

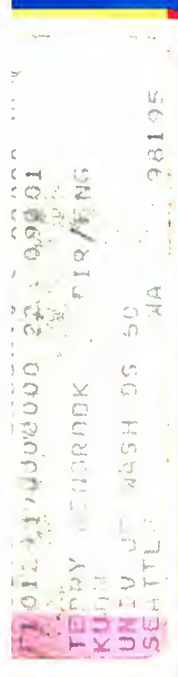
# BROADCAST<sup>®</sup>

AN INTERTEC PUBLICATION

## engineering

March 1990/\$4.50

## NAB '90 in Atlanta: Broadcasting's new decade







# When you need extra hands mixing audio, Shure's AMS can help.

Until recently, you needed outstanding hand-ear-eye coordination to mix audio in multiple-microphone broadcast situations.

Now there's a system that gives you broadcast-quality audio when you can't cover all the faders at once. It's the Shure Automatic Microphone System (AMS), featuring patented direction-sensitive gating.

The Shure AMS continuously compares audio signal levels from two matched unidirectional condenser microphone cartridges located back-to-back in each AMS microphone. The rear-facing cartridge monitors ambient sound, while the front-facing cartridge handles sound from the desired source. When the front cartridge output exceeds the rear cartridge output by 9 dB, the AMS mic channel gates on automatically in .004 seconds.

Because of this unique gating concept, an AMS microphone channel will only gate on

when addressed from within a 120-degree "window of acceptance" centered at the front of the microphone. AMS mics *not* addressed from within this angle remain off. So the number of open microphones is kept to a minimum automatically, with no need for manual control.

Since the Shure AMS automatically keeps track of the number of open microphones and adjusts the overall gain to compensate, your broadcast level stays constant as mics open and close, without troublesome gain-riding.

Direction-sensitive gating makes the

Shure AMS the best system to use in multiple-mic situations, from panel talk shows to game shows to hearings on Capitol Hill. More and more broadcast engineers are discovering the advantages of having broadcast-quality multiple-microphone



audio without the headaches of manual mixing or the time-consuming setup of so-called automatic mixers.

With AMS you not only get all the advantages of a truly automatic microphone system, you also get the broadcast-quality audio and reliability of Shure microphones.

For a comprehensive AMS literature packet, call us at 1-800-257-4873. For AMS technical support, call Michael Pettersen at 1-708-866-2512.



See us at NAB, Booth #4524

## SHURE®

The Sound of the Professionals... Worldwide.

Circle (1) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



the SOURCE

**DPS 275 Component TBC/Framestore**

# ADD-ONS



## Without ADD-UP.

How much would you pay for a true component, infinite-window TBC/Framestore?

Now add multi-format input capability, transcoding between NTSC, Y/C 688, Y/C 3.58, MII and Betacam. So you maintain superior quality in interformat dubs and you can handle all your VTR's with one TBC.

Add full-time multi-format output availability, regardless of input. To let you simultaneously distribute composite, Y/C and component video.

Add four field memory, freeze-field frame, variable strobe, A.T.R. chroma noise reduction and chrominance edge enhancement for improved playback quality.

Add a digitally programmable proc amp with ten non-volatile memories for saving information between scenes.

Add a built-in test signal generator, so you don't need separate and expensive test equipment.

Add RS-232 serial remote control.

The grand total?

To get all that – and more – for just \$6,450, move your fingers from your calculator to your phone. And call your nearby Midwest sales representative.



**Communications Corp.**

One Sperti Dr. • Edgewood, KY 41017  
(606) 331-8990

**See us at NAB, Booth #3234**

Circle (3) on Reply Card

# Contents

March 1990 • Volume 32 • Number 3



Page 40



Page 80



Page 94

## BROADCAST engineering

### **FACILITY DESIGN SPECIAL REPORT:**

*Broadcast and post-production work requires a state-of-the-art facility, one that can expand to meet new demands. In this special report, we discuss how to plan for the future.*

#### **40 Facility Design in a Changing World**

*By Fred Powers, SAIC Broadcast Systems*

To keep your broadcast plant functional, build in plenty of room for change.

#### **54 Hardening Broadcast Facilities**

*By James C. Ritchie, Cooper Carlson Duy & Ritchie, and Rick Lehtinen, TV technical editor*

Maintaining the integrity of a broadcast facility is vital to staying on air during a natural catastrophe.

#### **80 Planning a Satellite Uplink**

*By Tim McCartney, contract engineer*

Take one satellite uplink project, a tight schedule, lots of players and some unexpected problems. Then fasten your seatbelt.

#### **94 Hardening Towers**

*By Rick Lehtinen, TV technical editor*

Standing Tall in the Face of Adversity.

### **OTHER FEATURE:**

#### **108 Voodoo Engineering**

*By Dennis R. Ciapura, TEKNIMAX Telecommunications*

When it comes to evaluating audio, too many engineers abandon good engineering practice for something resembling sorcery.

### **ON THE COVER**

The 1990 NAB convention moves to Atlanta, March 30-April 3. The theme, "Broadcasting Works for America," heralds the beginning of a new decade for our industry. The change in location for the show is a refreshing break from the past and an exciting step toward the future. Cover design illustrating the Atlanta skyline by Stephanie Chiles, BE graphic designer.

### **DEPARTMENTS**

- |                             |                                                      |
|-----------------------------|------------------------------------------------------|
| 4 News                      | 22 SBE Update                                        |
| 6 Editorial                 | 26 Show Preview: NAB Engineering Conference          |
| 8 FCC Update                | 233 Station-to-Station                               |
| 10 Strictly TV              | 238 Field Report: Lexicon LXP-1, MRC MIDI controller |
| 12 re: Radio                | 246 Field Report: Ampex Vista                        |
| 14 Uncommon Engineers       | 254 People                                           |
| 16 Circuits                 | 256 Business                                         |
| 18 Troubleshooting          | 262 New Products                                     |
| 20 Management for Engineers |                                                      |



# Hitachi makes it easy.



## **NOW, THE SMARTEST CHOICE IN D-2 COMPOSITE DIGITAL RECORDERS IS SIMPLE. THE NEW VL-D500.**

Hitachi's new VL-D500 is the most convenient and easy-to-use D-2 recorder you've ever seen.

Rugged and compact, the VL-D500 occupies only seven rack units in a standard 19" rack. And it can play all three cassette sizes automatically—S, M, and L—for 208 minutes of record time.

The VL-D500 is simple to operate, with the proper mix of new display technology, menu-based diagnostics and analog operator controls.

Editing is faster than ever, too. The VL-D500 operates with a shuttle speed of up to  $\pm 60$  times normal speed. Microcomputer control of the servo system and a new low-friction tape path ensure gentle tape handling.

Learn more about the easy choice in D-2 composite digital recorders. Contact the Hitachi Denshi America/Canada office nearest you.



NEW YORK 516-921-7200 • ATLANTA 404-451-9453 • CHICAGO 708-250-8050  
DALLAS 214-233-7623 • LOS ANGELES 213-328-6116 • CANADA 416-299-5900



## Academy commends SMPTE contributions

The Society of Motion Picture and Television Engineers (SMPTE) has received a special commendation from the Academy of Motion Picture Arts and Sciences in recognition of the work of SMPTE engineering committees in establishing industry standards. The award was presented at the Academy's technical awards ceremony on March 3 in Beverly Hills, CA. The society received an Oscar from the Academy in 1957 for its contribution to the advancement of the motion-picture industry.

## Kodak, Bellcore join ATSC Exec Committee

Eastman Kodak Company and Bell Communications Research have been appointed to 3-year terms as members of the United States Advanced Television Systems Committee (ATSC) Executive Com-

mittee. Their terms will expire in December 1992. Sony Advanced Systems Company and Thomson Consumer Electronics were reappointed for the same 3-year term. In addition to these members, the following companies will serve on the ATSC Executive Committee this year: Ampex, Capital Cities/ABC, CBS Broadcast Group, Electronic Industries Association, Institute of Electrical and Electronics Engineers, Maximum Service Telecasters, National Association of Broadcasters, National Broadcasting Company, National Cable Television Association, North American Phillips, Society of Motion Picture and Television Engineers, Westinghouse Broadcasting Company and Zenith Electronics.

## Klystrode transmitter operates at 240kW

Comark Communications has placed into service a 240kW Klystrode-equipped transmitter at WDRB-TV, channel 41 in Louisville, KY. The Fox network affiliate station began broadcasting at its new, in-

creased power level of 5MW ERP on Feb. 1. This is the first time a transmitter output power level as high as 240kW has been achieved.

The transmitter uses four visual Klystrodes and one aural Klystrode. Two independent, phase-locked modulator/exciters provide for automatic redundancy. The total plant ac power consumption, during transmission of an average picture, is about 300kW, which represents an overall average plant efficiency of 80%.

## MSDC transmitter makes on-air debut

Harris, Broadcast Division, has announced that its first UM series UHF-TV transmitter to use the multistage depressed-collector (MSDC) klystron has begun operation at WNVN-TV, Falls Church, VA. The transmitter, which went on the air on Feb. 4, is the first of its type to be used for on-air broadcasting. The UM

*Continued on page 35*

## BROADCAST engineering

### EDITORIAL

Brad Dick, *Editor*  
Carl Bentz, *Technical and Special Projects Editor*  
Rick Lehtinen, *TV Technical Editor*  
Tom Cook, *Senior Managing Editor*  
Dawn Hightower, *Senior Associate Editor*  
Tim McNary, *Associate Editor*  
Suzanne Oliver, *Editorial Assistant*  
Pat Blanton, *Directory Editor*

### ART

Stephanie Chiles, *Graphic Designer*

### EDITORIAL CONSULTANTS

Fred Ampel, *Audio*  
Nils Conrad Persson, *Electronics*  
Ned Soseman, *Video*  
Michael Heiss, *Consulting Editor*  
Don McCroskey, *Directory Editor*

### BUSINESS

Cameron Bishop, *Group Vice President*  
Duane Hefner, *Group Publisher*  
Jerry Whitaker, *Associate Publisher*  
Evelyn Hornaday, *Promotions Manager*  
Darren Sextro, *Promotions Coordinator*  
Dee Unger, *Advertising Business Manager*  
Mary Birnbaum, *Advertising Production Supervisor*  
Sally Nickoley, *Advertising Coordinator*

### ADMINISTRATION

R.J. Hancock, *President*  
Chuck Rash, *Corporate Circulation Director*  
Sandra Stewart, *Circulation Director*  
Doug Wilding, *Circulation Manager*  
Customer Service: 913-541-6633  
Kevin Callahan, *Creative Director*

*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. RAPIDFAX: (913) 541-6697.*

### TECHNICAL CONSULTANTS

Eric Neil Angevine, *Broadcast Acoustics*  
John H. Battison, *Antennas/Radiation*  
Blair Benson, *TV Technology*  
Dennis Ciapura, *Radio Technology*  
Dane E. Ericksen, *Systems Design*  
Howard T. Head, *European Correspondent*  
Wallace Johnson, *FCC/Bdct. Engineering*  
John Kean, *Subcarrier Technology*  
Donald L. Markley, *Transmission 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/Satellite Systems*  
Vincent Wasilewski, *Communications Law*

### MEMBER ORGANIZATIONS

#### SUSTAINING MEMBERS OF:

- Acoustical Society of America
- Society of Broadcast Engineers
- Society of Motion Picture and TV Engineers

Member,  
Association of Business Publishers



Member,  
Business Publications  
Audit of Circulation

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 include consulting engineers and dealer/distributors of broadcast equipment.

BROADCAST ENGINEERING (ISSN 0007-1794) is published monthly (except in the fall, when two issues are published) and mailed free to qualified persons within the United States and Canada in occupations described here by Intertec Publishing Corporation, 9221 Quivira Road, Overland Park, KS 66215. Second-class postage paid at Shawnee Mission, KS, and additional mailing offices. POSTMASTER: Send address changes to **Broadcast Engineering**, P.O. Box 12960, Overland Park, KS 66212.

**SUBSCRIPTIONS:** Broadcast Engineering is mailed free to qualified persons in occupations described above. Others may subscribe at the following rates: United States, one year, \$50; all other countries (surface mail), one year \$60. Rates include postage. Foreign air mail and Canadian first class options are available at the annual subscription rate of \$115. Single copy price \$4.50, except for the annual Buyers' Guide/Spec Book, which is \$20. Back issues, when available, \$5; Buyers' Guide/Spec Book back issues \$23. Adjustments necessitated by subscription termination at single copy rate. Allow six to eight weeks delivery for change of address or new subscription.

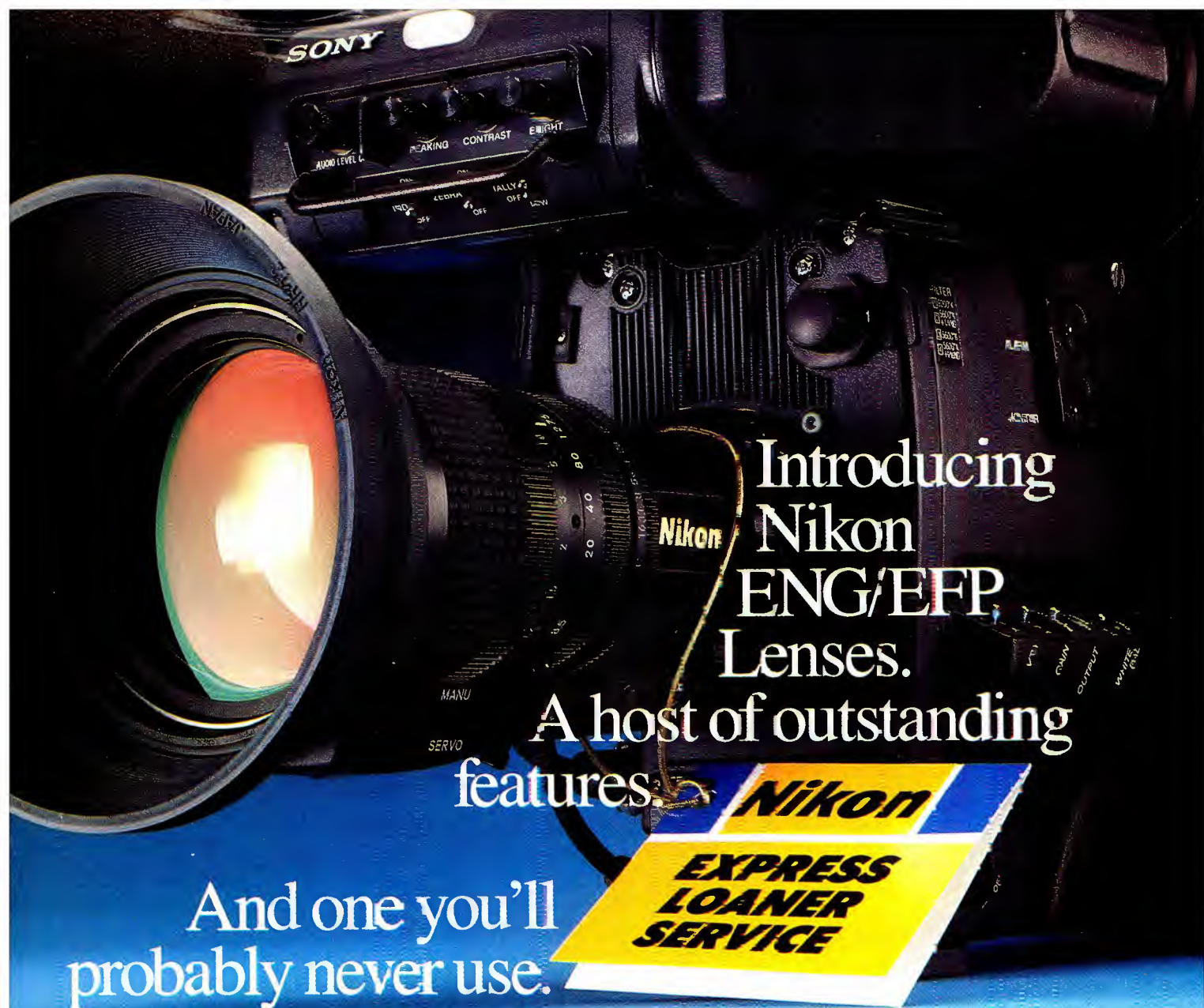
Photocopy rights: Permission to photocopy for internal or personal use is granted by Intertec Publishing Corporation for libraries and others registered with Copyright Clearance Center (CCC), provided the base fee of \$2.00 per copy of article is paid directly to CCC, 21 Congress St., Salem, MA 01970. Special requests should be addressed to Cameron Bishop, group vice president. ISSN 0007-1794 \$2.00 + \$0.00.

©1990 by Intertec Publishing.  
All rights reserved.

Advertising offices listed on page 282.

**INTERTEC**  
PUBLISHING CORPORATION





## Introducing Nikon ENG/EGF Lenses.

A host of outstanding  
features.

And one you'll  
probably never use.

Selecting an ENG/EGF lens for your  $\frac{2}{3}$ " CCD camera is a creative decision. It should be lightweight, responsive and zoom smooth as silk at any speed. Its design should utilize Extra-low Dispersion Glass to minimize chromatic aberration. It should include an anti-reflection coating for improved spectrum transmission ratio. And it should have an advanced design that improves corner resolution and produces a high, flat MTF curve. In short, it should be a Nikon.

But selecting an ENG/EGF lens is also a business decision. And on that score we provide something almost as compelling as Nikon quality – our unique Express Loaner Service. Simply register the Warranty, then in the unlikely event your lens needs service we'll get you a loaner lens overnight. All your investment in equipment and crews is more secure than ever before.

A service like this is remarkable in itself. But not quite as remarkable as our lenses.

As with all Nikon products, our new ENG/EGF lenses have all our renowned quality, tradition and technology built right in. Our growing line is also fully accessorized, including adapters that allow the use of your entire arsenal of Nikkor 35mm SLR camera lenses for special effects.

To find out more, call or write for our complete brochure: Nikon Electronic Imaging, Dept. D1, 101 Cleveland Avenue, Bayshore, NY 11706, (516) 222-0200 Ext. 324. Or call 1-800-NIKON-US (645-6687) for the dealer nearest you.

**Nikon**  
**ELECTRONIC IMAGING**

© 1999 Nikon, Inc.

Circle (4) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



## Quit whining

I received a letter last week from an engineer complaining about the "moral imbeciles calling themselves radio and TV station owners and managers." The poor fellow saw himself as the victim of bottom-line pressures, and ultimately jobless.

Although many of the issues raised in his letter were symptomatic of a less-than-spectacular broadcast market, frustration was another important element that was present. The engineer was frustrated because he has to compete in the free market-place, a situation brought about by FCC deregulation. He felt rejected and insecure and longed for the days of microregulation, when it was safe.

What this engineer doesn't realize is that during the many years of heavy regulation, which helped protect engineering jobs, no one else enjoyed such treatment. News and program directors, sales personnel and even station managers never could lean on the federal government for their job security. If they didn't perform well, they were out on the street. The tables have turned, and now everyone's on a level playing field.

I know of a program director who was hired by the market's No. 2-rated station three years ago. The most recent ratings place the station 10 out of 17 FM stations. Do you think he still has his job? Of course not; he was fired. Certainly he was upset about losing his job, but he didn't whine for the FCC to protect him. Why should engineers receive different treatment?

Some people in this business just can't understand that broadcasting is and has always been a business. If you don't produce or aren't cost-effective, you might as well find another job.

We forget that managers aren't immune to the effects of their work. They, too, have lost their jobs because of roller-coaster performance. If the station produces an inferior product, whether it's because of lousy programming or an

inferior sound or picture, the axe also can fall on them.

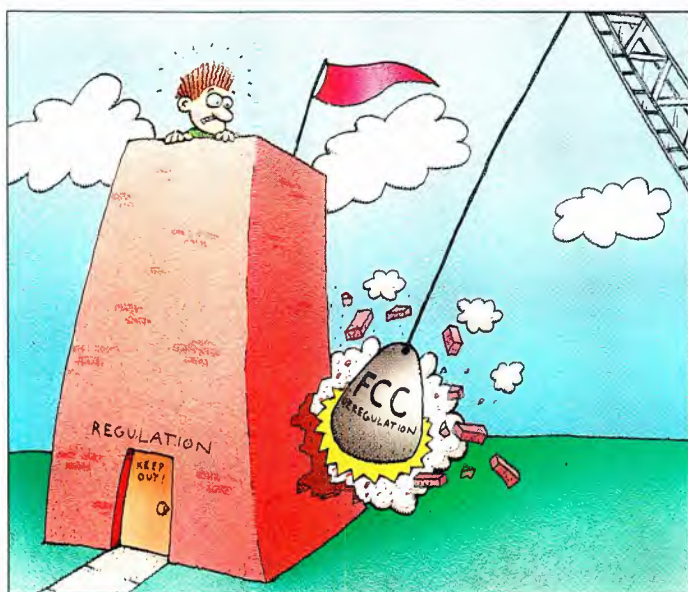
Engineers need to realize that they are more important to the profitable operation of broadcast stations than ever before. That importance, however, is measured much differently from what it was 15 or 20 years ago. Back then, engineers fixed the equipment and maintained the logs. Technology has changed the first task dramatically, and it is no longer mandatory to keep logs.

Engineers must change their emphasis and learn new skills. It's no longer enough just to fix equipment. Now, engineers must show a return on the station's investment through their work. And that's as it should be.

Look at what you do, and consider how you can help make the station more profitable. Is there a way to perform the same tasks more efficiently? What technical changes can be made to improve the station's operation or make it more competitive?

Instead of arguing for a new transmitter because it would lower the distortion by 2%, show how much electricity it would save. Stop trying to justify replacement simply for technology's sake. Show how the new technology will improve the station's performance. Forget justifying new equipment because it might make your job easier. Put yourself in the manager's position. What technical improvements could help the station compete more effectively and become more profitable?

Engineers are the only ones who can answer these questions. So, throw away that pocket protector full of screwdrivers and fire up the computer. Load a spreadsheet, word processor and maybe even a project manager. Put on your bean-counter hat and show a return on the management's investment in you. Tell your manager how to make more money, or at least how to save some.



*Brad Dick*

**Brad Dick,**  
editor





## First Class Sound. Affordable Price.

Orban's popular XT2 Six-Band Limiter Accessory for OPTIMOD-FM® 8100A has been chosen by many major-market stations seeking a "highly processed" sound that's also clean, natural, and easy to listen to. What's particularly significant is how many have chosen the XT2 after comparing it to "another unit" — which costs twice as much! (The XT2 costs only US\$2,075!)\*

How does Orban provide superior performance at a modest price? Simple — the XT2 uses your host OPTIMOD-FM's power supply and much of its circuitry to achieve efficiency, economy, and performance so high that the XT2 would be the processor of choice even if cost were no object.

The XT2 provides bass, presence, and brilliance equalization, plus density and clipping controls, to let you precisely tailor the sound to your station's format and target audience.

Ask your Orban Dealer for information about Orban's powerful First Class winner — the XT2. Or write, call, or FAX us directly.

**orban**

a division of AKG Acoustics, Inc.

645 Bryant St., San Francisco, California 94107 USA

Telex 17-1480 FAX (415) 957-1070

Telephone (415) 957-1067 or (800) 227-4498

Circle (5) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



## Local cable-rate limits to be relaxed

By Harry C. Martin

The FCC is planning to change the standards that have sharply limited regulation of basic cable service rates by local franchising authorities since 1985.

### The current standard

In 1985, the commission adopted a standard for determining whether cable systems face effective competition, and therefore not be subject to local rate regulation, based on whether there were three over-the-air TV signals available in the cable community. According to the commission, changed circumstances in the video marketplace warrant review of the 3-signal standard.

In the Cable Communications Policy Act of 1984, Congress sought to relieve cable systems of local regulation of their basic service rates to promote the growth of cable. However, Congress required the commission to periodically review its effective competition standard to take into account developments in technology relating to the video marketplace. The current proceeding involves redefining effective competition in light of changed marketplace conditions.

### New data on basic tier composition

The increase in the number of channels generally offered on the basic tier is the fundamental change that the FCC says justifies re-examination of the effective competition standard. The commission's latest studies show that the basic tier now includes, in addition to retransmitted broadcast signals, cable networks, superstations and other non-broadcast services. One major reason that basic tier expansion has occurred is because cable operators have an incentive to shift programming to the basic tier to make that service more attractive to potential subscribers. With rate deregulation of the basic tier in effect, enhancement of the basic tier has maximized cable operators' pricing freedom and net revenue. Although subscribership has increased, rates for basic cable service also have risen.



### Alternative methods of effective competition

The commission is considering the following alternative ways of determining whether cable systems face effective competition in light of the changed composition of the basic tier:

- Increase the number of over-the-air signals that would constitute effective competition and require some combination of network, independent and non-commercial signals.
- Define effective competition by the availability of alternative video delivery systems, such as a second cable system, MMDS, SMATV, DBS or home satellite dishes.
- Use high cable penetration as an indicator of undue cable market power or, alternatively, as an indication of the value of cable service when a competitive video marketplace is found to exist.
- Consider effective competition to exist when all subscribers in the cable community can purchase cable service on an "unbundled" or per-channel basis.
- Use any combination of the above measures to ensure effective competition.

### Rate regulation methodology

To assist local franchising authorities' oversight of cable rates, the commission is considering the adoption of uniform reporting and accounting systems similar to those that apply to telephone companies. Another proposal is to reinstitute the commission's annual financial reporting system and require the reports to be made publicly available. The commission also will consider alternative forms of rate control, including incentive regulations such as "price caps," which would place limits on the rate a cable system may charge for basic service. Price caps might give cable systems incentives to avoid unnecessary costs while offering consumers strong protection against increased rates and market dominance by a cable operator.

### New criteria developed for evaluating RF radiation

The commission has adopted new criteria for evaluating the environmental effects of RF radiation when ANSI exposure guidelines are exceeded because of emis-

sions from multiple transmitters. In the future, the actions necessary to resolve a multiple-station RF problem will be the shared responsibility of all licensees who contribute more than 1% of the applicable exposure limits.

The allocation of responsibility for corrective action is expected to be shared in proportion to the respective contributions of the stations involved, except when a newcomer to a site causes an increase in RF level to the point of non-compliance with ANSI guidelines. In such situations, responsibility for corrective action will fall on the newcomer.

The commission also has established guidelines for the measurement and interpretation of intense localized RF fields (hot spots) in relation to reradiating objects that distort the field. The FCC recommends a minimum separation distance of 20cm between a reradiating object and the closest sensing probe of a measuring instrument. The agency also advises that where the presence of a hot spot is indicated at a separation distance of 10cm-20cm, precautionary measures, such as posting warning signs, should be undertaken. Additional guidance on the measurement and interpretation of hot spots is included in the FCC's OST Bulletin 65, footnote 4.

### Notification deadline for aural STLs/ICRs postponed

The FCC has set July 1, 1993 as the new deadline for all aural STL and intercity relay (ICR) transmitters to have a valid FCC notification authorization.

In 1985, the commission adopted a rule requiring all new STL and ICR transmitters designed to operate in the 944MHz-952MHz band to complete the FCC notification process to demonstrate that the equipment meets the agency's bandwidth limits. As of July 1, 1990, all aural STL/ICR transmitters in use were to be notified models.

In extending the deadline, the commission stated that the delay should not be interpreted as modifying the commission's intent to require licensees to use more spectrum-efficient bandwidths in congested areas.

Martin is a partner with the legal firm of Reddy, Begley & Martin, Washington, DC.





- *Precise digital signal processing for superior image quality*
- *Selectable detail enhancement to accommodate a wide range of component source material*
- *Intuitive system control for ease of set-up and operation*

## The EMPHASYS™ Digital Encode System.

When no difference  
makes all the  
difference.

NTSC and PAL just got better. The EMPHASYS™ Digital Encode System\* delivers composite video as you would like to see it – virtually artifact free. Advanced digital signal processing techniques suppress annoying cross-color and cross-luminance effects while providing full control over detail enhancement. The result is image quality approaching that of the component source.

When it comes to superior performance at a competitive price, nobody supports you like GVG. For more information, contact the GVG sales office nearest you.

**Grass Valley Group®**

A TEKTRONIX COMPANY

*At the heart of Television*

\*Patents pending.

Circle (6) on Reply Card





## Check CAV with Lightning displays

By Margaret Craig

**E**lectronic news gathering (ENG) launched component analog video (CAV) as a practical technology. The problems solved by CAV and the many benefits for video signal processing and distribution have expanded CAV's role in the production, post-production and broadcast environments. In addition, CAV is becoming the interconnect format of preference for many new facilities.

Most of the available test equipment, however, is designed for monitoring composite video signal quality. Although some

adjustment in method and interpretation is possible for accommodating component signal monitoring, it can be a cumbersome and time-consuming process. A new type of display developed specifically for CAV monitoring addresses some of these issues. Because of its zig-zag nature, this display is referred to as the *Lightning display*. (See Figure 1.) The Lightning display provides an extremely powerful means of quickly evaluating CAV quality with a standard color bar signal.

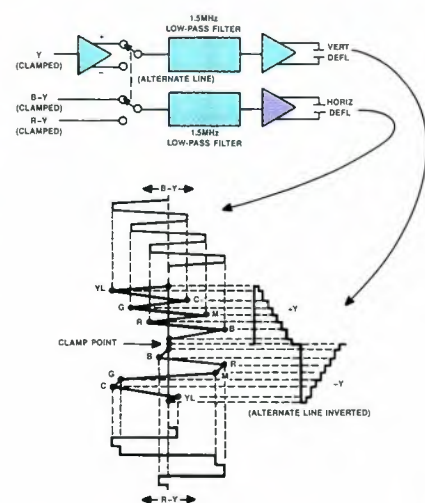
### Creating a Lightning display

The purpose of the Lightning display is to provide a single XY display of the three component signals (Y, R-Y, and B-Y). This display contains all the information needed to ensure that the correct timing and amplitude relationships are maintained among the three component signals.

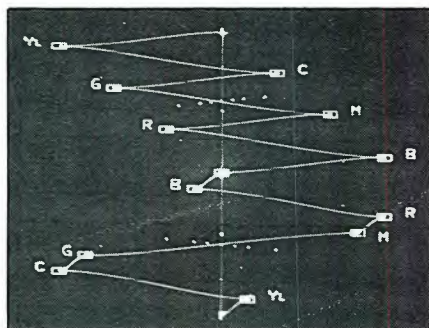
The Lightning display is similar in concept to the familiar vectorscope display used in composite monitoring. A composite vector display is obtained by applying the decoded B-Y and R-Y signals to the horizontal and vertical axes of an X-Y display. A similar vector display can be obtained in the component domain by applying the R-Y and B-Y channels directly to the X-Y display. The resulting display, shown in Figure 2, looks somewhat different from the composite vector display because the two channels are not scaled in the same way.

A complete CAV monitoring solution somehow must include the third component, luminance (Y), which imposes a 3-D vector display requirement. The question becomes, "How do we plot three components in a practical and easy-to-interpret 2-D vector display?" The answer is the Lightning display, which essentially combines two 2-D plots into one. The basic concept behind this display is illustrated in Figure 3.

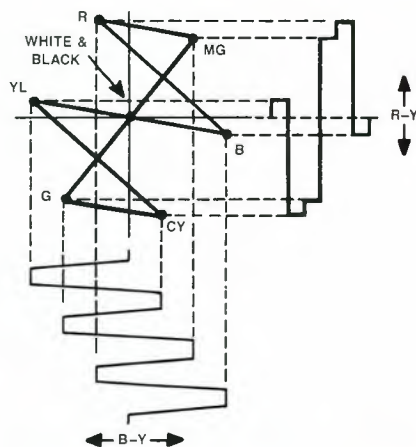
The top half of the Lightning display is created much like a conventional vector pattern, except luminance (Y) is plotted vertically and B-Y is plotted horizontally. This half of the display, therefore, shows the relationships between these two components (Y and B-Y).



**Figure 3.** The Lightning display plots B-Y signal against positive luminance signal and R-Y signal against inverted luminance, yielding a zig-zag or "lightning bolt" display.



**Figure 1.** The Lightning display provides a quick, easy way to check CAV signals.



**Figure 2.** In the component domain, plotting B-Y and R-Y signals yields a display similar to a conventional composite vector display, but this display tells us little about the luminance (Y) component.

The lower half is similar, again plotting Y vertically, but now R-Y is plotted horizontally. In this part of the display, luminance has been inverted so that increasing luminance plots downward.

Plotting luminance vs. B-Y and *inverted* luminance vs. R-Y separates the two halves of the display, providing easier viewing and interpretation. The three components are compared two at a time, with luminance common to both halves of the display.

Signal processing prior to the display also includes backporch clamping and filtering. Clamping each of the three signals stabilizes the reference levels at the center of the display, even with changing APL of the components. The center dot of the display represents zero signal (backporch level) in all three components. Low-pass filtering provides a "cleaner" display without the distractions of unnecessary high-frequency video or noise signals.



# PHASE TRAK 90<sup>TM</sup>

# The perfect cart machines for an imperfect world.

PHASE TRAK 90 PLAYBACK &  
PHASE TRAK 90 RECORD/PLAYBACK



**D**o you really need a cart machine as good as Phase Trak 90? In a perfect world, perhaps not. After all, there'd be no tape skew or phase error in an ideal universe. So, you wouldn't need the continuous non-encodec phase correction circuitry\* we developed for Phase Trak 90 cart machines. This BE-exclusive process is so effective, it actually cleans up stereo carts that sound dull on ordinary machines, while assuring consistently clear mono performance. In a perfect world, tape formulation and performance

would be consistent from batch to batch and brand to brand. There'd be no need for the Record/Playback Phase Trak 90's Automatic Tape Analysis system with Learn Mode.

On a fault-free planet, all audio formats would be created equal. Then you wouldn't need Phase Trak 90's superior cartridge guidance system, Phase Lok V head block and CD-quality sound, including our Dynafex® noise reduction system that audibly improves stereo signal-to-noise performance.

And of course, in a perfect world DJs would always treat

cart machines with care and respect. So you could get by without Phase Trak 90's robust, fully modular design featuring a solid die-cast front panel, machined 1/2"-thick aluminum deck plate, cool DC servo motor drive, Hall effect switches and gold-to-gold interconnects. Phase Trak 90: Quite simply, the best cart machine ever made for the real world. If that's where you live and work, call Bob Arnold at (217) 224-9600, or ask your Broadcast Electronics distributor for more information.

\* Patent Pending  
Dynafex is a registered trademark of Circuit Research Labs, Inc.

**BE<sup>®</sup> BROADCAST  
ELECTRONICS INC**

4100 North 24th Street • P.O. Box 3606 • Quincy, IL 62305  
Tel: (217) 224-9600 • Fax: (217) 224-9607 • Tlx: 250142

See us at NAB, Booth #4500

Circle (7) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



## Bring your array back into tolerance

By John Battison, P.E.

Last month's column outlined the initial steps to realign a DA system. An important first step is to know exactly what's in your system. Consider having a consulting engineer develop a computer printout of the array parameters required to produce your desired patterns. This information may enable you to use a different set of parameters that are more stable or efficient.

### Network arms

The report will show the reactance of every individual unit in the system. (See Figure 1.)

To properly tune the array, each ATU must be adjusted to the proper transfer ratio, which means that the base operating impedance is matched to the line impedance. Incidentally, the approximate phase change is planned by the designer.

### Make some tests

With a bridge and signal generator, connect the ground lead to the junction of  $L_1$ ,  $L_2$  and  $L_3$ . This junction should be grounded via a wide ground strap to the ATU ground. Use wide straps to avoid unwanted inductive reactance; even short, thin

Battison, BE's consultant on antennas and radiation, owns John H. Battison and Associates, a consulting engineering company in Loudonville, near Columbus, OH.

wires can introduce unexpected and misleading inductive reactance values.

Clip the other lead of your bridge to the input of  $L_1$ . There should be no other connections to  $L_1$  or the section you are measuring. Record the resistance and reactance measurements.

When measuring coils or capacitors, you should find *only* reactance. There is no resistance in a coil or capacitor at RF, unless the coil connections are dirty or the capacitor is faulty. A capacitor should normally read zero or a low resistance. Any value above  $0.5\Omega$  is suspect. Check the component for poor connections or faulty dielectric.

Next, measure  $L_2$  and  $C_2$  in the same manner. Make sure nothing else is connected to the arms that you are measuring. Also, make sure that the jacks are open and that you're recording only the arm components of interest.

It is a good idea to begin thinking of each arm as an equivalent reactance:  $X_1$  for the input arm and  $X_2$  for the output arm, including both the inductive (+) and capacitive (-) values. When you begin calculating and looking for specific values, you will be dealing with reactance ( $jX$ ).

When measuring  $X_3$  ( $L_3$ - $C_3$ ), you reverse the connections and ground your bridge to the ground side of  $C_3$  and lift all con-

nections to the junction of the three arms.

When you have finished, the ATU should be set to transform the antenna's base operating impedance to the transmission line impedance. Actual values may vary slightly from theoretical values, so a small adjustment may be necessary.

### Determining line length

Sometimes it's important to know accurately the actual phase shift (electrical length) in a transmission line. A common method is to go by physical length. If higher accuracy is needed, however, the following test can be performed.

Short the far end of the line. Use a signal generator capable of up to 5MHz operation and connect the high-impedance output to the coax line input using a series 500 $\Omega$  to 1k $\Omega$  resistor. This prevents shorting the generator output. A low-impedance generator will not work because it will load down the line. Also, connect a VTVM and a frequency counter at the same point. If you have an extremely accurate generator whose frequency can be read precisely, the counter is not needed.

Tune the generator up or down the band until a deep null is found. Record the frequency as  $F_1$ .

Continue in the same direction and find the next null. Record that frequency as  $F_2$ .

Determine the phase shift using the following formula. Make sure all frequencies are expressed in the same units, kHz or MHz.

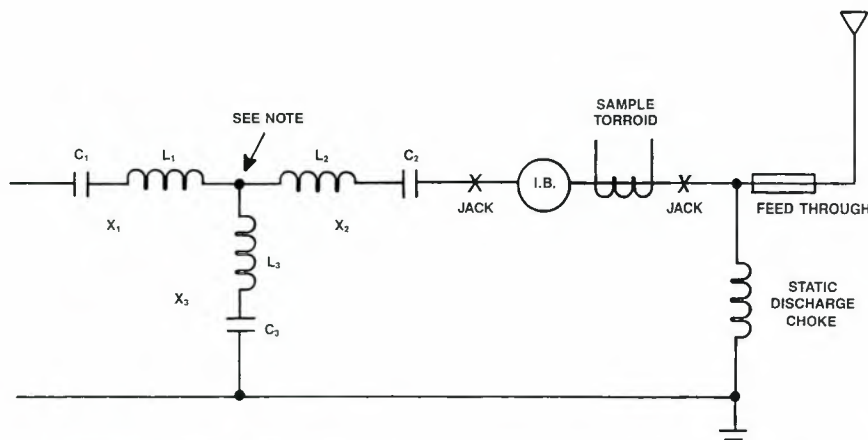
$$\text{Electrical length in degrees} = \frac{F_0}{F_1 - F_2} \times 180$$

$F_0$  = station transmitter frequency

$F_1$  = frequency of first null

$F_2$  = frequency of second null

This method is useful in situations where lines are buried or otherwise impossible to measure for length.



Note: Disconnect all arms here. Connect "hot" bridge lead here to measure  $X_3$ . Ground this point when measuring  $X_1$  and  $X_2$ .

**Figure 1.** Example of an ATU schematic. When measuring the reactance of each arm in the ATU, be sure it is disconnected from other components; otherwise, the values measured will be incorrect.

1:~:)))



# qual·i·ty

\ 'kwäl-et-ē \ *n, pl -ties* [ME *qualite*, fr. OF *qualité*, fr. L *qualitat-, qualitas*, fr. *qualis* of what kind; akin to L *qui* who — more at WHO] 1 **a** : peculiar and essential character : NATURE **b** : an inherent feature : PROPERTY **c** : CAPACITY, ROLE 2 **a** : degree of excellence : GRADE **b** : superiority in kind 3 **a** : social status : RANK **b** : ARISTOCRACY 4 **a** : a distinguishing attribute : CHARACTERISTIC **b** *archaic* : an acquired skill : ACCOMPLISHMENT 5 : the character in a logical proposition of being affirmative or negative 6 : vividness of hue

**syn** QUALITY, STATURE, CALIBER *shared meaning element* : distinctive properties or character (as of merit or superiority : **as in EIMAC power grid tubes—the industry-wide standard for quality**).



Quality is defined by Webster in general terms. Quality defined by Varian Eimac is “a measure of excellence” which is built into our product lines. At Varian Eimac, this measure of excellence means satisfied customers who have relied on Varian Eimac for the past half century.

- Quality according to Varian Eimac means consistent dependability.
- Quality means conformance to our customer requirements.
- Quality means reliability in every product we deliver.
- Quality is measured by the many new customers who are referred to us by long time users of our tubes, cavities, and accessories.
- Quality is a result of the pride in workmanship Varian Eimac employees take in the finished product.

Varian Eimac products are produced in Salt Lake City, Utah and San Carlos, California where the work skills and technology are among the best in the world and the tradition of quality is a part of the design and production of Power Grid products.

For more information on our products, please call 1-800-432-4422 or contact us at the address below.

**varian**  **eimac**

SEE US AT BOOTH 5100  
NAB ATLANTA

VARIAN EIMAC / 301 Industrial Way / San Carlos, CA 94070 / 415-592-1221  
VARIAN EIMAC / 1678 South Pioneer Road / Salt Lake City, UT 84104 / 801-972-5000

Circle (8) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)





**Uncommon engineers**

## Ogden Prestholdt

**By Elmer Smalling III**

**I**f you ask Ogden Prestholdt how today's aspiring broadcast engineer should prepare for a full, long-term career, he'll strongly recommend a firm grasp of the basics — physics, mathematics and engineering. He should know. After all, it certainly worked for him.

## Starting out

Today, Prestholdt's name looms large in the broadcast field, especially in the area of antenna design. Back in 1938, however, his name was where it mattered most at the time: on his diploma. He had just earned his bachelor's degree in electrical engineering from the University of Minnesota, Minneapolis. While doing graduate work in physics, math and engineering, he taught math and physics at the Institute for Technology in the engineering department.

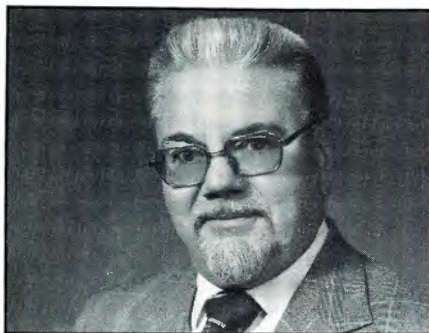
Not long after, Prestholdt took a position as director of technical operations for WLOL-AM, a 1kW, 24-hour Minneapolis station. He built the station, ran the entire operation and hired the staff, duties not expected of today's DOEs. WLOL went on the air on his first wedding anniversary, in June 1940. Four years later, he made his way to New York for his new job in the engineering department at CBS.

## A network career

As an engineer for the network, Prestholdt worked at a transmitter plant in Wayne, NJ, the site used by CBS before it moved its AM antenna to Columbia Island in the East Bronx. One of his many new facilities projects was the layout of the CBS TV transmitter atop the Empire State Building, in 1952. The engineering department was separate from the technical operations department, which worked on studio design.

In 1965, he disassembled the Columbia Island AM transmitter after moving the network radio antenna to High Island, another privately owned island just north of City Island. There on High Island, which was inhabited by a handful of summer cottage dwellers, CBS shared its new antenna with NBC radio. The dual antenna became famous, but not only because it

Smalling, **BE's** consultant on cable/satellite systems, is president of Jenel Systems and Design, Dallas.



## Profile

- *Director of Radio Engineering, CBS*
- *Developed skywave antenna*
- *Awards:*
  - *IEEE Fellowship*
  - *Registered professional engineer in Maryland, New York and the District of Columbia*
- *Member and past president of the AFCCE Association of Federal Communications Consulting Engineers.*

symbolized cooperation between the two biggest competitors in the world's largest market. The ingenious design of the antenna also caught the attention of the industry.

Prestholdt had played a major role in the design and installation of this unique facility. To dramatize the 110dB isolation between the two signals on one antenna, he had a  $\frac{1}{10}W$  resistor placed across the final circuit of the WCBS transmitter while the WNBC portion was radiating full power. He still has the intact resistor!

Prestholdt was appointed CBS Director of Radio Engineering in 1960. During this period he became active in the Institute of Electrical and Electronics Engineers (IEEE), presenting a number of technical papers on antenna systems and support facilities.

## Other projects

In 1969, after 25 years with CBS, Prestholdt joined the Washington, DC, consulting firm of A. D. Ring as a partner. He became involved in a number of projects in which clients' buildings impinged on AM antenna arrays, affecting the antenna patterns. He developed detuning schemes that made certain radiators electrically invisible. This allowed the placement of buildings on precious real estate sites that had been off limits because of the possibility of interference with antenna systems and the subsequent distortion of FCC license parameters.

One of these cases involved several FM stations in Prestholdt's home town of Minneapolis, which were multiplexed into a common antenna on top of one of the city's tallest buildings. Third-order harmon-

ics caused a great deal of intermodulation and were a source of interference with receivers throughout the city. Because of this problem, these transmitters were operating at reduced power. Prestholdt undertook a study to determine the cause of this interference, evaluate possible solutions and develop a program that would predict this type of interference at the many multiple-transmitter, single-antenna FM sites across the country. He released his recommended program to the FCC last year.

Prestholdt retired from A. D. Ring in 1985 and is now a consultant to the Washington, DC, firm of duTreil, Lundein and Rackley.

## An ingenious scheme

Prestholdt has developed a revolutionary method to control skywave and groundwave antenna patterns. If a station in city No. 1 must protect a station in city No. 2 from its skywave, its horizontal radiation pattern usually is designed with a big notch on the city No. 2 directional coordinates. This protects the second station and also affects the close-in coverage in the direction of the first station. Using Prestholdt's scheme, however, the skywave can be controlled without notching the horizontal pattern.

