246-8080 Member AFCCE
TWX 910-464-6112/Front!

MEYER GOTTESMAN
Broadcast consultant/engineer. FCC licensed
since 1951. FM and TV applications — Cheap!
Can travel to your location!
3377 Solano Avenue, #312
Napa, CA 94558

**Why not run
your business card
here?**
**Only \$35.00
per insertion.**
**Frequency discounts
available.**
Call 913/888-4664

BROADCAST engineering

Advertising Sales Offices

NEW YORK, NEW YORK

Joe Concert,
Phone: (212) 682-6630
Stan Kashine
Phone: (212) 687-4128
630 Third Ave., Eighth Floor
New York, NY 10017

KANSAS CITY, MISSOURI

Jan Winters,
P.O. Box 12901, Overland Park, KS 66212
Phone: (913) 888-4664

SANTA MONICA, CALIFORNIA

Herbert A. Schiff,
Schiff & Associates
1408 Santa Monica Mall, Suite 200
Santa Monica, CA 90401
Phone: (213) 393-9285

LONDON, ENGLAND

John Ashcraft & Co., John Ashcraft
12 Bear Street
Leicester Square, London WC2H 7AS
England
Phone: 930-0525
Telex: 895-2387

AMSTERDAM, HOLLAND

John Ashcraft & Co., John J. Lucassen
Akerdijk 150A, 1171 PV-Badhoevedorp,
Holland
Phone: 0-2968-6226
Telex: 18406 HARKE NL

TOKYO, JAPAN

Haruki Hirayama
EMS, Inc., Room 801
Shinjuku Komuro-Heim,
1-22, Shinjuku 4-chome
Shinjuku-ku Tokyo 160, Japan
(03) 350-5666
Cable: EMSINCERIOD
Telex: 2322520 EMSINCJ

TAIWAN, R.O.C.

Antony Liu
Long Life Advertisement Agency Co.
P.O. Box 36-1094
8F-3.50 sec 5
Naking E Road
Taipei, Taiwan
Telephone: (02) 760-2468
Telex: 25923 Fondland
Cable: Longad Taipei

NORWOOD, AUSTRALIA

Hastwell, Williamson, Rouse Pty. Ltd.
P.O. Box 419
Norwood 5067, Australia
Phone: 332-3322
Telex: AA87113

ad index

ADC/Magnetic Controls	130-131
ADM Technology	IFC
ANT Nachrichtentechnik GmbH	129
Abekas Video Systems	29
Amperex Electronics Corp.	56-57
Ampex Corp.	9,61
Andrew Corp.	99
Angenieux	88
Anritsu America Inc.	59
Anton/Bauer, Inc.	127
Asaca/Shibasoku Corp. of America	139
Audio Video Engineering Co.	116
Belar Labs	128
Beyer Dynamic, Inc.	4
Broadcast Electronics Inc.	54
Broadcast Video Systems	102
CMC Technology Corp.	134
Calvert Electronics, Inc.	16
Canare Cable, Inc.	104
Canon USA, Inc.	45,47
Channel Master	CE-11
Comex Systems	114
Colorgraphics Weathersystems	77
Cetec Antennas	60
Comark	43
Comtech Data Corp.	71
Continental Electronics Mfg. Co.	33
Crosspoint Latch Corp.	144
Digital Entertainment	63
Dynair Electronics	101
ESE	135
Elector	17
Electrex Co.	102
Feldmar Watch and Clock Center	108
Fidelipac Corp.	55
Film and Video Equipment Service	122
Frezzolini Electronics Inc.	128
General Electric Video	39
Grass Valley Group	7
Great American Market	124,126
HEDCO	14
Harris Corp.	18,90,103
Harris Video Systems	26-27,40-41,66-67
HM Electronics	60
Hitachi Denshi America Inc.	3
Howe Audio Productions Inc.	28
Hubbard Communications Inc.	95
ITC/3M	50-51
ITT Cannon	79
Ikegami Electronics Inc.	37,69
Inovonics	94
JVC Corp.	81
LRC Electronics	CE-13
L.W. International	118
Lake Systems Corp.	98
Laumic Co., Inc.	70
Leader Instruments Corp.	5,137-138
Leitch Video Ltd.	49
Lerro Electrical Corp.	25
Logitek Electronic System	120
3M Magnetic Tape	34-35,109

3M Professional Audio/Video	113
MCI/Quantel	115
MCI/Sony	136-137
MagnaTech	121
Maric Industries Ltd.	124
Microdyne Corp.	87
Microtime Inc.	31
Midwest Corp.	1
Modular Audio Products	132
R.K. Morrison	124
NEC America, Inc.	53
NTI America, Inc.	85
Rupert Neve	11
Opamp Labs Inc.	124
Orban Associates Inc.	23,112
J. Osawa & Co., Ltd.	32
Otari Corp.	105
Pacific Recorders and Engineering	117
Panasonic Corp.	20-21,125
Perrott Engineering Labs	78,132
Pioneer Communications of America	CE-7
Polyline Corp.	122
Potomac Instruments	102
Pye TVT	111
Q.E.I.	132
Quad Eight Electronics	123
Quantum Audio Labs	32
RCA Camera Tube Marketing	97
Ramko Research	IBC
Restoration	124
Rohde & Schwarz	38
L.J. Scully Mfg. Corp.	22,118
Sencore	15
Shintron	131
Shure Brothers	65,91
Sony Broadcast	82-83
Sprague Magnetics	124
Standard Tape Laboratory Inc.	108
Stanton Magnetics	128
Stantron div Wyco Metal Products	78
Studer ReVox America, Inc.	93
Swiderski Electronics Inc.	120
Swintek Enterprises Inc.	86
Tascam div TEAC Corp.	119
Tektronix, Inc.	12-13
Tele-Cine Corp.	76
Tiffen Professional Products	110
Time and Frequency Technology Inc.	72
Triple Crown Electronics	CE-15
UNR Rohn	94
United Media	121
Utah Scientific	89
Varian EIMAC	107
Videotek, Inc.	44
Video Aids of Colorado	72
Ward-Beck Systems Ltd.	BC
White Instruments Inc.	4
Winsted Corp.	100
Yamaha International Corp.	73,74

classified

Advertising rates in Classified Section are 75 cents per word, each insertion, and must be accompanied by cash to insure publication.

Each initial or abbreviation counts a full word. Minimum classified charge, \$10.00.

For ads on which replies are sent to us for forwarding (blind ads), there is an additional charge of \$10.00 per insertion, to cover department number, processing of replies, and mailing costs.

Classified columns are not open to advertising of any products regularly produced by manufacturers unless used and no longer owned by the manufacturer or distributor.

TRAINING

ELECTRONICS DEGREE by correspondence. Earn A.S.E.T., then B.S.E.T. Free catalog. Grantham College of Engineering, 2500 La Cienega, Los Angeles, California 90034. 7-82-tfn

FCC GENERAL RADIOTELEPHONE operators license through cassette recorded lessons at home plus one week seminar in Boston, Washington, Detroit or Philadelphia. Our twentieth year teaching FCC license courses. Bob Johnson Radio License Preparation, 1201 Ninth, Manhattan Beach, Calif. 90266, Telephone (213) 379-4461. 8-81-tfn

SERVICES

ONE STOP FOR ALL YOUR PROFESSIONAL AUDIO REQUIREMENTS. Bottom line oriented. F.T.C. Brewer Company, P.O. Box 8057, Pensacola, Florida 32506. 7-71-tf

HELIX-STYROFLEX. Large stock—bargain prices—tested and certified. Write for price and stock lists. Sierra Western Electric, Box 23872, Oakland, Calif. 94623. Telephone (415) 832-3527. 1-73-tf

TRANSMITTER TUBES REPROCESSED—Save 40 to 50%. 3CX2500, 4CX5000, 4CX15000 and many others. Write for details. FREELAND PRODUCTS CO., Rt. 7, Box 628, Covington, LA 70433. (504) 893-1243. 6-79-tfn

HEAD RE-LAPPING SERVICE. We expertly refinish all professional non-glass heads. Compare our new low prices over buying new. Two day turnaround. Tucker Enterprises, P.O. Box 10120, Alexandria, Virginia 22310-0120, 703/971-2321. 8-83-tfn

MISCELLANEOUS FOR SALE

QUALITY BROADCAST EQUIPMENT: New and Used, Buy and Sell! Transmission, Video and Audio. Formed my own company. Call Ray LaRue, (813) 685-2938. 10-82-tfn

REFINE SILVER from electronics scrap! RALTEC, 25884B Highland, Cleveland, OH 44143. 11-82-3t

RAZOR BLADES, Single Edge, Tape Editing, RALTEC, 25884B Highland, Cleveland, OH 44143. 11-83-3t