In the field of radiator detuning, he is working on a project involving two 500,000-square-foot, 30-foot-high buildings (each large enough to hold two football fields), located near an antenna farm that includes a 5-tower directional array. When he is finished, the buildings and antennas will co-exist peacefully.

**More to come**

An IEEE Fellowship, an honor reserved for those who are truly outstanding in the area of broadcast engineering, recently was bestowed upon Prestholdt. This uncommon engineer doesn't intend to rest on his laurels, however. He has a number of projects planned for his retirement years, including the writing of books on antenna systems and their design.

No doubt he will continue to contribute improvements to the field of broadcast engineering.



# Radio's Top Ten!

Many of our customers understand that this is more than a hollow boast. They know that when a manufacturer offers them a broad choice of products, it means money in their pockets.

How? Simple. You can select *exactly* the right equipment for your specific application.



And when you're not forced to make compromises in features or performance, your station not only sounds better to your listeners, it is also much more efficient in its day-to-day operation.

Otari has machines for news editing, on-air, and production with features to fit any application or budget.



To make a point, let's say you are in the market for a multitrack.

You can choose from our top of the line MTR-10 that gives you all the features you'll ever need, or our BQII, MKIII/4, MKIII/8, or the MX-70 with 8 or 16 tracks.

Need a 2-track?

How about our famous "workhorse" MX5050 BII, or the MKIII/2, or the MX-55NM with gapless, seamless, punch-in, punch-out and HX-Pro\*.

And don't forget the MX-50, perhaps the most affordable professional 2-track on the market.

We also offer three models of our CTM-10 cart machine. And if yours is an automated radio station,



our ARS-1000 reproducer is the most popular machine in the world.

You could say we have a *broad cast* for broadcast. But as we've pointed out, it can mean a lot more to you than just a phrase.

Call your nearest Otari dealer today, or call Otari at (415) 341-5900 for more information.

## OTARI



\* HX-Pro is a trademark of Dolby Laboratories Licensing Corporation

Circle (9) on Reply Card

©1989 Otari



## Using Smith chart scales

**By Gerry Kaufhold II**

Some scales of the Smith chart are placed horizontally off to the side. The SWR and attenuation scales are *radial* scales. Last month, we showed how to use these scales by aligning a straightedge at right angles to the scale of interest, finding the desired value, and tracing a line up to the Smith chart. We used the intersection of the traced line and the resistance component scale as a radius for an attenuation or SWR circle.

The bottom transmission coefficient scale is a *magnitude* scale, and must be used differently. Use a magnitude scale by taking a compass or dividers to transfer lineal distances from portions of the Smith chart. (See step A in Figure 1.) More about this later.

### Admittance, conductance and susceptance

The Smith chart shown (refer to Figure 1) is for series circuits. Normalized resistances and reactances are given in ohms and can be plotted directly on the

Kaufhold is a market development engineer for SGS-Thomson Microelectronics, Phoenix.

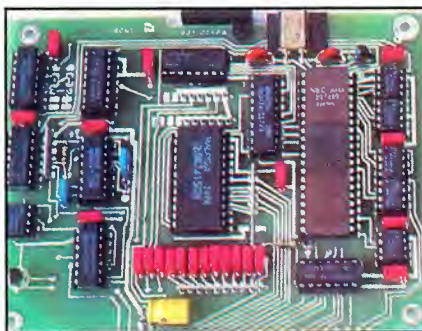


chart. The general equation for impedance is:

$$Z = R + jX_R \text{ (in ohms)}$$

Where reactance  $jX_R$  includes inductive and capacitive reactance components:

$$X_C = 1 / j\omega C$$

$$X_L = L$$

For most applications, parallel (shunt) circuits also must be included in circuit calculations. This introduces admittance.

The general equation for admittance is:  
 $Y = G + jB$  (in mhos)

The specific components are:

$$+jB = 1 / X_C$$

$$-jB = 1 / X_L$$

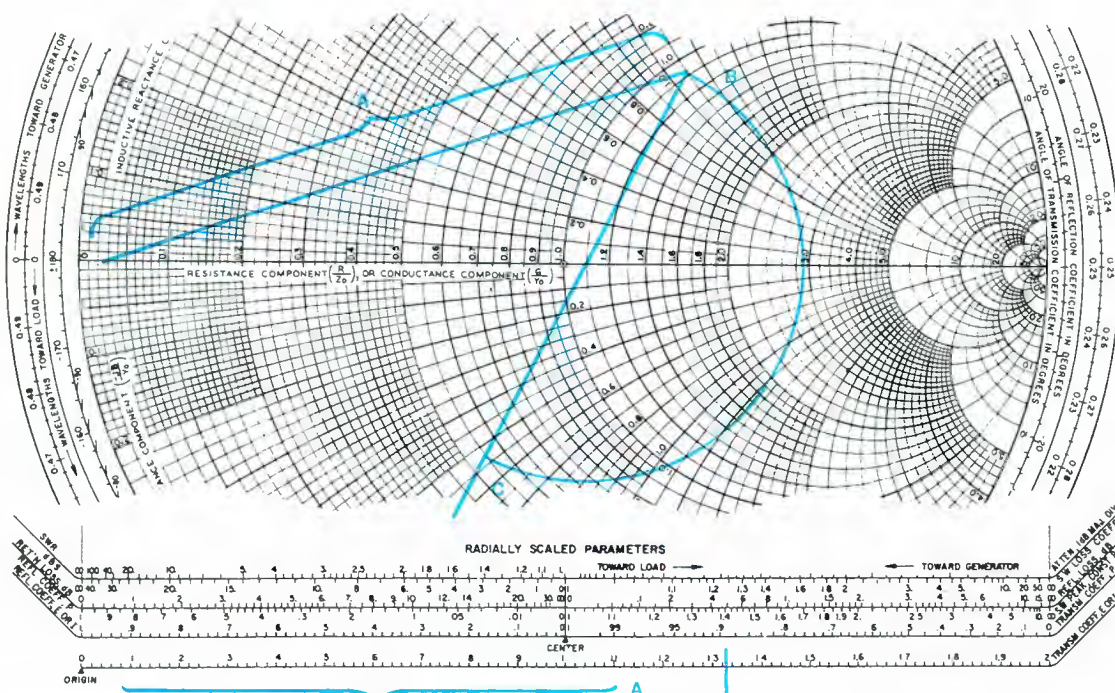
As can be seen, mathematical conversion between series and shunt circuits can be difficult.

### Graphical solutions

The Smith chart can make this conversion graphically. Using series impedance  $1 + j1$  as an example, plot the normalized impedance of each component. (See step B of Figure 1.) Using a straightedge, draw a line from the plotted point, through

prime zero, and on through the other side of the Smith chart. Align the compass or dividers between prime zero and the plotted impedance point and draw an arc that intersects the line  $180^\circ$  away from the beginning point. (See step C of Figure 1.) Mark this new point, which is the same distance away from prime center but  $180^\circ$  across the chart. This is the admittance value. To read off the normalized conductance and susceptance values, notice that the lower portion of the Smith chart (negative) is labeled *inductive susceptance component*. If the admittance point lies in the bottom half of the chart, read it as inductive susceptance ( $-jB$ ). The upper portion of the Smith chart (positive) is labeled *capacitive susceptance*. If the new point lies in the upper half of the chart, read it as capacitive susceptance ( $+jB$ ).

This graphical solution may seem simple when compared to the mathematics, but next month we will introduce a simple trick that allows us to eliminate the conversion altogether.



**Figure 1.** Impedance to admittance conversion using linear scales on Smith chart.



# THE SUPERIOR SPREAD



Orban's 222A Stereo Spatial Enhancer is a powerful, new, on-air processing weapon that gives your station a more competitive "leading edge" sound.

Hundreds of stations of widely varying formats have already pleased their audiences with an attractive, magnified stereo spatial image, and have gained noticeable improvement in brightness, depth, and transient definition as a bonus.

But, they haven't experienced the traditional curses of stereo image enhancers—increased multipath distortion, unnatural exaggeration of reverberation, mono incompatibility, and homogenization of the stereo image due to the 222A's new, patent-pending approach.

Here are a few user comments about the 222A:

**Frank Foti, Consultant (formerly WHTZ/Z-100, New York, NY/WMMs, Cleveland, OH):** "Sublime on some material, very dramatic on others. Retains natural quality of music. A device to keep the competition guessing at a very affordable price."

**Bill Ruck, KFOG-FM, San Francisco, CA:** "Wow! On-line, pre-Optimod 8100A, set at maximum enhancement. Sounds very dramatic. Management loves it; I love it!"

**Bob Leembruggen, KLOS-FM, Los Angeles, CA:** "Sweet separation with center channel power."

**John Alan, KLOL-FM, Houston, TX:** "Unit works well; no additional multipath, even in Houston!"

**Egidio Giani, WLR South East Radio, Waterford, Ireland:** "Nice overall stereo sound which does not sound enhanced when in fact it is."

**Unnamed Source (at user's request), Columbus, OH:** "Good job at a great price. Subtle intensity!"

Whether your station is protecting top ratings or striving to provide a more pleasing product, the 222A can give you that extra edge by naturally enhancing your existing stereo spatial image.

The 222A delivers a sound that is crisp, natural, and, well-defined for just \$995.\*—a cost that is within reach of any station, small or large. Ask your Orban Dealer for a demo, or call today for more information on the 222A—your next audience-pleaser and ratings booster.

## orban

### LISTEN TO THE DIFFERENCE.

Circle (10) on Reply Card

**Orban** a division of AKG Acoustics, Inc.,

645 Bryant Street, San Francisco, CA 94107 USA

Telephone (415) 957-1067 or (800) 227-4498 Telex: 17-1480 FAX: (415) 957-1070

[www.americanradiohistory.com](http://www.americanradiohistory.com)

\*(Suggested List)



# Troubleshooting

## Aerosol cans can be deadly

By Brad Dick, editor

**I**t was going to be a hot and humid weekend, thought the engineer as she parked the company car in the office parking lot on Friday. She went into the station to pick up a few things, returned to her own car and headed home. When she went to work on Monday, this is what she found.

### Aerosol-powered bomb

The windshield of the company car looked as if it had been attacked by vandals or shattered in a violent storm. The damage actually was caused by a small aerosol can, commonly used by technicians and engineers, that had exploded in the heat.

---

***Warning labels on these cans should be taken seriously.***

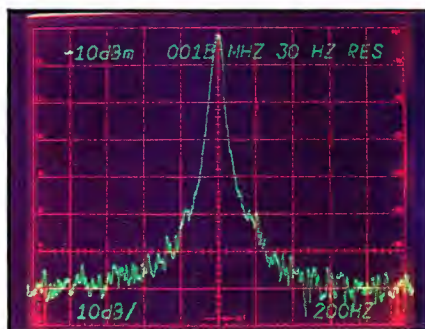
---

Even though the engineer left the window open slightly to let in some air, the temperature inside the car rose to an extreme level, causing the aerosol can of cleaning solution to explode. It damaged the dashboard, hit the windshield twice and finally broke through it, landing in a vacant lot more than 100 feet away from the car. Fortunately, the accident occurred over a weekend in an empty parking lot.

To avoid an accident like this, and to keep unexpected expenses off your vehicle operating budget and monthly expense statement, warn your staff about the



*Interior dashboard damage. If the can had exploded when the car was being driven, the results could have been fatal.*



*As a result of high temperatures in the car, the small aerosol can, shown here, caused severe damage to the windshield and dashboard.*

danger of leaving aerosol cans exposed to direct sunlight. Warning labels on these cans should be taken seriously. If the aerosol can had exploded when someone

while the damage was being repaired.

As we approach warmer weather, don't let a \$2 can of cleaning solution cause \$1,000 worth of damage to your vehicle. Even during the cooler months, strong sunlight can send internal temperatures of vehicles well above the 100° mark. Remind your staff of the potential for injury and damage when aerosol cans are exposed to high temperatures.

---

***The windshield of the company car looked as if it had been attacked by vandals or shattered in a violent storm.***

---

was driving the car, the driver and any passengers could have been injured or possibly killed.

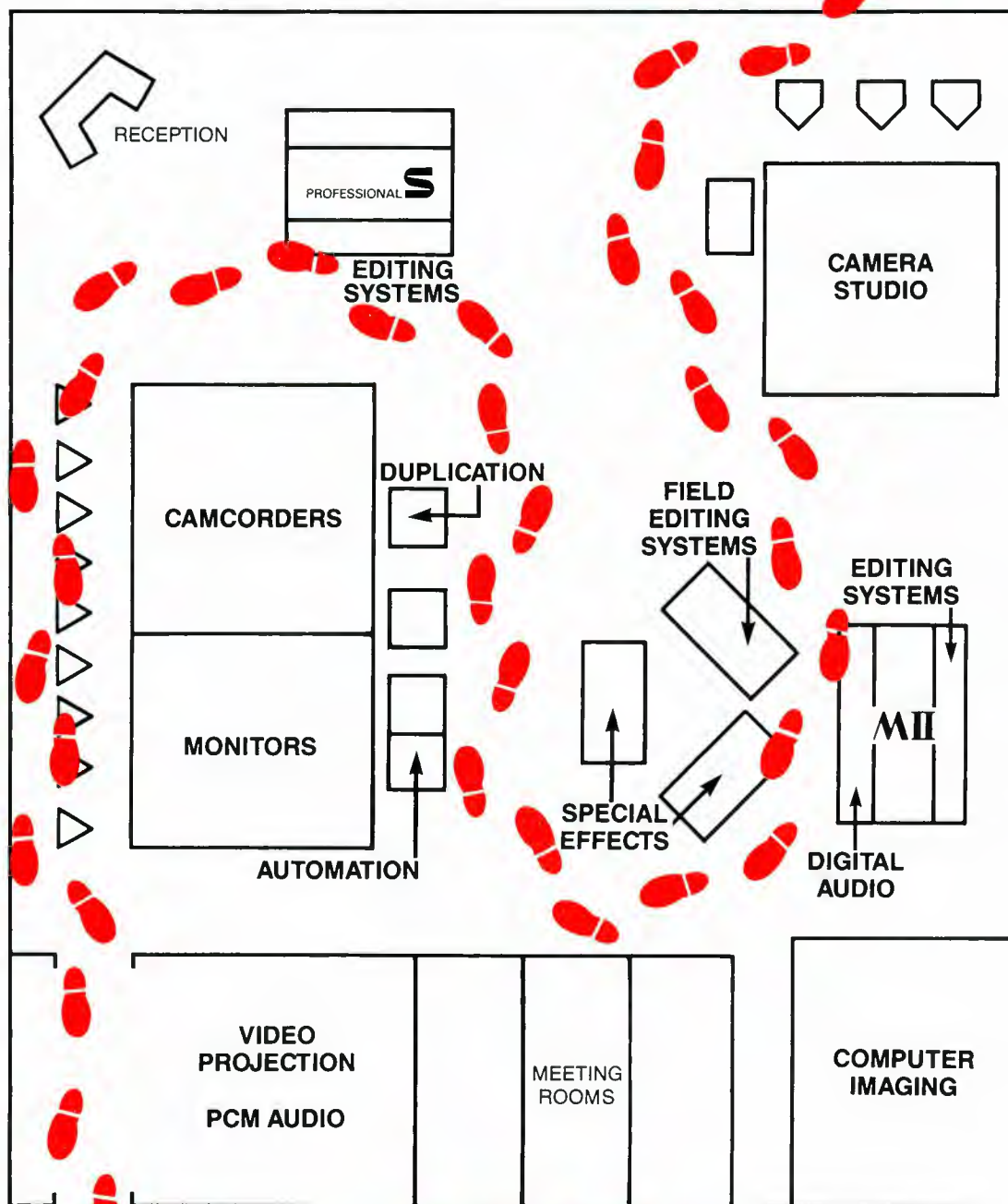
Aerosol cans should not be left on the passenger seats, on the dashboard or in a place where they can be exposed to direct sunlight. Such cans should be stored in a sealed tool box and placed in the trunk. If they should explode there, the damage would not be as great, and you wouldn't lose the use of your company car

**Editor's note:** This technical tip originally appeared in *Micro-Service Management*, an Intertec Publishing magazine, and was submitted by William Herbert of Coordinated Service, Littleton, MA.

1:7:)))



# “There are 14 good reasons to visit JVC at NAB Booth 3116.”



# **JVC**

## **PROFESSIONAL**

JVC PROFESSIONAL PRODUCTS COMPANY  
41 Slater Drive, Elmwood Park, NJ 07407 • 1-800-JVC-5825

Circle (11) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



## Motivate from the employee's viewpoint

**By Brad Dick, editor**

**W**hat motivates your employees to perform their jobs? It could be the money, or it could be other, less obvious reasons. If your employees are working for other reasons, you are missing out on some effective inducements for improved performance that may not cost you anything.

## What is motivation?

Motivation has been described as the psychological process that gives behavior purpose and direction. By appealing to this process, managers attempt to get their staffs to willingly pursue the organization's goals.

It sounds simple, but motivating people can be one of the most difficult tasks a supervisor undertakes. Motivating others is an unending task, because performance and morale will fall if you stop.

## Walk in my shoes

Every employee is motivated; the only differences are in the motivations. You may have found yourself saying that you have an employee who is unmotivated. More often than not, the employee is not producing the work the supervisor expects.

An investigation often will reveal that the employee does not understand what



the supervisor expects. It's common for employees to believe they are performing well when their supervisors believe just the opposite.

Supervisors often are guilty of looking at the work to be completed only from their position. It's easy to tell a VTR operator to record the children's show at 1 p.m., but what if the operator also is supposed to record a network feed and dub a spot reel for the 5 p.m. news, all on three machines?

To the supervisor, the assignment was just another simple task, but the operator thinks that she's been asked to perform an almost impossible feat. This misunderstanding of the employee's view of the situation by the supervisor can affect employee morale. As supervisors, we need to consider the job from the employee's point of view.

## What's in it for me?

People work for reasons other than money. It would be much simpler to encourage their actions if that weren't the case. All you would have to do is determine the amount of money required to motivate an employee, and you would have instant success. Successful supervisors understand that the people in today's

| FACTORS:                              | EMPLOYEE<br>RANKING | SUPERVISOR<br>RANKING |
|---------------------------------------|---------------------|-----------------------|
| • Interesting work                    | 1                   | 5                     |
| • Full appreciation<br>of work done   | 2                   | 8                     |
| • Feeling of being<br>in on things    | 3                   | 10                    |
| • Job security                        | 4                   | 2                     |
| • Good wages                          | 5                   | 1                     |
| • Promotion and growth<br>in the firm | 6                   | 3                     |
| • Good working<br>conditions          | 7                   | 4                     |
| • Personal loyalty<br>to employees    | 8                   | 7                     |
| • Sympathetic help<br>with problems   | 9                   | 9                     |
| • Tactful discipline                  | 10                  | 6                     |

**Table 1.** Comparison of job satisfaction as viewed by hourly employees and their supervisors. Matching company-provided inducements to the desires of the employees is an important key to profitable operation.

work force seek to satisfy other needs, such as acceptance, social interaction, autonomy, control and power.

**Reward me**

As employees' needs change, supervisors must seek to better understand what those needs are. Sometimes that's difficult, but some generalizations are apparent.

A survey taken of hourly employees revealed what is important to workers. The respondents were asked to rank, in terms of personal importance, 10 job-related factors. The supervisors then were asked to rank in order the factors in terms of how they expected the employees to rate them. The results are summarized in Table 1.

The factors the employees rated as important did not match the expectations of the supervisors. The employees rated *interesting work* as the number one factor to job satisfaction. That same factor was rated 5 by the supervisors. *Good wages* were rated 5 by the employees, but 1 by the supervisors. These differing viewpoints could be the cause of conflict.

The best way to get others to perform a task is to make it worthwhile to them. Make it in your employees' best interest to do what you want done. Structure the job environment so that their needs are met and yours (and the company's) will be, too.

It's been estimated that as much as a 300% increase in output could be realized by paying attention to what's important to the employees. Keep them informed about what's going on, and involve them in the process.



# ***NEW FROM ARRAKIS SYSTEMS***

## **10,000 SERIES**



For features, performance, price and reliability,

***NOBODY BUILDS CONSOLES LIKE ARRAKIS.***

**Call (303) 224-2248**

Circle (13) on Reply Card

ARRAKIS SYSTEMS INC. 2619 MIDPOINT DRIVE FORT COLLINS, CO 80525





## Regulations delay requested

**By Bob Van Buhler**

**T**he society filed a letter with the FCC last November requesting a 3-year delay in implementation of the Report and Order in Mass Media Docket No. 85-36. This action, adopted in 1985 after predicted aural STL band congestion in a variety of markets, was designed to ensure that all aural studio-to-transmitter links (STLs) and intercity relays (ICRs) met long-standing technical standards. It also encouraged the production of STL and ICR equipment capable of using narrower bandwidths. As of July 1, 1990, all STLs would be subject to new regulations that would have forced many stations to modify or replace their STL systems.

The society's request was supported in December by a filing from National Public Radio (NPR), who pointed out the expense involved to the public. NPR contended that the change should be spaced over several years to enable the use of NTIA public telecommunications facilities program funds to meet this need.

Although the implementation of the rules would affect all licensees financially, SBE and NPR were the only organized groups to request a delay. Several individual public and commercial licensees asked for a delay, but broadcast organizations representing management and ownership were silent on the issue. The commission, responding to the arguments of the society and NPR, granted a 3-year delay in enforcement of the measure. Licensees remain responsible for compliance of their equipment, but now have up to three years to certify or replace any equipment manufactured before Oct. 31.

SBE president Brad Dick encouraged members to let their managers know that the society's action in obtaining the delay will have a positive impact on their operation and pocketbook. "Tell them now," said Dick, "and remind them again when you request funding for your trip to the SBE national convention this fall." SBE Director Dane Erickson of Hammitt & Edison, and SBE Counsel Chris Imlay were the key players in the successful action.

Another SBE project is a petition proposing amendment of aural STL rules



to make these facilities subject to minimum antenna standards, similar to TV auxiliary stations' standards since 1981. The proposal would require all future aural STL stations to provide specific desired-to-undesired signal ratios to existing co-channel and first-adjacent channel stations. These would be based upon higher-performance antenna assumptions in congested areas, and a less-strict standard in areas where interference is not as likely.

Due to a misprint in section 74.651, the frequency tolerance for aural STLs is listed as  $\pm 0.005\%$ . At 950MHz, this corresponds to a tolerance of 47.5kHz, which is unacceptable for a 200kHz-300kHz channel. SBE proposes to change the listed tolerance to  $\pm 0.0005\%$ . Other revisions in the petition include a 10W limit on aural STL transmitter output power and a 22.1km minimum path length.

## Membership survey

Dick has met another goal of his administration, commissioning a demographic survey of SBE members. In the next *President's Newsletter*, members will find a survey, which will help the society better identify the needs and desires of its members. The information will be used to develop member services and training programs.

All members must complete and return the survey. Full participation will result in more customized programs to benefit the members. The survey was prepared and will be tabulated by a professional researcher. All responses will be anonymous and treated confidentially.

### Renewal time

SBE membership renewals, which will be mailed April 1, will reflect a new look. The form will contain a brief demographic survey. The results will help the society to design mailings to better meet individual member career paths and interests.

The application also will contain an order form for SBE products. Members can order past convention *Proceedings*, the SBE lab coat, T-shirts and membership pins. The SBE certification pin is a special new product. A pin has been custom-designed for each level of certification in both the radio and TV categories. Don't

miss this opportunity to show others your certification level. Order your pin today.

## Frequency coordination and computers

Gerry Dalton, who has served the society in frequency coordination, has been appointed director of management and information services for SBE. He is responsible for policy, direction and supervision of the society's computer systems and practices.

Dalton is currently interviewing Indianapolis computer companies who will provide the local hardware and software support. Dalton will supervise the company's work. The criteria for selection will be familiarity and skill in the use of database, compiler and local area network programs in use at the national office.

The latest version of the frequency coordination database software, version 2.9, is now complete. The update, with proper documentation, will be mailed to every coordinator listed on the National Frequency Coordination Committee (NFCC) list. The list, which was to have been taken over by the All-Industry National Frequency Coordinating Council, has been maintained by SBE's vice president Paul Lentz in absence of NFCC action.

## Washington luncheon

At the SBE executive committee meetings in Washington, the society hosted a luncheon, attended by representatives of the FCC, Corporation for Public Broadcasting, public and commercial TV stations, training foundations, consulting engineers and the broadcast trade press.

A special service award was given to the society's second president, Charles Hallinan. John Battison presented the award. Hallinan, chairman of the first local chapter, was responsible for successfully moving the society from its embryonic stage to national recognition.

Van Buhler is manager of engineering at KNIX-AM/FM, Phoenix.

**Editor's note:** For additional SBE information, !GO BPFO-RUM on CompuServe. **! : 7 - ) ||||**



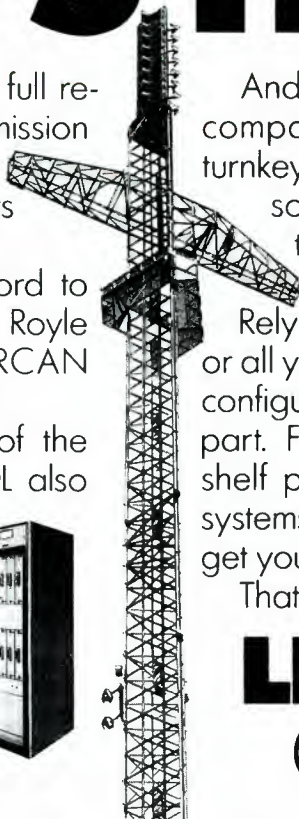
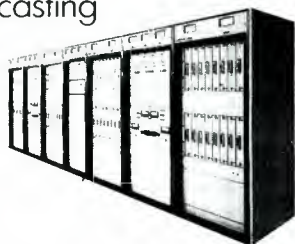


# THE BUCK STOPS HERE.

What makes us unique is that we take full responsibility for every broadcast transmission system we supply. Even if you specify other equipment and suppliers for parts of your LDL installation.

And it's a responsibility we can afford to take. Because LDL stands for LeBlanc & Royle towers, Alan Dick antennas and LARCAN transmitters. Leaders in their fields.

At the same time, we're members of the LeBlanc Communications Group. So LDL also stands for the vast broadcasting resources and experience of our other affiliated LeBlanc Companies.



And that makes us one of very few companies who can handle complete turnkey systems with our own internal resources. So you get every benefit of total systems integration. On schedule, within budget.

Rely on us. As your one source for any or all your needs. From the most complex configuration to the smallest replacement part. From custom-designed or off-the-shelf products to upgrades for existing systems. We've got whatever it takes to get you on the air. And keep you there.

That's LDL. Responsive and responsible.

**LDL COMMUNICATIONS, Inc.**  
A MEMBER OF THE LeBLANC COMMUNICATIONS GROUP  
 **leBLANC**  
14440 Cherry Lane Court, Laurel, MD 20707  
Tel: (301) 498-2200. Fax: 301/4987952. Telex: 821569.

See us at NAB Booth #1634

Circle (12) on Reply Card

March 1990 *Broadcast Engineering* 23

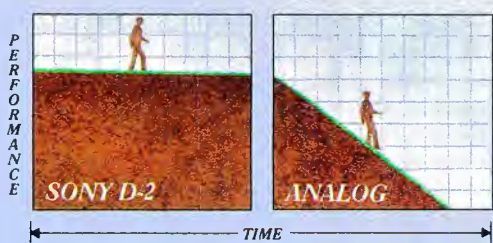


Not long ago, these facts would have been fiction. Then Sony introduced D-2 composite video.

D-2 takes the amazing possibilities of digital technology and makes them a practical reality.

In fact, revolutionary is the only way to describe it. D-2's digital world is a place where performance is consistently extraordinary.

Where every tape copy is as good as the original. Where audio is as



*D-2 maintains consistently high performance.*

important as video. And where machines operate without the need for constant adjustments.

In the digital world, a D-2 VTR does its job just about perfectly. So you can too.

And it's all a matter of fact.

D-2's picture quality is exceptional from the start, and it stays that way consistently. Here's why:

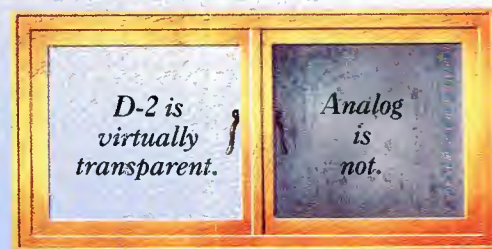


*D-2 effectively eliminates dropouts.*

# To everyone with their video it's time to

D-2's unique error correction and concealment system means you'll never have to worry about dropouts.

D-2's digital transparency is another



clear advantage.

And copies of D-2 tapes aren't dubs.





They're "clones." Digital replications indistinguishable from the original.

As for audio, D-2 VTR's have broadcast sound quality previously unheard of.



formance machine would be hard to work with. But in fact, D-2 is quite easy to use.

For example, D-2 shows you pictures-



in-shuttle faster and in color. So you can

work more quickly and efficiently. And one person can comfortably operate up to eight D-2 VTRs. Which makes it a lot easier to do a lot more.

Given all this intelligence, you'll have to agree. Sony D-2 sets a new standard in recording technology. After all, you can't argue with the facts.

*D-2 lets one person easily operate up to eight VTRs.*



For more information call (800) 635-SONY.

**SONY**

BROADCAST PRODUCTS

*D-2 combines digital audio with digital video.*



Four independently editable channels of CD quality digital sound. In stereo that never needs a phase adjustment.

Fact is, no other composite VTR performs as well as D-2. In both video and audio. You might think such a high per-



## Frankly, my dear, it's time to pack

That broadcast industry show of shows — the National Association of Broadcasters Engineering Conference and Exhibition — is only days away. This year, attendees of the annual event will find themselves deep in the heart of Dixie: Atlanta. The Engineering Conference will begin on Friday, March 30, one day before the official opening of NAB '90. The sessions will offer a wide variety of technical information covering the latest in technology for both radio and TV applications.

If you've ever attended an NAB convention, you know it's a grueling exercise in setting priorities. There is so much to do and so little time to do it. To help you get the most out of the show, the **BE** staff has compiled the following condensed schedule for the Engineering Conference. Use it to work out your own personal agenda beforehand. No matter how talented or organized you are, you can't be everywhere at once, so consider joining forces with your colleagues to help in covering sessions. With the buddy system and some good note-taking, you can trade useful information with fellow attendees.

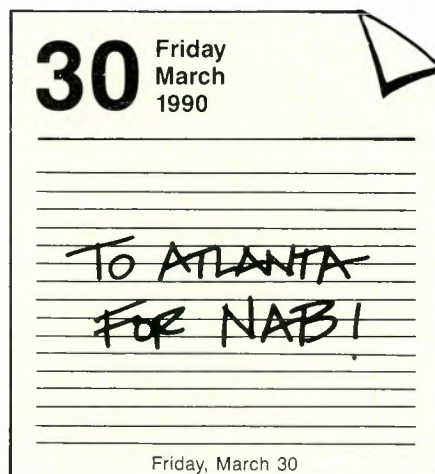
Cassette tapes will be available, and many of the papers will be contained in the "NAB Proceedings." It might be a good idea to have your copy mailed back home. It promises to be a real backbreaker.

### Radio sessions

#### FM Systems Engineering and Improvement

Friday, March 30  
9 a.m.-11:30 a.m.

1. "NRSC Report," Wes Whiddon, *Group W Radio*.
2. "The Application of FM Boosters Without Terrain Obstructions," Mark S. Olkowski, *Osborn Communications*, and Edward A. Schober, P.E., *Radiotechniques Engineering*.
3. "Optimizing the FM Transmitting Antenna," Dr. Stephen Jon Blank, *Bogner Broadcast Equipment*.
4. "Customized Pattern Applications of the FM CBR Antenna," Fred A. Pantsios, *Harris Corporation*.
5. "The Significance of RF Power Amplifier Circuit Topology on FM Modulation



Performance," Mukunda B. Shrestha, *Broadcast Electronics*.

6. "A New Approach to Prediction of Service and Interference for FM, VHF and UHF Television Broadcast Stations Using Terrain Sensitive Propagation Analysis," John Kean, *Moffett, Larson and Johnson*.

#### Digital Audio Systems

Friday, March 30  
1:30 p.m.-5 p.m.

1. "Digital Audio Broadcasting for Television and Radio: Efficient Modulation Techniques," Craig Todd and Menno Merringa, *Dolby Laboratories*.
2. "Digital Audio Techniques for Remote Broadcasts," Paul Donahue, *Gannett Radio*, and Mark Durenberger, *WCCO-AM*.
3. "EBU/DAB Sound Broadcast System," George T. Waters, *European Broadcasting Union*.
4. "7kHz Audio in ISDN B-Channel Channels," Tony Masiello, *CBS Radio Division*.
5. "PCM Digital Audio Technology for S-VHS Video Cassette Recorders," Neil Neubert, *JVC Professional Products Company*.
6. "Low-Cost Digital Audio Storage System," Tim P. Valley, *MacroMedia*.
7. "Narrowband Digital Systems," Skip Pizzi, *National Public Radio*.
8. "CD Player Maintenance," Laura Tyson, *Denon America*.

#### Radio Engineering

Sunday, April 1  
9 a.m.-12:05 p.m.

1. "Building and Operating a Multipurpose Remote Studio Vehicle," Michael D. Callaghan, *KIIS-FM*.
2. "Design and Development of a Computer-Controlled On-Air Automatic Music System," Michele Sanders, *Drake*

*Chenault Enterprises*, and Steve Kadner and Kevin Ferguson-Aquila, *Technologies Group*.

3. "Digital Program Control: Extending the Environment," David J. Evers, *Broadcast Electronics*.
4. "Simplified Maintenance Procedures Using Stereo Noise," John Bisset, *Delta Electronics*.
5. "Radio Data Systems, A North American Plan and an Update on the European Experience," Gerald M. LeBow, *Technical Marketing Consultants*.
6. "National Supervisory Network," William Sepmeier.

#### AM Systems Engineering and Improvement

Monday, April 2  
9 a.m.-11:35 a.m.

1. "FCC Regulations Update," Roy Stewart, Mass Media Bureau Chief, *Federal Communications Commission*.
2. "NRSC Update," John Marino, *New City Communications*.
3. "Correlating AM Transmitter Performance with the Ability to Comply With the NRSC-2 'RF Mask'," Glen Clark, *Glen Clark and Associates*.
4. "On the Relationship Between AM Transmitter Out-of-Band Emissions and the FCC's Second and Third Adjacent-Channel AM Separation Requirements," E. Glynn Walden, *Group W Broadcasting*, and John Kean, *Moffett, Larson and Johnson*.
5. "Designing Radio Receivers for NRSC Specifications," Almon H. Clegg (consultant.)
6. "NAB Anti-Skywave Antenna Project," Kelly Williams, *NAB*.
7. "Test of a Four-Wire Counterpoise Antenna," Ogden Prestholdt, P.E., consultant.
8. "Computer Design of AM Directional Phasing Equipment," Jerry Westberg, *Westberg Consulting*.

#### FM Systems Engineering and Improvement

Tuesday, April 3  
9 a.m.-11:25 a.m.

1. "Federal Communications Commis-



## "The beacons were blown out of their sockets, but our transmitter barely blinked."

**R**obert LaFore knows all about lightning. As Chief Engineer for WQPW-FM "Power 96" in Valdosta, Georgia, he'd better: His 600 foot tower



WQPW'S 600 FT. TOWER  
TAKES THEM WHENEVER THERE'S LIGHTNING.

is the tallest object for miles around. "We've been hit so hard the tower beacons were blown out of their sockets," he told us recently, "and so often that the lightning rod looks like someone's been beating chunks out of it with a sledgehammer. But so far our new Harris HT 20FM transmitter barely blinks at lightning. Occasionally we get a PA Plate Overload message, but that's it."

Robert also knows something about Harris reliability: Until they received a power increase to 50,000 Watts last year, WQPW had been on the air with a 3.5 kW Harris transmitter for thirteen years. "That transmitter was very good to us," Robert reports.

"Still is, in fact—it's our back-up now. Basically, we shopped around enough to be sure Harris could match or top the competition in both price and features: Things like Automatic Power Control for simple remote operation. Then we ordered a 20 kW HT 20FM transmitter."

About 45 days later WQPW's transmitter arrived (meanwhile, Robert supervised construction of a new transmitter building, tower and antenna). "We just took it out of the box and put it right on the air," he says. "Even the tuning movements were small. The installation went so smoothly, I told the factory 'You've got to do something—this transmitter's boring.'"

After a number of months of service, WQPW's HT 20FM remains just as "boring." Robert has only shut it down for routine monthly maintenance. "Even that is minimal," he told us. "I vacuum the cabinet out, check tube cooling, make sure nothing's overheating, and that's about it. Two or three times a week I do a meter check and log the readings. They hardly ever

*Chief Engineer Robert LaFore*  
WITH HIS NEW HARRIS HT 20FM 20 KW FM TRANSMITTER.



change. In fact, we're still using almost the same tuning numbers we got from the factory. And we're getting a very noticeable improvement in audio quality from our new Harris THE-1 exciter."

As you can tell, WQPW is very proud of their new transmitter. We're just as proud that



*Look South*  
FROM WQPW'S TOWER.  
AND YOU CAN SEE ALL THE WAY TO FLORIDA.

our HT 20FM is living up to their confidence in Harris engineering. But then, we expected it do exactly that from the moment it took shape on the drawing board.

For more information on HT family FM transmitters from 1 to 35 kW, call toll-free (800) 4-HARRIS, Ext. 3022. Outside the continental US, fax us at (217) 224-2764. And for the widest selection of studio products, call Allied Broadcast Equipment toll-free at (800) 622-0022.



HARRIS BROADCAST DIVISION  
MARKETING DEPARTMENT  
P.O. BOX 4290 • QUINCY, IL USA 62035-4290

Circle (51) on Reply Card



sions Update," William Hassinger, Assistant Bureau Chief, *Federal Communication Commission*.

2. "Broadband FM Master Antenna," Robert Surette, *Shively Labs*.
3. "What Can Be Expected From the New Technologies in FM Stereo," Tom Keller, *Broadcast Technology Partners*.
4. "FM Limiting and Generation of the Composite Baseband," William H. Gillman, *Gentner Electronics Corporation*.
5. "A New Approach to FM Composite Baseband Overshoot Control," Greg J. Ogonowski, *Modulation Index*.

## TV sessions

### Television Automation

Friday, March 30

9 a.m.-12:05 p.m.

1. "News Automation and Machine Control: The Marriage of Journalism, Production and Engineering," Richard Pierceall, *BASYS*.
2. "An Automation Workstation — The Final Integrator," B.J. Goldsmith and M. J. Wolfe, *Connolly Systems Ltd.*
3. "Automatic Closed-Captioning Insertion," L. Sanders Smith, *Dynatech Newstar*.
4. "Studio Camera-Control Motion System," Bran Ferren, *Associates and Ferren*.
5. "Application of the Library Management Systems at the New CBS Broadcast Operations Center," John Beyler, *CBS*.
6. "The Use of Cart Systems at NBC," A. Siegel, *NBC*.
7. "Database Management for an Automated Cassette Recorder/Player System," William F. Carpenter, *Ampex Corporation*.

### Graphics and Animation

Friday, March 30

1:30 p.m.-4:10 p.m.

1. "Broadcast Graphics: Balancing Budgets and Equipment Specifications," David Scammell, *Quantel*.
2. "The Engineer's Role in Implementing a New Look — Technical, Production and Management Considerations," Steven M. Davis, *WPRI-TV*.
3. "Real Time Weather Information in the '90s," Todd Glickman, *WSI Corporation*.
4. "3-D Graphic Animation Systems at NBC," J. Keane, *NBC*.
5. "Limelite Video Graphics Techniques," Marco Obdea, *Limelite*.
6. "Computer-Generated Graphics," Rick Lehtinen, *Broadcast Engineering magazine*.

### Television Engineering

Saturday, March 31

1:30 p.m.-5 p.m.

1. "TV Optics for TV Cameras, the Implications...and the Challenge," Gerard Corbasson and Bernard Angenieux, *Angenieux Corporation of America*.
2. "A New Element That Provides Pattern Versatility in the Wavestar Antenna," Fred A. Pantsios, *Harris Corporation*.
3. "New Adaptive Digital Technology for Interfacing Production Intercom Systems to Dial-Up Telephone Lines," Steve Church, *Telos Systems*.
4. "Systems-Based Control of the Broadcast Process," Dan Desmet and Martin Piepers, *Barco*.
5. "The Role of Image Data Compression in Professional Video Recording," John Kearney and Charles Coleman, *Ampex Corporation*.
6. "Design Considerations for the New Format Composite Digital VTR Using 1/2-inch Tape," Yoshinobu Oba and Katsuki Murayama, *NHK*.
7. "Broadening the Applications of Zoneplate Generators," John Horn, *Tektronix*.
8. "Switcher Crosspoint Reduction Techniques," David P. Bird, *Broadcast Television Systems*.

### UHF Transmission Systems

Sunday, April 1

9 a.m.-11:40 a.m.

1. "Channel 69 Filter System," William A. DeCormier, *Dielectric Communications*.
2. "Improved Technological Solutions for UHF Power Tubes," H. Bohlen, FT. Clayworth, R. Heppinstall and D.M. Wilcox, *EEV*.
3. "Field Performance of a Multiple-Stage Depressed-Collector Klystron Transmitter," James B. Pickard, *Harris Corporation*.
4. "Klystron Transmitter Operation Progress Report," Al Korn, *Georgia Public Telecommunications Commission*.
5. "Recent Advances in Klystron-Equipped Transmitters," N.S. Ostroff and R.C. Kiesel, *Comark*.
6. "Solid-State High-Power Transmitters," Jean-Marc Barrier, *Thomson-LGT*.

### Advanced Television

Sunday, April 1

9 a.m.-12:30 p.m.

1. "High-Definition Production at Telesat Canada," Peter Plekaitis, *Telesat Canada*.
2. "The Antenna/Transmission-Line System and HDTV," Geza Dienes, *Andrew Corporation*.
3. "A Codec for HDTV Transmission Through Terrestrial and Satellite Digital Links," Mario Cominetti and Francesco Molo, *Telettra USA*.

4. "The Costs of Converting a Broadcast Facility to HDTV: An Update," Robert J. Ross, *WJZ-TV*.
5. "The Proposed SC-HDTV Program Production Standard," Wayne Breti, *Zenith Electronics*.
6. "HDTV Image-Compression for Reducing Bandwidth and Improving Received Image Quality," Robert L. Dhein and John Marcinka, *New York Institute of Technology*.
7. "The Common Image Format and the Common Data-Rate Approaches to HDTV Standards European View," T.J. Long, *IBA*.
8. "Using Genesys Technologies for Today's NTSC Expanded Services," Richard C. Gerdes, *Production Services Inc. (PSI)*.

### Advanced Television

Sunday, April 1

1:30 p.m.-5:05 p.m.

1. "Development of Advanced-Television (ATV) Planning Factors," Donald Jansky, *Jansky/Barmat Telecommunications*.
2. "ACTV Progress Report," Jack S. Fuhrer, *David Sarnoff Research Center*.
3. "HDTV Advanced Research," William E. Glenn, *Florida Atlantic University*.
4. "High-Definition Optical Disc System," Larry Thorpe, *Sony Advanced Products*.
5. "EDTV Development and Experiments," Nobuo Katsura, *NTV*.
6. "HDS/NA-6: A Simulcast High-Definition System," Mikhail Tsinberg and Alan Cavallerano, *Philips Laboratories*.
7. "Compatible MUSE Systems for Terrestrial Broadcasting of HDTV Signals," Yutaka Tanaka and Taiji Nishizawa, *NHK*.
8. "Widescreen 525 — An Economical Entry Into ATV," Merrill Weiss, *NBC*.

### Television Audio

Monday, April 2

9 a.m.-10:50 a.m.

1. "A Practical Approach for Applying the M-S Stereo Microphone," David Ross, *Shure Brothers*.
2. "A Broadcaster's Experience With Locally Originated Stereo Broadcasts," Larry Posey, *KCNC-TV*.
3. "The Electromechanical Architecture of a Software-Based Television Audio Console," Richard S. Hajdu, *Orion Research*.
4. "SAP, Uses and Problems," Cary Wight, moderator, *PBS*. Presenters:
  - Ira Goldstone, *KTLS-TV (Spanish language)*
  - Robert Good, *WGAL-TV (NOA weather, IFB, translator)*
  - Joseph J. Manning, *KAET-TV (classical music)*
  - Bruce T. Herget, *WMPB-TV (data)*



# If Your Only Excuse For Not Buying An ITC Cart Machine Has Been Money, You Just Ran Out Of Excuses.

Introducing  
the Series 1 cart  
machine from  
ITC. As the world's  
leading cart  
machine manufac-  
turer, we under-  
stand how to make  
a superior cart machine. And the new  
Series 1 cart machine is superior.

Equally as important, we realize  
each station has a different need and  
a different budget. That's why we  
designed the new Series 1 with all the  
features you need at a

realistic price.

Pound the  
buttons. Flip  
the switches,  
jam a cart in  
and yank it out a few



hundred thousand  
times. We've built  
the new Series 1  
to take anything  
you can dish out,  
24 hours a day,  
365 days a year.

So before you

mortgage your program director  
or settle for something of less value  
than ITC, check out the new Series 1  
today.

You won't need an excuse to  
buy one.

For more information and the  
names of the Series 1 dealers nearest  
you, call ITC toll free at 800-447-0414  
or call collect at 309-828-1381 from  
Alaska and Illinois. Outside the USA,  
contact your local  
ITC distributor.