EQUIPMENT FOR SALE

SUPER VAN new Econoline with 122" equipment rackspace, side and rear doors, 2 air conditioners, removable ladder to roof rack, 4-wheel drive, Onan generator, 6 batteries for inverters, voltage regulators, all cable doors, interior downlites, transmitter burglar alarm (\$45,000 value)—\$27,950. Telaudio, Box 921, Beverly Hills 90213, 213/651-5563. Also: Tektronix demo #1470; tiemcode reader; ITE tripods; Sony PVM-1211F; Hitachi FP40, FP22, FP15, HR200E, CM182; Kodak S8mm projector; complete AU-series U-editing system. 10-83-2t

CEZAR 'EDITING CENTRE controller with CRT display. JVC CR-8200 & CR-6600 VCR's. Complete system: \$8,500.00. Will also sell separately. (203) 241-8111, ask for Doug. 11-83-1t

3-OTARI MX 5050 10" 4 Channel Tape recorders. \$1500/machine. Phone 303-753-0043, ask for Bob Shapiro. 11-83-1t

NEW "DOC" WITH ALIGNMENT TAPE for all U-matics VTRs including Sony "V" Series. Price \$185. Call Joe Pagano, Lerro Corp., (215) 223-8200. 11-83-1t

AMPEX SE-10 degausser rack mount. Excellent condition. Audio Associates, P.O. Box 152, Alamogordo, New Mexico 88310. 11-83-1t

Want more information on
advertised products? Use the
Reader Service Card.

EQUIPMENT FOR SALE (CONT.)

AUDIO EQUIPMENT: AMPEX AG 440A in roll-around console. New heads—2 channel E-R-P plus switchable quarter track play. Half inch convertible transport, head box wired for four channel. \$2250.00. Crown CX 844 four channel recorder/player. Very clean. \$900.00. Crown SX 824 quarter track stereo recorder with variable speed capstan. Great shape. \$500.00. Both Crowns for \$1300.00. Neumann U-67 tube condenser mikes with power supplies, shock mounts. One pair. Make offer. Schoeps CMT 34 condenser mikes, one pair, \$800.00. EV 655C \$100.00. HP 400D AC VTVM \$100.00. Pentagon six spot cassettes rewriter \$100.00. Contact John Fleetwood, 301-986-8881. 1-83-1t

FULLY EQUIPPED MOBILE UNIT: GMC Step Van with 2 fully controlled cameras, 1" tape machine, full effects switching, audio, complete monitoring, and testing equipment and Onan generator. For details call 914/356-6263. 11-83-1t

PERSONAL STUDIO FOR SALE: MCI 8 track w/DBX Noise Reduction Quantum 12 in-8 out console, 2 DBX compressor/limiters, AKG BX 10 Reverb. Excellent condition. (316) 264-5210. 11-83-3t

FRAME SYNCHRONIZER/DIGITAL NOISE REDUCER/TBC-Thompson/CSF-9100—New condition—Two units—\$22,000 each. Field Synchronizer/TBC-DSF-2550 Quantel—Excellent condition—Two units—\$8,500 each. 213-506-7470, Charlie Boster. 11-83-2t

26' AUDIO REMOTE UNIT (GMC transmode vehicle) 32 in x 24 track capability, mic splitter, TV, communication, generator, A/C alarm and lot more. Asking \$200K. Contact: Sam Boroda, LE Studio Inc. (617) 267-2825. 11-83-1t

RCA-TK76B MINI-CAM, like new, Fujinon Lens 10x14 zoom with two times extender. "C" lightweight body kit. Many extras. \$6,950.00. 213/763-0980. 11-83-1t

davidgreen

RENT broadcast test gear from the largest inventory in America. Potomac field strength meters and proof of performance systems, Delta operating impedance bridges, Belar modulation monitors, Orban Optimod, Moseley remote control and STL links, Marti RPU equipment. David Green Broadcast Consultants Corporation, 703-777-8660 or 703-777-6500, Box 590, Leesburg, VA 22075. 8-83-tfn

WANTED TO BUY

WANTED: Pre-1923 radio equipment and tubes. August J. Link, Surcom Associates, 305 Wisconsin Ave., Oceanside, CA 92054, (619) 722-6162. 3-76-tf

HIGHEST PRICES PAID for 112 Phase Monitors and for clean, one kw or greater powered AM and FM Transmitters. All duty and transportation paid. Surplus Equipment Sales, 2 Thorncliffe Park Dr., Unit 28, Toronto, Canada M4H 1H2, 416-421-5631. 2-79-tfn