International Tapetronics Corporation... The World Leader in Cartridge Machines



SEE US AT NAB BOOTH #3422

Circle (14) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)

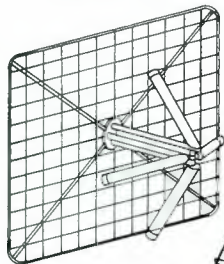




## Puts your signal in it's place!

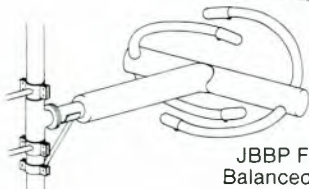
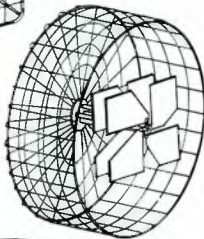
If you need a quality  
antenna, you need:

**JAMPRO ANTENNAS, INC.**  
The really experienced one  
for over 30 years.



JAHD CP  
Arrowhead  
Screen Dipole

JSDP CP Spiral  
Broadband Antenna



JBBP FM Antenna  
Balanced Excitation

**JAMPRO** is the world leader in  
custom-designed, directional,  
CP antennas.

- With over 1600 of our penetrators delivered, more stations have penetrated their market.
  - Our custom-made directional antennas are operating world wide.
  - Full-scale antenna measurements on **JAMPRO's** all-year, all-weather test range.
  - We custom-make tower structures to duplicate your's, for optimum results.
  - Ask about **JAMPRO's** low-power educational packages.
- Give us your requirements and see how fast we produce.

### **JAMPRO Antennas, Inc.**

6939 Power Inn Road  
Sacramento, CA 95828  
(916) 383-1177 • Telex: 377321  
FAX (916) 383-1182

Circle (15) on Reply Card

- Donald Sussman, WNET-TV (FM 13 music)
- Barry Cronan, WGBH-TV (descriptive video)

### **NTSC Ghost Canceling**

Monday, April 2  
10:50 a.m.-12:15 p.m.

1. "Predicting Television Ghosting Interference," Jack Dadourian, *Canadian Department of Communications*.
2. "Development of a Ghost Cancel Reference Signal for Television Broadcasting," Sigeo Matsuura, *Hitachi, Ltd.*, Hiroshi Miyazawa, *NHK*, Susumo Takayama, *Nippon Television Network*, Masao Usui, *Fuji Television Network*, Relichi Kobayashi, *NEC Home Electronics*, and Hiroyuki Iga, *Toshiba Corporation*.
3. "Ghost Canceling," A.G. Uyttendaele, *Capital Cities/ABC*.

### **Television Production and Editing**

Monday, April 2  
1:30 p.m.-4:35 p.m.

1. "The Integrated Digital Production Suite," Ken Carson, *Digital F/X*.
2. "Cost-Effective Digital Editing for Broadcasters," David Scammell, *Quantel*.
3. "Video and Audio Post-Production Switcher Systems," David E. Acker, *For-A Corporation of America*.
4. "Electronic Production Techniques for '60 Minutes' and '48 Hours,'" Howell W. Mette, *CBS*.
5. "The Price/Performance Revolution in Digital Special Effects," Greg McCartney, *Ampex*.
6. "Broadcast and Video Production Applications of the Stereosurround Audio Production Process," Robert B. Schulein, *Shure HTS*.
7. "Synthlevision — A New Chroma-Key Imaging Technique With Hi Vision Background," Shigeru Shimoda, Yasuaki Kanatsugu and Masaki Hayashi, *NHK Science and Technical Research Laboratories*.

### **Other sessions**

#### **Safety, Interference and Environmental Concerns**

Saturday, March 31  
1:30 p.m.-3:50 p.m.

1. "New Fire Protection Requirements for Indoor Installation of Coaxial Cable and Waveguide," Robert D. Leonard, *Andrew Corporation*.
2. "An Investigation of RF-Induced Hot Spots and Their Significance to Determining Compliance with the ANSI Radiofrequency Protection Guide," Richard A. Tell, *Richard Tell Associates*.

3. "Standards-Setting Work to Control Interference to Broadcasters," Kelly Williams, *NAB*.
4. "Field Testing of a Shortened EBS Alert Tone," Larry Estlack, *WSYM-TV*.
5. "Introduction and Presentation — Durham Life Broadcasting EBS Film," Robert B. Butler, *WPTF-TV*.

### **New Broadcast Technology**

Sunday, April 1  
1:30 p.m.-5:25 p.m.

1. "New Tower Construction Techniques," Ramon D. Upsahl, *Skilling Ward Magnusson Barkshire*, Larry Holtz and Gary Haerig, *KGON Radio*.
2. "Multichannel TV Combiners — Technology for the '90s," Jim Stenberg, *Micro Communications*.
3. "Distribution of Broadcast-Quality Video Using Telephony Transmission," Nicholas C. Stanley, *ADC Telecommunications*.
4. "Dynamic Precorrection of Component Video Signals for Improved NTSC Color-Encoded Pictures," John P. Rossi, *Intelvideo*.
5. "Transmission-Line Maintenance Using a High-Power Pulse Reflectometer," John Bisset, *Delta Electronics*.
6. "8-City DS3 Digital Video Trial — What Makes It Work," Robert J. Blackburn, *Bell Communications Research*.
7. "True 3-D Broadcast Television Without Glasses," Chris Mayhew, *Vision III Imaging*.
8. "Cable's Application of Fiber Optics for Improved Video Quality and Bandwidth," Walter S. Ciciora, *American Television & Communications*.

### **Computers and Communications for Broadcast Engineers**

Monday, April 2  
1:30 p.m.—5 p.m.

1. "How to Design a Computerized System for Scheduling Technicians and Engineers," Jim Fink, *PROMPT Corporation*.
2. "Practical Use of the Computer for the Broadcast Engineer," Matthew A. Sanderford Jr., *MARSAND*.
3. "PC Communications for Broadcasters," Phil Katz, *PKWare*, Chuck Forsberg, *Omen Technology*, John Hoffman, *New York Management Services*, CompuServe, Bill Tullis and Mark Leff, *Turner Broadcasting*, and John McAfee, *McAfee Associates/Interpath*.

### **Broadcast Auxiliary and Satellite Systems**

Monday, April 2  
2:45 p.m.-5:25 p.m.

1. "Utilization of Earth-Station Antenna Systems to Track Satellites That are in



# DATATEK'S D-2400 AUDIO/VIDEO ROUTING SWITCHER SYSTEM

CELEBRATING  
OUR 20th YEAR



## ...OPTIMIZED FOR STEREO.

The routing switcher you purchase today must be able to meet your requirements of tomorrow. Until now, this required compromises between versatility and cost.

Datatek's D-2400 switcher offers the flexibility to satisfy today's needs without sacrificing tomorrow's goals.

Systems start at 20x10 and expand all the way up to 800x800. Wide video bandwidth of 40 MHz allows HDTV and MAC compatibility. NTSC and PAL signals can even be switched in the same router. Optimized stereo performance, generous

headroom and wide bandwidth characterize the audio.

Datatek's wide choice of control panels allows you to select exactly what you need for each destination. No compromises because of system limitations or high price panels.

The D-2400 joins Datatek's complete line of quality switchers including: 6x1, 10x1, 16x1, 20x1, 20x10, 25x1, 50x1, 120x4, 250x2, RS-422 data routing and digital audio.

When it is time to look at routing switchers, don't make compromises. Ask about the D-2400.

SEE US AT NAB BOOTH #5652

**D**  
DATATEK  
CORP.

1121 BRISTOL ROAD, MOUNTAINSIDE, NJ 07092 • PHONE: 201-654-8100  
TOLL FREE: 800-882-9100 • FAX: 201-232-6381 • TELEX: 833541

Circle (52) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



- an Inclined Orbit," Barbara Hodge and Walter Maciejewski, *Andrew Corporation*.
- "Multichannel Audio Multipoint Distribution Service," Robert M. Unetich, *ITS Corporation*.
  - "PBS and the Next Generation of Satellites," C.V. Girod, P.E., *PBS*.
  - "Improved Audio Quality of Remote Broadcasts Using Multiline Telephone Extenders," Michael McKenzie, *Gentner*.
  - "A Personal Satellite Communications System for Voice and Data," Mark A. Harris, *CBS*.

#### **Professional Development**

*Tuesday, April 3*  
9 a.m.-12:05 p.m.

- "Careers in the '90s," Neil Fink, *Neil Fink Associates*, and Howard Lipson, *Lipson and Company*.
- "Keeping Current: New Educational Opportunities for Broadcast Engineers," David Harris, P.E., *NAB's Department of Science and Technology*, and Rick Lehtinen, *Broadcast Engineering* magazine.
- "Conflict Resolution," Judy E.A. Sheets-Perkinson, *Calumet Group*.

- "Professional Development as Leaders," Richard Cupka, *Cupka Corporation*.
- "PBS Technical Operations Total Quality Program," Cary Wight, *PBS*.

#### **Workshops**

##### **AM Antenna Systems Workshop**

*Saturday, March 31*  
9 a.m.-10:45 a.m.

##### **Panelists:**

- Benjamin Dawson, moderator, *Hatfield and Dawson*.
- Thomas G. Osenkowsky, *radio consultant*.
- Karl Lahm, *Lahm, Suffa and Cavell*.
- Thomas King, *Kintronics Laboratories*.

##### **RF Radiation Regulation Compliance Workshop**

*Saturday, March 31*  
9 a.m.-10:45 a.m.

##### **Panelists:**

- Richard Tell, moderator, *Richard Tell Associates*.
- Barry Ulmansky, *NAB*.
- Dane Erickson, *Hammett and Edison*.
- James Hatfield, *Hatfield and Dawson*.

##### **Contract Engineers Workshop**

*Saturday, March 31*  
10:50 a.m.-12:35 p.m.

##### **Panelists:**

- James Stanley, moderator, *consultant*.
- Barry Victor, *The Victor Group*.
- James Loupas, *James Loupas Associates*.

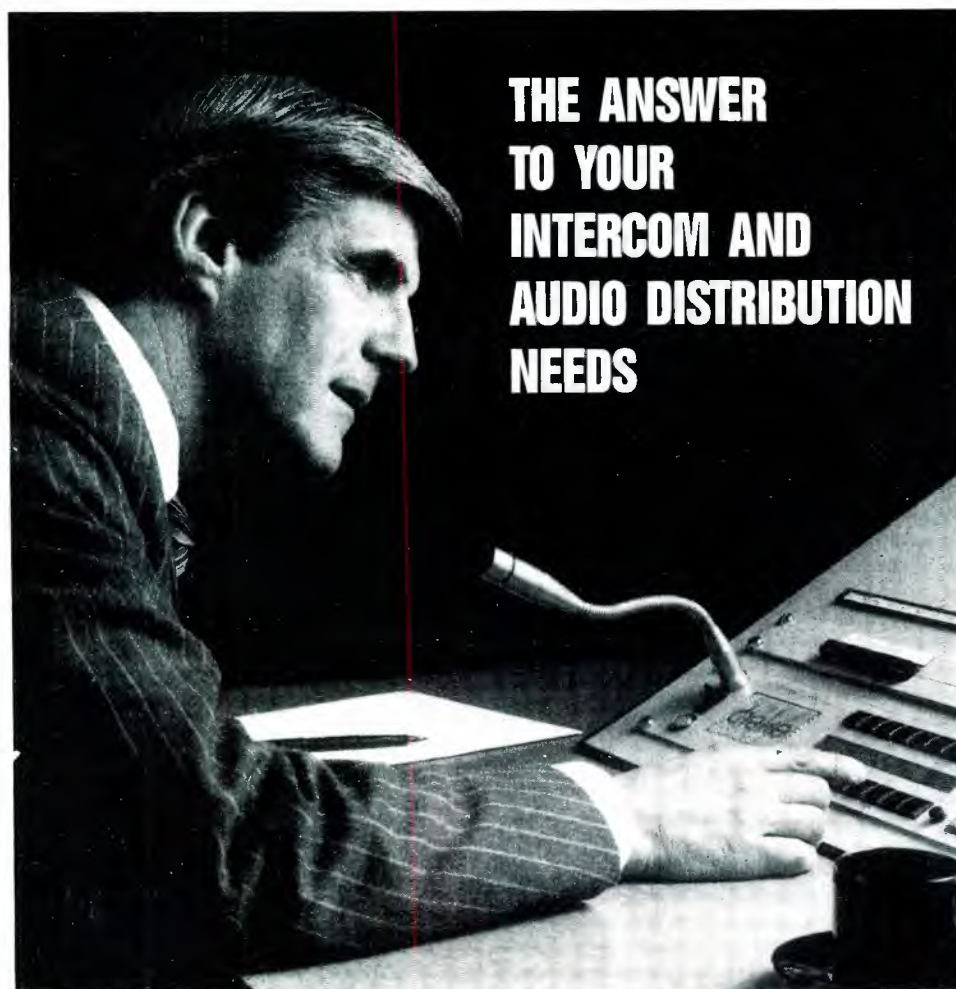
##### **Television Test and Measurements Workshop**

*Saturday, March 31*  
10:50 a.m.-12:35 p.m.

##### **Panelists:**

- William Dougherty, moderator, *Capital Cities/ABC*.
- Robert Weirather, *Harris Corporation*.
- Margie Craig and Adolfo Rodriguez, *Tektronix*.

I:~:~)))))



**THE ANSWER  
TO YOUR  
INTERCOM AND  
AUDIO DISTRIBUTION  
NEEDS**

**drake**

**NOW YOU'RE TALKING**

Philip Drake Electronics Ltd.  
37 Broadwater Road  
Welwyn Garden City  
Hertfordshire AL73AX England  
Telephone: (0707) 333866  
Telex: 25415 DRAKE G  
Fax: 371266

USA Call Redwood Marketing  
(615) 254-7400

**9000 Series Video Audio  
Distribution modules.**

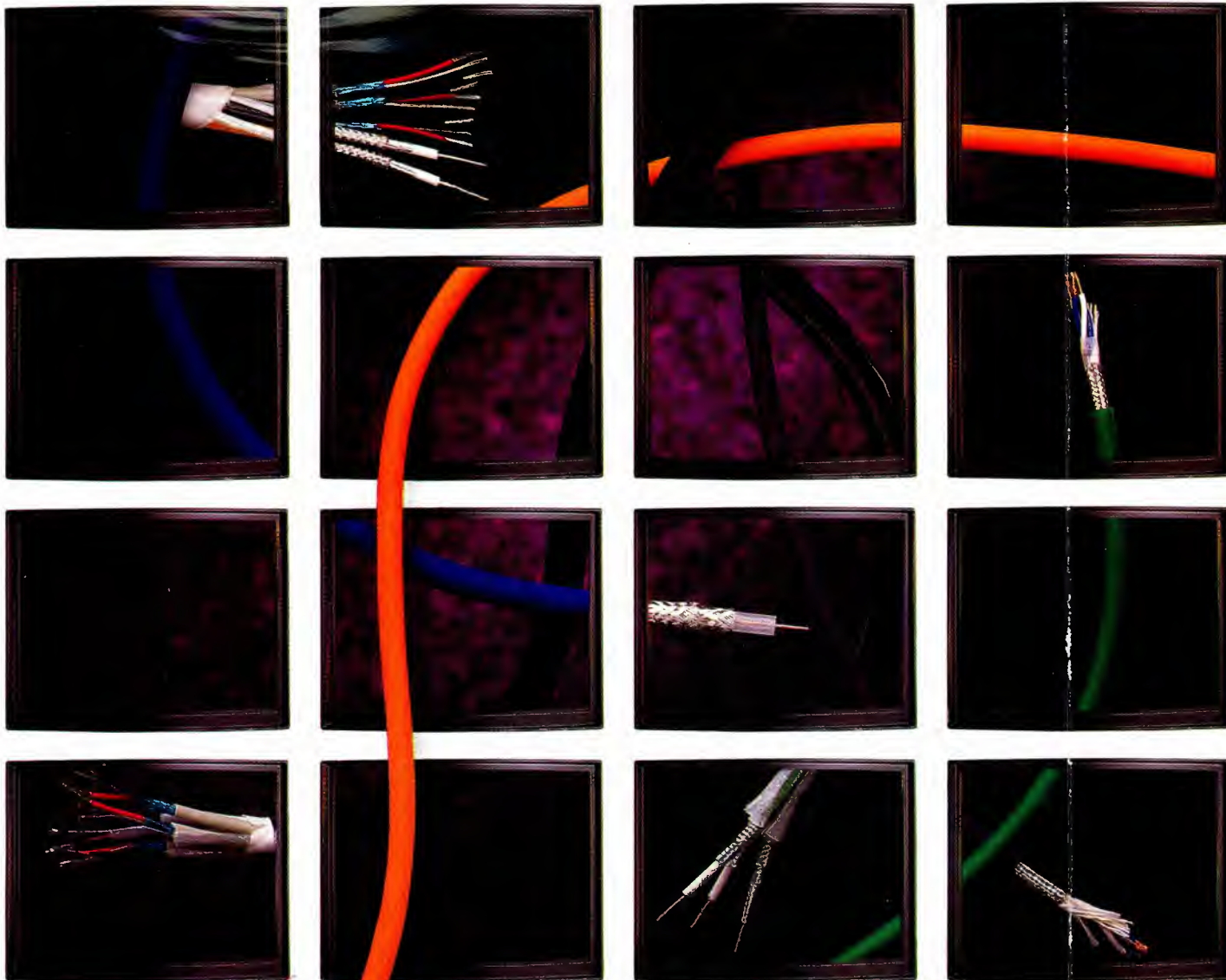
**6000 Series  
Microprocessor console,  
Talkback and Intercom  
system.**

**8000 Series Talkback  
including the definitive  
Compact range and  
Compact systems.**

**400 Series Radio  
Talkback modules.**

See us at NAB Booth #3164





## BELDEN BRINGS THE LIGHT OF INNOVATION TO BROADCAST CABLE

Just as no performer can stay on top without innovation, no company can retain its reputation for performance without product innovation. The standards we've set with our broadcast cables are a reflection of our commitment to product innovation - something that continues today with Brilliance®.

Named for the sound and picture brilliance obtainable through product innovation and improved signal integrity, Brilliance products range from exciting audio/video cable assemblies to the four new cable products below:

### **Soft, flexible Microphone Cables.**

The debut of Belden's four-conductor microphone cable

sets an industry standard. Featuring matte finish jackets in a wide range of colors, these new cables are designed to increase cable flexibility while enhancing performance.

### **High-Flex and CL 2 Rated Precision Video Cables.**

To solve the problems of rack installations and CCTV systems, Belden has developed a

new 75 ohm precision video cable. High-Flex combines Belden® 8281 electrical performance with improved flexibility and longer flex life.

### **Audio Snake Cables.**

Belden now offers a line of multi-pair snake cables. Featuring individually jacketed and shielded pairs, Belden snake cable provides maximum protection

against signal loss. Features include loose tube construction and a non-reflecting black matte finish.

### **Audio and Video Composite Cables.**

For systems combining audio and video, Belden has specifically designed cables for ENG and camera applications. They combine off-the-shelf availability with specialty design center technology and fiber/copper composition.

Call your local Belden distributor for our Broadcast Catalog, or contact us directly: BELDEN Wire and Cable P.O. Box 1980 Richmond, IN 47375

**1-800-BELDEN-4**  
(in Indiana, call 317-983-5200)

There is no equal.™

Copyright © 1989 Cooper Industries, Inc.



**BELDEN**

See us at NAB, Booth #6007-6015

Circle (16) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



---

# **What's in store for BROADCASTERS at NAB?**

**they're small  
they're fast  
they're affordable**

**they're new and still...**

**QUANTEL**

**BOOTH # 1134**

31 Turnpike Road, Newbury, Berkshire, RG13 2NE Tel: (0635) 32222 Fax: (0635) 31776  
655 Washington Boulevard, Stamford, Connecticut 06901 Tel: (203) 348 4104 Fax: (203) 356 9021

---

Circle (17) on Reply Card



## News

*Continued from page 4*

series includes 60kW, 120kW, 180kW and 240kW models.

The MSDC klystron uses the same RF section and electron gun employed in a standard wideband external cavity klystron; the only difference is in the collector stage. The 60kW wideband external cavity MSDC klystron, which has a figure of merit exceeding 1.30, offers nearly twice the ac to RF efficiency of the most efficient pulsed external cavity klystron transmitter.

## AES announces conference program, convention dates

The Audio Engineering Society (AES) has announced the preliminary program for its 8th International Conference on "The Sound of Audio." The conference, to be held in Washington, DC, May 3-6, will include the presentation of papers, panel discussion by audio industry magazine experts and aural demonstrations in specially treated listening venues, such as automotive environments. Skip Pizzi, National Public Radio, will chair the conference committee. Floyd Toole, Canadian National Research Council, is acting as papers chair for the conference.

The 89th AES convention has been rescheduled for Sept. 21-25. The revised show dates will make it possible to increase the exhibit space as well as contain all convention activities — exhibits, paper presentations, workshops, seminars and tours — in one location, the Los Angeles Convention Center. The new schedule allows for expansion of all convention programs and provides more time for exhibitors to load in and load out.

## FCC grants request for rule delay

The FCC has granted a request by the Society of Broadcast Engineers (SBE) for a 3-year delay in the implementation of STL-type acceptance compliance. The SBE petitioned the agency in November 1989 to allow stations three additional years to meet recent rule changes. A study by the SBE had shown that many stations would suffer severe financial penalty if they were required to comply by July 1, the original deadline. It is hoped that new technology developed during the 3-year period will provide transmission characteristics superior to those of today's analog systems.

Meanwhile, stations may continue to use their current STL equipment.

## SBE petitions for aural STL rulemaking

The Society of Broadcast Engineers (SBE) has filed a rulemaking petition to make several amendments to the aural STL rules. The proposed changes, designed to reduce interference on the aural STL band, would require that some installations meet minimum antenna standards similar to those TV auxiliary stations have been obliged to comply with since 1981.

The petition also includes recommendations that:

- New aural STL stations provide specific desired-to-undesired (D/U) ratios to existing co-channel and first adjacent-channel stations.
- STL sites be classified as either "congested" or "not congested." Congested sites would require Category A receive antennas.
- Frequency tolerance be tightened to 0.0005%.
- Transmitter output power be limited to no more than 10W.
- Aural STL stations limit EIRP for paths of less than 22km.
- A 3-year grandfather period be permitted.

## News from Europe

By John Blau,  
European correspondent

## Radio Free Europe to open bureau

After decades of scrounging for scraps of news, the Radio Free Europe staff is being flooded with information pouring over the Iron Curtain via telefax and telephone. To take advantage of this changing situation, the station plans to open a bureau in Budapest. Additional offices may someday be opened in Warsaw and Moscow.

## French state TV names new director

Philippe Guilhaume, head of Société Française de Production, the state-controlled film and TV production company, has been named the head of France's state television. He will be chairman of both Antenne 2, the main state channel,

and FR3, the regional network. The appointment is crucial to French state television because of the high rate of viewers that have been lost since commercial broadcasting began there.

## Pioneer to produce PAL laserdiscs

Pioneer plans to manufacture laserdiscs in the PAL format for the European market at its Carson, CA, plant. The company may set up a laserdisc factory in Europe too.

## Austria reviews its media policy

Officials have introduced a plan by which the Austrian public-service network, Österreichische Rundfunk (ORF), could be converted into a private company, with its radio and TV channels opened gradually to private program sources.

## Switzerland signs European broadcasting directive

Switzerland has become the first non-EC country to ratify the Council of Europe's "Convention on Broadcasting" by passing its broadcasting bill. The convention has 10 signatures, with West Germany and France yet to sign.

## Spanish TV viewing continues to grow

Spain's viewing audience has grown during the past year by 3.8% to 26.2 million viewers, according to statistics released by the governing agency Estudio General de Medios. Satellite programs experienced the most growth, up 88.5% to 1.2 million viewers. Video viewing was up 19.5% to 11.9 million viewers. Cable, which currently reaches about 1.5 million viewers, reported to have a potential viewing audience of 4.5 million.

Almost half of the inhabitants in cities with more than 250,000 homes are willing to pay for cable television, according to a survey conducted by Telefonica, Spain's national PTT.

| : ( ~ ) |||



Booth 2534

© 1990 Matsushita Electric Corporation of America

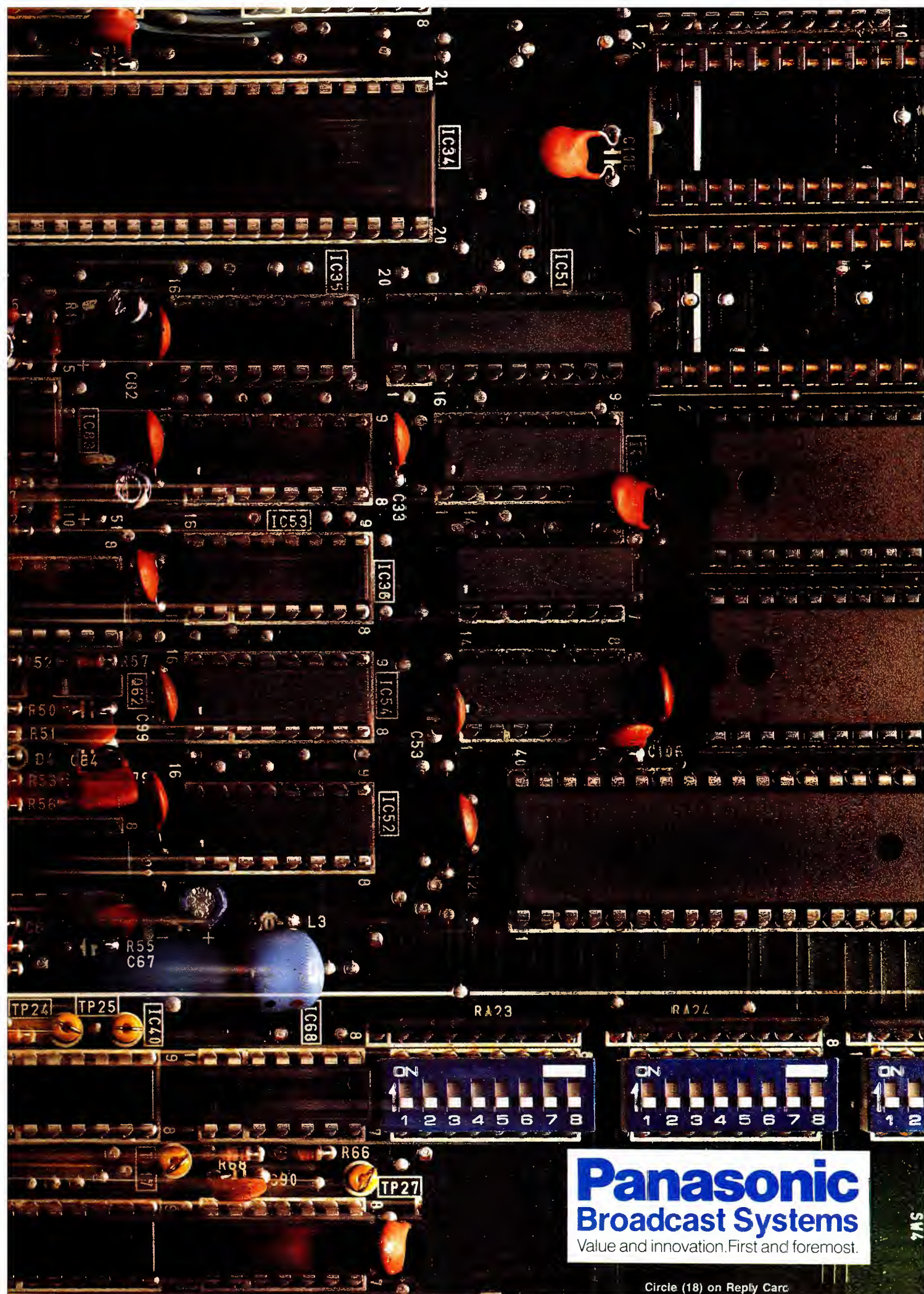
# 1/2" DIGITAL THAT WORKS. FOR YOU.

**Portable.  
Affordable.  
Incomparable.**

Parasonic Broadcast Systems Company, One Panasonic Way, Secaucus, NJ 07094 (201) 348-7671

Parasonic Broadcast Systems Company Field Offices: (Northeast) Washington, DC: (703) 759-6900; (Southeast) Norcross, GA: (404) 925-6721; (Midwest) Arlington Heights, IL: (312) 981-7325; (Southwest) Fort Worth, TX: (817) 683-1132; (Western) Cypress, CA: (714) 373-7203; (Northwest) (509) 396-7374. Parts, Service, Technical Information: 1-800-222-7401





**Panasonic**  
**Broadcast Systems**  
Value and innovation. First and foremost.

Circle (18) on Reply Card



# Facility design special report

**Building broadcast facilities for tomorrow.**

**S**ome things are hard to predict. For instance, who would have guessed that the collector's price for an early Barbie Doll could exceed the cost of a diamond ring. Or that baseball cards would be traded, not under the shade tree in the backyard, but in specialty stores that have sprung up for that purpose. If we had the slightest inkling that things would turn out this way, we might have acted differently back then.

It is just as hard to make guesses in our industry. Great changes are afoot. More of our daily work is accomplished on personal computers. FM rose, AM fell. MTS has increased the importance of producing quality audio for video. For a few hundred dollars, you can buy consumer gear today that rivals professional equipment costing tens of thousands of dollars just a few years ago.

Engineers charged with building and equipping broadcast plants must make choices to ensure that those plants are still viable years from now. For instance, if we think too big, we may be left with an elephantine facility that eats up our profits. If we design too small, we may end up in cramped quarters no better than the stations that were left behind.

This leaves us in a dicey position. We've got to build to last, but we're not sure what adversities we have to face. We must harden our facilities against crime, vandalism, terrorists and the increasingly restless forces of nature. Tomorrow's uncertain economic and competitive environment, in which our facilities will operate, also is questionable. The only constant we face is change. Even if things remained the same, that in itself would be a change,

compared with the advances and upheavals of the past few years.

In this special report, we will discuss how to plan for the future. Facility integration specialist Fred Powers discusses some of the design strategy behind Chicago's WMAQ-TV, the NBC owned and operated station, which chose real estate that could either expand or contract to meet future needs. Architect Jay Ritchie shares his views on designing properties that will stay on the air in the event of natural disasters. Satellite access is addressed by consultant Tim McCartney in an article on uplink design. We even discuss how to keep towers vertical in adverse conditions.

- "Facility Design in a Changing World" ..... page 40
- "Hardening Broadcast Facilities" .. 54
- "Planning a Satellite Uplink" .... 80
- "Hardening Towers" ..... 94

An old song goes, "Don't worry about tomorrow, for tomorrow never comes." This is good advice for preventing ulcers, perhaps, but in facility design, our decisions are literally cast in concrete. We must plan carefully for tomorrow, to avoid wishing we had done things differently, when today has become "back then."

*Rick Lehtinen*

**Rick Lehtinen,**  
issue editor



Photo courtesy of Flower Adams



*Audio control room in Chicago's recently relocated WMAQ-TV.*





# Facility design in a changing world

**To keep your broadcast plant functional, build  
in plenty of room for change.**

**T**he winds of change are scattering many of the venerable traditions of broadcasting. New forces have been thrust into the market, protective barriers have been lifted, and equipment has undergone extensive changes, many of which are tied to automation. What used to be a straightforward philosophy for connecting the component parts of a broadcast facility is being buffeted about. Caught in the midst of the storm are the broadcast engineers. The ones who will remain unscathed are those who do not cling to the seemingly safe old ways.

This article will explore four facets of facility design in today's broadcast environment: the market, automation, designing for change and using outside services. The ideas presented may help engineers who must make decisions today about equipment and buildings that will be in service for many years to come, even though the future may be shrouded with uncertainty.

## **Market trends**

Some financial market analysts predict a difficult time ahead for broadcasters. Declining market domination by the networks and the growing strength of cable are fueling competition for the advertiser's dollar. Individual programs compete for smaller audiences and lower per-program revenues, yet per-program production costs are rising. These factors are forcing

facilities to re-evaluate their existing operations in order to survive in a more competitive environment.

Broadcasters are finding that the market is not only shrinking, but also is becoming more fragmented. Cable companies are attracting more of the advertising

revenues with their ability to focus on specific local, regional or demographically distinct market areas at a lower cost. The expense of national advertising is becoming prohibitive to the advertiser whose intended market is not distributed evenly across the country.

Many broadcasters are in the first phase of responding to these market trends. Their reactions are coming in the form of reductions in overhead, with sometimes dramatic cutbacks in administrative, engineering and operations staffs. The result is that many broadcast operations have too few people working to service sprawling, multifaceted, operationally segregated facilities that were built in free-wheeling times, when broadcasters operated under government regulations designed to ensure the survival of the industry.

However, the demand for good programming is stronger than ever, and that doesn't seem likely to change any time soon. In other words, business will be good, but it will be more competitive, hence different.

## **Automation**

Over the years, the industry has adopted increasingly complex technologies, met the changing needs of customers and formed a series of labor union contract agreements. Meanwhile, however, broadcast plant layout, equipment distribution and job description categories have be-



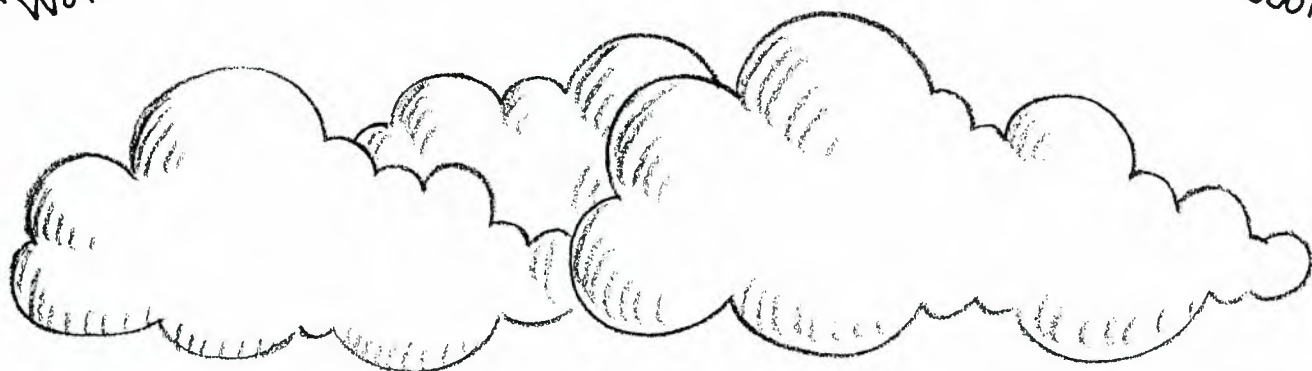
Photo courtesy of Flower Adams

*Chicago's NBC Tower is the new home of WMAQ-TV. Station operations and management occupy the first six floors of the 39-story building.*

Powers is marketing director, SAIC (Science Applications International Corporation) Broadcast Systems, San Diego.

*Continued on page 44*





## LOOK UP.

To see what's new at NAB this year,  
look up, look way up above all the rest.  
Then join the excitement in the Abekas NAB Sky Booth 160.

**Abekas**  
A Carlton Company

Leading in Digital Innovation



**NAB Sky Booth 160**

Atlanta (404) 451-0637 Chicago (708) 699-9400 Dallas (214) 385-4544 Los Angeles (818) 954-8700 New York (516) 829-0820 San Francisco (415) 369-6791

Circle (19) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)





**SONY'S NEW UHF WIRELESS SYSTEM GIVES YOU EVERYTHING**

A wireless system you can count on to do its job when your job is on the line. The new Sony WRT-28 UHF transmitter and WRR-28 UHF receiver utilize state-of-the-art surface mount technol-



ogy for the ultimate in reliability and miniaturization.

Sony advances wireless technology to a new plateau with transparent sound quality and superior interference rejection. Plus the



YOU'D WANT FROM A WIRED MICROPHONE SYSTEM WITHOUT THE WIRE.



versatility of a switchable linear or compander mode.

Amazingly light and compact, the 28 Series UHF system goes anywhere, performing over a wide operational range. Powered by "AA"

batteries, available worldwide.  
The Sony UHF Wireless System.

**SONY**®

PROFESSIONAL AUDIO

It performs like a wired microphone. With no strings attached.

To find out more, call us at  
1-800-635-SONY.

Sony Communications Products Company, 1600 Queen Anne Rd., Teaneck, NJ 07666. © 1989 Sony Corporation of America. Sony is a registered trademark of Sony.



*Continued from page 40*

come unnecessarily complex. Today's shifting economic climate is forcing many broadcast stations and production facilities to simplify their operations. One way to do this is through increasing use of automation.

The concept of automation in a broadcast facility is certainly not a new one. It has been a topic of discussion for many years. However, what has been missing from these discussions is a common definition of automation.



Photo courtesy of Flower Adams

*The WMAQ Studio B production control center features separated console positions. Director (center) shares console with associate director. Technical director operates switcher from separate console in right background. Fore-ground positions are for producers. Photo is taken from rear console, which has space for observers and ENG coordination.*

One person might describe automation as automatic remote control of a plant's videotape machines from a distant location outside the tape room. Another might say it is the capability to automatically control many varied mechanical and electronic devices throughout the broadcast plant from several specified operator locations. Everyone seems to have a different perspective on it. Because perceptions of the meaning, purpose and value of station automation vary so widely, it is unlikely that a truly meaningful exchange ever has taken place on the subject, or that realistic solutions have been offered.

Duffy Sasser, vice president of operations and technical services for NBC TV Stations, has a more far-reaching vision of station automation. What he calls the "Holy Grail solution" to successful station automation begins with bridging the gap between sales and program production. Sasser says the automation process must begin at the time the sales representative enters the order for programming material into the system.

Sasser also thinks all information regarding a program segment should be available to any department upon request. Traditionally, this information exists within all departments, but in independent files. When a change is required, the new information must be re-entered in separate computer systems or reproduced in paper

form and hand-delivered to all departments that need to update files. For optimum efficiency, it should be a requirement that the initial sales order, all the pertinent routine information and any changes be entered into the system only once.

A common database running throughout the facility, which also controls the daily broadcast routine, is the backbone of true station automation, Sasser said. "Eventually, even advertising agencies could be given access to the system to directly input sales orders in much the same manner that travel agencies can book tickets with the airlines. The agencies could also verify commercial runs to reconcile invoices," he said. Sasser predicts that this service will be available from some broadcasters within five to 10 years.

Another advance that would help close the automation loop would be an industry standard data header for every program, commercial and promo. When a new book arrives at the public library, it is accompanied by several electronic cards that contain pertinent information about it. Sasser thinks a similar electronic system could bear information about the contents of a piece of videotape.

### Designing for change

As a broadcast engineer, you may not be able to predict change, but you certainly can prepare for it. In equipment terms, this means that it is unwise to build your facility around any one piece of equipment or operating philosophy. Pretend that any equipment you integrate today may be obsolete and replaced or reconfigured in six months. This is an extreme viewpoint, to be sure, but look at the de-

sign choices it prompts. If you are certain you'll have to access cable trays repeatedly over the years, you'll make them big enough. You'll use more computer flooring. You'll make sure you can easily access any area that may be needed in the future. You'll provide, or at least allow for, equipment racks to make it easy in case you need to expand the central rack room.

But what about buildings? All the broadcaster's equipment, computers, stages and sets must be housed in some sort of permanent, businesslike structure that can be modified easily to accommodate whatever curves the future throws.

Plans for a new facility for Chicago's WMAQ-TV, an NBC owned and operated station, began more than five years ago. After developing a master plan with architects, station personnel reviewed more than 40 potential sites. Sasser described the facility plans as being "as definitive as possible" while allowing for a certain amount of uncertainty and risk. "After all, our industry was experiencing some pretty drastic changes, and we didn't know how it would be configured 10 years down the road," he said.

The planners originally wanted a stand-alone, single-use building with a good line of sight for microwave transfer of the signal to the transmitter site atop Chicago's John Hancock Center. However, they decided to approach site selection and structure design in such a way that space for the facility could someday be expanded or, if necessary, reduced.

The result is a multi-use building, a 39-story tower that houses station operations and management offices on the first six floors. Station personnel use a bank of



Photo courtesy of Flower Adams

*WMAQ "Day-of-Air" console, used for switching program feed. Master control, which controls all feeds in and out of the station, is seen in rear. Photo is taken from a news producer's platform, used for cut-ins and breaking events.*



# Dolby SR improves the medium for your message.

## TAPE RECORDERS

Dolby SR provides the performance attributed to digital systems while maintaining such analog virtues as economy, editing ease, and tape interchange.

## CARTS

Along with their familiar ruggedness and all-around utility, carts with Dolby SR capture the full dynamics of all your source material, digital or analog.

## 1-INCH VTR'S

With Dolby SR, video can sound as good as it looks. Signal purity is maintained through the multiple tape generations necessary in today's post-production techniques.



## DISCRETE STL'S AND RPU'S

Dolby SR improves headroom and lowers noise, while suppressing the effects of interference and fade.

## TV STL AUDIO SUB-CARRIERS

With Dolby SR, there's no need to re-allocate subcarrier frequencies or replace existing equipment in order to deliver high quality audio to the transmitter.

## SATELLITE AUDIO

Dolby SR improves analog channels without audible side effects yielding performance rivaling digital systems.

Listeners today expect better sound wherever they go — at home, at the movies, in the car. To keep up with their expectations, you need Dolby SR. Two channels, with the compact, easy-to-operate Dolby Model 363 (shown) Or up to 24 channels, with Dolby Laboratories' multitrack products.

Dolby SR dramatically reduces noise, increases headroom, and lowers distortion from initial production to final transmission. That means you can deliver your message today with the clarity you've been expecting from the technology of tomorrow.

Dolby Laboratories, Inc., 3300 University Avenue • San Francisco, CA 94103-4813 • Telephone 415-558-0200 • Telex 34209 • Facsimile 415-863-1373  
4400 Chatham Road • Ewing, NJ 08640 • Telephone 609-720-1171 • Telex 919109 • Facsimile 609-720-4118  
Dolby and the Double-D symbol are trademarks of Dolby Laboratories Licensing Corporation. © 1989 Dolby Laboratories Inc. S89/8871

**Dolby**



dedicated elevators that are separate from the public elevators that serve tenants of the upper floors. The building's classic architectural theme visually supports the 50-year association between WMAQ and NBC. The network's peacock symbol resides in a lighted full-color display with a solid brass framework at the top of the structure, identifying it as the NBC Tower. The structure is a focal point between Lake Shore Drive and Columbus Avenue just west of the Navy Pier.

Part of the reason the site was selected was a height restriction on a center parcel of three adjacent parcels. The lots on each side are zoned for tower structures. However, the center parcel is limited to a maximum of four stories in order to preserve a view corridor to the lake from the downtown area. The station located its on-site production stages in the center parcel.

"This is the only area where we have some concerns about remarketing the space in the future," Sasser said. "They are large, fully isolated spaces which employ construction techniques unique to production sound stages, whereas all of our spaces in the tower are fully capable of being converted for traditional office use, should conditions change and we find that at some future time we must re-market the real estate."

### Using outside services

At one time, networks and many of the larger stations fabricated much of their own equipment. Gradually, as the industry matured, manufacturers began to fill broadcasters' needs. Today, a minimum of equipment is fabricated in-house.

Similarly, all system integration and equipment maintenance once was performed by staff engineers. The economic climate of broadcasting today, however, forces broadcasters to look at new ways of operating and maintaining their facilities. In some cases, outside contractors,

consultants and temporary employment agencies are providing peak-period support for engineering and production requirements. Engineering managers should consider carefully the use of outside services for the design and installation of new facilities as well as the relocation of broadcast plants.

In the case of WMAQ, engineering managers reviewed five separate proposals for the redesign and relocation of the station. They eventually narrowed the field to three, finally selecting SAIC (Science Applications International Corporation), San Diego, as the system integration and relocation contractor for the project. The total complement of equipment was one-third existing WMAQ equipment, one-third from the Seoul Olympics, and the rest was supplied new by SAIC.

The job was tricky because of a hard deadline of Oct. 1, 1989, as well as a requirement to move all technical, studio and news operations on a single night without any period of split operations. To accomplish this task, crews were detailed to wire the new plant ahead of time. Equipment was installed into the awaiting slots. WMAQ asked for and obtained cooperation with labor. For a 48-hour period, each of the unions operating in the technical area of the station agreed to drop



Photo courtesy of Flower Adams

The camera control console at WMAQ, with TSM robotic control console.

## Introducing A Stereo Audio Signal Test Set with the Widest Range Ever Designed



This simple and easy to operate gain set allows stereo measurements of level, balance, crosstalk, and signal-to-noise over the entire dynamic range of your system from noise floor to clipping. The solution to balanced stereo lines.

### FEATURES

- Range of 100 dB
- Simultaneous Peak & Average
- L/R or Sum/Diff Modes
- 2 B scale Loudness Meters
- Easy to Use

### MEASUREMENTS

- Signal-to-noise ratio
- Program Balance
- Separation
- Crosstalk
- Headroom
- Phase

### APPLICATIONS

- Stereo Television
- FM Stereo
- Recording
- Duplication
- Uplink
- Price: \$1650.00



*dorrough*

Dorrough Electronics • 5221 Collier Place • Woodland Hills, CA 91364 • (818) 999-1132 • Fax: (818) 998-1507

Circle (21) on Reply Card





***It takes teamwork to produce the industry's best-performing router. It takes confidence to guarantee it for ten years.***

At Utah Scientific, people know how to work together to bring you the best in product design, product performance, and product support. Products like the AVS-2, the new generation of Utah Scientific routers.

With the best operating specs in the business, the AVS-2 offers these exclusive features:

- ☐ surface mount component technology — increased packaging density for maximum size reduction with no sacrifice in signal integrity
- ☐ up to 525 crosspoints per rack unit including power supplies
- ☐ 1280 x 1280 matrix sizes with 8 separately addressable levels
- ☐ HDTV compatible — video frequency response flat to 30 MHz
- ☐ matrix cards automatically assigned to location — change card positions without reprogramming
- ☐ full matrix salvo capability — reconfiguration in one vertical interval
- ☐ only multi-sourced components are used — no hybrid circuitry.

And even though the AVS-2 is a revolutionary new design, we have the confidence to guarantee it for ten full years — parts and labor.

That means you can have confidence every time you buy a Utah Scientific product. Confidence that you are buying the best. Confidence that our team of experts is available to help you whenever you need it. Confidence that your Utah Scientific switcher will keep working for you year-after-year with the best reliability record in the industry.

Call us today for more information about the AVS-2 or any other Utah Scientific product.



***Confidence in Quality.***

Utah Scientific, Inc.  
4750 Wiley Post Way  
Salt Lake City, Utah 84116-2878  
(801) 575-8801 Toll Free: (800) 453-8782

Dynatech Broadcast Group



their jurisdictions, and all station and contract personnel were allowed to pitch in, working side by side as needed.

Trusting the design and implementation of a new station to others can be a gut-wrenching decision. It is especially difficult for engineers who have been with the same properties for a long time. They may feel an emotional attachment with the maze of cable and equipment we call a broadcast station.

After assuring yourself, through background checks and references, that the proposed system integrator knows its business, your next undertaking is to lay out the level of support required. Some broadcasters want the integrators to simply build their technical plants to order. Perhaps the operational philosophies are fixed firmly, and they need the integrators to attend to the details of construction and equipment acquisition and installation. Other broadcasters want to work alongside the integrators, giving input on items considered key to the success of their facilities and relying on the experience of the integrators for other details. Some want turnkey installations, opting to have relatively little to do with the day-to-day complexities of design and construction.

Thoroughly establish the approval process in advance. Spend the time necessary

to completely define the project. The system integrator must be able to visualize the desired results. The best process for ensuring that the station's requirements are met is to prepare well-written specifications. The system integrator should be able to assist with this, but expect to pay for that service, because it is a tedious process. Make sure you have defined a clear route for resolving differences of opinion once construction is under way. At the outset, determine who is responsi-

ble for approving changes. Who will be responsible for making final operational and technical decisions?

Obtain an agreement of when, and in what format, you can expect to receive the "as-built" drawings. These are vital to continuing maintenance operation of a facility. Many stations require the documentation from the integrator on a compatible CAD program. This allows them to follow progress and trade information during the construction phases and easily upgrade the documents to reflect future system upgrades.

### The show must go on

For the foreseeable future, broadcasters will continue to play a role in the distribution of information. What form that information takes, as well as the methods of delivery, are subject to change as the industry moves into a new economic climate and evolves with expanding technology. Engineers can help their facilities to meet the future gracefully by designing plants with change in mind, by seeking automated solutions to existing bottlenecks and by considering contracting with reliable, experienced integration firms when moving into new quarters or remodeling an existing facility.



Photo courtesy of Flower Adams

WMAQ-TV newsroom, with three TSM full-motion robotic camera systems, with one pan-and-tilt overview camera in the background.



## The choice of the professionals...



**310B PROFESSIONAL PHONO PREAMP/EQUALIZER**  
... Interfaces magnetic phono cartridges for optimum calibration of audio systems. Available with balanced or unbalanced output.



**680EL** ... Delivers sound excellence and stands up to backcuing, vibrations and mishandling.



**PBR ANNOUNCER'S EARPHONE** ...  
Ideal for on camera studio work and remote coverage.

Stanton is the company with a total commitment to quality and reliability—producing products for the Recording Industry, the Broadcast Industry and the Professionals in Audio.



**STANTON**  
THE CHOICE OF THE PROFESSIONALS™

101 Sunnyside Blvd., Plainview, NY 11803



The **Dynaphase 30MISR** is a shoulder rest single cup headphone that provides the ultimate in convenience, comfort and superb sound quality. Made to rest on either your left or right shoulder, or shoulder rest can be detached and used as a single cup hand-held monitor.



**500AL** ... For heavy duty on-the-air use with wide tracking force range.

Circle (23) on Reply Card

See us at NAB Booth #4726



1952  
1953  
1954  
1955  
1956  
1957  
1958  
1959  
1960  
1961  
1962  
1963  
1964  
1965  
1966  
1967  
1968  
1969  
1970  
1971  
1972  
1973  
1974  
1975  
1976  
1977  
1978  
1979  
1980  
1981  
1982  
1983  
1984  
1985  
1986  
1987  
1988  
1989

35 YEARS AGO WE PIONEERED  
THE FIRST TRANSMISSION LINES...

# FLEXWELL®

TODAY WE'RE STILL LEADING THE WAY!



Cablewave Systems 6-1/8", 8", 9" and 12" high power *Flexwell* coaxial cables represent the largest semi-flexible transmission lines of their kind in the world. Produced in continuous lengths, large capacity corrugated copper and aluminum *Flexwell* cables are designed to meet the high power requirements of medium wave and shortwave international broadcast installations.

The family of *Flexwell* transmission lines are produced and marketed worldwide by member companies of the Radio Frequency Systems Group. *Flexwell* corrugated transmission lines range in size from 1/4 inch jumper cable to 12 inch high

power broadcast cable with up to 9 megawatt RF power handling and *Flexwell* elliptical waveguide from WR42 through WR430.....Cablewave Systems covers the whole spectrum.

For more information on the *Flexwell* family of RF transmission lines, contact Cablewave Systems division of Radio Frequency Systems Inc. North America. 60 Dodge Avenue, North Haven, CT 06473. (203) 239-3311.



**Cablewave Systems**

Circle (24) on Reply Card

SEE US AT NAB BOOTH #4020



# Planning for good acoustics

By Eric Neil Angevine P.E.

Many of the TV studios constructed in the past 20 years are little more than warehouse-style boxes. As such, they are incapable of keeping out exterior noise, let alone controlling the noise created within. Yet these facilities have spent untold sums on studio lighting and magnificent sets and cycloramas. Even the smallest local station now has an extravagant set from which to broadcast its nightly news program.

With the advent of stereo television and the "home entertainment center," in which consumers can interconnect their TV receivers and their high-quality audio components, the importance of sound has begun to catch up with that of picture quality. As producers, directors, talent and engineers pay closer attention to sound quality, they desire and expect better facilities from which to broadcast.

The science and art of architectural acoustics deals with two discretely different phenomena regarding sound control. One is sound transmission or, more specifically, how to keep unwanted external sound out of the studio. The other is commonly referred to as room acoustics, or how sound behaves within an enclosed space.

## Sound transmission

The principles of sound transmission and engineering "noise control" that accompanies it are simple, yet often hard to implement in practice. The basic tenet is that materials that are effective noise barriers are solid and massive. The "mass law" tells us that the sound attenuation provided by any material is related directly to the weight of the material and the frequency of sound:

$$TL = 20 \log w + 20 \log f - 33\text{dB}$$

Angevine, BE's broadcast acoustics technical consultant, is an associate professor at the Oklahoma State University School of Architecture, Stillwater, OK.

Where  $w$  is the weight of the material in pounds per square foot of area, irrespective of material thickness, and  $f$  is the frequency of sound.

Because of the logarithmic relationships in this equation, two important observations can be made. First, the sound transmission loss of any wall or material will increase 6dB for every doubling of the weight of the wall. Second, the attenuation will increase at 6dB per octave (doubling of frequency).

The sound transmission loss of any wall usually is limited by doors, windows or other openings in the wall, rather than by its inherent sound attenuation properties. Door and window areas should be kept to a minimum, and care should be taken to seal any opening left during construction, as well as the operational clearance around doors.

## Room acoustics

Older construction materials were massive, providing sufficient sound transmission loss to keep all but the loudest sounds from outside and from adjacent interior spaces. The place where many older studio facilities really fall short is in the realm of room acoustics.

The fundamentals of room acoustics are nearly as simple as those of sound transmission. It is helpful to remember that sound waves have a physical size that can be reckoned with. The speed of sound in air at typical room temperatures is about 1,130 feet per second, so the wavelength of audible sound waves ranges from less than one inch at the highest audible frequencies to more than 10 feet at frequencies below 100Hz.

Like a guitar string or organ pipe, a room will sustain sounds only at frequencies that are related to its dimensional characteristics. Because TV studios typically are large rooms, they seldom have poor low-frequency response. However, this problem may occur in small voice-

over booths. To provide the best mixture of sustained frequencies or resonances, it is best if the room dimensions not be the same, or even-integer multiples of one another.

## Sound absorption

The most common problem in studio spaces is a lack of adequate sound absorption. Despite some arguments to the contrary, most broadcasters still prefer studios that are overly "dead" to those that are too "live." They argue that it is a simple matter to introduce some synthetic reverberation into the audio feed, but it is still not possible to electronically remove excessive reverberation.

In reality, the amount of sound absorption that can be added to any studio space is limited by the area of surfaces suitable for treatment and the owner's budget. At the very least, a quantity of sound absorption equal to a full acoustical ceiling with some wall treatment is essential. Wall treatment should be distributed around the room, rather than concentrated on one wall or in one area. It is most effective when placed in exposed areas, possibly behind thin curtains, but not behind hard cycloramas. A designer who has thought far enough ahead will have included structural materials, such as roof decks and masonry walls, that are acoustically absorptive. Even ordinary concrete block, if left unpainted, is moderately sound-absorptive. However, unpainted concrete masonry does not have high absorption coefficients, and some added wall treatment is recommended.

# New options in wiring

By C. Robert Paulson

In the 1980s, your options for hooking up systems in broadcast facilities were simple: You could use twisted pair or you could use coax. In the '90s, interconnection options are multiplying. In addition to traditional wiring, you may now choose from a plethora of digital cables

Paulson is a communications consultant and managing partner with AVP Communications, Westborough, MA.

and fiber optics. Even good old coax and twisted pair have an updated look for the new decade.

The reason for new types of cable is the advent of new types of signals. Whereas the video interface was once nearly 100% NTSC, a multitude of analog component formats exists today. Add to that the increasing use of dub signals and digital video.

## Wider bandwidth, more channels

Audio has undergone a reformation from simple mono to multichannel TV sound (MTS). Three channels, and often three channels plus time code, travel together. (Note how many new tape formats come with at least four audio channels.)

Supposedly, HDTV is lurking in the



By James C. Ritchie, AIA, and  
Rick Lehtinen, TV technical editor

# Hardening broadcast facilities

**Maintaining the integrity of a broadcast facility is vital  
to staying on air during a natural catastrophe.**

**A**ny event that takes a broadcast facility off the air is a catastrophe, whether it is caused by nature, a design error or a manmade activity.

Following are a few of the critical aspects of construction that should be considered in the design of a new facility, or in the evaluation of an existing facility, in order to minimize damage in the event of a natural or manmade disaster.

## **Lateral forces**

On Nov. 29, 1988, an explosion at a Kansas City, MO, construction site took the lives of six firefighters. The explosion was felt over a large area of the city. The computer facilities of a nearby major corporation suffered considerable damage, not from failure of the building structure, but primarily from the failure of suspended ceilings, lighting fixtures, suspended ductwork and unbraced pipework above the ceiling of the computer room. Had this computer facility been a TV or radio station, in all probability, it would have been put out of commission.

A *lateral force* is any pressure that causes a building to move horizontally. The cause may be an earthquake, high wind or, as in the Kansas City example, an explosion. (See Figure 1.)

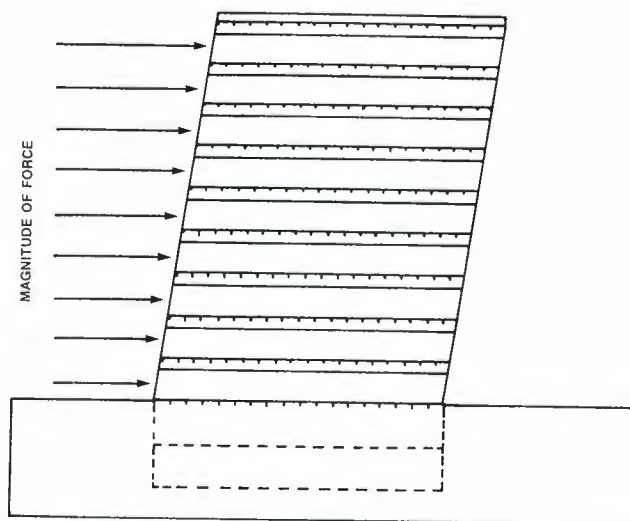
Building codes for earthquake design in seismic zones 2, 3 and 4 now require that all suspended ceiling systems, including lighting fixtures, be braced to resist later-

al forces. (See Figure 2.) Existing facilities constructed under earlier versions of the building code or buildings in seismic zone 1 may not have this requirement. Nevertheless, it would be prudent to include lateral bracing above the critical areas of a broadcast facility.

Bracing is accomplished by attaching a series of 12-gauge wires, using angle clips and power-driven pins, at 12-foot centers, to the ceiling grid. (See Figure 3.) The wires run at a 45° angle from the ceiling grid to the structure above, where they are fastened mechanically. Bracing can be ac-

complished in either existing or new construction for about 50 cents to 60 cents per square foot.

Access-type flooring systems (computer floors) are available for use in both seismic and non-seismic zones. In critical areas of a broadcast facility, it is wise to select a system that will resist lateral forces, whether or not it is required by local building codes. Several systems have provisions for fastening each floor panel to the supporting pedestal at all four corners instead of relying upon friction to hold the panels in place. (See Figure 4.)



**Figure 1.** A building with lateral force applied.

Ritchie is chairman of Cooper Carlson Duy & Ritchie (CCDR), an architectural firm in Kansas City, MO.



# History doesn't happen twice.

You can't plan it. But you've got to be ready. Because when it happens, it happens.

That's why virtually every major television facility on earth relies on products from Tektronix to help bring home the news.

Whether you're broadcasting live feeds from a hometown sports event or sending signals via satellite from Berlin or Beijing to thousands of stations around the world, you can count on Tek to help deliver the clearest picture of current events. Globally or locally.

Whatever format you work in, no one offers better tools than Tek for measuring and maintaining your video signal quality. More confidence, at the moment of truth.

For over 40 years, Tektronix technology has kept a step ahead—to keep you on the air. Our high-performance waveform monitors and vectorscopes, sync and test signal generators and fully integrated video measure-

ment sets cover the entire gamut of test and measurement capabilities. They're accurate, easy to operate and give you results quickly and consistently.

Even in the evolving world of high-definition television, Tek is out in front with wide-bandwidth instruments to test and evaluate HDTV equipment.

It's just another measure of proof that Tektronix television products continue to meet the broadcast industry's needs better than anyone, day after day, year after year. Whether it's the first big break in the Iron Curtain or the last lap at the Indy 500, we'll see to it that your picture looks its best; because nobody's watching closer than Tek.

**For a firsthand look at Tektronix television products see us at NAB Booth 2016.**

## Nobody's watching closer.



**Tektronix**  
COMMITTED TO EXCELLENCE

Circle (26) on Reply Card

Copyright © 1990, Tektronix, Inc. All rights reserved. TVG-103







wings. Whereas NTSC required cables capable of passing 6MHz or so without rolloff, HDTV at 1125/60 requires 20MHz to 30MHz. Digital formats for both audio and video now are emerging. These signals require special cables because of their high bit rates — from D-1 at 140Mb/second to almost 2Gb/second for digitized HDTV.

And remote control, time code, MIDI and even automation signals require some kind of interconnection.

Transmitting even simple NTSC through coax is far from trouble-free, requiring equalization after several hundred feet. These problems only grow worse when the signal is higher-bandwidth analog or high-speed digital. All these new signals have placed demands on cable manufacturers to supply products worthy of the challenge.

#### Some like it flexible

As electrical codes have tightened over the years, cable manufacturers have responded with cables designed to withstand National Electrical Code (NEC) flame tests. Unfortunately, cables designed to be highly flexible usually won't meet the test. This has led some manu-

facturers to provide cables in both NEC-acceptable and flexible versions. The advantage of greater flexibility is that cable pulls can be much longer, because the cable doesn't fight you as much in tight places.

Some twisted pairs achieve superflexibility by using many strands of extremely fine wire, 40-gauge or so, laid together into a wire that is 22- to 26-gauge overall. Although it is ideal for some situations, make sure this cable is right for you. Check whether it will hold securely in the punch block or terminal strips you plan to use.

#### New cables

A space-efficient method for routing many audio pairs from one location to another is with a multiple-pair cable. These cables usually have a foil shield around each pair and a common sheath around them all. Using these cables can be an exercise in reading color codes, because the pairs are differentiated by the color of the individual wires in the pair.

Some manufacturers now offer "audio snake" cable. Separately shielded and jacketed pairs are enclosed in a common

sheath. Pairs are identified by numerals printed on the individual jackets.

Coax has moved into bundles as well. This has been brought about, in many cases, by computer graphics applications that require separate cables for red, green and blue, and sometimes, sync. It is vital that these cables be identical in length, to avoid relative timing errors between channels. Furthermore, the velocity characteristics of the individual cables must be matched closely to prevent the introduction of similar errors. Broadcasters may find that multiconductor coaxial cables are a convenient way to avoid problems in this area.

New variations of the popular "Siamese" cable, in which a video coax and an audio pair are sealed in a common jacket, are arriving. These new versions contain larger cable counts than before, allowing single cables to connect more equipment.

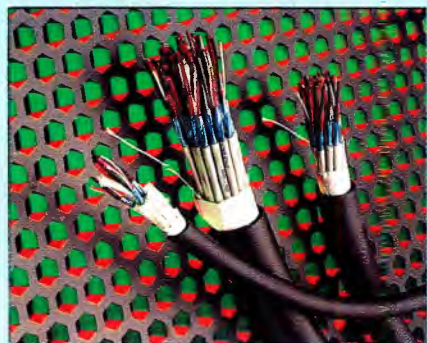
#### Can you get there from here?

None of the formats in existence today are likely to simply retire and go away. Rather, they will continue to be

*Continued on page 258*



*Bundled coaxial cables simplify installations involving RGB video. Bundling ensures that cables are of identical length, preventing inter-channel timing errors.*



*Multiple-pair "audio snake" cables identify individual pairs by number and free installers from color codes.*

## ...And Panasonic Professional SVHS Video Tape



Get your SVHS video tape from the leading supplier of professional SVHS video equipment. Panasonic® And rest assured that your SVHS programming will perform to its full potential.

Panasonic professional SVHS video tape is available in 120, 60 and 20 minute lengths. Ask your local Panasonic Professional/Industrial Video Dealer for details.

**Panasonic**  
Professional/Industrial Video

Circle (25) on Reply Card





## Take It On The Road

**P**anasonic lets you hit the ground running with compact SVHS and MiniDV camcorders. They give you less to carry on your shoulder and your budget by combining component recording technology with the efficiency and flexibility of half-inch cassettes.

No matter what your specific application requirements may be, Panasonic has the right camcorder for you, including both dockable and fully integrated one-piece units. In addition, only Panasonic has SVHS camcorders available with three, two and single CCD image sensors and up to 700 lines of resolution. Panasonic lets you decide what's best for you.

Panasonic SVHS and MiniDV camcorders don't cut any corners when it comes to recording in the field. With high performance features like on-board vertical interval and longitudinal time code, hi-fi audio, and a variety of auto adjustment functions, they're features that Panasonic brings to the field so you have less work when you're back in the studio.

# ENG/EFP

# STUDIO

## Panasonic Has V Down To

Selecting the most comprehensive video production system has never been easier. The Panasonic® Professional Video Production System is designed for total systems operation in the field, studio, editing suite and for virtually any playback application.

The SVHS recording format is at the heart of Panasonic's comprehensive video production system. It provides a new level of high performance and cost effectiveness across the spectrum of video recording and playback applications. One look at the numbers tells it all. Five generations of signal integrity, 400 lines of resolution and two-hour operation on a single cassette.

You can complement the performance of SVHS with the sophistication of Panasonic's MiniDV. The MiniDV format delivers the operational characteristics

## Improve The Studio Scene

**P**anasonic makes studio productions productive. With high performance studio components that provide efficiency through versatile applications.

Whether you are planning a studio with a multiple camera system, a single camera, or looking to expand an existing facility, Panasonic CCD cameras will capture every detail. With features that include up to 700 lines of resolution, gen-lock capability and remote control operation. They provide the results you need today with an eye on expansion tomorrow.

Panasonic's exclusive three and two CCD cameras let you specify the

configuration and features that meet your requirements best. And as an added benefit, Panasonic CCD cameras operate as well in the field as they do in the studio.

Panasonic's three CCD cameras also feature component outputs to take full advantage of SVHS and MiniDV studio recorders. And to see that all the action you've recorded looks its absolute best, Panasonic monitors give you more than just a pretty picture. They allow you to easily analyze any video signal from any video source in your studio. A safeguard you'll appreciate during postproduction and final playback.





ENG/EFP



# Panasonic Has Video Production Down To A System.



STUDIO

[www.americanradiohistory.com](http://www.americanradiohistory.com)





## Raise The Editing Standard

**P**anasonic is setting new standards in editing excellence. With SVHS and MII VCRs and editing components that maintain the integrity of your original footage through multiple generations of recording. And a host of sophisticated features designed for any application.

Panasonic has the editing system

configuration you need. From sophisticated programmable 128 event A/B roll systems with time base correction to highly accurate insert and assembly systems. It's everything you need to turn ordinary footage into extraordinary productions.

In addition, Panasonic speaks the industry's language for inter-format editing with RS-422 VCR control interface components. And video signal transcoders that allow you to integrate virtually any video signal with the Panasonic Video Production System.

Whether your editing operation requires single format or inter-format editing, Panasonic delivers the high performance and signal integrity you demand for final playback.

## Video Production System.

you need for demanding broadcast and post-production applications. Like a luminance bandwidth of 9.5MHz, a K factor of 2% and a signal-to-noise ratio in excess of 50dB. To produce images that equal one inch VTRs with signal integrity that exceeds five generations of recording.

The integration of SVHS and MII video production components adds a new dimension to video system specialization. Because you can select the Panasonic components you need for the highest degree of performance and flexibility for specific system applications. And for highly efficient playback operation, there's Panasonic's line of professional VHS recorders and players.

Anyway you add it up, the cost/performance characteristics of the Panasonic Video Production System are revolutionary.

# EDITING

# PLAYBACK

## Feed Your Channel

**P**reserve the quality of your finished production through distribution and playback. With professional playback components from Panasonic. They offer you the performance and versatility required to satisfy even the most demanding applications.

Panasonic VCRs and TBCs are perfect for closed circuit, cable and even broadcast transmission. They're ideally suited for stand-alone operation and can easily be configured for station automation.

For general viewing and large screen presentations, Panasonic has the right

combination of SVHS and VHS VCRs, monitors, and video projection components to suit virtually any size audience.

If your playback application involves program distribution to a corporate network, Panasonic will carry your message. With VCR features like video sensor recording that allows you to record programming transmitted during off-peak hours. So you can save on transmission and personnel cost. And for large scale duplication and point of sale playback, Panasonic professional VHS VCRs are the industry's standard for excellence.





# EDITING



## From Start To Finish

Panasonic's highly trained sales and support professionals provide you with expert engineering consultation before and after the sale. To ease your task of selecting and maintaining the components you need for comprehensive system operations. And with authorized Panasonic Dealers located throughout the country, you can easily plug into the Panasonic system.

Panasonic offers the most comprehensive video production system available for every stage of the video production process. With all the performance, compatibility and versatility required to compete in the video market. And the outstanding cost/performance qualities necessary for today's economic environment.

Make Panasonic your choice. After all, Panasonic has video production down to a system.

For more information and your local dealer  
call your nearest regional office  
Eastern Zone: (201) 348-7620  
Central Zone: (708) 981-4326  
Southern Zone  
Dallas Region: (817) 685-1117  
Atlanta Region: (404) 925-6841  
Western Zone  
Seattle Region: (206) 235-8883  
Los Angeles Region: (714) 373-7275

# Panasonic

Simulated monitor pictures



# PLAYBACK

[www.americanradiohistory.com](http://www.americanradiohistory.com)



# Small Monitor. Big Difference.



In the recording business, little things can often make big differences. Studio monitors, highly sophisticated critical listening devices, are certainly no exception. Our Control Series™ compact personal monitoring systems each provide the performance characteristics demanded in today's recording environments.

Take our Control 5™ for example. You get power handling capacity of 175 watts, outstanding dynamic range, smooth frequency response and excellent clarity and imaging. This high power, low distortion system is housed in a non-resonant polypropylene structural foam enclosure.

Today you can find Control 1's in home studios and midi workstations; Control 5's in major recording and teleproduction facilities; Control 10's in foreground and background systems, corporate boardrooms and teleconferencing facilities. And the two-way horn loaded Control 12SR, a logical extension of the technology, in sound reinforcement applications from supper



*Control Series. Compact high performance monitors designed to meet a broad range of fixed and mobile applications.*



clubs and discotheques to small tour sound systems. Control Series meets such diverse applications because they are, above all else, powerfully honest.

## **Versatility, the Other Advantage.**

Designed to accommodate a wide variety of specialized mounting brackets, Control Series monitors can go virtually anywhere. On the console, on the wall, on the ceiling, in a rack, on a tripod, keyboard or mic stand. Control 10's and 12SR's even come with a built-in handle so they travel like a seasoned professional.

Next time you're looking for a super compact high performance loudspeaker system, remember Control Series then go see your JBL dealer. Look at the specs, then listen to the big difference.



JBL Professional  
8500 Balboa Boulevard, Northridge, CA 91329 USA  
A Harman International Company

Circle (27) on Reply Card



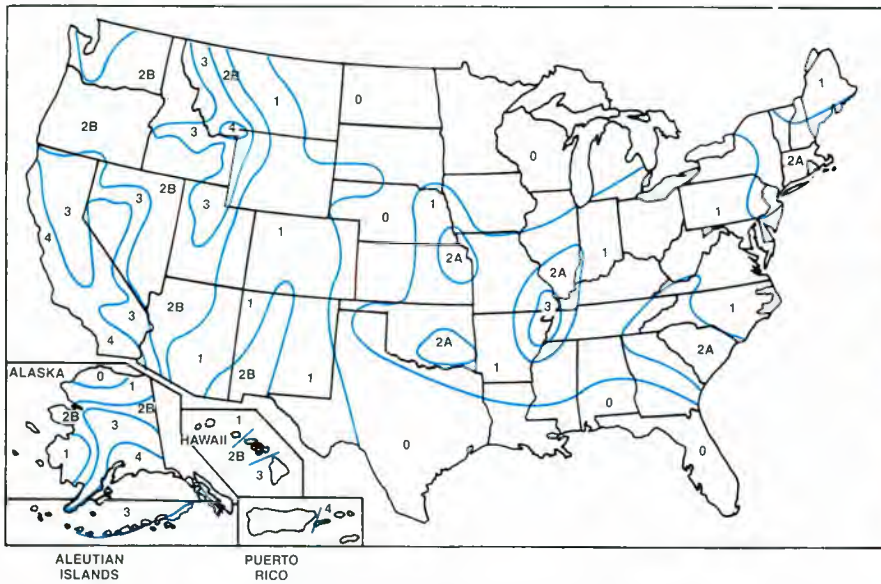


Figure 2. Seismic zone map of the United States (from the Uniform Building Code).

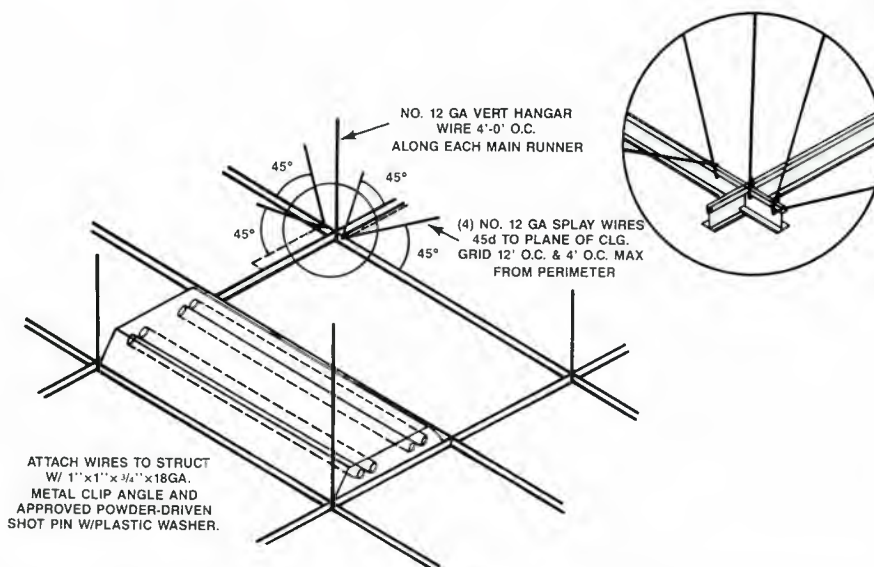


Figure 3. Bracing for ceiling and lighting fixtures will allow the ceiling to withstand greater lateral force.

This provides lateral stability, yet allows relatively easy access to the under-floor plenum. The pedestal height should be maintained at 12 inches or less, for a more rigid system.

### Water woes

Water, regardless of the source, is a potential cause for disaster in a broadcast facility. Water leaking from the roof membrane can migrate horizontally and create havoc with electronic equipment great distances away. Hot and cold water lines, condensate and roof drains, steam pipework, fire-sprinkler systems and sanitary sewers all can fail because of mechanical faults or installation shortcomings. The fol-

lowing are the most common causes of water problems.

### • Roof penetrations.

Every penetration in a roof membrane is an opportune place to develop a leak. Broadcasters must minimize roof penetrations, and develop a system for attaching roof-mounted equipment that will allow flexibility without punching holes in the roof. One successful technique is to build a grid of structural beams, supported on stub columns above the roof. (See Figure 5.) When equipment is changed or new equipment is added, it is easy to provide the necessary support without having to penetrate the roof membrane.

When KSL Broadcast House in Salt Lake City was completed in 1984, there were three satellite dishes. Five years later, several additional pieces of equipment have been added, and no additional roof supports or conduits for cabling have been required.



Using a roof-mounted grid allows broadcasters flexibility to update and change outdoor equipment without having to risk damaging the roof membrane.

### • Poor placement of pipework and HVAC equipment.

In the design of a new facility, it is imperative that the mechanical design — the placement of pipework and equipment for heating, cooling and plumbing — be coordinated so that water is kept as far as possible from electronic equipment.

In an existing facility, it is often too difficult or expensive to relocate pipework above critical areas. It usually is possible, however, to build sheet-metal troughs or tubs below the pipework or above sensitive equipment to divert water in case a leak develops above the ceiling. Although this solution will not be of much use in the event of a major failure in the pipework, it will take care of many of the problems that do arise.

### • Common ceiling plenum.

Another possible trouble spot is the ceiling plenum, the space between the finished ceiling and the structural floor above the ceiling. The architectural design of a broadcast facility should avoid the use of a common ceiling plenum above both technical and non-technical areas.

One telephone company learned this the hard way, when a soldered joint on a 140° hot water line failed. Even though the water line was 20 feet away from the telephone computer switching room, the hot, leaking water produced tremendous amounts of vapor that spread throughout the ceiling plenum and rained down like a tropical storm on the electronic gear. Although some of the switchers were saved, the manufacturer voided the warranty on more than \$1 million worth of equipment.

As a matter of interest, the manager of the facility, in an effort to restore service as quickly as possible, moved equipment

*Continued on page 60*



See us at NAB Atlanta  
Booth #1246

# Prodigy<sup>TM</sup>

Experience the  
genius of Videotek.

You're burning the midnight oil...Final edit's due at 8 a.m. Be glad you have Prodigy—the switcher with more brainpower in a smaller package.

**Forget about old two mix/effect systems.**

A reliable video switching and special effects system follows the industry standard—multi-level effects with look-ahead preview—then raises it with features no one else has, even on their most expensive systems. Prodigy offers stereo audio-follow-video, editor interface, effects memory and a programmable downstream keyer. Independent inner/outer border

softness control is standard. An RGB chroma keyer is also available.

**Have it your way.**

Modify Prodigy to suit your style and create memorable performances. Program up to 99 events into Prodigy's 68000 microcomputer and preview the results instantly. Ten programmable sequences link 80 on-line memory registers, and ten learned operator transitions track your actions over time. With Videotek's exclusive Times Six Plus black burst generator, system timing is virtually automatic.

**Prodigy is multi-talented.**

Equally at home in the post-product on facility, newsroom or

studio—Prodigy rack-mounts in minutes and its software talks to a wide range of popular editing controllers.

Get your hands on a Prodigy and let the performance begin! For details or your nearest Prodigy dealer, call Videotek today.



**VIDEOTEK INC.**  
American made technology.  
And value.

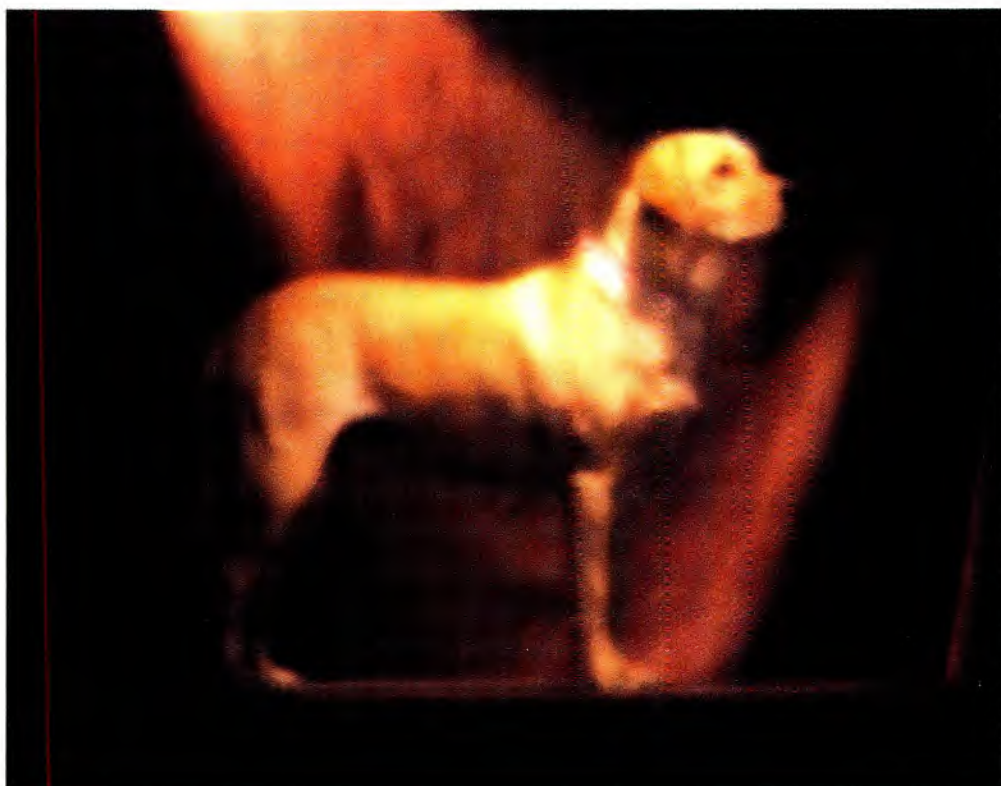
243 Shoemaker Road, Pottstown,  
Pennsylvania 19464 • (215) 327-2292  
TWX 710-653-0125 • FAX (215) 327-9295  
**A Zero Defects Company**



## Introducing the GraphicSmart™ Projection System.



When we tell you that our new GraphicSmart Projection System creates superior big-screen images, we're not just wagging our tail. Because in addition to giving you clearer images, GraphicSmart gives you better color quality, brightness and higher definition. Whether you're displaying video images or computer graphics, our digital convergence memory technology allows you to pro-



Simulated picture from photograph.

**With any large screen projector you know it's a dog.**

gram almost 100% accuracy from a wireless remote control. Resulting in a consistent, sharp picture on your screen. That same technology allows you to switch from a video to a data source in the middle of your presentation. Without having to re-adjust your image, turn on the lights or get up from your chair. And if you think that's a bright idea, wait till you see what our 600 lumens of light will do for your picture. The GraphicSmart Projection System also has a wide horizontal scanning



frequency range. Giving you the flexibility to project higher resolution computer graphics. And the freedom to make a presentation in any size. From five feet to twenty-five feet diagonally, with all the color quality and definition you de-

Simulated picture from photograph



With ours you know it's a girl.

mand. You'll find GraphicSmart's projector has a sleek design that won't compromise the look of your boardroom. And the projection system includes interface cables,

wired or wireless user and set-up remote controls, power cables and a ceiling mount. It also comes with the NEC name. Plus, all of the experience that goes with being a leader in the fields of digital technology and multiple frequency monitors. So, if you've been looking for a superior projection system, remember—you won't find a better breed than GraphicSmart. For more information call NEC at (708) 860-0335.



# NEC



Continued from page 56

without documenting the damage properly. This may have weakened the telco's legal position.

All of this might have been avoided if the walls surrounding the building's equipment core had run all the way up to the structural ceiling.

- **Condensation.**

The ceiling plenum also can be a problem if the exterior walls and roof of the building are not insulated properly or lack

adequate vapor barriers. Cooper Carlson Duy & Ritchie, Kansas City, MO, recently designed a broadcast facility in Boston that was being relocated from a high-rise office building to a renovated, reinforced-concrete factory building.

The design of the heating and air conditioning systems called for a relative humidity of 35% to 40% and used the ceiling plenum for return air. The original walls and roof of the building did not have enough insulation to prevent condensation on the warm side of the wall. Also, there

was no vapor barrier that would prevent the build-up of condensation above the ceiling. Remedial work was included in the design documents to alleviate this situation. Had this condition not been recognized at the outset of the design program, there is a good chance that damage may have occurred while the station was in operation.

- **Accidental discharge of fire-protection systems.**

Fire inspectors are understandably reluctant to omit fire-protection systems in technical areas, but they are generally cooperative in allowing systems that minimize the risk of accidental discharge.

Dual-signal systems require that two detectors must activate before the fire system will be engaged. (See Figure 6.) This can be accomplished with either two smoke detectors or one smoke detector and a heat detector. Typically, dual-signal systems are dry systems using automatic valves. In a dry system, water is not allowed to enter the sprinkler line servicing the room until a smoke or heat detector has been activated.

Figure 7 shows an alternate system using one smoke detector and a high-temperature, fusible-link sprinkler head.

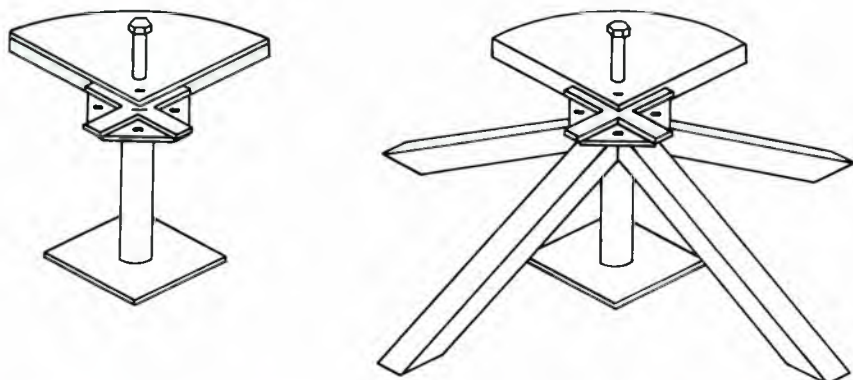


Figure 4. Diagram of corner-lock or freestanding access-floor systems.

## SONEX. Peak sound control.



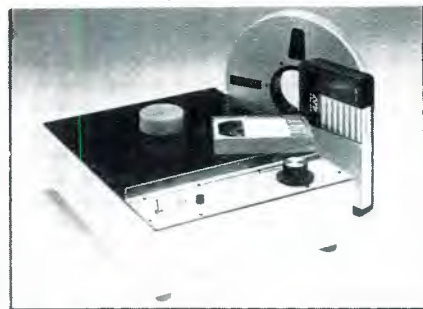
Nothing controls sound better than the famous anechoic peaks of SONEX acoustic foam. Control reverb, reflections and resonances to leave just the true sound. Distributed by: Alpha Audio Acoustics, 2049 West Broad St., Richmond, VA 23220

Call (804) 358-3852

**illbruck**

Circle (30) on Reply Card

## HIGH ENERGY DEGAUSSER Model TD-5



### Erases all formats including:

Beta SP, D1 & D2  
MII  
Reels up to 2" x 16"

### Features:

High Gauss Field  
Gauss Field Orientation  
Continuous Duty Capability  
Built-in Timer  
Thermal Overheat Protection

**Call to arrange your Free Demo Tape**

Manufactured by:

**AUDIOLAB  
ELECTRONICS, INC.**

5831 Rosebud Ln., Bldg. C  
Sacramento, CA 95841  
Phone (916) 348-0200  
FAX (916) 348-1512

Circle (31) on Reply Card



- "Before..."

- "After just one treatment with the 1647."



Use the 1647 on problem scalps and you will once again enjoy full, rich colours undamaged by the sun.

Introducing the 1647, the CCD portable broadcast camera from Thomson Vidéo Equipement. It's the most effective product on the market for eliminating bothersome problems like burnt out areas, washed-out colours and loss of detail.

The active principle? Advanced Thomson CCD technology including the industry's most effective white compressor. What it means to you are rich, highly-detailed colour images whether you're shooting in the bright of day, the dark of night or anything in between. Indeed, with the remarkable 1647 you can see more, and do more, than with any other camera!

Take a look at the numbers:

- 450 000 pixels/new high resolution CCD.
- Up to 21 dB gain.

Shutter speed variable between 1/50 and 1/2000 sec - enough to stop the fastest action! And it takes aliasing and smear to new, breathtaking lows.

Lightweight and rugged like the 1640, its thoroughly ergonomic design makes your job easier than ever. It also doubles as a superb EFP camera ready to work alongside your studio cameras. There's a whole range of EFP rear modules for Triax operation.

The 1647: highly recommended for all those who want brilliant images, not images with burnt out areas. Contact us at the address below for a demonstration.



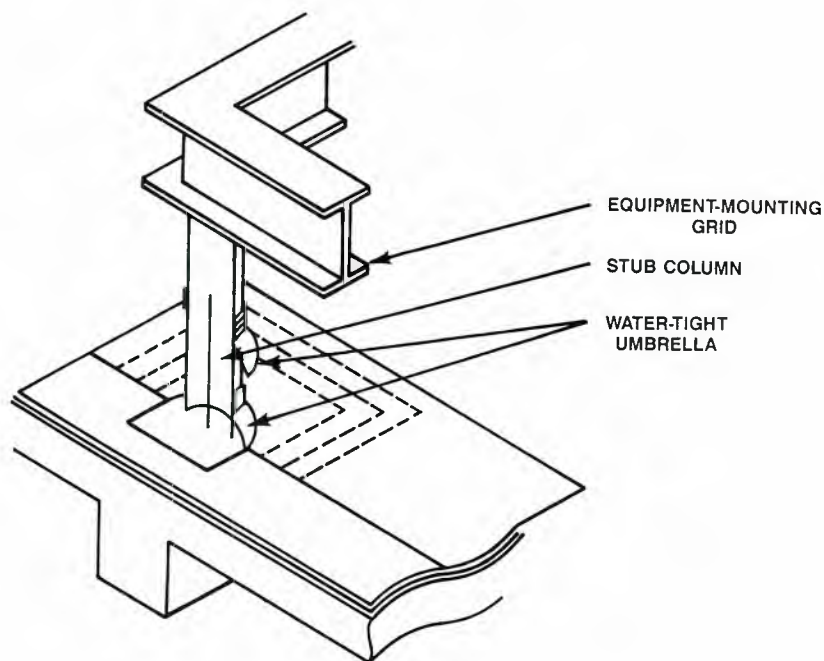
**TTV 1647 CCD CAMERA.**

Circle (32) on Reply Card



**THOMSON VIDEO EQUIPEMENT**





**Figure 5.** An equipment-mounting grid allows future flexibility of roof-mounted equipment, without requiring future puncturing of the roof membrane, which can lead to water damage.

Water is allowed to enter the system when the fire alarm control system receives a signal from the smoke detector. Water does not discharge into the room until there is sufficient heat to melt the fusible link.

#### Building owner's maintenance and operation procedures

When the broadcaster owns the station's building, the facility's mechanical system preventive maintenance procedures are usually the chief engineer's responsibility.

ty. But if the station is a tenant, engineering may have little to do with building preventive maintenance. It is important to make sure that the landlord protects the integrity of the emergency electrical system, remote chilled water system and other essential services throughout the period of the lease.