WANTED: STATION LIBRARIES OF MUSIC, 16" ET's, 12" Transcriptions, 45's, 78's, LP's. Boyd Robeson, 2425 W. Maple, Wichita, KS 67213, (316) 942-3673, 722-7765. 5-82-tfn

McCurdy PS830 REGULATED POWER SUPPLY for McCurdy SS1028 Intercom; also parts or modules for same. Fader Pots for Gates TV15B Audio Board (Altec Lansing 8842-01KQN 1502/3002). Marcel Martel, Canadore College, P.O. Box 5001, North Bay, Ontario, P1B 8K9, (705) 474-7600, Extension 2110. 11-83-1t

WILL PAY CASH for Sharp XC 701RP camera control unit. New or used. Call Arlee, 800/648-6966. 11-83-2t

WANTED: OLD RCA, Western Electric tubes, speakers, amplifiers. Also, McIntosh, Marantz tube amplifiers. Garrard, Thorens, turntables. (713) 728-4343. Maury Corb, 11122 Atwell, Houston, Texas 77096. 11-83-3t

EMPLOYMENT SERVICES

**WE PLACE
TV and Video Engineers
[All Levels, But Not Operators]
COME TO THE SOURCE
Come To
KEY SYSTEMS
Westminster Road
Wilkes-Barre, PA 18702
Phone Alan Kornish at
(717) 655-1458**

MAKE SURE YOU KNOW ABOUT EVERY POSITION

USA's largest personnel system for engineers.
We can help you in every city, every state.
New Positions daily. Confidential and no fees.

Engineerslog

Box 252 Latham, New York 12110

HELP WANTED

WANTED—VIDEOTAPE EDITORS for top quality production company experiencing major growth in electronic publications. Must have considerable experience on CMX and ADO. Salary commensurate with experience. Send resume to Kartes Video Communications, 10 East 106th Street, Indianapolis, Indiana 46280, c/o Jim Kartes, 317-844-7403. 11-83-1t

CHIEF ENGINEER FOR TV, AM, FM and production facility (SBE certified preferred). Five years experience in repair and maintenance of broadcast equipment required, as well as FCC reporting, budget management and supervisory skills. Area is a hunting and fishing paradise, just 30 miles from the beaches of the Gulf of Mexico. EOE. Send resume or inquiries to Dept. 597, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212. 11-83-1t

SALES—EXCELLENT OPPORTUNITY in Audio/Video Communications System for professional career-oriented person. Must have 2-3 years selling experience with successful sales record. Some travel. Attractive fringe income commensurate with qualifications. Send resume to: Dept. 598, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212. 11-83-1t

BROADCAST ENGINEER: Immediate opening in Southern California for Television/Radio Maintenance Engineer. Current state-of-the-art television production and post editing facility and FM radio station. Minimum 3 yrs. current broadcast maintenance experience. First Phone desired. Paid health, dental, vision, life insurance and retirement plan + 14 pd. holidays a year. Contact Personnel Services, SAN DIEGO COMMUNITY COLLEGE DISTRICT, (619) 230-2109. Equal Opportunity Employer. 11-83-1t

WANTED: AM/FM BROADCAST ENGINEER/TECHNICIAN. All phases of technical support for established manufacturer of AM/FM broadcast transmitters. Position includes: product testing, field service, tech service, etc. Applicants must have strong background in transmitter systems and ability to communicate effectively with customers. Salary commensurate with ability. Send resume to: John Bensfeld, TTC/Wilkinson, 5970 W. 60th Ave., Arvada, Colorado 80003. 11-83-1t

ENGINEERING SUPERVISOR

For transmitter and studio maintenance. 5 years experience. Dallas/Fort Worth metroplex area. Join fast growing chain. You will be given authority and support to build a successful operation. \$30,000. Call or write Ed Reid, Director of Engineering, 1712 E. Randol Mill Rd., Arlington, TX 76011. (817) 265-2100.

HELP WANTED (CONT.)