If you work for a station that rents or leases space, follow these guidelines:

- Know the preventive maintenance procedures that have been established for the building.
- Take nothing for granted. Verify that preventive maintenance procedures actually are followed.
- Arrange for access to critical building systems during "off hours."
- Participate with the landlord in the testing of critical equipment, such as emergency generator and fuel systems and air-conditioning systems for technical areas.
- Verify that the building electrical system provides surge protection to the broadcast areas.
- Determine the potential sources of trouble. Learn whether other tenants' building system failures will jeopardize your broadcast operations.
- Verify that critical building systems have sufficient redundancy to prevent the

## FOR THE RECORD

### OTARI® MX-55 "Workhorse"

A new concept  
in 1/4" Compact  
Recorders

Also Tascam,  
Revox, Marantz

Buy It  
**FOR A  
SONG**

Call Now:  
**1-800-356-5844**



**FULL COMPASS SYSTEMS**

608-271-1100  
5618 Odana Road  
Madison, WI 53719

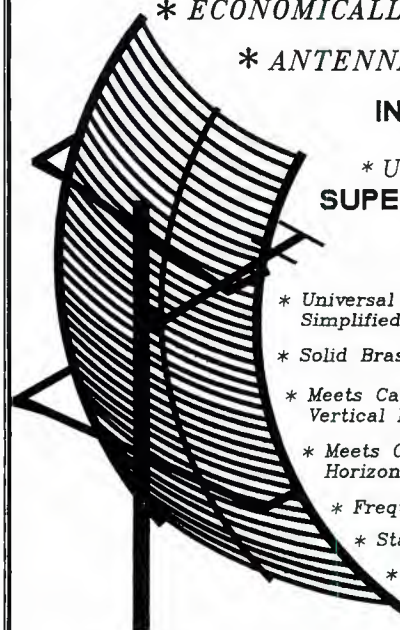
#### \* THE HIGHLY EFFICIENT

#### \* ECONOMICALLY SHIPPABLE

#### \* ANTENNA ALTERNATIVE

#### INTRODUCING THE NEW

#### \* UPS Shippable \* SUPER SHORT HAUL ANTENNA



- \* Universal Clamps Used For Simplified Mounting Installation
- \* Solid Brass Feed Components
- \* Meets Category A In The Vertical Polarized Plane
- \* Meets Category B In The Horizontal Polarized Plane
- \* Frequency 940-960 MHz
- \* Standard VSWR
- \* 20.0 dBi Gain

*The Antenna Source*



**Radiation Systems, Inc.**  
**Mark Antennas Division**

2180 S. Wolf Road, Des Plaines, Illinois 60018  
Tele: 708/298-9420 Telex: 282557 Fax: 708/635-7946

Circle (33) on Reply Card

Circle (34) on Reply Card



# THE LONG WAIT FOR DEPENDABLE WIRELESS INTERCOM IS OVER.

See us at  
NAB Booth  
2116

Telex

**RADIOCOM**

**is here and headset  
intercoms will never  
be the same.**

Radiocom is new! It's a complete wireless intercommunication system from Telex, a company famous for its headsets, intercoms and wireless microphones. Even though it's a professional high band (150 to 216 MHz) system the cost is so low it will amaze you. Four belt-pack transceivers can operate from the BTR-200 base station, and when two base

stations are daisy-chained together, up to 8 headset stations can be tied into a full duplex communication network. Just think of the problem-solving possibilities.

The stylish new belt-pack transceivers are compatible with Telex Audiocom headsets or other headsets with four pin XLR connectors. By using Telex Radiocom you can incorporate wireless headset stations into most existing wired intercom systems for exciting new mobility and freedom.

Yes the long wait for depend-

able wireless intercom is over but it was worth it. Each Telex system is completely tested as a system before it's shipped and carries the exclusive Telex THREE YEAR limited warranty. For complete details write to: Telex Communications, Inc., 9600 Aldrich Av. So., Minneapolis, MN 55420.

© 1989 Telex Communications, Inc.

**TELEX**

Circle (35) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



### CHECK LIST:

1. Try to keep all water-carrying pipework out of the ceiling above technical areas.
2. Consider suspending sheet-metal troughs or tubs beneath existing pipework.
3. Recognize the hazards related to condensation above suspended ceilings. Separate the ceilings above technical areas from other ceiling plenums in the facility.
4. Provide bracing above the ceiling of critical areas for lighting fixtures, pipework and ductwork to prevent damage to personnel and equipment in case lateral forces cause the ceiling to collapse.
5. Use access-floor systems designed to withstand lateral movement in critical areas of broadcast facilities.

station from being put out of business in case a minor piece of equipment fails.

### Protection of emergency power systems

Several important items must be considered in the design and maintenance of emergency power systems:

- **Location.** Generators and fuel-storage systems should be located in areas protected from vandalism or accidental damage.
- **Lateral forces.** Generators and fuel-storage systems must be mounted to withstand movement that might occur as a result of an explosion, earthquake, tornado or other disaster.
- **Testing generators.** Periodic testing of the emergency power system is essential.
- **Fuel storage.** Diesel fuel gels in cold

weather. Solids will settle out of gas. Propane is heavier than air, and if it leaks, can form explosive pockets of gas.

- **Adequate power for broadcast operations.** In older buildings, the emergency power systems may have been designed primarily to handle life-safety requirements, and they may not be adequate to handle the emergency requirements of tenants with heavy electronic loads.

- **Location of transfer switch.** In many buildings, the transfer switch is located near the main switchboard, with little or no separation. An explosion, lightning strike or fire that damages the transfer switch can eliminate both normal and emergency power. (See Figure 8.)

Maximum reliability can be obtained by locating the automatic transfer switch at

the power panel and providing separate fire enclosures for the main switch and emergency generator. The current National Electrical Code requires that the generator and transfer switch be installed in a fireproof room. (See Figure 9.)

### Building security

Short of turning a broadcast facility into an armed fortress, little can be done if an armed terrorist enters a station either to take it over or to put it off the air. Fortunately, a more frequent security problem is encountered with persons "off the street" who want to get on the air to express their views or perhaps vent their anger at a specific on-air personality.

In stations that were designed before security was a serious consideration, the receptionist frequently was given the responsibility of admitting persons from the reception area to the station operations area through electrically controlled doors. Recent experience has shown that this solution is no longer acceptable. Receptionists must not be so isolated from the operations area that they have no escape route from their workstations. (See Figure 10.)

Visual control of the exterior entrance corridor and electronic control of the entry door allow some screening of visitors before they actually enter the premises. A concealed switch that actuates an alarm within the station provides added protection for the reception area.

- **Code access doors.** If forced intrusion occurs, one method of deterring, or at

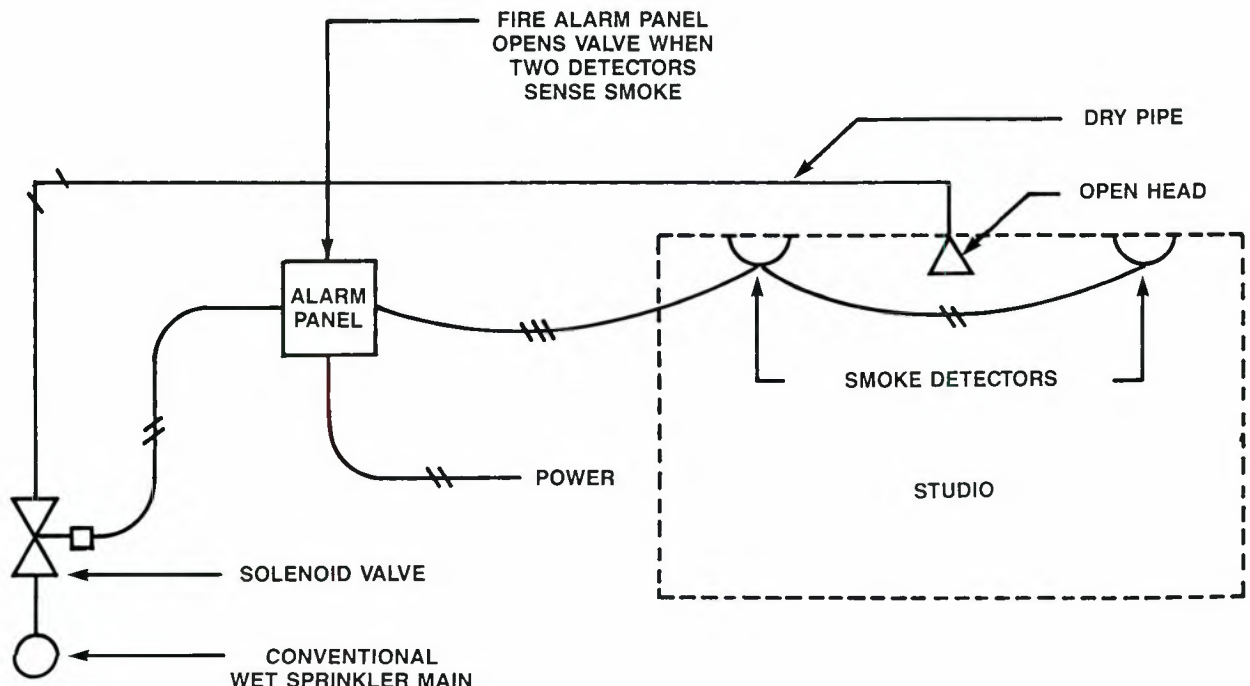


Figure 6. A dual-signal fire-protection system that requires two smoke detectors to sense smoke before activating the system.





*Day's dawn breaks on misty morn  
With all its promises, all its hopes;  
While youthful minds their follies express  
Leaving rainbow traces of tomorrow.*

In the not too distant future, it will be  
our pleasure to introduce the Digital  
Prizm and Digital Lazer, opening the  
door to a new generation of audio  
processing.

**GENTNER**

Gentner Electronics Corporation 1825 Research Way Salt Lake City, UT 84119 (801) 975-7200 Fax: (801) 977-0087

Call me, I'm interested. Circle (37) on reply card.  
Send literature. Circle (36) on reply card.

[www.americanradiohistory.com](http://www.americanradiohistory.com)

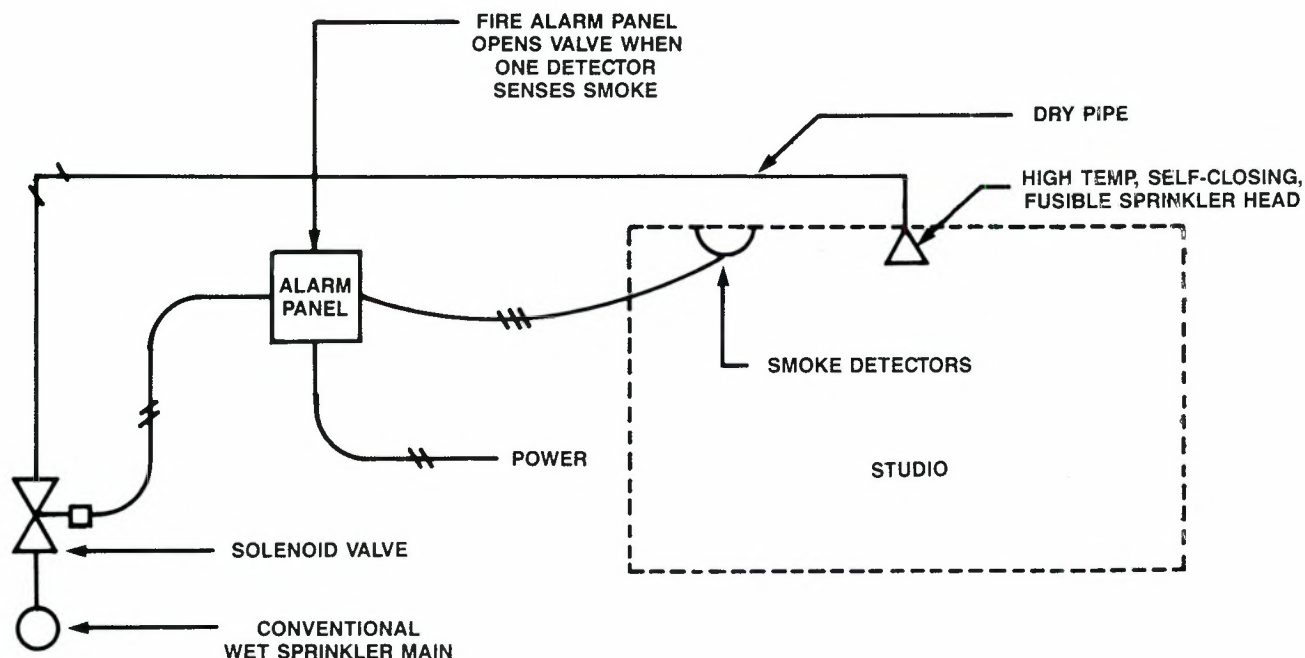


least slowing down, an intruder is to provide code access doors to technical areas. Of course, management must see to it that staff members do not deactivate or wedge open the doors to avoid a perceived has-

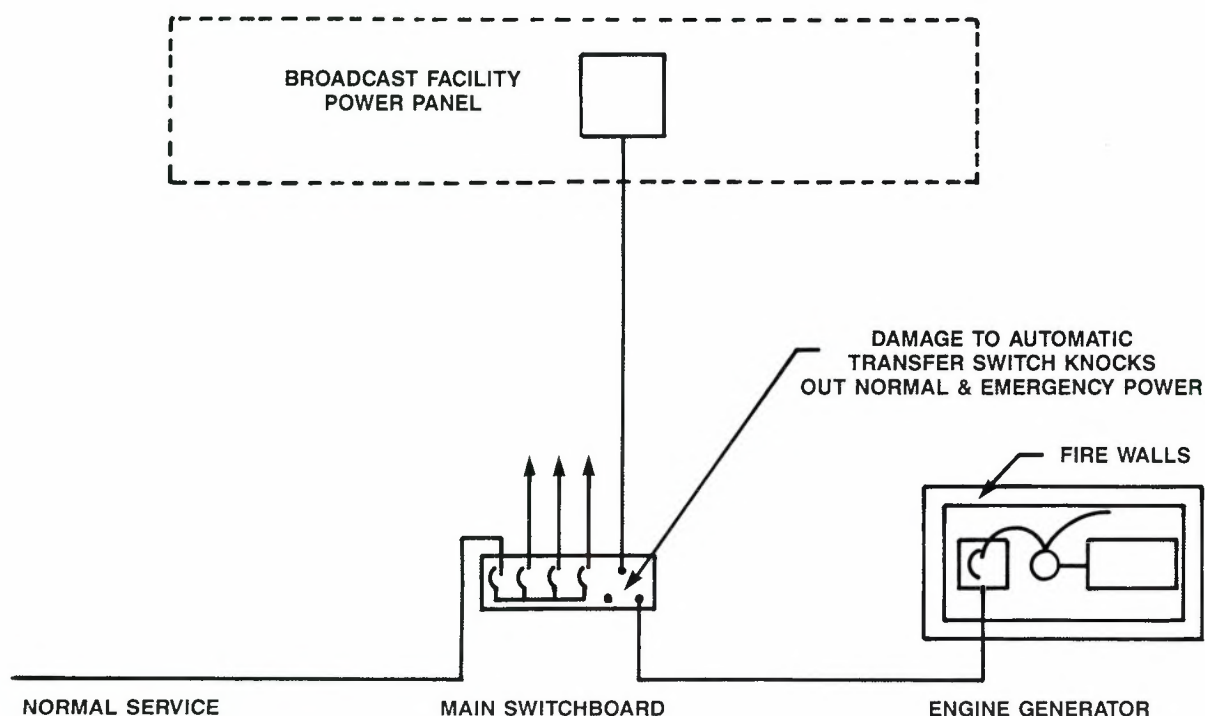
sle when going from one part of the station to another.

- *Hardened windows.* Nearly everybody in a broadcast facility wants to have an outside window at their workstation. From

a security standpoint, it is wise to avoid placing sensitive broadcast operations against windows or glazed exterior walls. When the functional planning dictates this situation, consider providing bullet-



**Figure 7.** A dual-signal fire-protection system with one detector and a fusible-link sprinkler. The pipe will flood when the detector signals, but the water will not be released until the heat melts the link.

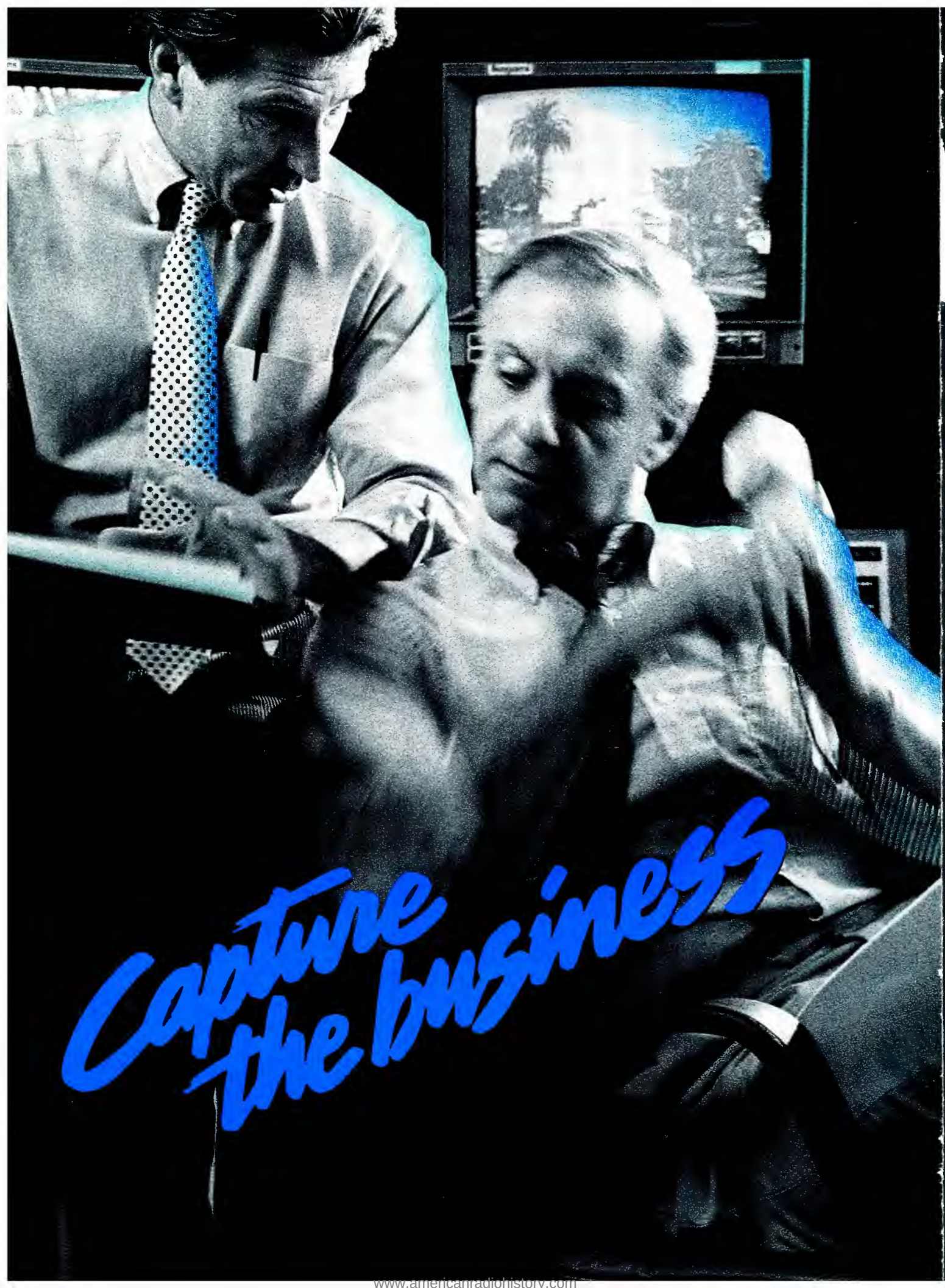


**Figure 8.** Emergency power transfer switch must not be co-located with switchboards. A disaster that would take out the switchboard might also disable the transfer switch.



*It's  
your show*





*Capture  
the business*



It's no game. Not now.  
You came up through the ranks.  
Working hard to get where you are.  
Now your reputation is on the line.  
Sure there's risk. But you bought Abekas.  
And right now, it's your show.  
Capture the business.

**Abekas**  
A Corlton Company

Leading in Digital Innovation



It's not a rumor. If you've heard that Abekas customers get better service, training and technical support than anyone else—it's true. And it doesn't matter where you are, who you are, how big you are, or which Abekas system you buy. When you deal with us—you're gold. And we treat you like it.

For detailed system information or to arrange a personal demonstration, call: (415) 369-5111.

*Digital Post  
Production Switchers*



*Composite Digital  
Disk Recorder*



*Integrated Digital Post  
Production System*



*Component Digital  
Disk Recorders*



*Digital Character  
Generator*



*Digital Still  
Store System*



*Digital Special  
Effects*



**NEW**  
**SEE IT AT NAB**  
**SKY BOOTH #160**

**Abekas**

A Carlton Company

Leading in Digital Innovation

**See us at NAB Sky Booth #160**

Atlanta (404) 451-0637 Chicago (708) 699-9400 Dallas (214) 385-4544  
Los Angeles (818) 955-6446 New York (516) 829-0820 San Francisco (415) 369-6791



resistant or intrusion-resistant glazing.

### Site selection

Many of the building problems that a broadcast engineer inherits are the results of decisions made by others before the station was constructed. Often, the site for a broadcast facility is selected by management, or perhaps a real estate department, before there is serious involvement by design professionals and those persons who will have responsibility for operating the facility.

If the architect and consultants are involved in the site-selection process, whether for a stand-alone building on a new site or the relocation of a station to an existing building, they may identify potential problems that may affect the final site selection and the financial negotiations.

Ideal building sites are becoming scarce.

The sites that are available may have characteristics that increase construction costs significantly. For instance, sub-surface soil investigations made before closing on a new piece of property will help detect unstable or low-bearing-capacity soil, rock, ground water and other common problems. It is important to be aware of these conditions up front.

In cases where a station is being relocated to an existing building, make use of the architect/engineer team for assistance in the selection of a building and in reviewing leases. A team experienced in the design and construction of broadcast facilities will frequently spot conditions that can have a major impact on station operations.

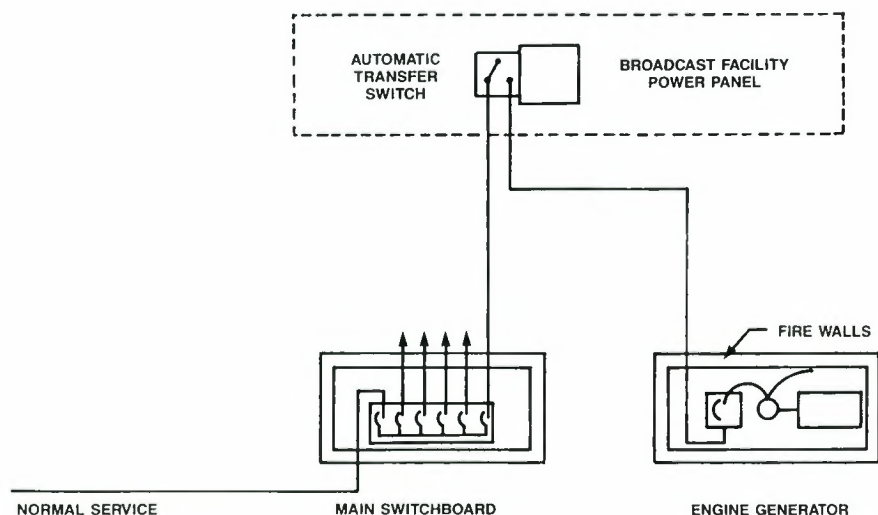
Obtain the assistance of a professional who knows the building and zoning regulations. Determine the extent to which

broadcast operations will be affected if, several years down the road, neighboring construction has blocked or is interfering with satellite dishes and microwave feeds. Such new construction also may affect antenna patterns. Make the tests necessary to establish that the broadcast signal can reach all areas of the market. In one instance, because of inadequate testing, it was discovered too late that a significant part of a 2-city metropolitan market could not receive an adequate signal. The transmitter and tower had to be relocated to a new site, and the chief engineer took early retirement.

### Professional services

Although the broadcast engineer's rugged individualism and natural inventiveness are legendary, it is important to know one's limits. In matters of site selection, facility design, building construction and tower design, the use of a competent professional design team is strongly encouraged. It costs no more to bring architects and consultants on board at the beginning of a project than it does to bring them in after certain critical decisions have been made. It makes sense to get all the help that will be needed at an early date. Failure to do so is to invite greatly increased project costs and may spawn maintenance headaches that will tax your resources indefinitely.

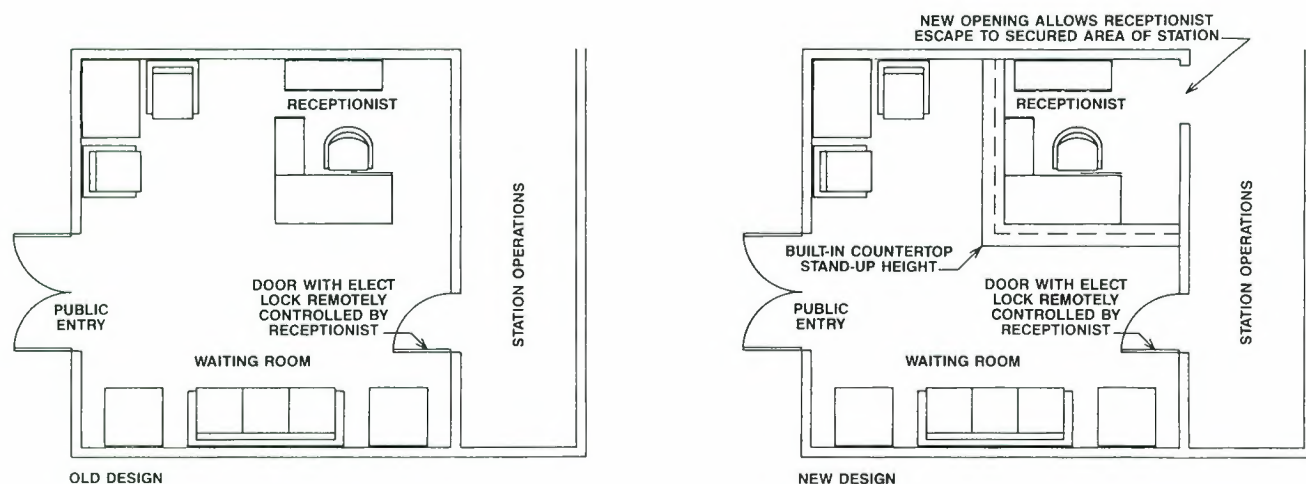
(See the related article on page 70.)



**Figure 9.** The most reliable emergency power installations isolate the switchboards and transfer switches from each other.

**Acknowledgment:** The authors wish to thank the following persons for their contributions in the preparation of this article:

- David R. Fitzsimmons, AIA, senior vice president of Cooper Carlson Duy Ritchie (CCDR), Kansas City, MO.
- Robert E. Smith, P.E., chairman, Associated Engineering Consultants, Overland Park, KS.



**Figure 10.** A modified foyer that leaves an escape route from the reception area.



# BECAUSE YOU BROADCAST MORE THAN BELLS

*If there's one thing Asaca/Shibasoku is known for, it's building the finest video monitors, bar none. Asaca's reputation has been earned by producing real world monitors that give you a full range of features to meet real needs. Though Asaca/Shibasoku monitors continually incorporate the latest technology, it is always appropriate technology and not bells and whistles. From the compact 9" CM99A to the new 16:9 Delta Gun HDTV monitors, you always get what you paid for: flawless high resolution, brilliant color imagery and rugged performance.*

## OUR NEWEST HIGH RESOLUTION MONITORS.

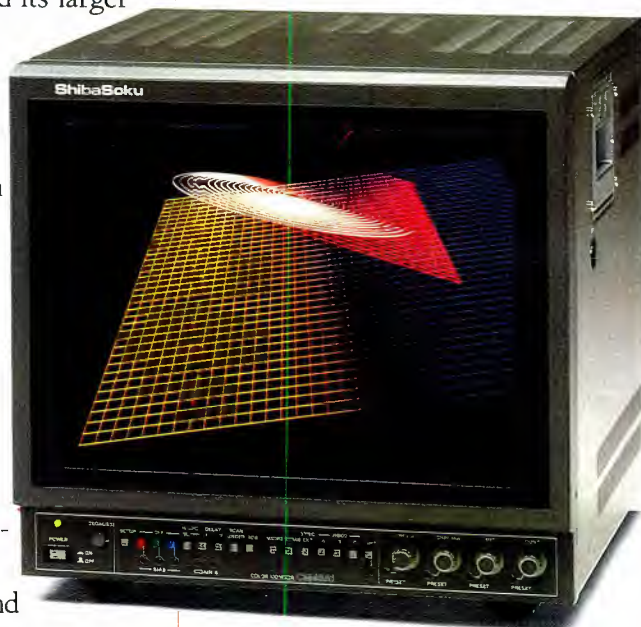
The new 15" CM43 and its larger counterpart, the 21" CM23, in-line dot matrix monitors is equally at home in a broadcast or production facility as it is in a manufacturer's test line or computer graphics system.

You get a variety of input selections: including NTSC, RGB and Y/C. The flat square CRT has a semi-tint glass offering you wider contrast range and

black levels that are truly black.

You get high quality comb filters, high stability feedback clamp circuits, H/V delays, pulse cross and scanning size selections.

The CM43 and CM23 neatly put Asaca's high performance into a very economical package.



**\$4,200<sup>00</sup>**

*The new CM43 (15") and CM23 (21") flat screen monitors incorporate legendary Asaca/Shibasoku quality and performance into a very economical package.*



# WHISTLES.

## DELTA-GUN, THE TOP OF THE LINE.

Asaca's delta-gun/shadow mask monitors, 20" CMM20-11 and 14" CMM14-11 provide the most accurate reference for color imagery with superior horizontal resolution. The geometric structure of the delta-gun configuration backed by active convergence circuitry gives you ultra-sharp dynamic focus, adjustable from the front, across the total CRT surface.

The delta-gun monitors include switchable high performance comb filter and aperture correction. And, with digital sync circuitry, no adjustments are required.

Optional extras include NTSC, PAL and SECAM capabilities, switchable from the front (20" model) and RGB, YIQ, BETA and M-II plug-in modules.

Asaca delta-gun/shadow mask monitors, the true measure of performance.



**\$7,695<sup>00</sup>** *The delta-gun/shadow mask CMM11 series is the standard in professional broadcast monitoring. The delta-gun CRT provides the most accurate reference for color imagery with superior horizontal resolution.*

## HIGH PERFORMANCE, COST-EFFECTIVE.



**\$6,500<sup>00</sup>** *Exceptional picture quality and low price tag make the in-line CMM26-7 ideal as a broadcast master monitor, test signal monitor or in fixed or mobile teleproduction facilities.*

Asaca's 26" CMM26-7, 20" CMM20-7 and 14" CMM14-7 are designed for use in Master Control, teleproduction facilities and post suites as well as quality assurance. These in-line monitors incorporate many of the design and engineering features of our delta-gun monitors. You can switch between video input signals, internal or external sync, picture size or HDL/VDL with the touch of a single button.

**Free** *To receive your free copy of the Asaca/Shibasoku full line catalog simply circle the appropriate number on this publications reader response card.*

Circle (38) on Reply Card

**ASACA®**

Asaca/Shibasoku Corporation of America  
12509 Beatrice Street, Los Angeles, CA90066  
(213) 827-7144 FAX (213) 306-1382

## LAST, BUT NOT LEAST.

Just what you've been looking for, our 9" CM99A high resolution CRT. Compact and side-by-side rack mountable, the CM99A is perfect for mobile applications or plugging into those tight quarters where high quality signal monitoring is essential.

The CM99A standard features include two NTSC and one RGB input, plus audio input and loudspeaker.



**\$3,145<sup>00</sup>** *The lightweight compact 9" CMM99A is ideal for mobile use or applications where you need to rack up a lot of monitoring in very little space.*

Shibasoku  
ELECTRONIC  
MEASURING  
INSTRUMENTS  
89-90



## If there's fire...

By Craig Hardman

In the broadcast field, as in any industry, fire prevention is the key to saving lives and property. Fire hazards within work areas in the broadcast facility must be eliminated or, at least, reduced.

The engineering department plays an important role in any fire-prevention program. Engineering areas related to fire protection and fire prevention include building design and construction, building equipment and facilities, fire-protection systems and water supply and distribution.

### Where there's smoke...

Fire is a chemical reaction known as combustion. It's defined as the rapid oxidation of combustible material accompanied by a release of energy in the form of heat and light. The "fire triangle" (see illustration) explains the combustion and

Hardman is a firefighter and paramedic for the Salt Lake County, UT, fire department.

extinguishment theory. It shows that oxygen, heat and fuel combined in the proper amounts create a fire, and that if any element is removed, fire cannot exist.

A fire hazard is defined as any material, condition or act that will contribute to the start of fire or will increase the extent and severity of a fire. Once again, if any of these are eliminated, a fire cannot occur. Oxygen is normally present and, for the most part, beyond human control. The fuel supply and heat source are more readily controlled. Many fires have been started in both homes and industry through something as simple as an improperly discarded cigarette.

It is not uncommon for materials to generate their own heat to the point that combustion begins. Oily rags, improperly stored chemicals or explosives, even metal shavings from a drill press or lathe

have the capacity to self-ignite. Certain reactive materials even burn in an atmosphere of nitrogen, or they produce their own oxygen. Problems of this type have led to advanced research on fire and its control.

### Electrical fires

If properly designed, installed and maintained, electrical systems for lighting, power, heat and, in the case of broadcasting, radio-transmitted power, amplifiers, receivers and computer banks should be safe. However, electricity may become a fire hazard through arcing or overheating of electrical equipment. It can present a casualty hazard through burns, electrical shock or falls resulting from contact with live parts. To minimize these hazards, only suitable and safe materials, which have been tested and listed by a recognized testing laboratory, should be used.

# The engineers who know RF best already know us very well.

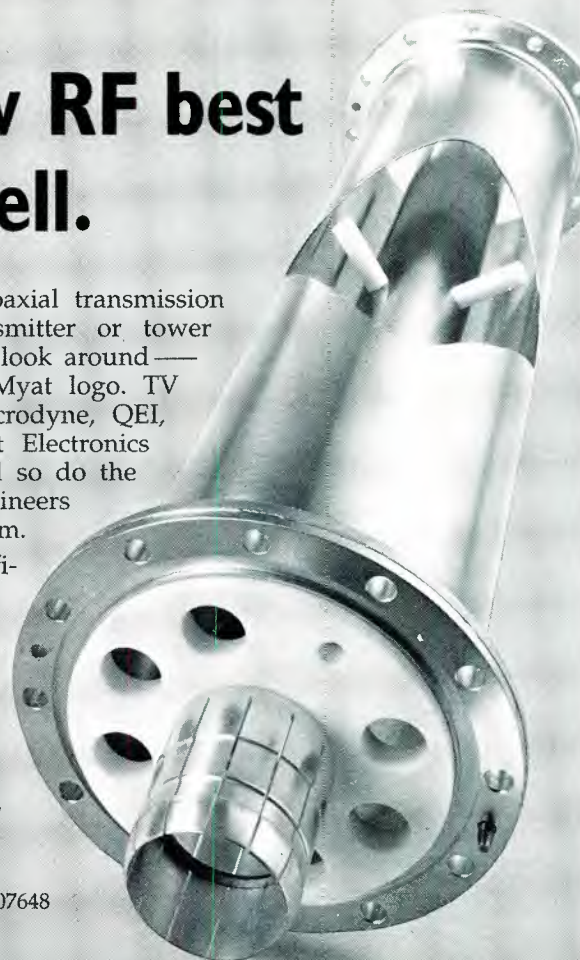


If you're looking for superior rigid coaxial transmission line and RF components, your transmitter or tower might be a good place to start. Take a look around — you'll probably find the bright blue Myat logo. TV and radio RF engineers at Harris, Acrodyne, QEI, Micro Communications, and Broadcast Electronics all routinely specify our products. And so do the antenna experts at Jampro and the engineers for the Navy's top airborne radar system.

All of these manufacturers demand long life and superior efficiency. They expect the highest quality materials, the toughest construction techniques, plus the most effective expansion compensation designs. And, like you, they have budgets and schedules to meet. All of them demand Myat, because they know Myat delivers.

Next time you need rigid transmission line or RF components, call your favorite RF equipment distributor or phone us direct at (201) 767-5380. For quality, durability, value and service, **Myat is the name to know.**

MYAT, INC. • 380 CHESTNUT ST. • P.O. BOX 425 • NORWOOD, NJ 07648  
TELEPHONE: (201) 767-5380 • FAX: (201) 767-4147



Circle (39) on Reply Card



# Trade up to Sachtler and save up to \$4455.

## Introducing a "Trade Up To Sachtler" Deal That's Unbeatable!

Announcing spectacular savings on Sachtler camera support systems. Trade in your old head/tripod combination — no matter how old... in whatever condition... **any brand** — and get big cash savings. There are Special Sale Prices in effect with no trade-in equipment.

Simply send your old equipment to Sachtler (New York only), and purchase a new Sachtler camera support system at your participating dealer before May 15, 1990.

| Trade In Any Camera Support...Any Brand...Any Model:       |          |                    |                  |                    |                 |                                                  |
|------------------------------------------------------------|----------|--------------------|------------------|--------------------|-----------------|--------------------------------------------------|
| On A New Sachtler Camera Support System                    | List     | Special Sale Price | Trade Up Savings | Your Total Savings | Your Total Cost | Sachtler System Features:                        |
| System 10                                                  | \$1,245  | \$1,125            | \$226            | <b>\$346</b>       | \$899           | V-10, tripod, elevation column, dolly, Free bag. |
| System 14 II                                               | \$1,955  | \$1,780            | \$365            | <b>\$540</b>       | \$1,415         | V-14II, S-14 long, SP-14, Free case.             |
| System 18 II ENG                                           | \$5,130  | \$4,695            | \$996            | <b>\$1,431</b>     | \$3,699         | V-18II, ENG 2CF, SP-100, Free ENG2 case.         |
| System 20 II ENG                                           | \$6,235  | \$5,705            | \$1,206          | <b>\$1,736</b>     | \$4,499         | V-20II, ENG 2CF, SP100/150, Free ENG2 case.      |
| System 25 II                                               | \$7,400  | \$6,734            | \$1,380          | <b>\$2,046</b>     | \$5,354         | V-25II, DA 150 med/long, dolly S, Free case.     |
| System 30 II Combi                                         | \$15,325 | \$13,870           | \$2,771          | <b>\$4,226</b>     | \$11,099        | V-30II, Combi-Pedestal, rubber feet, Free case.  |
| System 80                                                  | \$16,185 | \$14,525           | \$2,795          | <b>\$4,455</b>     | \$11,730        | V-80, OB-2 tripod, OB-2 dolly, (no case avail.). |
| Special Savings Up To 10% Even Without Trade-In Equipment! |          |                    |                  |                    |                 |                                                  |

## The Sachtler Warranty. The Best In the Business.

We're so confident of the quality and performance of every Sachtler that we have a **3 year warranty** on the entire system...and **5 years** on the leak-proof fluid modules. It's the best camera support warranty available.

## A "Free Loaner" Program If You Buy Now.

Every Sachtler purchased during this "Trade Up" is covered by a special "Free Loaner" program. If your Sachtler is out-of-action for warranty service for more than 48-hours (2 business days), we'll loan you a replacement...FREE!

Chances are you'll never need this, but owning a Sachtler gives you extra peace-of-mind.

## Special Bonus: Buy Now And Get A Free Case Too!

## Act Now — This Offer Ends Soon.

You must act now because the "Trade Up To Sachtler" Savings Program will end May 15, 1990.

Every system is on sale. If you don't see the exact combination you want, call us. We'll put it together.

So grab your old, used, worn-out camera support and see your participating Sachtler dealer. It's the best move you and your camera can make.

## See your participating Sachtler dealer today.

## Sachtler Performance. Now's the Time To Get It.

You've always wanted Sachtler performance. Features like dynamic counterbalance; dial-in drag control; and precise camera movements with our patented fluid system.

To make it easier for you to own a Sachtler, we've assembled the most popular packages for ENG, EFP, and STUDIO, at truly remarkable savings.

Take a look at the Sachtler Savings Chart and see how much you can save!



**sachtler®**  
corporation of america

55 North Main Street  
Freeport, NY 11520  
Phone: (516) 867-4900  
Telex: 140 107 sac frpt  
Fax: (516) 623-6844

West coast office:  
Burbank, California  
Phone: (818) 845-4446



Circle (40) on Reply Card

See us at NAB, Booth #1610



Equipment should be installed in conformance with accepted standards and maintained and used in accordance with these standards. If electrical equipment malfunctions at any time, it should be turned off, circuit breakers should be pulled and qualified people should be notified for repairs. Intentional overloading of electrical circuits, although not as common as in the past, still occurs. This should never be permitted. All equip-

ment should be maintained on a regular basis, and any signs of wear or overheating should be noted.

With the increased use of solid-state components, electrical fires have declined. This is because of the lower voltages and current requirements of these parts and, as a result, lower operating temperatures. All equipment operating within dangerous voltage limits should be marked properly with warning signs,

and protective doors kept closed. Even static electrical charges produced by friction may be dangerous under the right conditions, but this can be controlled by proper grounding.

#### "Fire!"

If a fire occurs, top priority is evacuation. Get everyone out of the building, and close the doors behind you. A good fire door will prevent the fire from traveling and will add precious minutes in containment for the responding fire department.

The second thing to do is call the fire department. Although this seems obvious, it is not unusual for building occupants to assume that someone else has or will call for help. As a result, the reporting of a fire is greatly delayed.

Once everyone is out of the building, someone should be responsible for accounting for all employees in each department. Establish a safe zone away from the building, free of falling glass, bricks and other debris, for everyone to meet.

Never re-enter a burning building. Beyond the hazard of burning, embroiled structures can be unstable and subject to collapse. Furthermore, the smoke created by the combustion process frequently contains dangerous gases. Some fire fatalities are people who, following their escape from burning structures, return to porches or balconies, where they are overcome by smoke.

Assign one person to communicate with the fire department officer. (It is difficult for firefighters to communicate with more than one staff member at a time.) If someone is missing, tell the fire officer at once. Other information fire officials need include the contents of the building, the location of the gas and electric shutoffs and the estimated location of the fire.

#### Right tool for the job

Don't try to fight the fire yourself if there is any question as to whether you can put it out. Some types of extinguishers, or rather the agents they contain, can damage electrical equipment, especially computer systems. Portable fire extinguishers are classified according to their intended use on the four classes of fires (A, B, C, D). In addition to the letter classification, certain extinguishers also receive a numerical rating. The number preceding the letter designates the potential size of fire the extinguisher can be expected to extinguish. The rating system is based on tests conducted by the Underwriters Laboratories (UL).

The classifications for fire extinguishers are:

- A. Ordinary combustibles.
- B. Flammable liquids.
- C. Electrical equipment.
- D. Combustible metals.

*Continued on page 76*

# Team Camera Mart: Solving your problems with the right equipment at the right price.

We teach our people how to meet your video needs, not how to meet their quotas.

One call puts you in touch with Team Camera Mart: our team of sales pros, trained broadcast engineers and customer-service specialists—all working together and supported by one of the largest inventories of video equipment in the country.

Our team keeps up with the latest technology by attending manufacturers' seminars every chance it gets. And, our engineers constantly inspect and check equipment before it goes out to you.

At Camera Mart, we represent all the major manufacturers in the business on both coasts and around the world.

So, if you're looking for video equipment, come to the people who know that *equipment*, not just the *box* it comes in.

Call Team Camera Mart today. See how good we really are.

**The Camera Mart, Inc.**  
SALES • SERVICE • RENTAL

456 West 55th Street, New York 10019  
(212) 757-6977 FAX: (212) 582-2498



Regional Offices:  
Liverpool, New York 13088 (315) 457-3703  
FAX: (315) 457-3795  
Evansville, In. 477-5 (815) 476-6327  
Miami, Florida 33172 (305) 227-2975  
FAX: (305) 227-6551  
Burbank, Calif. 91506 (818) 843-8644  
FAX: (818) 843-2478  
Las Vegas, N. 89121 (702) 425-9234  
FAX: (702) 451-3229

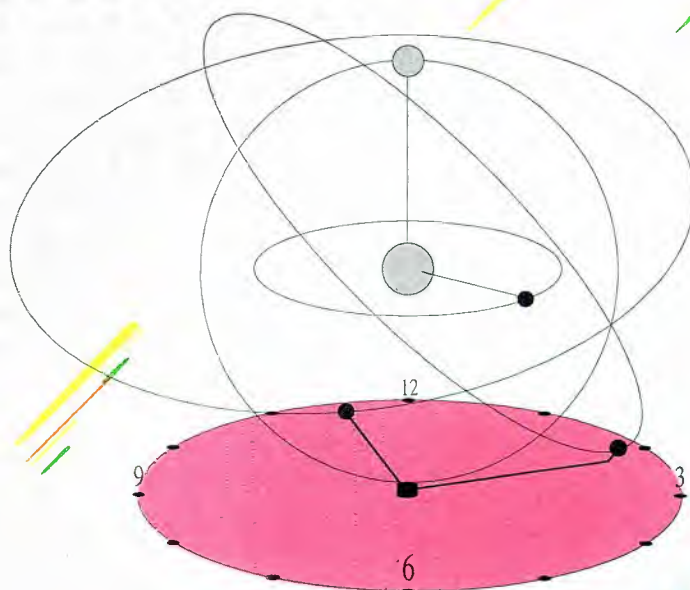
**See us at NAB Booth #6330**

Circle (97) on Reply Card

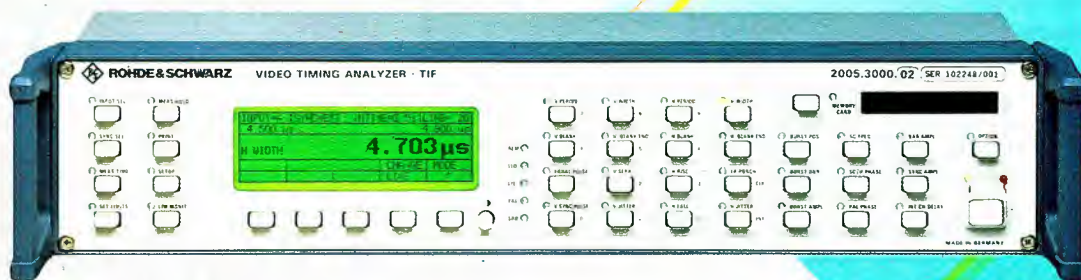


# Video Timing Analyzer TIF

**SC/H phase ?  
Yes, and lots more !  
Jitter,  
...**



Digital measurement of all timing parameters



Call or write for full details

D-8000 München 80  
Postfach 80 14 69  
Telex 523 703 (rs d)  
Telefax (0 89) 41 29-21 64  
Tel. internat. +(49 89) 41 29-0



**ROHDE & SCHWARZ**

An independent concern, founded in 1933.  
5000 employees, represented in 80 countries.  
Design and turn-key installation  
of systems with software and servicing.  
Calibration, training and documentation.

Circle (216) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



A landscape photograph featuring a radio tower on a hill under a cloudy sky. A white digital signal line, resembling a square wave, starts from the tower and extends diagonally across the sky. The foreground is a dark, silhouetted hill.

# DMC INTRODUCES DIGITAL VIDEO.





Digital video transmission is here.

It comes from DMC—Digital Microwave Corporation.

We're the leader in short-haul digital transmission systems, with more than 16,000 digital microwave radios in operation worldwide.

And now we've integrated a high-quality video codec and microwave radio into important new products for television transmission.

DMC digital video microwave offers clear advantages over analog transmission.

One. It provides constant video and audio performance at all signal levels.

Two. It's easily installed. It requires substantially less maintenance than analog systems. And DMC digital video systems carry a full five year warranty.

Three. Once encoded, digital video can be transmitted over any distance without degradation.

Four. Digital video and digital audio systems do not accumulate noise and distortion as analog systems do.

In short, digital video is the STL of the 1990s. And beyond.

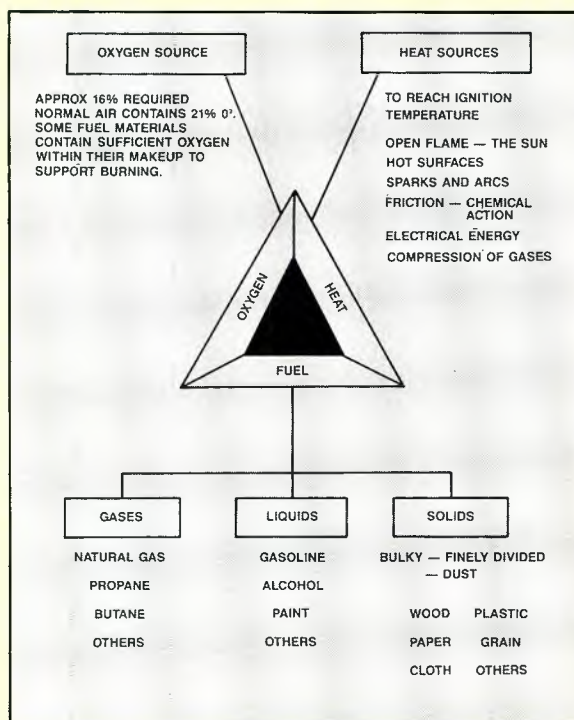
And it's here today, from DMC. To find out more, call 1-800-255-4DMC.

Circle (43) on Reply Card

**DMC**  
**Digital Video**

A division of Digital Microwave Corporation  
170 Rose Orchard Way, San Jose, CA 95134  
(408) 943-0777 FAX (408) 435-1698





*The fire triangle explains the necessary components for combustion to occur.*

### Continued from page 72

These classifications arise both for efficiency of extinguishment and operator safety. For instance, it is never a good idea to play a water or soda-acid extinguisher, which shoots a stream of liquid, into an electrical fire.

Numbers are used with letters on Class A and Class B extinguishers only. A 2-A model extinguishes twice as much fuel as a 1-A extinguisher.

In an emergency, every second is of great importance. Under the right conditions, fire can double in size every five minutes. Everyone should be acquainted with the general instructions applicable to most portable fire extinguishers.

### Damage control

The first concern of the fire department will be life safety. The second will be extinguishment of the fire. When practical, firefighters will next take steps to limit damage. Equipment will be covered with salvage blankets that prevent dust, smoke and water from getting into delicate locations.

Water damage is an especially severe problem. Although the equipment may be on a lower floor, away from the fire, water may drip down from the upper floors, causing damage. The fire depart-

## Control Up To 64 TBC's VIA COAX From Up To 64 Locations

### EAST COAST VIDEO SYSTEMS' TBC REMOTE CONTROL

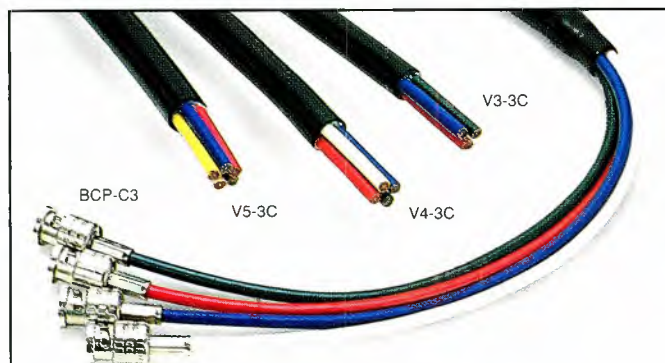
- Digital shaft encoder for data entries.
- 8 memories per TBC
- Controls SCH phase and displays SCH confidence LED on BVH TBC's.
- RS-232/422 Universal Interface speaks to D-2 VTR's, GVG EDL's, and dumps to a PC.
- Battery backup.
- Competitively priced.

## East Coast Video Systems

ON-LINE... IN-TIME.

52 Ralph Street, Belleville, NJ 07109 • (201) 751-5655

Dealer inquiries welcomed. Specifications subject to change.



## CLEANER & SHARPER VIDEO RESOLUTION

- Optimize the signal to your video monitor with Canare high performance cables and connectors.
- Ideal for computer graphics, video projectors, component (RGB) broadcast and digital VTR's.
- Component coax cable: super flexible, 75 Ohm (<2.2 nanosecond differential delay time). Matched with 75 Ohm BNC connectors (<1.1 VSWR to 2 GHz).
- Available in bulk or pre-assembled fan-to-fan tails.

**CANARE**™

**CABLES & CONNECTORS**

511 5th St., Unit G, San Fernando, CA 91340  
Phone: (818) 365-2446 FAX: (818) 365-0479

REQUEST  
FULL-LINE  
CATALOG

SEE US AT NAB BOOTH #3730, 3732

Circle (44) on Reply Card

Circle (45) on Reply Card



# Winsted®

## VIDEO CONSOLES

**WINSTED CONSOLES** are designed for complete compatibility with your electronics, your facility, your requirements, and your decor.

**A WIDE RANGE** of editing and production models accommodate virtually every major brand of electronics. Modular components let you create consoles to match your rack mounted VTRs and controllers.

**CORNER CONSOLES** with wrap-around design let you utilize space efficiently. And attractive wood trimmed consoles let you match your studio decor. You can expand your system as needed with versatile add-on components.

**ONLY WINSTED** offers such a complete line of consoles, compatible with your requirements.

### All Winsted Consoles Feature:

- Sturdy, heavy-duty steel construction
- Adjustability to fit your needs
- Easy access for maintenance and installation
- Ergonomic design for operator comfort
- Slope console models available
- Multiple bay models
- Free planning and design service

Write or call for **FREE** full line  
catalog **1-800-447-2257**

(in MN call collect:  
**612-944-8556**)

**FAX: 612-944-1546**



### THE WINSTED CORPORATION

10901 Hampshire Avenue So.  
Minneapolis, MN 55438

**Preferred by Professionals Worldwide**

Circle (46) on Reply Card  
See us at NAB, Booth #5748



ment always tries to extinguish the fire with a minimum amount of water, to help prevent this kind of damage.

#### Overhaul

After the fire is out, the "overhaul" phase begins. Overhaul is the practice of searching a fire scene to detect hidden fires or sparks that may rekindle, and to detect and preserve as evidence any signs of arson. The building, its contents and the fire area will be returned to as safe a condition as possible at this time, so that everything worthwhile can be salvaged. Water will be pumped out of basements and elevator shafts, floor runners will be placed over carpets, and

dirt and debris will be removed. The building will be ventilated so that personnel can return without protective breathing apparatus. Every effort will be made to get the building back in service as quickly as possible.

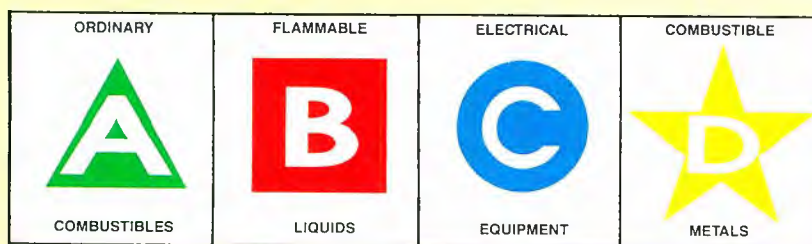
#### Planning

The best time to fight fire is before it starts. Engineering personnel should take the following steps:

- Develop a primary and alternate escape route for each area of the facility. Practice exiting the building by these routes at least once a year, no matter how much the staff complains.
- Determine what would be a safe ren-

dezvous area, free from falling glass, bricks and other debris, where the staff can assemble for a head count following evacuation.

- Decide whose duty it will be to call the fire department. After evacuation, verify that it was done.
  - When the fire department arrives, pick someone to communicate with the fire officer. Report immediately any people you suspect might be missing, and give their likely locations inside the building.
  - Know the location of all emergency shutoffs (gas, electricity, water and heating oil). Print these on a laminated sheet of cardboard that you can hand to the fire officer in case of emergency.
  - Know which fire extinguishers to use on what materials, and how to use them. Do not waste time fighting a fire that you think might be too big for you to handle.
- If these steps prevent even one injury, let alone save a life, they will be well worth your effort.

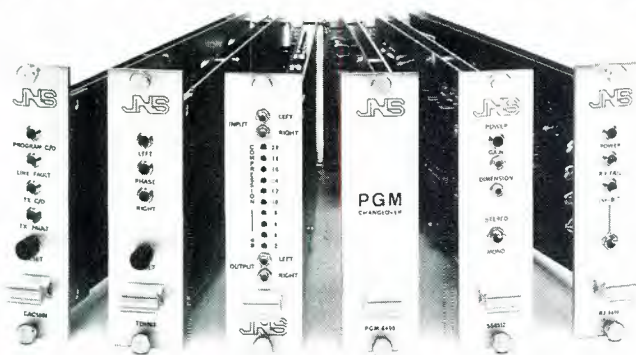


Fire extinguishers are marked for the class of fire they fight.

1:2:0000

# Audio, Video & RF solutions

for your time,  
space, maintenance  
& money problems



'the FRAME' is the only compact modular system available that offers

- |                                                                  |                                                            |
|------------------------------------------------------------------|------------------------------------------------------------|
| <input type="checkbox"/> Stereo / Mono Audio Distribution        | <input type="checkbox"/> Video Distribution (NTSC/PAL/HDV) |
| <input type="checkbox"/> Audio Monitor Amplifiers                | <input type="checkbox"/> Audio Failure Sensing             |
| <input type="checkbox"/> Stereo Validity Measurement             | <input type="checkbox"/> RF Demodulation                   |
| <input type="checkbox"/> Automatic and Manual Program Changeover |                                                            |

With the advent of 'the FRAME' multiple unit installations are a thing of the past. 'the FRAME' installs as ONE unit. Rack space problems are obviated by 'the FRAME' one or three rack height configurations. Pop-out modules make maintenance a breeze and you'll be pleasantly surprised at the price. With engineering staff time and budgets stretched to the limit, the logical **Solution** is 'the FRAME'.

Contact J.N.S. or authorized distributor for details

**J.N.S.**

**J.N.S. Electronics, Inc.**

P.O. Box 32550, San Jose, CA 95152

408/729-3838 FAX 408/926-1003



AMEK  
BCII  
AMEK  
BCII  
AMEK  
BCII  
AMEK  
BCII  
**AMEK**  
**BCII**  
THE  
WORLD  
STANDARD  
COMPACT  
AUDIO  
MIXING  
SYSTEM

AMEK's BCII compact audio mixing system is the versatile problem-solver for a vast range of Broadcast, Edit Suite, and General Production applications from location recording to transfer suites.

Our large customer base – many with multiple BCII installations – includes such well-known names as the BBC, Central TV, Granada TV, NBC, Sony Corporation in Japan, Turner Broadcasting Systems, and ZDF in West Germany.

The 30mm wide modules can be housed in 16, 24 or 32 position frames which give formats as diverse as 6/1 and 24/4/2 with mono or stereo inputs and mono or stereo subgroups – with or without Dynamics – in most combinations. The frames are available in drop-through or tabletop formats with a variety of moving-coil meters including VUs, BBC-type PPMs and DIN-spec PPMs.

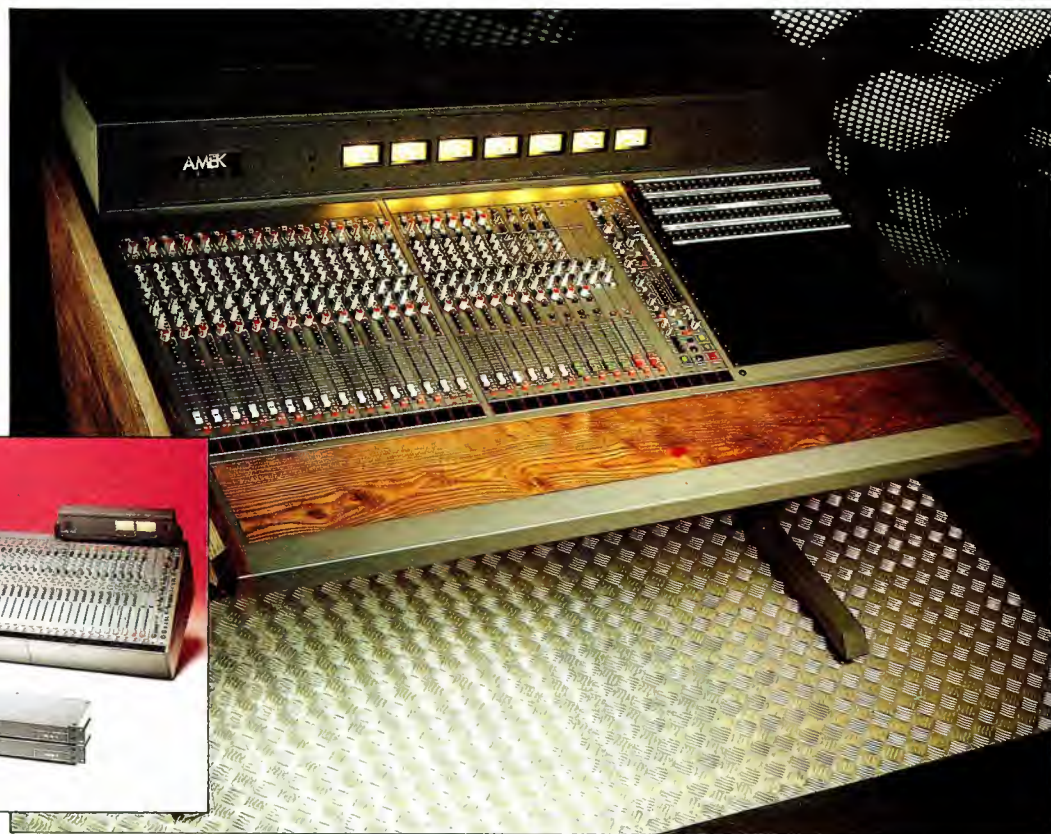
The SC Studio Chassis (illustrated) allows the basic audio system to be housed in a free-standing frame which can incorporate not only quarter-inch or TT jackfields but also many other custom features such as Audience Mixers and Bargraph meters.

All chassis are ruggedly built from steel and aluminium and afford a high degree of immunity from RF.

Input channels have a sophisticated and effective 3-band equalizer and 4 auxiliary send busses; the system has not only balanced inputs and outputs but also balanced mix busses. Several monitor modules cover all control room, studio and production gallery requirements.

The sophisticated ESM 32 AFV (Audio Follow Video) interface provides a simple package solution to problems of integrating a complete audio control system into a Video Edit environment. BCII/ESM32 provides quality audio – not 'video' audio – with monitoring and preview of audio sources. Audio can follow or be independent, and various cross-fade patterns are provided. The protocols support a vast range of equipment from major editor suppliers such as AMPEX, CMX, GRASS VALLEY, PALTEX and SONY. Standard AMEK-specified packages of desk and interface are readily available, but custom flexibility is catered for.

Pricing for a product of this quality is more than competitive and is yet another reason why AMEK BCII is the first choice of the world's leading broadcast and video production organizations.



Head Office, Factory and Sales:  
AMEK Systems and Controls Ltd.,  
New Islington Mill, Regent Trading Estate,  
Oldfield Road, Salford M5 4SX, England.  
Telephone: 061-834 6747.  
Telex: 668127. Fax: 061-834 0593.

AMEK/TAC US Operations:  
10815 Burbank Blvd, North Hollywood,  
CA 91601. Telephone: 818/508 9788.  
Fax: 818/508 8619.

Circle (49) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)

AMEK  
BCII  
AMEK  
BCII  
AMEK  
BCII



By Tim McCartney

# Planning a satellite uplink

**Take one satellite uplink project, a tight schedule, lots of players and some unexpected problems. Then fasten your seatbelt.**

**W**hen things go along the way they're supposed to, it's easy to be lulled into comfortable indifference. The daily operation of a satellite earth station, for instance, is taken for granted after a few years of dependable service. But when equipment fails or something else goes wrong, everyone in the station suddenly realizes how important the system really is.

Ensuring the reliable operation of an uplink/downlink requires diligent planning and construction. This article will describe the process Boise State University (BSU), Boise, ID, and National Public Radio (NPR) went through to build a system on the university campus.

## Case study

The satellite uplink/downlink was placed in operation in 1989 by the BSU radio network. The entire process spanned more than 18 months, once the proposal was approved and funded.

NPR uses a single-channel-per-carrier (SCPC) analog voice-transmission system to feed programs from 21 regional uplinks through Westar IV to 260 downlinks. It owns the main origination system in Brenmar, VA. Other uplinks are associated with public radio affiliates and provide program distribution for NPR, American Public Radio (APR) and other users. The network relies on standard C-band transmission techniques, 6GHz transmit and 4GHz receive.

The BSU radio network originally con-

sidered merging with a major AT&T uplink project in Boise. The university's final decision, however, was to construct a dedicated system to guarantee 24-hour access. The AT&T system, remotely controlled from Hawley, PA, is a movable design, capable of transmitting video and audio to nearly all of the geostationary communication satellites. As a result of the AT&T project, space became available at the new antenna farm for the BSU installation.

## Planning

The facilities provided at the AT&T site greatly simplified the project, resulting in considerable cost savings. Otherwise, planners would have had to not only find an alternate site, but also secure access and permits, construct a new building with heating and air-conditioning systems and erect a fence. BSU and AT&T people discussed some of the concerns of sharing

space, such as building security, operator safety and construction dust that might accumulate inside the positive-air enclosure.

Several decisions had to be made at this point, such as antenna size, waveguide length and pressurization, equipment configuration and how to handle rack heat exhaust. The power and mechanical considerations were electrical power, antenna de-icing, grounding and interfacing the program and control circuits to the studio.

Organization was key at this critical stage. A master calendar of the project addressed the hundreds of details related to each phase. For example, it was necessary to estimate the length of time required for FCC approval of the application. This information was vital in developing the project timetable.

Table 1 lists key resource personnel and businesses for the project. They were contacted regularly to discuss concerns and expectations, as well as to advise on costs,

University administrators, financial personnel, engineers  
AT&T managers and engineers  
Broadcast attorney  
Architect  
Frequency-coordination company  
Contractors  
Equipment manufacturers and suppliers  
Shipping companies

**Table 1.** Key resource personnel and businesses involved with the BSU project.

McCartney is a contract engineer in Bemidji, MN.



# Everything you always wanted in a tube camera. Except tubes.



LDK 910 CCD Studio Camera

What you've always wanted in a tube camera is the best picture possible. But now you get the best picture in a CCD Camera — the new BTS LDK 910. And you'll never miss the tubes. Because the LDK 910 meets or beats the picture quality of tube cameras with a new CCD sensor that employs over 800 pixels per line, and over 406,000 total picture elements.

In addition to excellent resolution, the LDK 910 has a high signal-to-noise ratio, high sensitivity and accurate colorimetry. Along with a few other things you don't get with tubes. Such as BTS's frame-transfer technology, which eliminates smear. A high dynamic contrast range without blooming or burn-in. And excellent dynamic resolution enhanced



LDK 91 CCD Portable Camera

by advanced electronic shutter control. It's also ready to shoot when you are — no waiting for warm up.

And here's another reason you won't miss the missing tubes. Not only is the LDK 910 priced competitively with tube cameras, but it costs less than you'd probably spend replacing worn out tubes over the life of a studio camera.

But of course, big ideas also come in small packages. The LDK 91, a lightweight, easy-to-handle ENG/EFP camera, is the LDK 910's portable companion.

Also available are the LDK-900 and LDK-90 as a more economical alternative. These cameras offer the best price/performance ratio in the industry.

Together, these fully compatible CCD cameras will make your old ideas about picture quality go right down the tubes. For complete information

on the new line of BTS cameras call today **1-800-962-4BTS.** The name behind what's ahead.

**BTS**



lead time and turnaround time.

### Financing

As the sponsoring organization, BSU was responsible for mapping out its financial strategy. The initial estimated budget is shown in Table 2. Although price increases were a clear threat to the budget, of far greater concern were unanticipated costs.

Because it was possible that the project would take two years to complete, finance personnel wanted to know when particular payments would be necessary. This meant that contingency plans had to be developed early in the project. For example, the decision was made to equip the initial system only for monaural operation. Operating with one instead of the two planned modulators would delay a \$5,000 expense.

### Site and antenna selection

Choosing an appropriate site and antenna system were the next major decisions. It was important to thoroughly investigate this aspect because a site change greater than about 50 feet would invalidate the frequency search. In addition, any change of the antenna system probably would mean different specifications, which also could invalidate the original study. Fortunately, no major changes were needed. The selected site provided the required clear vertical view up to 33° above the ho-

rizon and a clear azimuth view from 67° east to 143° west.

The antenna system needed to meet the FCC's 2° satellite spacing requirement. Parabolic antenna systems may exhibit half-power (-3dB) beamwidths of less than 1°. This is more than adequate to distinguish between two satellites parked just 2° apart some 22,000 miles above the Earth. With help from NPR, a 5-meter, prime-focus, fiberglass reflector dish was chosen.

### Frequency coordination

The frequency-coordination and licensing processes are intended to help eliminate terrestrial interference, not adjacent satellite interference. Just as with other bands, the FCC requires frequency coordination for satellite uplink transmissions. This helps prevent interference with existing, licensed, land-based microwave links. Frequency coordination and FCC licensing are optional for receive sites. The uplink/downlink licensing procedure places information in databases so that interference to and from high-powered, land-based microwave links can be avoided.

A company hired to investigate potential interference initially concluded that interference would not exist to or from existing or proposed common-carrier facilities. The firm also sent the frequency-coordination data to seven Western U.S.

telephone companies and one pipeline corporation.

After reviewing the data, one of the telephone companies objected through its frequency-protection service. It requested that BSU verify actual blockage provided by a building near the proposed uplink. The company wanted to be sure its link was protected because the path was along a potentially interfering azimuth.

The telephone company and university reached an agreement to coordinate uplink testing. It was decided that if interference to the telephone company's link was detected, it would be NPR's problem to resolve. A copy of the agreement was filed with the FCC and the company's protection service.

### Licensing

The required FCC documentation was prepared and submitted to the commission. Some of the uplink's specifications are shown in Table 3.

When the commission issued the construction permit and license just six months after the filing, it brought an unwelcome surprise: The construction deadline was only six months away. Such a tight schedule seemed unrealistic, especially to broadcasters accustomed to 18-month CPs.

Fortunately, the commission has provisions that permit an additional 6-month

*Continued on page 86*

**Table 2.** Original budget estimates. The final project cost was quite close to that predicted.

|                                                                                                                                       |                 |
|---------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Antenna system (5-meter), including spar, feedhorn assembly, reject kit, waveguide section and foundation kit .....                   | \$14,000        |
| Transportation for antenna system .....                                                                                               | 5,000           |
| HPA (75W) .....                                                                                                                       | 18,000          |
| Upconverter .....                                                                                                                     | 11,000          |
| Modulators (two at \$5,000 each) .....                                                                                                | 10,000          |
| Downconverter .....                                                                                                                   | 2,500           |
| Demodulators (two at \$2,150 each) .....                                                                                              | 4,300           |
| Elliptical waveguide (70 feet) .....                                                                                                  | 1,300           |
| Flanges, rigid line sections, elbows, waveguide twist-flex, pressurization parts, hanging & mounting hardware, wall feedthrough ..... | 1,600           |
| Attenuators, combiners .....                                                                                                          | 500             |
| Equipment rack, with rear mount rails .....                                                                                           | 700             |
| Electrical power to rack .....                                                                                                        | 200             |
| Cement foundation, waveguide support system, protection barriers, drill and fill holes in building .....                              | 2,000           |
| Architect .....                                                                                                                       | 800             |
| Frequency coordination study .....                                                                                                    | 750             |
| Broadcast attorney .....                                                                                                              | 500             |
| Crane rental/operation (2 uses) .....                                                                                                 | 300             |
| LNA .....                                                                                                                             | 150             |
| Coax, connectors, divider, ground wire .....                                                                                          | 600             |
| <b>TOTAL:</b>                                                                                                                         | <b>\$74,200</b> |



This image shows a blank, aged, cream-colored page, likely an endpaper or flyleaf of a book. The paper has a slightly textured appearance with some faint smudges and discoloration, characteristic of old paper. In the bottom right corner, a portion of a black book binding is visible, featuring a small red label with the number '81' and a small logo.

When the toughest critic in the audience is you, choose the tape products that compromise nothing. Ours. We won't be satisfied until you are.

See us at NAB Booth #1824



**3M**

Circle (54) on Reply Card

A collage of various 3M audio and video cassette tapes, including UC130, PB20, PB20M, SX30, AVX120, MBR50, MBR60, and PB5M models, scattered on a light-colored surface. The tapes are in different orientations, showing their labels and the 3M logo. Some are audio cassettes, while others are video cassettes. The background is a plain, light-colored surface.

Circle (54) on Reply Card



From the moment you experience the cutting edge quality of the HK-355, you'll realize that this is no ordinary chip camera. From its lightweight aluminum design to its outstanding specs, Ikegami's premier Studio/Field chip camera is simply the best ever built.

The HK-355 features three FIT 2/3" Chips each delivering 450,000 individual pixels, a resolution of 800 TVL and a S/N ratio of 62dB. A newly developed optical LPF (low-pass filter) insures exceptional response characteristics, while our CCD driving system and 3-DTL enhancer results in dramatic improvements in vertical resolution and substantial reductions in moire noise patterns. The HK-355 also features Ikegami's exclusive Automatic Colorimetry Correction Circuitry.

Breakthrough engineering that incorporates auto level setup functions with chip technology, eliminates various setup functions associated with tube cameras, while triax, multicore, and filter optics are connected via simple plug-in modules.

Additional features include plug-in board design for easy maintenance, a computer controlled CCU, a 7" viewfinder and optional 7" color viewfinder.

A hand-held version, the HK-355P, is available and can operate from the same base station or with any popular recorder.

Owners of Ikegami's outstanding HK-323 tube camera can enjoy total compatibility with all HK-355 accessories, allowing them to own the finest studio chip camera at a substantial cost savings when compared to the competition.

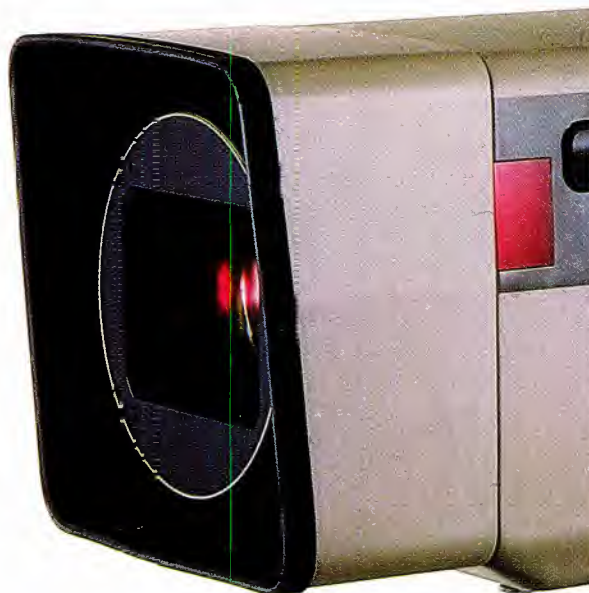
For information on the studio chip that's best, contact your Regional Sales Office or the Ikegami dealer nearest you.

# Ikegami

Ikegami Electronics (USA), Inc.  
37 Brook Avenue, Maywood, NJ 07607  
East Coast: (201)368-9171 West Coast: (213)534-0050  
Southeast: (305)735-2203 Southwest: (214)869-2365  
Midwest: (708)834-9774 Hawaii: (808)946-5955

## AT LAST, A STUDIO

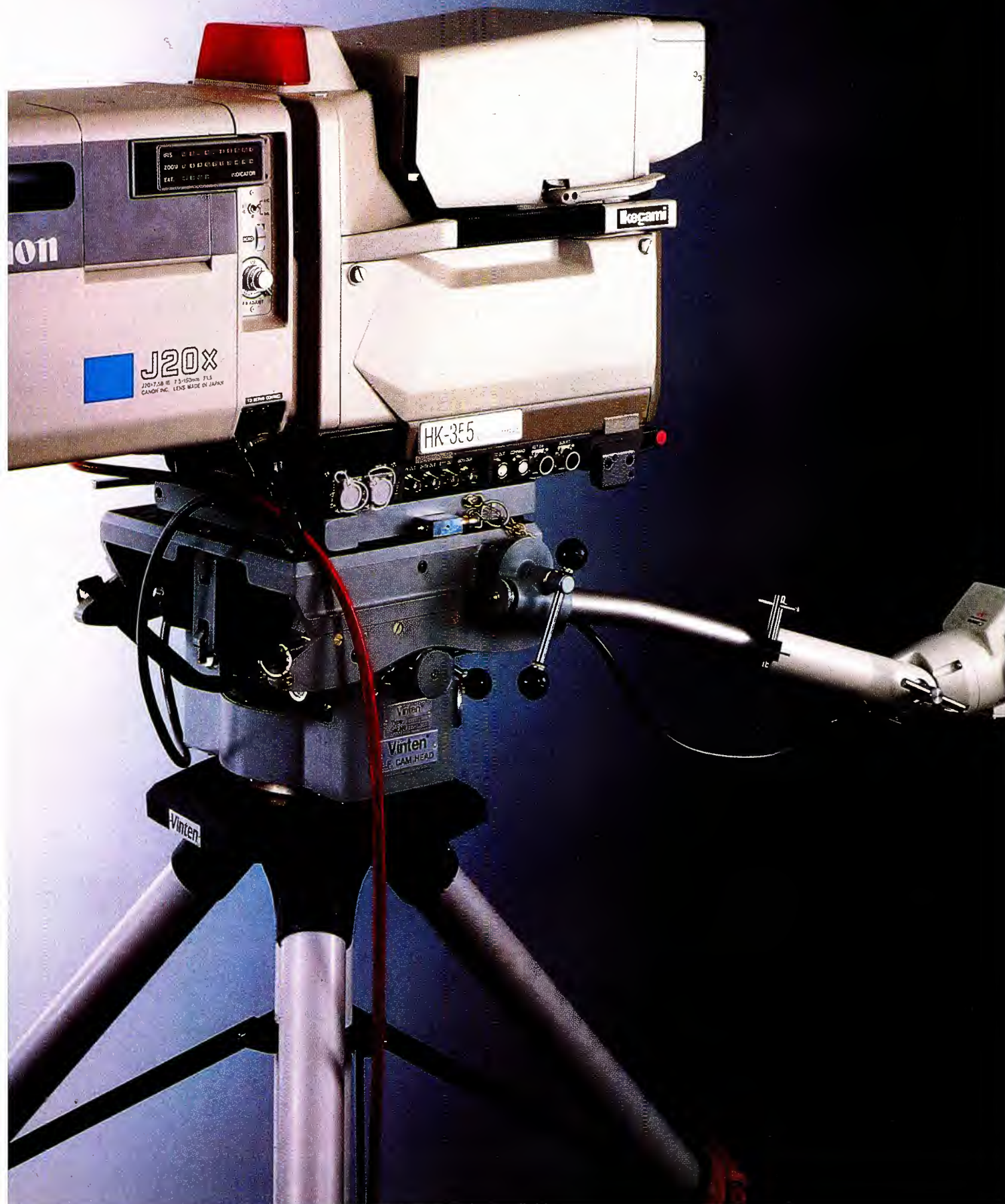
### INTRODUCING IKEGAMI'S HK-355 CCD



**IKEGAMI'S HK-355P PORTABLE COMPANION CCD**



# CHIP CAMERA THAT'S BETTER *Best*





Continued from page 82

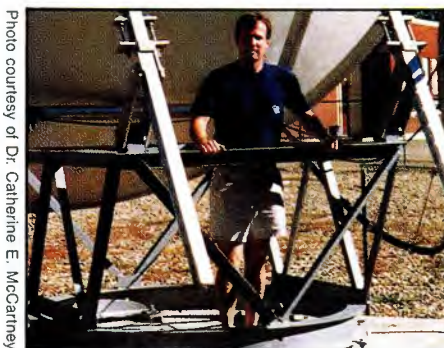
extension. Most of the typical reasons, such as seasonal limitations and manufacturer delays in building custom-designed equipment, are acceptable. A shortage of funds, however, does not justify an extension by the commission. As it turned out, BSU needed and received a 6-month extension.

The construction permit and license is basically an operating license. After construction was complete, BSU was required to certify that the uplink was built and operating by the specified date. The commission issued an actual license about a month later.

### Equipment selection

Figure 1 outlines the overall uplink system design. Stereo program audio is coupled to the modulators where the standard 70MHz IF frequencies are produced. Up to 16 separate audio channels are possible through variation of the IF by  $\pm 18$  MHz.

The IF signals then are attenuated and combined to feed the upconverter, where the 6GHz carrier signal is developed. This low-level RF signal drives the HPA. From 13W to 25W of RF power is fed into the elliptical waveguide. The signal then is



Lightweight dishes are especially vulnerable to warping if the dual rear support brackets are not properly adjusted. Both brackets must be moved equally to prevent misalignment of the dish focus point.

transferred to the antenna in the feedhorn assembly and effectively increased by the 5-meter reflector.

The major equipment purchased included the antenna system, HPA, upconverter, modulators and waveguide. Because of the high cost of the elliptical waveguide (\$18/feet), it was important to purchase enough, but not too much. Other RF components required were tunable

and pre-tuned flanges, elbows, flex-line, rigid line and pressurization equipment.

### Downlink equipment

Figure 2 outlines the overall downlink system. The received 4GHz satellite transponder signal is reflected up into the feedhorn assembly. It then passes through a reject filter and into the antenna LNA. The LNA provides sufficient amplification so the signal can travel through the waveguide to the downconverter.

At this point, a power block isolates the coax so the LNA dc-supply voltage can be fed through the coax. The RF signal is downconverted to a 70MHz IF and split for distribution to the two demodulators. The same kind of considerations that guided the selection of uplink equipment were applied to the downlink purchases. The major items purchased were the downconverter, demodulators and the LNA.

The timing for equipment purchases turned out to be a problem. Because of the two national political conventions and the summer Olympics in Korea, demand for uplink equipment was high. This created unexpected delays in the custom-construction of some of the uplink equipment. Careful follow-up was necessary to be sure that each piece of equipment ar-

#### MODEL VA-16

##### 1-in/16-out Video/Audio Distribution System



Size: 10"x12"x5" Deep  
"Halliburton" Alum Case  
Wt: 8 lbs Price: \$795

##### DESCRIPTION—

The Model VA-16 1-in/16-out Video/Audio Distribution System is useful as a network feed for courtroom or as a classroom feed for up to 16 monitors and audio amplifiers.

##### SPECIFICATIONS—

VIDEO: BNC Connectors  
DC to 8 MHz ( $\pm 1$ db)  
Diff Gain: 0.1%  
Diff Phase: 0.2 deg  
Tilt & Overshoot: <1%  
Hum & Noise: -60db  
Isolation: >40db at 3.58 MHz  
 $R_i = 75$  Ohms  
 $R_o = 75$  Ohms  
Unity Gain  
In-Phase

AUDIO: XL-Type Connectors  
Bal-in (10K), Bal-out (600 Ohms)  
30 HZ to 15 KHZ ( $\pm 1$ db)  
Output Level: +18 dbm  
THD: 0.05%  
Signal/Noise: >70db

#### MODEL A-24/2ML

##### 2-in/24-out (mic/line) Network Feed Box



Size: 13"x18"x6" Deep  
"Halliburton" Alum Case  
Wt: 16 lbs Price: \$1295

##### DESCRIPTION—

The Model A-24/2ML Network Feed Box is a high quality transformer isolated versatile unit for conferences, meetings, courtroom, auditoriums, etc. It is a portable unit mounted in a Halliburton aluminum case.

##### SPECIFICATIONS—

###### INPUTS:

Two Balanced microphone (switchable to line inputs at 10K ohms)  
Gain controls  
Vu Meter

###### OUTPUTS—24 SEPARATE OUTPUTS EACH ONE:

Transformer isolated  
"XLR", 1/4" Phone Jack, RCA and 3.5mm Jack  
Mic/Line Switch  
+18 dbm Output capability  
Ground Floating (Does not require ground lift)  
50HZ-15KHZ ( $\pm 2$ db)  
50 db Channel isolation

POWER:  
105-125V, 50-60 HZ, 5 Watts

#### MODEL V-44

##### 4-Channel Video Dist. Amplifier



COVER PLATES INCLUDED

Size: 1 1/4"H x 19"W x 6"D  
Wt: 5 lbs

##### DESCRIPTION

The Model V-44 Video Distribution Amplifier consists of a Model 512 Power Supply, 4 Model 404 Video Distribution Amplifiers mounted on a Model H-5/V Panel-Chassis. The back panel has a loop-thru BNC input connection and 4 output BNC connectors for each of the 4 channels.

##### SPECIFICATION (per channel)

DC to 8 MC ( $\pm 1$ db)  
DC to 4.2 MC ( $\pm 1$ db)  
Diff. Gain: 0.1%  
Diff. Phase: 0.2 deg.  
Tilt & Overshoot: <1%  
Hum & Noise: -60 db  
Isolation: >40 db at 3.58 MC

PRICE: \$400

#### MODEL A-44

##### 4-Channel Audio Dist. Amplifier

##### DESCRIPTION

The Model A-44 Audio Distribution Amplifier consists of a Model 520 Power Supply, 4 Model 422B Audio Distribution Amplifiers mounted on a Model H-5/A Panel Chassis. The back panel has four 12-terminal barrier stripe for input-outputs. There is one electronic balanced input and four balanced outputs for each of the 4-channels.

##### SPECIFICATION (per channel)

Bal. (Electronic) Input Imp: 20K Ohms  
Freq. Resp: 20CY to 20KC ( $\pm 1$ db)  
Gain: Unity (0 dbm)/THD: 0.05%  
Output Imp: (600 $\Omega$ ) for 600 $\Omega$  load  
Output Level: +24 dbm

PRICE: \$440



**OPAMP LABS INC.**

1033 N. SYCAMORE AVENUE

LOS ANGELES, CA. 90038

(213) 934-3566

MANUFACTURERS OF AMPLIFIERS (MIC, MAG, PHONO, LINE, POWER, VIDEO, RGB)-OSCILLATORS-AUDIO TRANSFORMERS-POWER SUPPLIES-AUDIO/VIDEO ROUTING SWITCHERS-AUDIO CONSOLES-AUDIO MATRICES

**FREE CATALOG WITH OVER 80 APPLICATIONS**

Circle (56) on Reply Card



# COMPACT, POWERFUL, FLEXIBLE...



# ...AND TOUGH

Designed and built to withstand daily operation into the next century, the ergonomically designed AMS VCS offers more facilities and flexibility than any other console, within a compact, yet reassuringly conventional work surface.

Complete console set ups can be stored and recalled instantaneously in live situations or for later transmission. Featuring a unique offline set-up editing package, complete with high definition graphics, precious studio preparation time can be significantly reduced.

Faders are freely assignable to channels so that a single person can centrally operate the entire console. For occasions when more than one operator is required, two separate Assign panels accessing all console parameters are simultaneously available.

Fourteen day memory storage is automatic in the event of mains power failure and a sophisticated automatic maintenance program pinpoints faults to a single card.

Time tested in Europe and the United States, much copied but never equalled, this concept in consoles is the result of over 20 years of console design for broadcasters and leads the way for the future.

**The AMS Virtual Console System**  
**The most technologically advanced stereo console available.**



For information and literature contact...

AMS Industries plc  
Billington Road, Burnley BB11 5ES, UK  
Tel: (0282) 57011 Fax: (0282) 39542

AMS Industries Inc  
1180 Holm Road, Suite C, Petaluma, CA 94954, USA  
Tel: (707) 762 4840 Fax: (707) 762 4811

**SEE US AT NAB STAND No 6338**

[www.americanradiohistory.com](http://www.americanradiohistory.com)



rived in time.

Good fortune allowed construction of the antenna system and HPA to be completed ahead of the promised 4-month schedule. Considerable difficulty was encountered with transporting the dish over a long distance during the winter. The up-converter was the last piece of equipment to arrive, five months after the order was placed.

#### Dish construction

The earth-station manufacturer provid-

ed the foundation kit several months before the dish arrived. This enabled the architect to draw foundation plans. When the plans were in hand, the cement was poured with mounting bolts located properly.

A crane was used to unload the pieces from a flatbed truck and then again during the final assembly. With the two dish sections bolted together on the ground, the crane hoisted it onto the base. The spar (tripod support) was bolted to the dish and feedhorn assembly. A rigid section of

6GHz waveguide was attached to one leg of the spar. Once the basic assembly of the dish was complete, it was possible to stand inside to connect and seal the fittings properly. This was especially important for all of the coax fittings and assemblies. Then, a final tightening of the dish to its support system aligned the reflector roughly toward Westar IV.

#### Line installation

Because of the extremely high frequencies, proper waveguide installation was critical. On the transmit side, a short piece of flexible waveguide couples the signal from the feedhorn to a 10-foot section of rigid line. The rigid line runs along a support beam and exits near the bottom of the dish. Elliptical waveguide then is used to connect with the HPA.

The waveguide, downlink coax and ground wire are supported on braces made of 2-inch pipe. Bending the elliptical waveguide required a special tool. The manufacturer's instructions explained how to bend and twist the waveguide to route it along the support system and inside the building.

A waveguide flange was field-installed inside the building for attachment to a section of twist-flex waveguide, which is kept pressurized.

#### Rack equipment

The equipment rack was located in the AT&T building. The rack was connected to the main AT&T building ground. After rack equipment was installed, each chassis was tied to ground with copper braid.

A telephone line was used to connect the uplink site with the studio for remote control. It's possible to remotely control the filaments, high-beam and fault-reset circuits in the HPA. Remote readings were limited to high-beam status. The ac power for the upconverter can be turned on and off remotely.

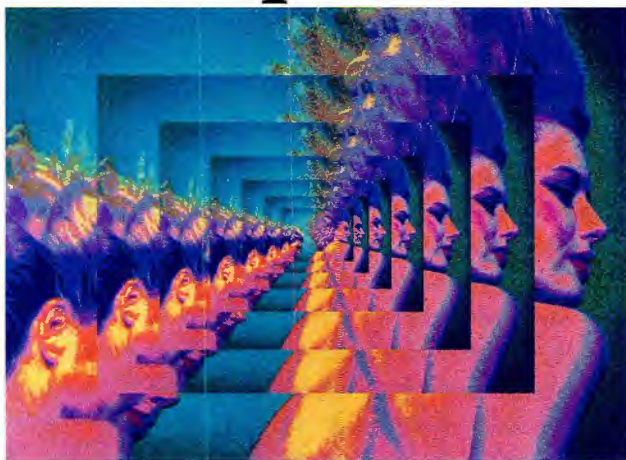
The modulators were not so easily interfaced. There was no provision to turn the power on or off from the studio. This feature typically is not needed because most users switch the IF output of unused modulators to dummy loads. It also was not possible to remotely retune program channels on the modulators.

Modulator output levels are adjusted manually by external rotary attenuators. If motorized versions or solid-state attenuators had been used instead, remote control of the attenuators would be possible.

#### Alignment

Initial system alignment was performed using the downlink side. The dish was aimed and the LNA rotated to achieve maximum signal. It's possible to do this simply by reading the demodulator AGC

## Full Compression. No Depression.



If you're really depressed by the fact that broadcast quality full video compression systems *start* at \$17,000, ALTA Pictoris offers you a fresh start that will really impress you.

\$10,900. For broadcast quality infinite video compression, and so much more. Variable cropping and positioning over live background video. Colored borders. Auto zoom in and out. Dissolve. Program-mable presets. GPI trigger. Digital effects that include negative video, vertical and horizontal inversion, posterization, mosaic and freeze. And spectacular 5.5 MHz, 450-line resolution video, with full 8-bit Y/C component processing.

ALTA Pictoris. Another example of ALTA's "Technology of Value" that designs a whole lot more into packages that cost a whole lot less. Call us for the dealer nearest you.



535 Race Street, San Jose, CA 95126  
TEL 408/297-2582 FAX 408/297-1206

# Pictoris

Circle (41) on Reply Card

*Continued on page 92*



# CRUISE CONTROL.



**The editing systems company that helped to start a revolution, is starting it all over, again.**

Fourteen years ago Convergence jogged the industry's collective consciousness, pioneering the joystick. You found yourself doing with one hand what had been difficult to accomplish with two. You cruised from one edit to the next with rocket-like speed and found yourself in full command of a very powerful device.