VIDEO MAINTENANCE ENGINEER

Cablevision of Boston seeks a video maintenance engineer to maintain state of the art TV studio facilities in the Boston area. Must have experience in maintenance of industrial quality 1/4" video tape recorder and color camera systems. Cablevision is an Equal Opportunity Affirmative Action employer. Qualified applicants should submit resume to: Personnel Coordinator,

CABLEVISION

21 Merchants Row, Boston, MA 01209
617/367-9100

VIDEO SALES—Major N.J. video dealer offers a challenging opportunity for professional video sales people. Previous industrial and/or broadcast experience required. Salary commensurate with experience. Commission, car, excellent fringe benefits. Reply in confidence to: Video Corporation of America, 1913 Route 27, P.O. Box 697, Edison, N.J. 08818. 1-82-tfn

SOUTHERN CALIFORNIA. Christian satellite and broadcast network has openings for master control engineers. Minimum two years experience required. Send resume to Ben Miller, director of engineering, Trinity Broadcasting Network, P.O. Box "A", Santa Ana, CA 92711. An equal opportunity employer. 10-83-2t

Video Analog Design

Engineers

Fernseh Inc., the world leader in the development of professional video broadcast equipment, has some outstanding opportunities for EE's with experience in the design of video equipment relating to signal processing (synchronization, distribution, signal switching, etc.). A heavy analog design background is required.

Fernseh Inc. is part of the multimillion dollar Bosch organization. We offer an attractive pay and benefits package and plenty of opportunity for personal and professional growth while living in one of the West's truly sophisticated and beautiful locations.

Please send resume, including salary requirements, in confidence to Ken Oswald, Fernseh Inc., Box 31816, Salt Lake City, Utah 84131 or phone Ken at 972-8000.

An Equal Opportunity Employer m/f.

BOSCH

CHIEF ENGINEER—VHF CBS Affiliate seeking chief engineer. Must possess 1st or general class FCC license. Excellent pay and employee benefits. Resume should reflect personnel management, responsible television engineering achievements and FCC compliance ability. Send resume to Charles Woods, General Manager, WTVY-TV, P.O. Box 1089, Dothan, Alabama, 36302. EEO/AA Employer. 10-83-3t

ENGINEER: TELEVISION PRODUCTION ENGINEER with 2-3 yrs. of video & maintenance experience. Must have experience with Hitachi cameras, Ampex & Sony VTR's, CMX editing systems and D.V.E. units. Call Jerry Ebberts at (303) 751-6000 or send resume to Telemation Productions, 7700 E. Iliff Ste. H, Denver, CO 80231. 10-83-21

STUDIO MAINTENANCE TECHNICIAN needed by this 15th market VHF independent. We are looking for someone to help us maintain our RCA, Grass Valley & Sony equipped facility in the beautiful Pacific Northwest. Qualifications include 2-4 years of studio maintenance experience and a General Class FCC license. SBE certification or tech school also helpful. Send resume to: Larry Brandt, KCPQ-TV, POB 98828, Tacoma, Washington 98499. 11-83-11

MAINTENANCE ENGINEER FOR SOUTHERN OHIO based remote units. Should have experience with VPR-2, PC 70, Quantel 5000, Chyron IV and Vital 114. Must possess supervisory skills and be willing to travel. Send resume to WLWT, 140 West Ninth Street, Cincinnati, Ohio 45202; Attention: Personnel. Equal Opportunity Employer (M/F). 11-83-11

MANAGER, TELECOMMUNICATION CENTER—THE UNIVERSITY OF TEXAS AT AUSTIN: Immediate vacancy for a registered Professional Engineer with a Bachelor's degree in Electrical Engineering. Must have seven years' experience in performing technical maintenance activities including two years' at the supervisory level. Would prefer eight years' experience with additional course work related specifically to broadcast, cable, satellite, and computer technologies. Job duties are to supervise and perform maintenance activities for a 100kw FM broadcast station with major audio production facilities; highspeed audio open-reel and cassette duplication facilities; satellite R/T terminal facilities, microwave and cable system facilities. Also includes equipment installation, parts purchasing, and other related duties as required. Salary is commensurate with qualifications. To apply a resume must be received by December 1, 1983. Contact: William S. Giorda, Center for Telecommunication Services, University of Texas at Austin, Austin, Texas 78712. 11-83-11

TELEVISION ASSISTANT CHIEF ENGINEER: To maintain, operate and modify studio and transmission equipment. Must know production. Salary range \$17-25 thousand plus many benefits including 22 days vacation, tuition remission for self/family, etc. Day shift. Advancement potential. Women and minorities are urged to apply. Equal opportunity employer. Contact: Malcolm Montgomery, Chief Engineer, Biomedical Communications, University of Cincinnati Medical Center, Cincinnati, Ohio 45267, (513) 872-5652. 11-83-11