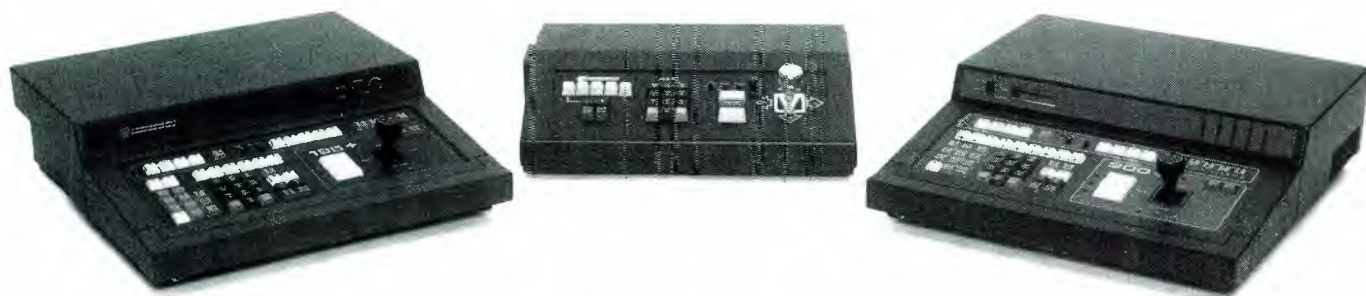
Constant refinement of the dedicated keyboard, human engineering with the emphasis on human, led to the ECS-104 in 1981. Today the full benefit of this unprecedented developmental effort continues to provide you with the ability to do an edit without even looking at the control surface. There has never been, nor will there ever be, anything intimidating about a Convergence keyboard. You will never find yourself scanning the control surface hunting for that next command.

**A new connection and a renewed commitment.**

Now a member of the Paltex International family of companies, Convergence has a new connection. A parent company with an international reputation for engineering excellence and strong customer support. Whether in the form of hands-on training, technical documentation and bulletins, or software enhancements, look to Convergence for a renewed commitment to an old-fashioned idea.

**A product is only as good as the company behind it.**

So if you're in the market for an editing system, put the Convergence legacy to work in your facility and start your own revolution.



**CONVERGENCE**

A Paltex International Company

**NTSC** • 2752 Walnut Avenue • Tustin, CA 92680 • (714) 731-3300 • TLX 910 333-8535 • FAX (714) 838-9619  
**PAL/SECAM** • 7 Airlinks, Spitfire Way • Heston, Middlesex TW5 9NR, England • 01-759-3891 • TLX 94011067 • FAX 01-561-1122

© 1990 Paltex International

Call me, I'm interested. Circle (60) on reply card.  
Send literature. Circle (59) on reply card.

[www.americanradiohistory.com](http://www.americanradiohistory.com)





# THE HEART OF A GREAT TV TRANSMITTER!

## Thomson Tubes Electroniques!

Make sure the UHF transmitter you invest in comes with the unique competitive advantage of a 25 kW tetrode TH 563 from Thomson. In fact, the TH 563 tetrode is based on the same principles as the TH 582, which routinely achieves more than 20,000 hours of operational life time.

Efficient, compact, linear, TV transmitters using the

new 25 kW tetrode from Thomson outperform competing technologies giving unsurpassed reliability.

 **THOMSON TUBES  
ELECTRONIQUES**

For additional information, mention code **T.T**

Circle (61) on Reply Card

**France:** BOULOGNE-BILLANCOURT  
Tel.: (33-1) 49 09 28 28  
Fax: (33-1) 46 04 52 09  
**Italie:** ROMA  
Tel.: (39-6) 639 02 48  
Fax: (39-6) 639 02 07

**Brasil:** SAO-PAULO  
Tel.: (55-11) 542 47 22  
Fax: (55-11) 61 50 18  
**Japan:** TOKYO  
Tel.: (81-3) 264 63 46  
Fax: (81-3) 264 66 96

**Deutschland:** MÜNCHEN  
Tel.: (49-89) 78 79-0  
Fax: (49-89) 78 79-145  
**Singapore:**  
Tel.: (65) 284 34 55  
Fax: (65) 280 11 57

**España:** MADRID  
Tel.: (34-1) 519 45 20  
Fax: (34-1) 519 44 77  
**Sverige:** TYRESÖ  
Tel.: (46-8) 742 02 10  
Fax: (46-8) 742 80 20

**Hong-Kong:** WANCHAI  
Tel.: (852-5) 865 32 33  
Fax: (852-5) 865 31 25  
**United Kingdom:** BASINGSTOKE  
Tel.: (44-256) 84 33 23  
Fax: (44-256) 84 29 71

**Inde:** NEW DEHLI  
Tel.: (91-11) 644 7883  
Fax: (91-11) 644 7883  
**U.S.A.:** TOTOWA, NJ  
Tel.: (1-201) 812-9000  
Fax: (1-201) 812-9050



# 25kW UHF TV Transmitters with all the advantages of VHF and more. That's advanced UHF tetrode technology!



- Highest overall plant efficiency
- No diplexer
- Inherent tetrode linearity
- Simplistic VHF-type correction
- Full 10% aural power
- Tube change in minutes
- Proven over time
- Sensibly priced

New advances in tetrode technology and transmitter design now offer the UHF broadcaster the huge benefits enjoyed by VHF stations for years... and then some! Only from Acrodyne.

Call us for all the details.

Tetrode-equipped transmitters for 20 years

## ACRODYNE

Acrodyne Industries, Inc.  
516 Township Line Road  
Blue Bell, PA 19422

**1-800-523-2596**

In Pennsylvania, (215) 542-7000

FAX: 215-540-5837



◀ Gino Ricciardelli,  
chief engineer;  
WICZ-TV,  
Channel 40,  
Binghamton, NY

©1990 Acrodyne Industries, Inc. All rights reserved.

See us at NAB Booth #6000

Circle (62) on Reply Card



Continued from page 88

voltage. Maximum voltage coincides with minimum program audio noise.

This procedure not only aimed the dish at Westar IV, but also simultaneously provided the correct polarity for both receive and transmit signals. This occurred because the feedhorn is constructed to offset the uplink and downlink feeds by 90°. NPR indicated that, although this setup would be close to the final positioning, minor adjustments might be required. When discrepancies occur, the uplink settings take precedence over any preferred downlink setups.

At this point, the system was ready for transmission alignment. The initial transmission required considerable coordination. Two people were stationed at the uplink, and additional staff members were required at NPR, the satellite owner's monitoring site and the telephone company, which was concerned about interference. It was necessary to schedule two hours of test time to complete the work.

### Problems develop

The first problem encountered was not the one expected. The initial concern had been about reflected power in the elliptical waveguide or its connections, but it proved unfounded. As a result, it was not necessary to adjust the tunable waveguide flange. However, the satellite, Westar IV, was receiving insufficient power. After three hours of re-aiming the dish and re-orienting the feedhorn assembly, the problem still existed.

Of even greater concern was the 14dB cross-polarization figure. The satellite owner required no less than 27dB isolation between the receive and transmit planes. In fact, to protect other users, the company preferred at least 30dB.

NPR and the satellite owner agreed that the problem was related to the dish. Ruled out was the possibility that a side lobe, in-

stead of the main beam, was reaching Westar IV. Because of the 2° spacing requirement, side lobes are too far down to be a problem with these types of dishes.

The antenna manufacturer disagreed that the dish was at fault, but agreed to replace the feedhorn assembly. After its installation, a second attempt netted the same unacceptable results.

NPR decided to send an engineer to Boise to troubleshoot the problem. The visit was called off, however, because a wild guess during the third try resolved the matter.

Unlike many dishes, this model has two rear support brackets. Thus, any re-aiming should have involved both support brackets. However, only one bracket was adjusted in the initial tests. Once the problem was discovered, the power level increased easily and cross-polarization improved to an acceptable 27dB. The satellite owner and NPR both certified the new uplink, and the telephone company detected no interference.

NPR engineers recalled similar problems they had encountered, mostly with portable uplinks. Another new, permanent uplink had experienced the same type of problem, however. That dish had to be removed from its foundation so that each bolt could be loosened until one "banged into proper place." Even one piece of hardware can cause structural misalignment, which may result in a warped antenna-reflector surface.

Satellite dish surfaces must be perfect parabolas, with no surface anomalies or bumps. Any distortions may cause colliding waves to shift out of phase and detract from the total gain of the antenna. Even moderate surface warping may reduce antenna gain. When proposing new licensing rules in 1987, the FCC expressed similar concern about additional interference as a result of the new 2° satellite spacing. The commission noted the potential for

problems from small uplink antennas that are easily damaged in transport.

### Testing

After RF certification, audio performance tests were conducted with NPR's help. An audio oscillator fed +4dB of signal directly into the modulators. Signal-to-noise was down 73dB, frequency response was  $\pm 0.5$ dB from 20Hz to 20kHz, and THD was under 0.30% at all tested frequencies.

A pulse-code modulator (PCM), coupled with a videocassette recorder, was supposed to provide playback of recorded programs for the transmission tests. Unfortunately, because of the strong RF being generated at the site by the AT&T and BSU uplinks, the recorder wouldn't work properly. The final tests used audio fed from the studio over telephone lines.

### Operation

Several operational procedures were established by the engineering staff. The uplink operators received thorough instruction in these procedures. Proper level controls were paramount. Guidelines were developed using VU meters and an intercom between uplink and studio.

Careful coordination with NPR during setup and takedown was necessary. The BSU operators also were trained on how to use NPR's coordination channel. The channel allows network stations to start tape decks automatically for automated program recording.

Special procedures were developed to help obtain the longest possible filament life from the HPA traveling-wave tube. The AT&T uplink personnel suggested that the filament remain powered continuously to improve reliability. Although this was appropriate for AT&T's operating schedule, the limited use of the system by BSU dictated a different approach. The TWT fila-

Continued on page 278

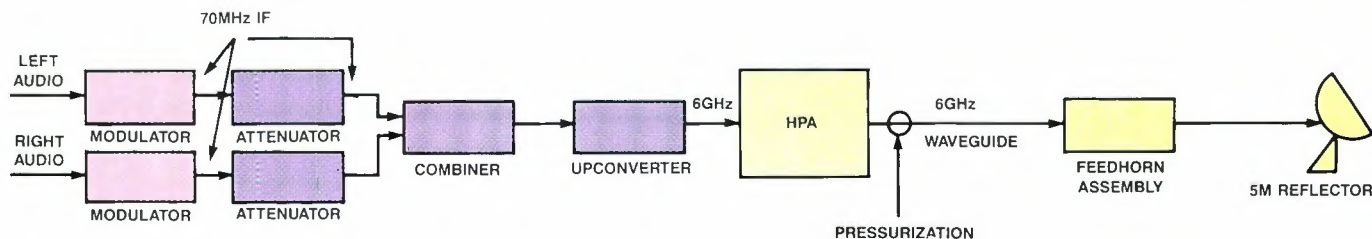


Figure 1. Basic block diagram for the 6GHz uplink portion of the system.

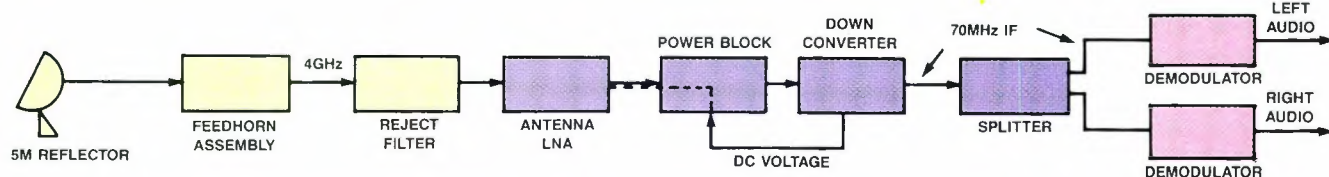


Figure 2. Downlink portion of the satellite uplink/downlink system.



*FLOATING POINT.*  
*THERE'S NOTHING ON EARTH QUITE LIKE IT.*

Create any light-sourced logo, character, word, line or page. Combine them however you like

Now zoom, rotate, twist, stretch, fade or overlap them – separately or together in real time. That's Floating Point.

Never before has real time, anti-aliased, 3D character generation and manipulation been achievable with such simplicity. The possibilities are endless.

It's tomorrow's technology at today's prices

And there will be more, because Floating Point is only the first of a new generation of digital character generators and manipulators from AVS.

See Floating Point and a whole lot more on the AVS booth **No 3634** or on AF Associates' booth **No 1756** at NAB.

And see if you can keep your feet on the ground.

**AVS**  
A V E S C O

An AVESCO plc Company

AVS, Venture House, Davis Road, Chessington, Surrey KT9 1TT  
Tel: 01-391 5678. Tel Int: +44 1 391 5678 Telex: 267439 AVS G Fax: 01-391 5409

Circle (63) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



By Rick Lehtinen,  
TV technical editor

# Hardening towers

Standing tall in the face of adversity.

**A**fter all we do to keep our stations on the air in the face of natural and manmade catastrophes, if the tower fails, it is all for naught. This was borne out in May 1989 when an errant F-15 from Tyndale Air Force Base clipped the guy wires on a 1,500-foot tower in Panama City, FL, in September 1989 when Hurricane Hugo snapped a 1,600-foot tower in Charleston, SC, and in October, when the Bay Area quake toppled several towers and damaged others. The goal for the station engineer is to keep the tower erect in the face of natural and manmade forces until the structure is no longer needed. Five reasons for tower failure are poor construction, poor maintenance, overloading, icing and accidents.

## Build it right

Poor construction is avoidable, but that requires diligence on the part of the station representative. Frankly, you get what you pay for. Rumors about highly paid tower specialists possessing nerves of steel abound in the industry. In reality, what you might see is a low-paid, poorly treated, justifiably nervous crew, made up of individuals who will put up with the dangerous, uncomfortable job of tower work for only a short time before quitting. As a result, inexperience runs high. Try to find a crew that has been working together for some time and that takes pride in its work.

Next, inspect the work in progress. If you can't climb the tower yourself, hire

someone who can. Verify that the connections are joined properly, using the right-sized hardware, appropriately tightened. If a joint doesn't fit at assembly time, it certainly won't be easier to fix once a couple hundred extra feet of tower are stacked above it.

Contact your tower designer to learn what variances are acceptable. Decide ahead of time what your recourse will be in case you observe shoddy work. Nitpicking will make you your own worst enemy, in that nobody, including you, will stay on schedule. However, an improperly built tower that fails will not only raise serious liability issues, but will also deprive you of revenue and incur expenses for cleaning up the mess and rebuilding.

Beyond the tower structure itself, there is the issue of how the antenna and feedline are mounted. These items are expensive to service, so a job well done is worth the effort. One expert indicates that 90% of the problems he has seen with antenna systems are attributable to poor installation.

## Tower maintenance: what to look for

Even if the tower is about to topple, unless the marking lamps or paint are bad, the FCC usually takes no action. This means the responsibility to inspect the tower falls to you, the station engineer.

Any obvious structural damage, such as if the tower was hit by lightning or struck by a vehicle, an airborne object or instru-

ments wielded by vandals, should be looked into at once.

Hollow tower members usually are equipped with drain holes, but if they are plugged, either by galvanizing or paint, water may accumulate and lead to rust. What's worse, trapped water may freeze, leading to expansion and breakage.

Check for tower straightness periodically with a high-quality transit. A bow in a tower may be due to sinking foundation or to a slack guy wire.

The guy system needs to be checked thoroughly. Verify first that the guys are in position. Next, ensure that the turnbuckles have safety wires in them to keep them from unraveling. A dynamometer and a come-along can be used to check individual guy tension.

## Paint

Recent rule changes allow station owners to leave tower structures unpainted, in many instances, if strobes are installed. (See Figure 1.) Towers with traditional beacons still need paint.

In the case of towers built with galvanized materials, paint is strictly for tower marking. For towers made of black iron, the paint protects the tower from corrosion. Tower experts allow that galvanized towers may be painted with water-based paint, but for black iron, use oil.

Surface preparation for each paint is different. In all cases, clean off areas of bad paint and rust. Next, for water-based paints, wire-brush loose paint from the sur-





The Faroudja

# LINE DOUBLER

## Ahead of its time

The LD-1 Line Doubler accepts 525 line, 2:1 interlaced, 59.94 Hz video signals and converts them to 525 line progressive scan or 1050 line interlaced signals.

The motion detection techniques used in the LD-1 are considered by experts in the field as being the most advanced. Along with proprietary bandwidth expansion techniques\* and patented detail processing,\*\* Faroudja Laboratories LD-1 delivers images that rival HDTV.

## 35 mm Film Quality

The absence of visible scanning line structure, edge blurring or motion artifacts at the LD-1 outputs makes it an ideal companion for large screen TV displays. Its crystal clear, artifact free image delivers a "cinema-like" feeling from standard 525 line video sources.

## SuperNTSC™

The Faroudja LD-1 Line Doubler, CTE-2 Encoder and CFD-N Decoder comprise the basic building blocks of the **fully compatible** SuperNTSC™ ATV system.

\*Patent Pending

\*\*Patent Numbers 4,030,121 and 4,262,304

---

# FAROUDJA LABORATORIES

Faroudja Laboratories Inc.  
946 Benicia Avenue  
Sunnyvale, California 94086  
Telephone 408/245-1492  
Telex 278559 MUHA UR  
Fax 408/245-3363  
Circle (74) on Reply Card





face, and apply paint. For oil-based paint, scrape, then paint bare spots with primer before applying the final coat. Water-based paint is likely to fade in five years, oil-based in eight.

Be cautious in your choice of painting contractors. Some unscrupulous operators have painted only the undersides of tower members, making them look good from the ground. Also, some contractors thin the paint excessively to cut costs.

### Lamps

Because licensees must keep their towers properly illuminated, it makes good sense to relamp at regular intervals, and spare the expense of unscheduled trips. The relamping climb is a good opportunity to inspect the other items previously mentioned.

### Wide load

Station owners may find it profitable to rent space on the tower and in equipment shelters to other broadcasters or land-mobile radio users. Remember to design in these extra loads when the tower is specified.

Also, it is important to remove feedline when it goes bad or the antenna comes down, unless it is to be reused. The extra weight and windloading provided by even a single transmission line can be considerable. After a few years of adding antennas onto antennas, it is easy to approach the design limits of smaller towers. This situation must be avoided.

Always use proper installation hardware to mount antennas and feedline. Nylon wire ties and black tape may seem adequate at first, but the ravages of weather and ultraviolet radiation may soon make them brittle.

### Ice

Broadcasters have long known that atmospheric icing of radio and TV towers can cause problems ranging in severity from transmission pattern distortion to complete tower collapse. Ice forming between antenna radiating elements can cause electrical shorting and equipment burnout. Ice can stretch guy lines. Also, towers near populated areas are subject to the added liability of falling ice, which threatens lives and surrounding property.

### How ice forms

There are two recognized sources of ice accretion. The first is "in-cloud" icing, in which supercooled water droplets float in the air and contact a surface because of air movement. The second is precipitational icing, where the droplets are massive enough to fall from the atmosphere onto the tower structure.

These two sources form three types of ice. (See Figure 2.) *Glaze* ice is usually the product of freezing rain or of airborne

spray from nearby bodies of water. It forms at relatively high temperatures (0°C to -3°C) and forms on surfaces as a tightly bonded, clear, dense, glasslike coating. This type of icing is the most serious threat to structures because of its density and the large additional loads it may impart.

*Rime*, or fluffy, white ice, forms more frequently than glaze in mountainous areas. Rime ice varies from "soft" to "hard" depending on its density, clarity and crystal structure. Soft rime forms at low temperatures (-5°C to -25°C) and low wind speeds. The impinging droplets freeze quickly, trapping air as the accretion grows. The large amount of entrapped air is responsible for the opaque-white and fluffy appearance of rime.

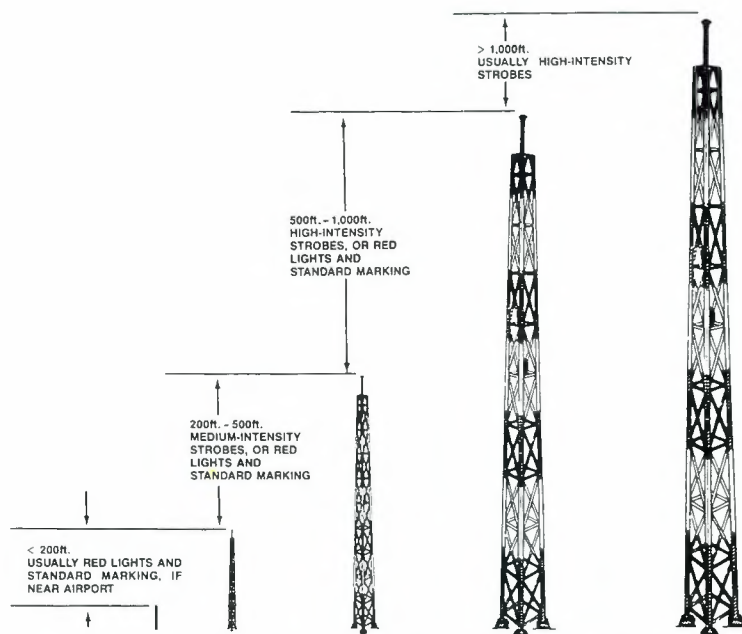
Because of its lower density, soft rime is not too problematic for broadcasters. Hard rime, on the other hand, is halfway between glaze and soft rime in terms of density, clarity and hardness. It can be as dangerous as glaze ice. *Frost*, a fairly harmless form of icing, forms when in-cloud moisture freezes on a surface, in still air.

Many forms of ice can form simultaneously on the same structure, depending on surface features such as shape, exposure and heat-dissipation characteristics of the structure part.

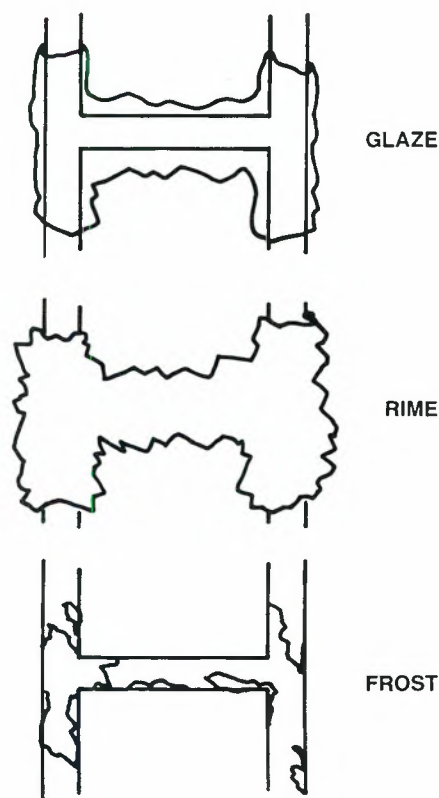
### Problems caused by icing

Icing imparts additional dead weight to the structure and also presents a larger surface area to the wind. Towers must be periodically surveyed for signs of structural fatigue from repeated ice accretion and windloading, and guy lines should be in-

spected for wear and retensioned to counteract stretching. When ice falls, it is called



**Figure 1.** General information about tower obstruction marking and lighting. The use of medium-intensity, white flashing lights for 200- to 500-foot-tall towers is a relatively new option.



**Figure 2.** Glaze ice forms a clear, hard envelope around tower members. Rime forms a fluffy, needlelike sheath, and frost forms a light layer. Most of the danger from tower ice comes when it "sheds" or falls.



# This switcher handles standard bandwidth like it's going out of style.



TVS/TAS-3000 Distribution Switcher

The new TVS/TAS-3000 video/audio distribution switcher from BTS handles standard bandwidth switching in stride. But the fact is, standard bandwidth may not be the standard much longer. And that's why the TVS/TAS-3000 is not your standard switcher.

With the advent of wide bandwidth video, you'll need a switcher that can handle the new higher bandwidth signals. The 3000 will. It provides a video bandwidth of more than 50 MHz, measured with a full-amplitude sine wave or video signal. Which makes it upwardly compatible with HDTV or computer graphics—no matter what the standard.

The TVS/TAS-3000 also delivers the cleanest signal and expands to accommodate any matrix size to meet your specific needs.

And if high bandwidth capacity isn't a require-

ment, BTS still has you covered with our best-selling switcher, the TVS/TAS-2000. The 2000 represents the same advanced technology and quality as the 3000 in a standard bandwidth switcher. BTS also offers a full-range of control panels and distribution amplifiers for a complete system designed, tested and guaranteed by one supplier.

All BTS switchers undergo 100% computerized factory testing and are protected with a 5-year warranty. In the unlikely event you do have a problem, simply return the board for a free replacement.

Dependable, performing switchers from BTS. Anything else is substandard. Call for information and technical specifications today: **1-800-562-1136, ext. 21.**

**BTS**  
The name behind  
what's ahead.

BTS is Broadcast Television Systems, a joint company of Bosch and Philips, P.O. Box 30816, Salt Lake City, UT 84130-0816.

Circle (66) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



"shedding."

Guyed towers are especially prone to failure from uneven shedding. Heavy iceloading on the guys exerts tremendous tension, and when individual guy lines suddenly release a load, torsional forces may overcome the strength of the tower.

Harmonic oscillation of guy lines, or "guy galloping," is a rare but extreme type of ice-induced stress. It has been proposed that a small amount of ice building up on the windward side causes a cable to assume the shape on an airfoil. A moderate wind then can induce the cable to move because of an aerodynamic lift and drop phenomenon. Galloping occurs when the movement matches the resonant frequency of the cable, resulting in increasing oscillation amplitudes. The danger lies in the fact that galloping usually affects only one or two lines of an entire guy system, which can produce violent twisting of the tower. An added danger is the fact that metal becomes more brittle and subject to failure when cold. Damping guys can be installed, which tend to limit such oscillation.

Tower-mounted items are subject to damage from falling ice shed from the upper levels. Threatened items include transmission lines, reflector dishes and anten-

na elements. Falling ice chunks of considerable size, weighing tens of kilograms, are common during shedding events.

#### **Weatherwise**

Icing and shedding are usually the result of specific storm patterns, and station personnel often can predict from past experience the onset of a dangerous situation. In light of the likely storm track and the associated wind directions, buildings beneath the tower normally are situated to the windward side, for protection from falling ice. Transmitter roof buildings are likely to be constructed to absorb impacts and resist punctures. Vulnerable items on the tower can be shielded from above with wood, sheet metal or wire-frame construction.

#### **Prevention and ice control**

Falling ice is a difficult problem because there are no feasible proven means of prevention available for tall masts. The best way to guard against damage to adjacent property is to restrict land usage in the icefall shadow of the tower. Initially, the tower should be constructed on a vacant parcel of land large enough to encompass the highly probable fall zone.

Thereafter, land-use planners should be cognizant of the danger and restrict development in this zone.

Many different approaches have been taken to prevent ice accretion, to minimize its severity or to aid in its removal. "Anti-icing" methods minimize or prevent accretion, whereas "de-icing" methods remove the ice once it has formed. Because of the large size of transmitting towers, many of the traditional anti-icing and de-icing methods are not cost-effective when applied to the whole tower. They usually are applied only to sections immediately surrounding the antennas.

Popular techniques for ice control include the following:

- *Shrouding.* Atmospheric icing has been shown, in theory, to be diminished by increasing the diameter of superstructure elements. This reduces the ability of the structure to collect water droplets. This idea has been used with success on arctic oil drilling platforms by enclosing the superstructure in a solid panelwork. Radomes are an example of the use of this principle. Application of this concept to broadcasting is limited to short, sturdy towers that are not subject to excessive windloading.

- *Flexure.* It has been discovered that out-

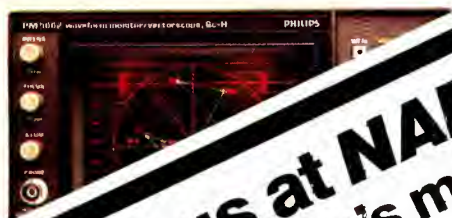
# **WARNING:**

## **FAILURE TO VISIT OUR BOOTH CAN LEAVE YOU SERIOUSLY UNBALANCED.**

### **MINOLTA NAB SHOW BOOTH # 3119, 3121, 3123**



Switch to  
the brightest  
displays for  
every  
TV signal!



**See us at NAB — Atlanta booth 1914**  
for industry's most complete line of:  
• composite or component test signal generators  
• waveform monitors • modulators/excitors  
• demodulators • color analyzers  
• VITS generators and inserters • vectorscopes

Philips TV Test Equipment  
Kornmarksvej 21  
DK-2605 Brøndby, Denmark  
Phone +45-31-572222

Distributed in US by  
BTC Test & Measurement  
7500 Six Forks Road  
Raleigh, NC 27615  
919-676-8378



**Test &  
Measurement**

**PHILIPS**

Circle (67) on Reply Card



fitting radomes or exposed elements with a flexible sheathing has been successful

at some installations. Flexure is caused either passively by wind and vibratory ac-

tion, or by an active pneumatic system. Ice was removed from the guys of an antenna tower in Finland during the winter of 1981-82 using a common concrete vibrator attached to a guy line. Other tests have been inconclusive.

- **Low-adhesion coatings.** Another approach to icing protection has been in the areas of icephobic or low-ice-adhesion coatings. The types of coatings studied have been freezing-point depressants and low-wettability substances. Freezing-point depressants, such as glycol solutions, soluble salt solutions and gas-evolving coatings, function by contaminating the accreting droplets and reducing the freezing point to below that of pure water. Sloping or vertical surfaces then will shed the liquid so ice doesn't form. As such, freezing-point depressants are classified as "sacrificial coatings" because they are continually being washed away and must somehow be replenished. Highway salting and aircraft wing de-icing are common applications of these materials.

Low-wettability oils, greases and permanent coatings have been pursued because of their hydrophobicity. However, it is incorrect to assume that because a coating

*Continued on page 104*



*Although removed for this photograph, use of protective clothing and headgear is important. (Photo courtesy of Rick Murphy.)*

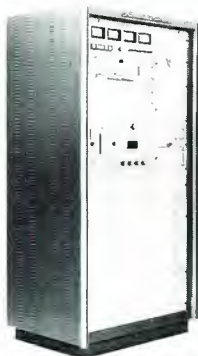
## COMPLETE YOUR DEFINITION OF "CLASS A," CALL CONTINENTAL ELECTRONICS



500H/1000W



3.8 kW



2.5 kW



5 kW

Continental Electronics is here to assist you with your new definition of "Class A." You can increase power, increase revenue base, and expand your listening audience by upgrading your transmitting facility.

Continental has engineered four transmitters to meet your needs. The 500/1000 Watt transmitter is single phase and is only 42 inches tall. This transmitter and the 3.8 kW are totally solid-state and designed for high efficiency and reliability.

The 2.5 kW and the 5 kW transmitters are single tube transmitters. All Continental FM transmitters include an internal harmonic filter and the Ultimate 802A Exciter.

For service after the sale, call the Continental 24-hour tech line. At Continental, service is an attitude, not a department.

So, call your Continental Sales Manager to get the complete definition of "Class A."

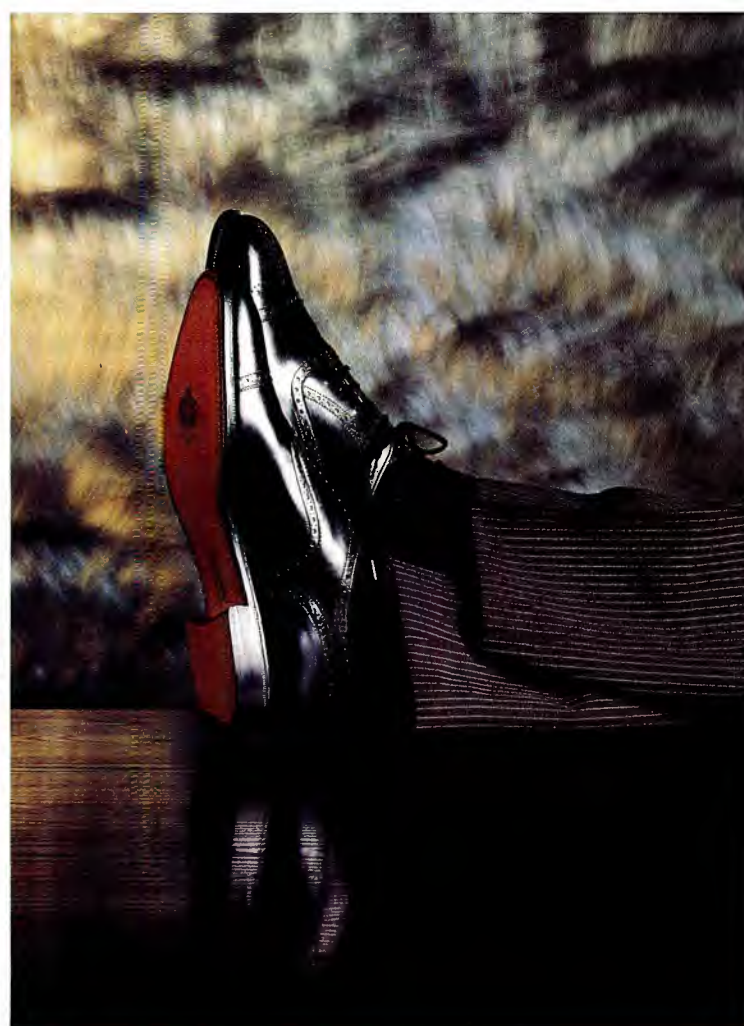
**varian**®

continental electronics division

PO. Box 270879 Dallas, Texas 75227  
Telephone: 214-381-7161 Fax: 214-381-4949 Telex: 73398







# THE DESK ON THE RIGHT BELONGS TO THE SNELL & WILCOX USER

How do you judge a standards converter – on paper or on performance?

For professional broadcast engineers there can only be one answer:

That's why at Snell & Wilcox we're not just interested in technical specifications, but in practical ones as well.

Our range of standard converters – the only complete range in the world – is designed and built by broadcast professionals. We understand what it's like to be in your shoes. And it shows. In every aspect of performance:

**Superior picture quality** – Seeing is believing. Our 4-field, four-line aperture converters, incorporating *Advanced Motion Processing*, provide sharper pictures than you'd ever have thought possible – even from the poorest input signals.

**Versatility** – Our standards converters also serve as time base correctors, synchronizers, color correctors, enhancers and powerful noise reducers.

**Upgradeability** – A concept introduced by Snell & Wilcox. When your needs grow, Snell & Wilcox converters grow with you. Snell & Wilcox converters up to 5 years old can now be upgraded to full broadcast specification at any time.

**Handling** – Low power consumption, portability and ergonomic design make our machines the most user-friendly on the market.



## SNELL & WILCOX

Stress-free standards  
conversion

There is of course one major performance specification without which all the rest are useless:

**Reliability** – When you're a Snell & Wilcox user you can put your feet up and relax. It's very likely that you won't have any problems at all. But in the unlikely event you ever do – call us up and speak directly to the engineers who designed and built your machine.

What other manufacturer can offer that reassurance?

But naturally we don't expect you to be convinced just by promises on paper.

The only real way is to judge for yourself.

That's what all the world's major broadcasters have already done. As a result they use more Snell & Wilcox standards converters than any other make.

Once you try Snell & Wilcox you won't be satisfied with anything less.

Call us to arrange a demonstration. You'll be converted.





This is not  
a studio tube camera intro





solution for turning  
a studio chip camera.

In their haste to get to market, some camera manufacturers have employed what we think are band-aid solutions to product design.

Simply fitting chips into a camera originally configured for tubes seems quite acceptable to some.

But not to Sony.

Introducing the Sony BVP-370 studio CCD camera. It's been specifically designed to complement Sony's most advanced chip, the 768 FIT CCD, for superior performance.

This chip virtually eliminates vertical smear. And Sony's exclusive HAD sensor gives clean, quiet images, and excellent color reproduction.

Because we took time in the design process, you save time. The automatic set-up feature doesn't require an internal lens diascope or external charts. This reduces set-up time to a few seconds, instead of two and a half minutes.

And the BVP-370 employs the latest component triax system, specially suited for optimal performance of CCD cameras.

These features reflect Sony's belief that the only way to design a studio chip camera is from the inside out. And that a bandaid solution is no solution.

To learn more about the BVP-370 studio CCD camera, call (800) 635-SONY.

Sony Communications Products Company, 1600 Queen Anne Rd., Teaneck, NJ 07666.  
© 1989 Sony Corporation of America. Sony is a registered trademark of Sony.

**SONY**

BROADCAST PRODUCTS



Continued from page 100

sheds water it will necessarily shed ice. During the early stages of icing, these substances allow the droplets to run off a sloping surface more rapidly before freezing can occur. Eventually, some droplets accrete before they can be shed. In turn, these create sites for further accretion and the hydrophobic coating thereafter rapidly becomes coated with ice.

Studies have shown that certain polymer coatings exhibit a lower adhesive strength for ice than bare metal surfaces.

Many broadcasters insist that the glossy surfaces of their antennas' radiating elements help prevent the formation of ice.

### Heating

The only totally effective anti-icing method available today is heating, and it is the method of choice for most station owners. Given the large power demands, heating is, in general, used only to prevent icing of the radiating elements of FM and TV antennas. The popular heating units are factory-built into "batwing" or whip-

type antennas and must be activated before icing can begin. These low-wattage heaters usually cannot keep up with the accretion rate if ice is allowed to accumulate appreciably before the heaters are activated. Some station operators manually activate heaters based on the local weather forecast or individual judgment. Others prefer the more cautious alternative of operating de-icers for the entire season. A third alternative is to provide for automatic activation via thermal, precipitation and/or icing sensors.

### Future towers

Further reliability in towers will be achieved through constantly improving tower design methods. The construction code used currently for tower construction is TIA/ANSI/EIA RS-222-D. This code takes into account the static forces of tower design, but dynamic loads are covered for by building in a safety factor. Additionally, there is no provision for specific cases of iceloading, although loading guidelines are mentioned in an earlier version of the code. The soon-to-be-released RS-222-E code will account for ice. Subsequent revisions will begin to take into account dynamic loading. As a result, future towers will not be overbuilt to accommodate blind safety factors, but also not underbuilt against the dynamic loads.

### Accidents

There is not much hope of making a tower stand tall against a direct hit by an aircraft, or resist a nearby explosion, intentional or otherwise. The best protection against this type of disaster is proper tower maintenance, with particular emphasis on tower marking, and good security at the tower site.

It is noteworthy that in the recent San Francisco quake, the Mount Sutro tower, which was built to withstand such things, came through unscathed. It may be time for more broadcasters to consider forming joint ventures on the construction of such multistation transmission facilities.

### Playing the odds

It is unlikely that there will be a movement to harden broadcast antennas against all the forces they might endure. The trend is to strike a balance between the most likely potential problems and tower costs. This means broadcasters should consider their hedges. At what cost will underwriters replace damaged towers and transmitters, answer liability claims and replace the station's income during the period of reconstruction?

Many stations that have recently fallen victim to tower tragedies were able to recoup a substantial part of their audiences within days or hours by connecting into cable systems by microwave or satellite. This might suggest that strengthening the

## Now there's an easier, more efficient way to locate your video tapes...

I NEED THAT TAPE NOW!

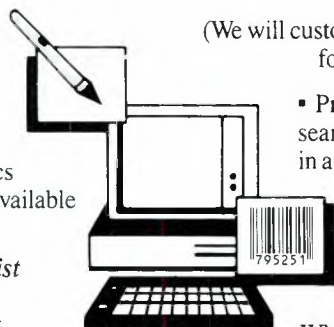


### ...with NSI's PC based Video Tape Library System.

This new video tape archival and locating system was used by NBC Sports for their coverage of the 1988 Summer Olympics in Seoul, and now it's available for stations.

Consider this partial list of features:

- Runs on a single IBM (or compatible) PC in standalone mode or on a PC network for many users.
- Scans bar code labels on the tape to update the tape's location.
- Provides 11 search criteria with which you can specify a tape; use one or any combination of them.



(We will customize these criteria for FREE for your installation.)

- Provides a KEYWORD search facility which can be used in any of the 11 categories.
- It's FAST — on a PC we can search through 15,000 tapes and find 20 in 3 seconds.

Why spend large amounts of money for a system which is an add on to traffic or a newsroom system?

This system is cost effective NOW, and is compatible with most cart machines.

For more information call or write:  
Nesbit Systems, Inc.



Come see us at our  
Booth at the NAB Show

5 Vaughn Drive • Princeton, N.J. 08540 • 609-799-1482

Circle (70) on Reply Card



# LEITCH UNLOCKS STILL STORAGE



## Introducing STILL NET™... the Key to Multi-User Still Storage



Advance into a new era in still management that breaks the confines of today's multi-user systems.

STILL NET connects independent still stores, creating a multi-user environment so powerful that users are free to share their material without compromising their own operation.

STILL NET, using the industry standard Ethernet, is unbounded in size and time, and will grow as your requirements and technology change.

STILL NET, multi-user Still Storage with a future.



Call 1-800-387-0233 and we'll show  
you the key to set Still Storage free.

See us at NAB Booth #3516

**LEITCH**®

Leitch Video of America, Inc., 825K Greenbrier Circle, Chesapeake, VA 23320 — Tel: (800) 387-0233 Fax: (804) 424-0639  
Leitch Video International Inc., 10 Dyas Rd., Don Mills, Ont., Canada M3B 1V5 — Tel: (800) 387-0233 Fax: (416) 445-0595

Circle (71) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



# No Assembly Required.



Sometimes, a good deal really isn't that good.

Like "saving money" by ordering a knock-down video console that's only available in gray, when you *could* have had a *completely assembled*, all welded Stantron unit for about the same price. And, it comes complete with tapped mounting rails and is available in your choice of *15 standard colors*.

Why endure bloody knuckles, missing parts, wasted time and needless hassles. Specify Stantron video cabinets and consoles — the safe, *complete* solution that really saves you time and money!

*And*, there's no assembly required.

**CALL TOLL-FREE! 1(800) 821-0019**  
**In California, call (818) 841-1825**



6900-6918 Beck Avenue • North Hollywood, CA 91605

FREE, FULL LINE CATALOG! CALL OR WRITE TODAY.

**See us at NAB, Booth #3534-3538**

Call me, I'm interested. Circle (80) on reply card.

[www.americanradiohistory.com](http://www.americanradiohistory.com)

TV/cable interface is an important aspect of tower hardening. But this only applies toward problems with the station itself. Any general catastrophe that knocks out a broadcast facility will likely raise havoc with the cable systems and telcos as well. Engineers must estimate what it is worth to keep giving the viewers a signal in times of trouble and invest in tower construction and maintenance accordingly.

## Bibliography

Bishop, Don. "When to Use Strobes on Communications Towers." *Mobile Radio Technology*, March 1989.

\_\_\_\_\_. "Tower Maintenance." *Mobile Radio Technology*, April 1988.

\_\_\_\_\_. "How the FCC Decides Whether Your Tower is OK." *Mobile Radio Technology*, April 1988.

Mulherin, Nathan D. "Atmospheric Icing on Communication Masts in New England." *CAREL Report 86-17*, December 1986. U.S. Army Cold Regions Research and Engineering Laboratory.

**Acknowledgment:** The author wishes to thank the following persons for their contributions in the preparation of this article:

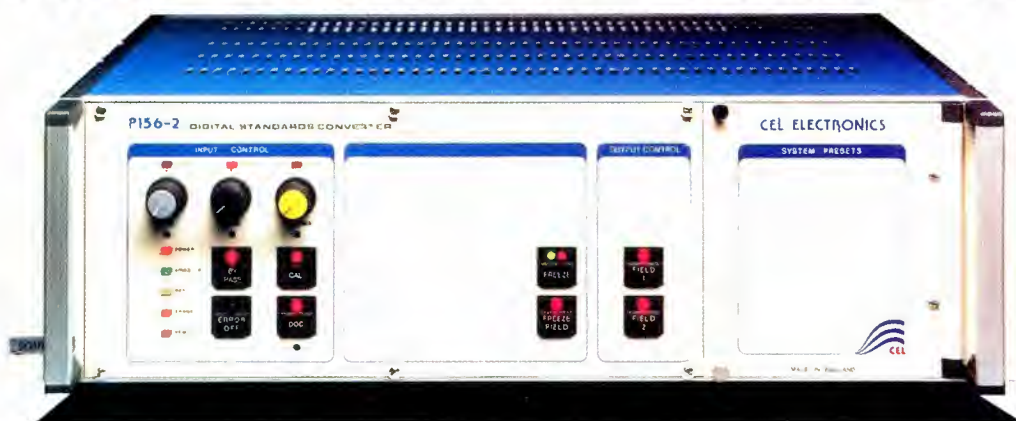
- Rick Murphy, aka "Tower King," tower and antenna technician, Kentucky Educational Television, Lexington, KY.
- Mark Malouf, senior project engineer, Alfa Tower Design, Richardson, TX.
- Richard Bell, president, Transmission Structures Ltd., Vinitia, OK.

[:(-)]]]]





# SETTING WORLD STANDARDS



CEL is crossing international boundaries in bringing its popular Standards Converter to many countries.

This industry standard product is specifically designed and produced for VHS and U-Matic/SP high and low band requirements. The P156-2 has consistently shown its worth, and with a world leading market share, goes on proving its value.

And values don't stop there. Look around the world and you will not find a competitor product within sight. The P156-2 – your passport to the market leader from CEL.

Circle (73) on Reply Card  
See us at NAB Booth #1006



The Art of Image Control

CEL Electronics Ltd, Chroma House, Shire Hill, Saffron Walden, Essex, CB11 3AQ. Tel: (0799) 23817, Telex: 817807, Fax: (0799) 28081  
James Grunder and Associates, Inc., 5925 Beverly, Mission, Kansas 66202, Tel: (913) 831-0188, Fax (913) 831-3427

[www.americanradiohistory.com](http://www.americanradiohistory.com)



# Voodoo engineering

By Dennis R. Ciapura

**When it comes to evaluating audio, too many engineers abandon good engineering practice for something resembling sorcery.**

**R**adio broadcasting is probably the least scientifically engineered technology-based industry on earth. Unfortunately, the technical decisions are more often based on audio superstition and rhetoric than on logical testing of any kind.

Years ago, when only a relative handful of vendors were developing products for broadcasters, and equipment performance was improving by leaps and bounds, it was easy to make upgrade decisions. The business was far less competitive, and the technology was simpler and easier to understand. In today's complex and fast-paced broadcast environment, however, it pays to know what makes a difference and what does not. The astute broadcaster does not derive technical strategy from electronic folklore.