CHIEF ENGINEER to act as both Director of Engineering and General Manager for new, international satellite broadcast facility, utilizing both radio and television capabilities. Must be knowledgeable in all aspects of studio equipment design, maintenance, and management. Familiar with VHF, UHF, Cable, Satellite and Microwave operations. Bright future and generous compensation for motivated, creative associate. Salary open, based on experience. Substantial stock option plan. Write CHIEF ENGINEER, c/o Jim Mietus, Discovery Broadcasting System, 12401 West Olympic Blvd., Los Angeles, CA 90064. (213) 820-2900. 11-83-11

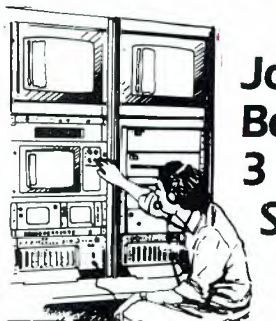
CHRISTIAN TELEVISION STATION requires Chief Engineer. Strong UHF background required. Contact Ben Miller, Director of Engineering, Trinity Broadcasting Network, P.O. Box "A", Santa Ana, CA 92711. E.O.E. 11-83-21

ASSISTANT CHIEF ENGINEER—OPERATIONS. Strong, people oriented person with 3 to 5 years management experience as Assistant Chief or Chief desired for this top 15 TV sunbelt market. Responsibilities include: scheduling, streamlining operations, special projects, and assist in maintenance of the station as time permits. Send resume to Chief Engineer, Dept. 599, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212. E.O.E. 11-83-21

TRANSMITTER SUPERVISOR—Present supervisor retiring after 20+ years service. This large market sunbelt TV station has a clean, modern RF plant and requires a conscientious engineer with 3-5 years transmitter maintenance experience to maintain it. Send resume to Dept. 600, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212. E.O.E. 11-83-21

Engineers:

video troubleshooters



Join Avtec and have the Best of Two Worlds—with 3 Month Assignments in Saudi Arabia!

You should never get bored with 3 months abroad and 3 months home in the U.S.A.—and while you're overseas, you get to bank your salary since practically all of your living expenses are covered with housing, living allowance, and use of a car provided to you—and with up to \$75,000 of income earned abroad tax free, you should be able to save more money than you ever might in a conventional job!

As for us, we're communications specialists with the expertise and experience to totally develop and maintain a communications system anywhere in the world. Our installations include television studios, multimedia audio/visual facilities, industrial and educational teleconference rooms, community-wide cable networks, and multi-building, broad-band signal-handling operations. Current and upcoming broadcasting facility projects in Saudi Arabia have created these opportunities for highly competent, creative problem solvers who know how to roll up their sleeves and get the job done. Degrees are not as important as is at least 5 years' experience as outlined below.

This position calls for a project-oriented individual who is still able to perform the actual maintenance work as well. You must be technically able to repair to the component level without supervision. In addition, solid communications skills and the tact essential to maintaining good client relations in a foreign environment are mandatory. Ideally, you've worked in the sort of environment where "you were the one", doing it all at a station. Willingness to respect deadlines and keep the ball rolling in the face of challenge will ensure your success.

Responsibilities will include performing maintenance sweeps to discover items in need of repair, diagnosing problems, ordering needed parts, effecting their repair, and follow-up report writing; plus interfacing with other consultants.

These are great opportunities for professionally-oriented individuals who appreciate a real challenge and want to be rewarded handsomely with attractive salaries, generous project completion bonuses, and excellent benefits including health, life, dental coverages and actual equity participation in our employee-owned company.

So if you're looking for a position where you work on new and different problems and assignments daily and have what it takes to handle them, we would like to talk with you. Forward your resume with salary history, in strictest confidence to: **Ron White, Avtec Industries, Inc., 39B Industrial Avenue, Teterboro, New Jersey 07608.**

avtec
Industries, Inc.

—a world leader in custom-designed turnkey communications systems

RF Broadcast Systems Engineer

CBS, Inc., a diversified leader in the communications industry has a position available for an allocations & RF systems engineer for its radio engineering department in NYC.

Responsibilities will include project budget preparation and planning, including FCC application, RF design and installation, and the supervision of AM, FM, microwave and 2-way communication systems.

You should have a BSEE degree and a minimum of 4 years related experience; familiarity with FCC procedures essential. Excellent written communications skills required to draft reports and comments for FCC review.

We offer a fully commensurate salary and excellent benefits package. For prompt consideration send resume and salary history to: Mr. Robert Werner, Manager of Technical Recruitment, CBS, Inc., 51 West 52nd Street, New York, NY 10019.

CBS RAD

A Division of CBS Inc.

Men and Women of All Races Desired

BENCH & FIELD TECHS

Experience only. 1/2", 3/4" and 1" computer assisted editing, color cameras.

Please send resume including salary history and requirements to the attention of Bob Hemenway, Lake Systems Corporation, P.O. Box 65, Newton, MA 02160

LAKE
An Equal Opportunity Employer
LAKE SYSTEMS CORPORATION

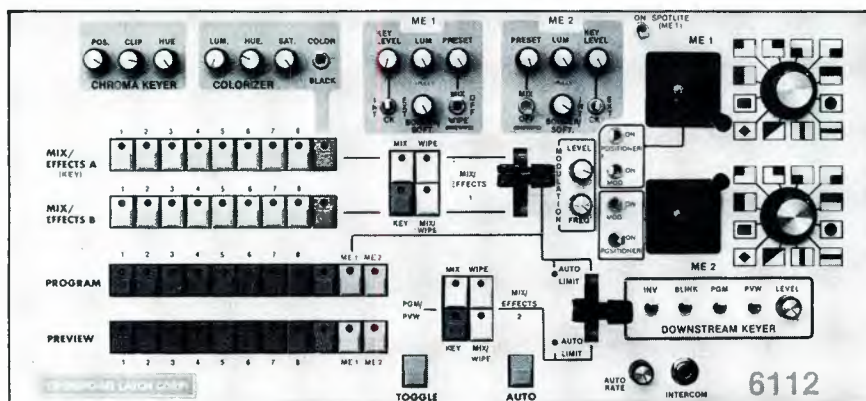
HELP WANTED (CONT.)

ENGINEERS: MAINTENANCE ENGINEERS NEEDED IMMEDIATELY. Studio E.N.G., and Transmitter Supervisors. Applicants must have a General Class license, and experience in their field. Please send resume and salary history to: Chief Engineer, WTVC-TV, Box 1150, Chattanooga, Tennessee 37401. 11-83-21

Broadcast Engineering's "Help Wanted" ads are well-read. Call today to place your low-cost ad.

THE 6112 IS BOTH A PRODUCTION AND A POST-PRODUCTION SWITCHER

Complete a mix or wipe on a 6112 (or any of our switchers for that matter), and there is **ABSOLUTELY** no **COLOR CHANGE** or **HORIZONTAL SHIFT**, we mean just that, absolutely none. That is because the 6112 has a blanking processor which replaces the sync and burst on all incoming video signals with a constant amplitude internally generated signal, completely eliminating the continuous problems caused by small drifts in your cameras and TBC's. **You never know the value of a blanking processor until you own a switcher that does not have one.**



- TREMENDOUS PRODUCTION CAPABILITY
- EASE OF OPERATION
- TWO FULLY INDEPENDENT MIX-EFFECTS SYSTEMS
- AUTOMATIC MIX AND WIPE

- DUAL BACK PORCH CLAMPS
- ROCK STABLE CIRCUITRY
- DOWNSTREAM KEYS
- TWO ADDITIONAL KEYS

MODEL 6112 NTSC \$7950
Chroma Keys Encoded or RGB \$1050.
(Encoded chroma keyer not available in PAL)
Model 6112BH - Illuminated Push Button - \$10,500

CROSSPOINT LATCH has the largest selection of compact switchers. All of them have blanking processors. Ask your local dealer for our very informative booklet "VIDEO POST PRODUCTION" which will be mailed to you free.

OPERATE THE 6112 DIRECTLY FROM THE EDITOR KEYBOARD

The 6403 allows the 6112 to interface directly with most editors. No modification to the editor is required.

Under **6403** control the **6112** accepts commands such as duration times, pattern type, bus selection etc., directly from the editor keyboard. The **6403** also provides additional capability of accurate start and finish, size and position of pattern transitions.

Audio follow or split audio capability is provided by the **6800** mixer which has separate level controls for each stereo input. The **6803** can be driven either directly by the editor or via the **6403** interface unit.

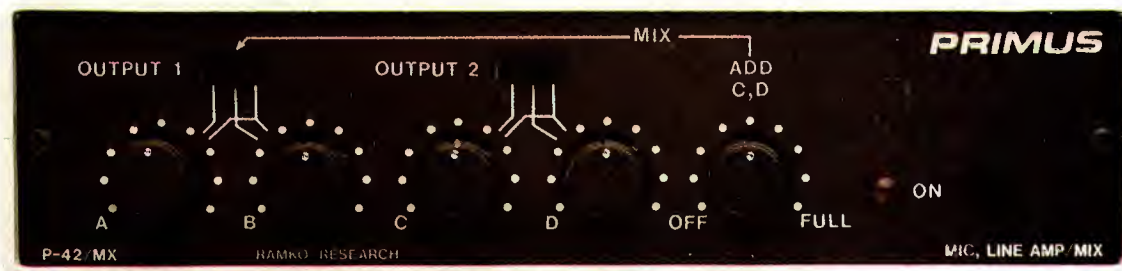
DELIVERY WITHIN TWO WEEKS

CROSSPOINT LATCH CORP.

95 Progress St. Union, N.J. 07083
(201) 688-1510 Telex: 181160

Circle (128) on Reply Card

INTRODUCING THE NEW PRIMUSTM AUDIO COMPONENTS



**CERTIFIED
PERFORMANCE**

Powerful performance in the palm of your hand.

PRIMUS (Pree-mus): an array of compact, performance-engineered audio electronics from Ramko Research.

The new PRIMUS components are unlike any professional audio equipment you've ever used. Never before has so much advanced performance been put into such compact and rugged packages. Rarely have you had available so many features and options to help get the job done. Never have you had a three-year warranty that's backed up by factory certified proof-of-performance.

PRIMUS is a comprehensive range of components that give you the flexibility to configure an audio system limited only by your imagination. Whether you choose from tabletop or rack mounting versions, there's hardly an audio job that can't be improved upon.

Here's a partial list of models currently available:

- ☐ Lab standard mono or stereo turntable preamplifiers.
- ☐ Dual and quad input, gain selectable microphone/line amplifier mixers.
- ☐ Audio distribution amps from three (3) stereo/six (6) mono up to eight (8) stereo/sixteen (16) mono outputs. All models feature individual recessed front panel adjustments or optional high resolution, conductive plastic potentiometers.
- ☐ Mic/Line equalizer amplifiers with balanced I/O and up to ± 15 dB of reciprocal equalization.
- ☐ Expandable audio console mixers with cueing, selectable EQ, metering phones and monitor.
- ☐ VoicegardTM combination limiter/compressor, noise gate with variable threshold and slope ratio; gain reduction metering.
- ☐ Signal processing VCA's with six (6) independently controlled channels. DC remote control with balanced outputs.
- ☐ R/P and playback, stereo and mono NAB cart machines.

Whichever combination of precision PRIMUS audio components you choose, you're guaranteed outstanding specifications. For example, our stereo turntable preamplifier measures:

Signal-to-noise Ratio: -93 dB (A weighted)
Total Harmonic Distortion: Below .0018%
Frequency Response: 10 Hz to 20 kHz, $\pm .25$ dB
Stereo Separation: -70 dB @ 1 kHz
Output Level: $+25$ dBm (10 Hz - 20 kHz)

The simplified and modular packaging of PRIMUS allows us to concentrate the quality where it belongs: in state-of-the-art circuitry. High slew-rate integrated circuits and extensive ground planes insure the highest RFI protection.

All IC's plug into gold plated sockets. All models feature quick disconnect I/O connectors and require only 1 1/4 inch standard rack height.

We've taken another important step, too.

When you invest in PRIMUS, you receive a *Certified Performance Gold Card* that instantly puts you in touch with our Technical Assistance Department on a toll-free line. Just call in your registered serial number and you're in touch with the advice you need.

To put PRIMUS audio components to task on a free two-week trial, call toll free (800) 821-2545 or contact your nearest Ramko Research sales representative or distributor. Put the powerful performance of PRIMUS in the palm of your hand.



PRIMUS audio components are an array of compact, performance-engineered rack mounting or tabletop packages.



PRIMUS is a division of Ramko Research, Inc. 11355-A Folsom Blvd., Rancho Cordova, California 95670

(916) 635-5600

Circle (1) on Reply Card

© 1983 Ramko Research

Communications in the digital world.

Beyond the impressive lines of digital intercom terminals in Britain's Molinare production complex, lies the heart of Ward-Beck's versatile MicroCOM system.

Leading edge technology, and Ward-Beck's custom designed software, give this innovative production company complete flexibility to reconfigure the entire system whenever varying production requirements demand.

MicroCOM. Today's unique solution for ultimate communications!



First by Design.

Ward-Beck Systems Ltd.
841 Progress Avenue, Scarborough,
Ontario, Canada M1H 2X4.
Tel: (416) 438-6550. Tlx: 065-25399.