## **The non-comparative evaluation trap**

The worst possible way to evaluate a potential improvement is to install new equipment or make some adjustment or modification, then listen to the station to gauge the results. This may seem to be a radical statement, but given the ear/brain system's short audio retention time, the sonic difference between the before and after performances would have to be quite substantial to be truly audible.

The typical non-comparative evaluation trap might develop like this: A signal processor or console is removed from service, "upgraded" with the latest integrated circuit and placed back on-line the next morning. The engineer who makes the

modification hears a distinct improvement in clarity and transient response and informally reports those findings to associates at the next SBE meeting. Before long, stations all over the country are trying the modification and reporting impressive results.

More than likely, the "improvement" everyone is hearing is a psychogenic effect — the numerical refinement of the unit's performance parameters leads to the expectation of an audible improvement. These placebo effects can be extremely powerful; participants in this kind of non-comparative testing usually are convinced of an audible enhancement, even if it doesn't exist.

Clinical psychologists sometimes plant carefully designed placebos to enable their clients to solve problems. Dr. Jefferson M. Fish wrote a fascinating book in 1973 entitled "Placebo Therapy," which actually set forth a system for formulating, communicating and even maintaining placebos. It is surprisingly easy to intentionally generate placebos. It is frighteningly easy to become a victim of unintentional placebo effects.

Scientists and researchers are well aware of this risk, and they go to extreme lengths to avoid contamination of experimental objectivity. Broadcasters, however, seem generally unconcerned about psychogenic factors affecting objectivity. Until, of course, they've had the opportunity to actually test industry rhetoric in a controlled environment.

## **A case history**

An interesting experiment was conducted at the last Noble Broadcast Group national engineering meeting. The attend-

ees, all chief engineers of major-market radio stations, were briefed on the performance capabilities of an audio amplifier consisting of 20 stereo stages of 741 op-amps R/C-coupled through tantalum capacitors. They also were shown the performance graphs (see Figures 1 and 2), which clearly indicate the cumulative effects of the 741's modest slew rate.

The actual circuit then was made available for listening tests with a bypass switch to allow comparison with a straight-wire bypass. The stated objective of the demonstration was to illustrate the audio degradation said to result from the use of slow ICs and tantalum capacitors.

Electrostatic headphones were provided for supercritical listening acuity, and everyone was invited to switch back and forth with the straight-wire bypass. Six of the eight engineers who participated in the test reported hearing anomalies in the 20X741 circuit, and those who articulated what they heard generally described the effects implicit in the performance graphs they had just seen.

The group then was challenged to try the A-B test again, with someone else doing the switching. Only three accepted, and none of the three scored better than chance in picking out the 20X741 circuit from the straight wire. All the participants were surprised at the results of the demonstration, and one skeptic even checked the wiring to be sure that the amplifier was really in the circuit!

## **Comparative evaluation vs. belief structure**

The Noble 20X741 demonstration is not a unique event in comparative testing. A leading consumer audio magazine recent-

Ciapura is senior vice president of technical operations for Noble Broadcast Group and president of TEKNIMAX Telecommunications, a San Diego-based technical management consulting firm.



# Extreme Measures

## High-performance Audio Testing With System One + DSP

DESIGNING, MANUFACTURING and MAINTAINING high-performance analog & digital audio equipment places **extreme** demands on your test equipment. Your test set must have **extremely** low residual noise and distortion as well as **extremely** high accuracy... and the variety of systems under test calls for **extremely** flexible test set-up and control.

**System One + DSP** from **Audio Precision** is the solution. The trace below is a **System One + DSP** FFT spectrum display showing the residual distortion performance of our generator and analyzer. 2nd harmonic distortion of the sine wave is 125dB below the 1kHz fundamental level before nulling. The 3rd, 5th & 7th are all even lower!

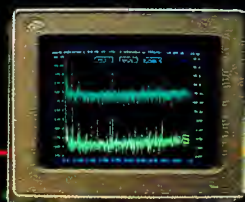
This self test is typical of the high-performance, high-accuracy measurement capability of **System One + DSP**.

### System One + DSP features include:

- **Dual Channel FFT Analyzer** — Signals up to 80 kHz may be acquired and analyzed with 16 bit resolution.
- **Waveform Capture** — Acquire and display signals on the PC screen for analysis in time domain "digital storage oscilloscope" mode.
- **Harmonic Analysis** — Perform harmonic analysis such as measurements of individual distortion components, with automatic tracking to 9th harmonic.
- **Processing Power** — Dual high-speed 24 bit internal DSPs and precision 16 bit analog I/O conversion.
- **Low residual THD + N** — Total analog system THD + N (22kHz bw) .001%. DSP analysis permits resolution of distortion as low as 145 dB below fundamental.

**System One + DSP... When you're serious about performance.**

## System One



## Audio precision

P.O. Box 2209, Beaverton, OR 97075  
503/627-0832 1-800/231-7350  
FAX: 503/641-8906, TELEX: 283957 AUDIO UR



**INTERNATIONAL DISTRIBUTORS** Australia: IRT Electronics Pty Ltd. (02) 439 3744 Austria, Eastern Europe: ELSINCO elektron GmbH, Wien (222) 812 17 51 Benelux: Trans European Music NV, Belgium (02) 466 50 10 Canada: Glentronix Ltd. (416) 475 8494 Denmark: AudioNord Danmark A/S 86 12 88-1 Finland: Ganslec OY 77 13311 France: ETS Mesure (1) 45 83 66 41 Germany, West: TRV GmbH 221 70 9133 Hong Kong: TRP Consumer Electronics Ltd. 887 2008 Italy: Medea S.r.l. 2 445 3838 Japan: TOYO Corporation 3 279 0771 Korea: Myoung Corporation 784 9942 Mexico: Ar S.A. 5 250 73 94 New Zealand: Audio & Video Wholesalers, Ltd. 71 73 414 Norway: Lydconsult (09) 19 03 81 Portugal: Acutron ELA 1 941 40 87 Singapore & Malaysia: TME Systems PTE Ltd 86 4808 Spain: Telco Electronics, S.A. 1 231 7840 Sweden: Tai & Ton AB 31 80 36 20 Switzerland: Techno SA (021) 805 05 06 Taiwan: Litz Technologies Ltd. 703 6280 U.K.: SSE Marketing Ltd. 01 987 1262

Circle (64) on Reply Card

www.americanradiohistory.com



ly conducted rather extensive blind listening tests to determine whether any audible differences exist among CD players, in light of the varied prices and levels of circuitry sophistication. None were found, despite the fact that audiophiles with strong biases were included in the sample base. Similar tests have been done in comparing time-aligned speaker systems and identical systems with conventional driver alignment. None of the reviewers could hear a difference, although audiophiles typically report less phase "smear-

ing" with time-aligned systems.

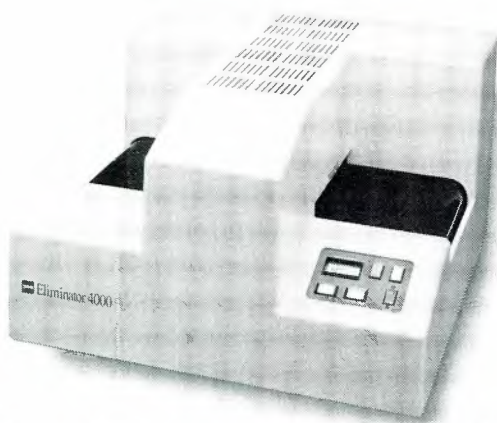
To a certain extent, the fields of broadcasting and professional audio have been infiltrated by the same kind of rhetoric-borne generalizations that have become so popular in the consumer electronics industry. All sorts of esoteric audio imperatives that either can't be heard at all in A-B tests, or are perceptible only with highly specialized test inputs, have become the beliefs of a kind of audio religion. The faithful repeat dogma without objectively testing or even questioning it. As en-

gineers, we know better, but we're compelled to go along with the momentum of opinion.

This illogical and almost spiritual approach also is evident in many common qualitative statements. For example, a prominent radio programming executive once declared that a certain station with a reputation for extremely clean audio must be having a problem because Neil Diamond's voice didn't sound right. But what is *right*? Did he listen to the master tape of the recording on the same speakers in the same room? Perhaps the station in question was really providing the "most right" version of the recording than any other station he had heard play it.

Another example is the engineer who reported on the superior performance of a new type of wiring installed in a recording studio. Not reduced hum or crosstalk, but actual audio clarity. However, no tape of the sound before and after was made, so in the absence of any objective comparative testing, how could he know?

# Leaving the Users of MII, Betacam SP and D2 Tape Speechless.



## The Eliminator 4000

There's no one better at eliminating unwanted information than Garner. So we won't bore you with a lot of impressive talk about our Eliminator 4000. All we'll say is that it's so effective at erasing low-end audio noise, it's the one degausser approved for use by the major television networks and production facilities. And it's the one bulk eraser that guarantees -75 dB erasure of completely saturated 1500 oersted metal particle tape in 12 seconds or less.

If you'd like to know more about everything the Eliminator 4000 can do for you, give us a call. We've got a lot to say.

See us at NAB,  
Booth #2027



4200 N. 48th Street / Lincoln, NE 68504 / Toll-free 1-800-228-0275 / FAX (402) 464-6960

Circle (75) on Reply Card

---

***If you expect an  
improvement, you will  
most likely hear it.  
Conversely, if you  
think there are  
deficiencies, you will  
hear those, too.***

---

The point is certainly not that improvements are rarely audible, but that well-controlled blind comparison testing can cut through audio mythology to reveal changes that really are audible. After all, if the result of some new equipment, modification or adjustment isn't detectable in a blind A-B evaluation test, what difference would it make to the listening audience?

### **The long-term listening myth**

The classic proponent response to a failed blind test is, "Oh, you can only hear the difference in long-term listening. It won't show up in A-B tests." This actually may be true, but not because the difference is really audible. Rather, the absence of an immediate direct comparison leaves the reviewer vulnerable to the plethora of psychogenic influences that affect the overall sonic impression. If you expect an improvement, you will most likely hear it. Conversely, if you think there are deficiencies, you will hear those, too.

When audio equipment is being evaluated on a non-comparative listening basis, knowledge of the internal circuitry or performance specifications may strongly



# The best just got better.



## ROSCOR & Multimedia Video Productions make it "one more for the road".

Multimedia Video Production enjoys a reputation for uncompromising standards in mobile video productions... among the best in the industry.

For the design & fabrication of their mobile production vehicles, they prefer to work with a company with the same standards for quality and a reputation for design innovation & advanced system engineering... ROSCOR Corporation.

ROSCOR is their logical choice because they lead the industry in the custom design & fabrication of mobile production facilities... not just meeting specifications but exceeding expectations with innovative design and advanced engineering integration.

In 1987 ROSCOR built Multimedia's "Eagle 2" *Super Truck*. Just recently, ROSCOR completed Multimedia's newest *Super Truck*, the "Eagle 4".



### Advanced System Engineering.

Careful consideration to ergonomics, ROSCOR engineers custom designed the interior environment with efficiency, flexibility & innovative aesthetics:

- Specially-Designed Rolling VTR Racks
- Three-Tiered Production Room

### Latest-Technology Equipment:

- RTS InterComs
- 8 Computerized SONY cameras with Triax
- 6 SONY VTR's with SloMo
- Chyron 4200 w/Motion Control
- ROSCOR Monitor Tally System
- Abekas A-53 DVE w/Warp
- Abekas A-42 Still Store
- much more

For video productions call **Multimedia Video Productions** at 513/381-7100.

For "concept to turn-key" video systems contact your **ROSCOR System Consultant** at 708/299-8080 ext. 314 or visit us at NAB for a tour of the "state-of-the-art" in mobile teleproduction vehicles.



**MULTIMEDIA VIDEO  
PRODUCTIONS**

250 Production Plaza Cincinnati, Ohio 45219 (513) 381-7100  
a MULTIMEDIA Broadcasting Company



ROSCOR Corporation  
1061 Feehanville Dr.  
Mt. Prospect, IL 60056  
Phone (708) 299-8080  
Fax (708) 299-4206

See us at NAB Booth #A183

Circle (76) on Reply Card



influence sonic impressions. Under certain circumstances, even the appearance of the equipment can be a significant factor. However, the most powerful factor may be the "after-acquisition glow." Once you've spent either the company's money or your own on some new item for the audio chain, you are strongly biased in favor of the acquisition. This phenomenon is known to psychologists as the "halo effect."

Let's say an audiophile buys a new amplifier and "hears" an improvement that is totally psychogenic. It may be argued that there has been an actual benefit. After all, does it really matter whether the sonic virtues of the new equipment are really audible as long as the user is convinced that they are and derives pleasure from the illusion?

The broadcaster, however, must deal in realities. The listener is buffered from all

those psychogenic factors as they relate to the broadcast station, and can react only to real audible differences. Granted, listeners may be subject to a host of psychogenic effects relative to their receiving equipment, but it's the perception of the station that concerns the broadcaster. Consequently, it is critical to know what makes an audible difference and to channel fiscal and human resources in that direction.

### What about listening fatigue?

Listening fatigue really does exist, but the high levels of processing and routine clipping that generally cause it are easily detectable in blind comparative testing. In fact, A-B testing of new processing adjustments is probably the quickest and surest method of quantifying average level differences and artifact generation. The role of comparative testing in the case of listening fatigue evaluation is to block irrelevant psychogenic effects while focusing the analysis on the truly audible artifacts.

Follow-up longer-term listening tests then are more productive because the A-B testing will have suggested potential problem areas to listen for. This kind of bias can be useful in that it allows the broadcaster to focus on potential irritants quickly, making it possible to subjectively evaluate the processing impact on the overall format.

### Evaluating audio-processing equipment

Audio-processing equipment is really the easiest class of audio equipment to evaluate, because the artifacts generated by even moderate processing are relatively audible. This is fortunate because processing is, at almost any station, the point of greatest audio alteration.

The first step is to formulate an evaluation strategy, starting with deciding what method of comparison will be used for the new processing unit. In general, three useful ways are:

- comparison with a straight-wire bypass.
- comparison with other processing.
- comparison with itself.

Stations configured for maximum fidelity might be interested in the straight-wire comparison, but most stations would be more interested in comparing a new processor with the station's existing equipment. If the new processing proves to be more appealing in general, then comparison of various settings of the new processing will yield the optimum adjustments and familiarize the user with the sonic effects that result from various individual adjustments.

The most critical stage of evaluation of processing is the first. Is the proposed system really better? There are two ways to put both systems on an equal footing for comparison.

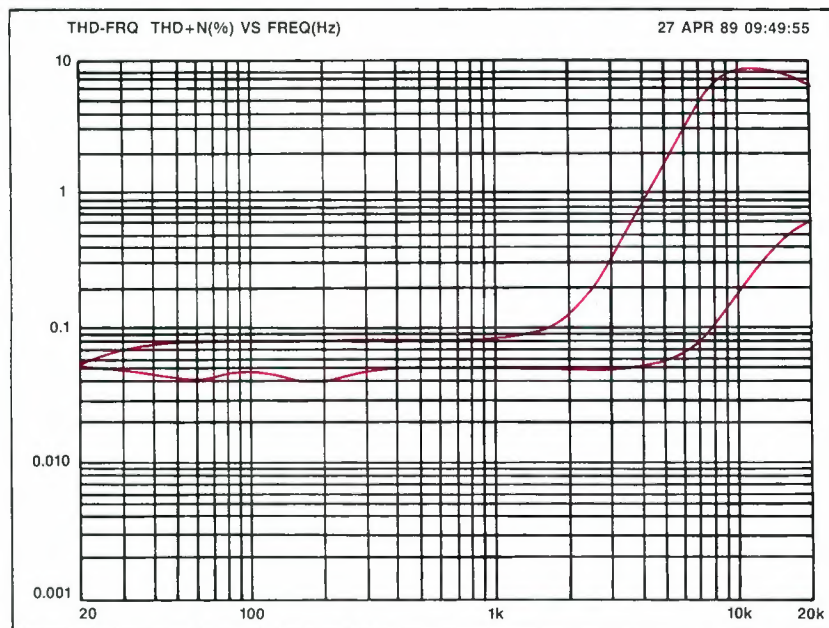


Figure 1. This performance graph shows the 20X741 demo circuit's distortion at 0dBm operating level.

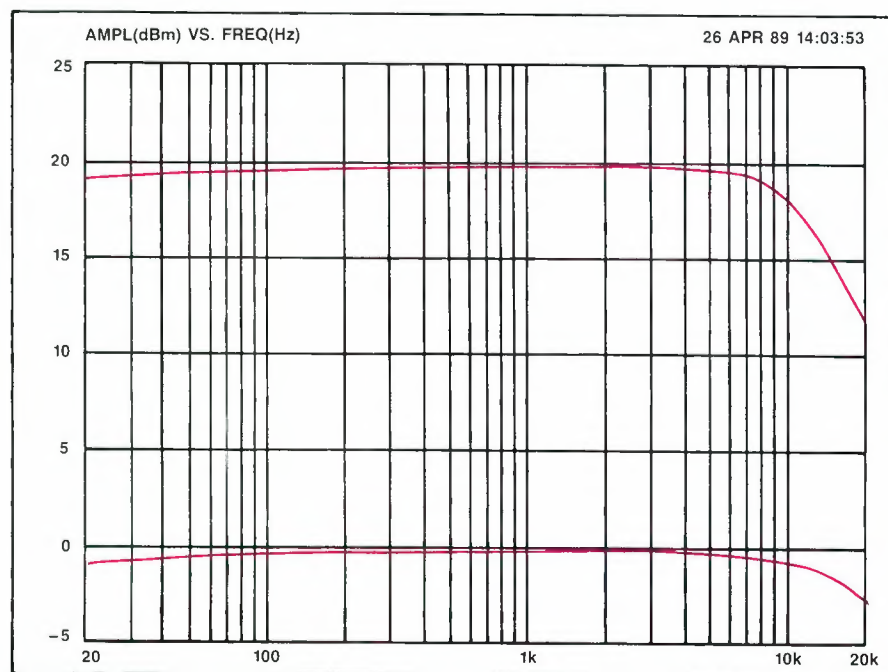


Figure 2. Frequency response of the circuit shown in Figure 1.



# TRANSPARENCY... **VIDEO**



## YOU CAN SEE RIGHT THROUGH US. With the Microtime FS-10 ten-bit Frame Synchronizer

Precision ten-bit sampling at 4xfsc results in negligible quantizing errors, impeccable performance specifications, and superior video transparency...

...with the Microtime FS-10 Frame Synchronizer. Offering the industry's most advanced capabilities for synchronizing remote video signals.

Dual video inputs allow AB source selection from the front panel, and the synchronizer can automatically switch to an auxiliary input with loss of the video feed. A line-by-line video

advance corrects for timing delays introduced by other equipment. A D2 composite digital output is also standard.

The FS-10 is available in NTSC, 525 PAL and 625 PAL, and a heterodyne TBC option is available. NTSC models can be ordered with a 2-field or 4-field memory. The FS-8 eight-bit version is also available.

For the ultimate in video transparency, call Microtime to learn more about the FS-10 and the FS-8 today.

---

*Visit Microtime at NAB, Booth #5740*

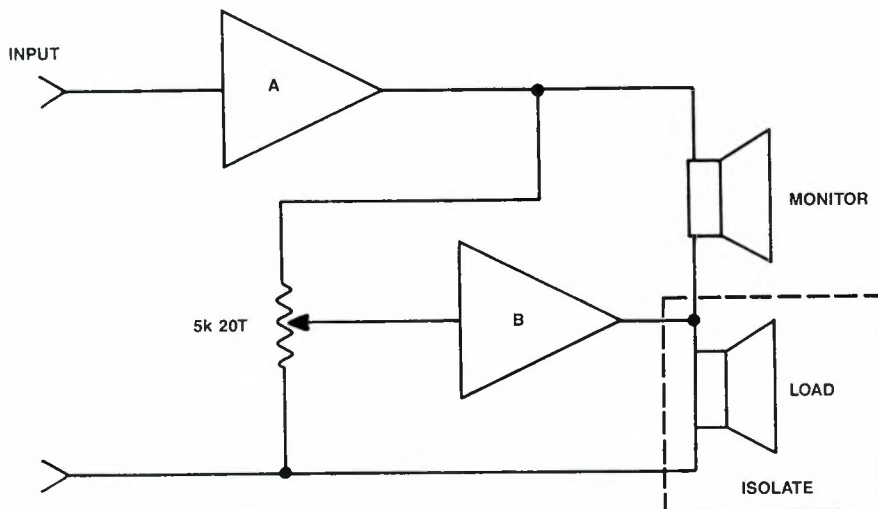
---



A Subsidiary of ANDERSEN GROUP • 1280 Blue Hills Avenue, Bloomfield, CT 06002 USA  
Tel: (203) 242-4242 • 1-800-243-1570 • Telex: 493829C MICRO UI • Telefax: (203) 242-3321

Circle (77) on Reply Card





**Figure 3.** Differential power-amplifier test circuit.

The most direct method is to temporarily install the new processor or processing system with a set of locally switched or remotely controlled gold-contact relays in the inputs and outputs. Start with the new unit or system adjusted according to the manufacturer's recommendations, and adjust the audio or composite output to the transmitter for identical peak flasher activity. Now the new and old processing can be compared directly with a variety of typical program material. A DAT or 15ips analog tape record should be made for future reference. It's always a good idea to monitor on small speakers as well as studio monitors, and having both systems available on-line makes it easy to compare them on a variety of auto receivers.

It is *extremely important* to either use an A-B-X box or have someone else do the switching while the person doing the evaluating listens and records the results in writing. It also is critically important that the levels be matched within at least 0.2dB. You may be shocked to find that even though the systems sounded different when you knew which ones you were listening to, your score in identifying one from the other is no better than chance. In fact, this is frequently the case in comparing high-quality, state-of-the-art processors set for identical peak output and average levels. You also may find that if one system has a slightly higher average level than another, they sound alike when the lower one is readjusted for the same density.

The second, more complex method of comparison (if you have backup main processing) is to set up both processors on the bench using a signal generator or exciter to simulate the transmitter, and a modulation monitor to calibrate the outputs for identical peak activity. This is much easier to do for FM than for AM because most AM generators are balanced

modulator designs incapable of positive modulation beyond 100%. It's easy enough to do for FM, however, as long as the modulation monitor used has an amplified front end that will work from the FM generator output.

The advantage of the off-air method is that the same segment of typical program material can be played over and over to explore the equipment's capability to han-

---

***The listener is buffered from all those psychogenic factors as they relate to the broadcast station, and can react only to real audible differences.***

---

dle the most difficult inputs. And, because there's no problem with on-air repetition, both systems also can be recorded easily in near synchronization on a 4-track. It's also easier to explore extreme processing settings that you really wouldn't want on the air. Hearing what happens at the extremes often is helpful in deciding how much of a certain parameter you might accept in the mix of artifacts.

#### **Can modern amplifiers sound different?**

Compared with processing artifacts, the audio imperfections exhibited by modern audio amplifiers are minute, and it really takes comparison with a straight-wire bypass to determine whether any audible problems exist. Be sure to set the operating levels for at least 20dB of headroom.

At less than 16dB of headroom, live microphone signals and some CD sources will clip. Most current-generation audio gear exhibits extremely good fidelity, and any audible differences are far more likely to be the result of application and interface problems.

When comparing line-level amplifiers, be sure that the operating levels be adjusted for equal headroom. Up to a certain point, a higher-headroom amplifier always will sound better. Psychogenic effects aside, this is probably the reason that some consoles are reported to sound better than others. It has less to do with any audible difference in the active devices employed than with the operating levels selected and maximum output device dissipation and buffering.

Low-level amplifier design is driven more by the input device equivalent input noise and device supply voltage limits. Although 30dB of headroom is not unusual for a microphone pre-amplifier these days, it's a good idea to check if you're evaluating a console.

#### **Evaluating power amplifiers**

Because of their extremely low output impedance, power amplifiers these days have high damping factors. As a result, significant adverse effects arising from interaction with the load are rare, but not impossible. A useful comparative test circuit, shown in Figure 3, was suggested by amplifier designer David Hafler.

One channel of the subject stereo amplifier is used as an active dummy in the bridge circuit. The speaker connected to the dummy amplifier should be in another room or someplace where you can't hear it blasting away. To the extent that the amplifiers are identical *and* distortionless, there will be no output from the speaker connected to the test amplifier channel. The circuit is simply nulled like a distortion meter. What's left in the test speaker is the difference between the amplifiers and between the test amplifier channel and the straight-wire bypass.

Any distortion you hear is the actual total non-linearity under actual operating conditions, including any mysterious distortions that haven't been named yet. If all you hear is a little clean audio, it's a phase difference. The Hafler amplifiers included trim controls in the feedback loop to optimize the phase linearity in the audible band, and the test circuit provided an easy means for the avid audiophile to make the adjustment with the actual speakers to be used.

The results of this kind of power amplifier testing can be quantified and documented by comparing the voltage across the test speaker with the voltage across the dummy speaker. The result can be expressed as the total operating non-linearity

*Continued on page 260*



# The Future of Broadcast Audio Has Arrived...

## Neve's 66 Series

The 66 Series offers the possibilities of tomorrow for today's sonically demanding broadcast facilities. Neve has combined its unmatched analog circuitry with the latest techniques in digital control to create the 66 Series — a completely new range of audio consoles for broadcast applications.

Take a look at just a few of the features of the 66 Series:

- Microprocessor - controlled reset system for switch status and input gain
- Optional system to restore rotary controls and faders to previous settings
- Dual input mono and stereo mic/line channels
- Multiple clean feed system (mix-minus)
- Four-band equalizer
- Silent matrix switching
- Four or eight stereo groups
- Up to 12 mono and two stereo auxes
- 24 or 32-track recording and post-production options

**Neve welcomes you  
to the future -**



 **Neve**  
A Siemens Company

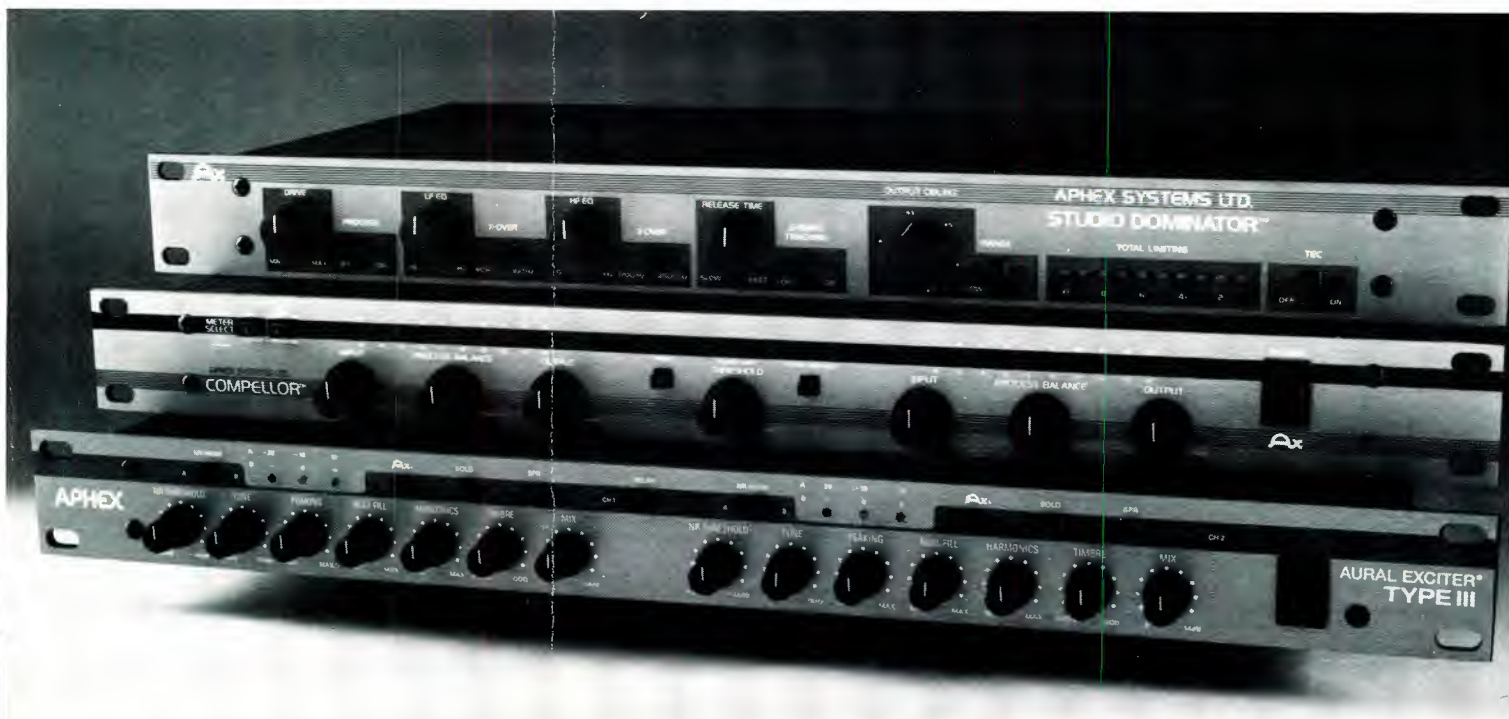
Circle (78) on Reply Card

BERKSHIRE INDUSTRIAL PARK, BETHEL, CONNECTICUT 06801, U.S.A. • TELEPHONE: (203) 744-6230.  
260 WEST 52ND STREET, NEW YORK, NY 10019, U.S.A. • TELEPHONE: (212) 956-6464.  
6353 WEST SUNSET BLVD., SUITE 402, HOLLYWOOD, CALIFORNIA 90028, U.S.A. • TELEPHONE: (213) 461-6383.  
1221 16TH AVENUE SOUTH, NASHVILLE, TENNESSEE 37212, U.S.A. • TELEPHONE: (615) 329-9584.  
MELBOURN, ROYSTON, HERTS SG8 6AU, ENGLAND • TELEPHONE: ROYSTON (0763) 60776.  
POSTFACH 326 A-1031, VIENNA, AUSTRIA • TELEPHONE: 43-222-72930.

©1989 DRC Graphic Advertising, USA



# The Aphex Audiophile Air Chain



"FM radio has become a ratings war in which we are the casualties by being subjected to a poor excuse for clean, accurate music."

Thomas J. Koch, *The Audiophile-File*

KTWV-FM The Wave. WHYI Miami-Ft. Lauderdale Top 40's. KKGQ America's Jazz Station. WQXR New York's Premier Classical Station. All different, but all winners, because they have an overriding demand to deliver the best in audio quality. They know quality sound is essential to attract and keep loyal listeners.

That's why these premier stations rely on The Aphex Audiophile Air Chain, a combination of the Aphex

Compellor®, Aural Exciter® and Dominator™ to achieve *consistent high quality sound*. Quick and easy to set up, this combination will achieve competitive loudness while maintaining the same high quality regardless of program or who is controlling the board. By comparison, other processors need to be tuned for almost every song, and achieve loudness by homogenizing or crunching to the point of pain.

AM, FM, TV or Cable ... rock to Bach or talk, if you want to be a winner in the "no win modulation wars", contact your Aphex dealer to arrange for a demo of the Aphex Audiophile Air Chain.

**APHEX**  
SYSTEMS

11068 Randall St.  
Sun Valley, CA 91352  
(818) 767-2929

All Aphex products are designed and manufactured in the U.S.A.  
© 1989 Aphex Systems

Circle (79) on Reply Card



# Equipment Exhibitors

## BROADCASTING *WORKS!*

**B**roadcasting works in numerous ways, and the 1990 NAB convention and exhibition (March 30-April 3, Atlanta, GA) intends to show you how it works for everyone involved. NAB officials are planning on another attendance record, this year more than 50,000. An equipment exhibition area greater than 430,000 square feet will show the wares of more than 700 manufacturers and distributors. In addition to the hardware on exhibition, there will be numerous papers presented and hands-on workshops, covering topics from engineering to management. Tours through some of the broadcast facilities in Atlanta are also offered and a gala finale to the event will be the 50th Anniversary Peabody Awards dinner on April 3.

Not far from the Georgia World Congress Center the Advanced Television Exhibit will offer a look at tomorrow's

television. Combining the NAB ATV and 1125/60 Group, more than 100,000 square feet of exhibits will feature concepts for high definition television and video production. That event, at the Atlanta Inforum is expected to draw a larger crowd than the 15,000 who visited the special exhibits in 1989. (**Note:** an NAB exhibit badge will be required for admission to the Inforum.)

To help you prepare for your visit to the NAB exhibition in Atlanta, the following pages list the manufacturers who had booked space at the show as of February 1. The first section of this special *who's who and what's new* coverage is an alphabetic listing of exhibiting companies, including some who will be represented by their exclusive US representatives. The exhibit stand numbers indicated in this list are also current as of February 1, but realize that the manufacturers keep jockeying for better positions up until the show starts. As a result some of those numbers will change. Check for an updated list when you register for the convention and be sure to get an updated copy of the **BE/VS** map at the convention center. Manufacturers known to be participating in the ATV exhibition are indicated by **HDTV** as a booth number or by a dagger † preceded-

ing their booth assignment.

Advertisers in this Pre-show issue are indicated in the alphabetic list by a highlighted *See ad page* line. Reader service numbers are included, to allow you to get information direct from the manufacturers about the products they will be showing.

The second section of this special coverage lists the *new* to be introduced by the manufacturers. Many companies were apparently victims of the early date for this year's event and were unable to provide new product information. Others offered very sketchy comments. The products included in the coverage are those introduced following NAB '89 and production models of prototype products as well as items which were described as upgrades from original models. Products introduced in the past, and not noted as upgrades, are not included. If new products will be shown by an exhibitor, codes (such as A1, S5, V7) will be included in the company's generic equipment comment in the alphabetic listing. A guide to the range of those codes is provided at the beginning of the **New at NAB** section, page 180.

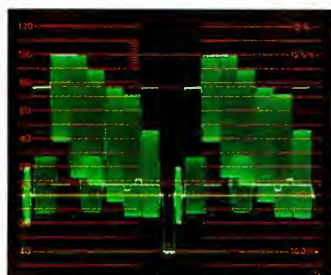
Come, join us in Atlanta, and learn how broadcasting can work even more!



|                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>A.C.E.</b> 3234<br>Video encoders, decoders, color correctors, matting; synchronizers; video, routing switchers. (S5, V6, V7)<br>Circle (501)                                                                                                                           | <b>AGAP</b> 7021<br>Audio playback automation.<br>Circle (517)                                                                                                                                                                                                         | <b>AMCO Engineering</b> 2009<br>Standard, custom equipment enclosure racks, accessories.<br>Circle (535) <a href="#">See ad page 160</a>                                                                                                                                              |
| <b>A.F. Associates</b> 1756<br>Remote production vehicles, facilities design, construction; AVS standards converters; test/monitoring equipment; Radamec-EPO robotic camera pedestals and camera control systems. (V2, V7)<br>Circle (502) <a href="#">See ad page 157</a> | <b>Aircraft Digital Music Library</b> 6802<br>Production music on CD, record, tape.<br>Circle (518)                                                                                                                                                                    | <b>AMEK Consoles/TAC</b> 3164<br>Audio consoles, console automation interfaces; audio equalizers. (A1, A2, A5)<br>Circle (536) <a href="#">See ad page 79</a>                                                                                                                         |
| <b>Abbott &amp; Company</b> 6608<br>Power connectors, distribution products.<br>Circle (503)                                                                                                                                                                               | <b>AKAI Professional/IMC</b> 3902<br>Digital audio recorders, samplers. (A5)<br>Circle (519)                                                                                                                                                                           | <b>American Lightwave Systems</b> N.A.<br>Fiber-optical system electronics. (S1)<br>Circle (537)                                                                                                                                                                                      |
| <b>Abekas Video Systems</b> 160W<br>Videodisc recorders, still stores; digital video effects systems; video production switchers; graphic titlers. (V5, V6)<br>Circle (504) <a href="#">See ad page 41, 66A-D</a>                                                          | <b>AKG Acoustics</b> 6500<br>Mics, headphones; audio effects, delays; digital audio workstations. (A4, A5)<br>Circle (520) <a href="#">See ad page 155</a>                                                                                                             | <b>American Studio Equipment</b> 6506<br>Special purpose camera mounts, dollies; studio electrical equipment; grip products.<br>Circle (538)                                                                                                                                          |
| <b>Absolute Broadcast Automation</b> 7118<br>Circle (599)                                                                                                                                                                                                                  | <b>Alamar Electronics</b> 2948<br>Broadcast programming automation equipment; machine controller interfaces. (S1)<br>Circle (521)                                                                                                                                      | <b>Ampex Corporation</b> 2200<br>Video cameras, camcorders, analog/digital recorders; digital effects, titling systems; editing controllers; video switchers; still store systems; digital signal translators. (S1, V1, V2, V5, V6)<br>Circle (539) <a href="#">See ad page 276-7</a> |
| <b>ACCOM Inc</b> 2900<br>Video noise, grain reducers. (V7)<br>Circle (505)                                                                                                                                                                                                 | <b>Alcatel-ATFH</b> 3107<br>Video, audio, multiple pair cables. (S2)<br>Circle (522)                                                                                                                                                                                   | <b>Ampex Recording Media</b> 2200<br>Audio, video analog, digital recording media; reel, cassette formats. (S4)<br>Circle (540) <a href="#">See ad page 263</a>                                                                                                                       |
| <b>Accu-Weather</b> 6723<br>Weather data services, graphic displays, maps. (V5)<br>Circle (506)                                                                                                                                                                            | <b>Alden Electronics</b> 5153<br>Weather graphics, radar displays. (V5)<br>Circle (523)                                                                                                                                                                                | <b>AMS/Calrec</b> 6338<br>Digital and digitally assignable analog audio consoles; audio workstations. (A4)<br>Circle (541) <a href="#">See ad page 87</a>                                                                                                                             |
| <b>Accurate Sound Corporation</b> 4111<br>Mics; reel, cassette audio recorders, duplicators; tape conditioners. (A3, S4)<br>Circle (507)                                                                                                                                   | <b>Alexander Batteries</b> 5155<br>Batteries, charger, analyzers. (V4)<br>Circle (524)                                                                                                                                                                                 | <b>Amtel Systems</b> 6008<br>Time code, machine control, signal distribution systems; editing controllers. (V2)<br>Circle (542)                                                                                                                                                       |
| <b>Acoustic Systems</b> 1019<br>Acoustic materials; broadcast booths.<br>Circle (508)                                                                                                                                                                                      | <b>Allen Avionics</b> 5607<br>Video delay, timing systems; hum eliminators; audio, video processors, filters, distribution equipment; test, monitoring products. (S6, V7)<br>Circle (525) <a href="#">See ad page 266</a>                                              | <b>Andrew Corporation</b> 1860<br>C-/Ku-band earth station antennas, LNA/LNC controls; transmission line, connectors; microwave equipment. (R1, R6)<br>Circle (543)                                                                                                                   |
| <b>Acrodyne Industries</b> 6000<br>VHF, UHF TV transmitters, exciters.<br>Circle (509) <a href="#">See ad page 91</a>                                                                                                                                                      | <b>Allen Osborne Associates</b> 7124<br>Portable, pneumatic masts.<br>Circle (526)                                                                                                                                                                                     | <b>Angenieux Corporation</b> 6112<br>TV camera lenses. (V1)<br>Circle (544)                                                                                                                                                                                                           |
| <b>Adams-Smith</b> 6808<br>Time code systems, transport synchronizers, emulators; A-V editing controllers. (A3, V2)<br>Circle (510)                                                                                                                                        | <b>Allied Broadcast Equipment</b> 4430<br>AKG digital workstations; digital audio spot systems; A-V dubbing centers; telco hybrids; radio receivers; microwave, satellite electronics, antennas by Tectan, Wegener, Fairchild, Microdyne. (A2, A5, R4)<br>Circle (527) | <b>Anixter Brothers</b> 1506<br>Mark microwave antennas.<br>Circle (545) <a href="#">See ad page 62</a>                                                                                                                                                                               |
| <b>ADC Telecommunications</b> 6001<br>Machine control, signal patching; patch panels, cords; wiring management; switching equipment. (S5)<br>Circle (511)                                                                                                                  | <b>Allied Tower</b> 5606<br>Broadcast towers, construction, services.<br>Circle (528)                                                                                                                                                                                  | <b>Anritsu America</b> 6549<br>RF test equipment. (S6)<br>Circle (546)                                                                                                                                                                                                                |
| <b>Adrienne Electronics</b> 8059<br>Computer hardware, software; PC time code cards; routing, distribution systems. (V2)<br>Circle (513)                                                                                                                                   | <b>Alpha Audio</b> 6701<br>Audio editing systems; digital audio hard disk recorders; acoustic material. (A5, S3)<br>Circle (529)                                                                                                                                       | <b>Antenna Technology</b> 6406<br>Earth station antennas, HPAs; demods, receivers. (R6)<br>Circle (547)                                                                                                                                                                               |
| <b>Advanced Designs</b> 2021<br>Weather radar, related video graphics equipment. (V5)<br>Circle (514)                                                                                                                                                                      | <b>Alpha Image</b> 7017<br>Digital interface, routing, encoding/decoding equipment; video frame stores. (S5, V7)<br>Circle (530)                                                                                                                                       | <b>Anton-Bauer</b> 5013<br>Batteries, chargers; battery analyzers.<br>Circle (548) <a href="#">See ad page 275</a>                                                                                                                                                                    |
| <b>Advent Communications</b> 1300-A208<br>Satellite news collection flyaway systems; video exciters, modulators, data converters; communications package systems. (R6)<br>Circle (515)                                                                                     | <b>Alpha Video &amp; Electronics/AVEC</b> 3111<br>Enhanced VTRs/VCRs; IFB systems; ENG antenna mast accessories. (A4, R1, V2)<br>Circle (531)                                                                                                                          | <b>Anvil Cases</b> 2110<br>Heavy-duty, custom, standard shipping cases of various materials. ATA-approved.<br>Circle (549) <a href="#">See ad page 212</a>                                                                                                                            |
| <b>ADx Systems</b> 7119<br>Time code equipment, transport synchronizers, controllers. (A3, V2)<br>Circle (516) <a href="#">See ad page 212</a>                                                                                                                             | <b>ALTA Group/Dynatech</b> 6030<br>Video production systems; TBCs, synchronizers, video effects systems. (V6)<br>Circle (532) <a href="#">See ad page 88</a>                                                                                                           | <b>Aphex Systems Ltd.</b> 6054<br>Audio processors, DAs; MIDI equipment; clock systems. (A2)<br>Circle (550) <a href="#">See ad page 116</a>                                                                                                                                          |
|                                                                                                                                                                                                                                                                            | <b>Altronic Research</b> 6814<br>Water, air-cooled RF dummy loads. (S6)<br>Circle (533)                                                                                                                                                                                | <b>Apollo Lighting/Audio-Visual</b> 3800<br>Slide-to-video transfer systems; AV/TV furniture; lamps; video presentation systems. (A3, S3, V4)<br>Circle (551)                                                                                                                         |
|                                                                                                                                                                                                                                                                            | <b>Amber Electro Design</b> 4900<br>Audio test, distortion analyzers. (S6)<br>Circle (534)                                                                                                                                                                             |                                                                                                                                                                                                                                                                                       |



# LEADER



## THREE.



## IN ONE.

### And only in the 5870 Vector/Waveform Monitor.

Only the 5870 gives you a unique numerical readout of SCH phase. And waveforms from 2 channels, plus vector information - appearing at the same time or separately. All this in one half-rack!

### No compromises.

This unsurpassed unit performs like three superb instruments in one.

**2-channel NTSC waveform monitor:** Features simultaneous or separate display of both channels, and dual filter display, plus a CRT readout of SCH phase, full 525-line select capability with a CRT readout of the line and field selected, memory

preset and recall of nine lines. Add to this the unit's remote control capability and extra-bright CRT, and you have a terrific waveform monitor.

**Full-fledged NTSC vectorscope:** Boxes for error limits of  $\pm 2.5^\circ$  and  $\pm 2.5$  IRE units;  $\pm 1^\circ$  differential phase and  $\pm 1\%$  differential gain; internal Z-axis blanking for line selection and continuous phase adjustment. The 5870 is a great vectorscope, too!

### Designed to go anywhere.

Operating from any 11-20 Vdc or 85-264 Vac (48-440 Hz) power source, this 12-lb, half-rack unit is ideal anywhere that size and weight are critical.

Call toll-free

**1 800 645-5104**

In NY State

**516 231-6900**

Ask for our full-line Catalog, an evaluation unit, and the address of your nearest Leader Distributor.

**Leader Instruments Corporation**  
380 Oser Avenue, Hauppauge, New York 11788  
Regional Offices:  
Chicago, Dallas, Los Angeles, Boston, Atlanta  
In Canada call Omnitronix Ltd. 416 828-6221

**LEADER**  
FOR PROFESSIONALS WHO KNOW  
THE DIFFERENCE

SEE US AT NAB BOOTH #3012-3018

Circle (82) on Reply Card for product information.  
Circle (83) on Reply Card for product demonstration.



# Now Jazz makes it easier than e



Jazz. That may strike the professional video producer as a strange name for an effects system. But Jazz music is open-ended. It can change mid-stream. It's not elitist or highbrow. Jazz is always creating and re-creating within an ever evolving structure.

That's how we came to name our system. It can evolve, adapt, modify or improvise. All to suit your ser-

vice or your customer's needs. It's advanced enough to offer every compatibility. Yet it boasts a startling simplicity in operation. And an even more surprising price tag. So as your company changes, Jazz

can change right along with you.

How? Well Jazz is easily upgradeable through both software and hardware. And soon Jazz will offer the functionalities of an edit suite without the need of a

switcher. But for now, you can play with all this Jazz:

Flip and Tumble. With Jazz, you can change the axis. Or you can change the size. Which means you have an infinite number of possibilities.

Or you can Rotate if you like. That means clockwise or counterclockwise. With variable speed in both directions. Maybe you want to blow it out of proportion?

Jazz offers you Overexpansion just in case you want to reframe that perfect shot.

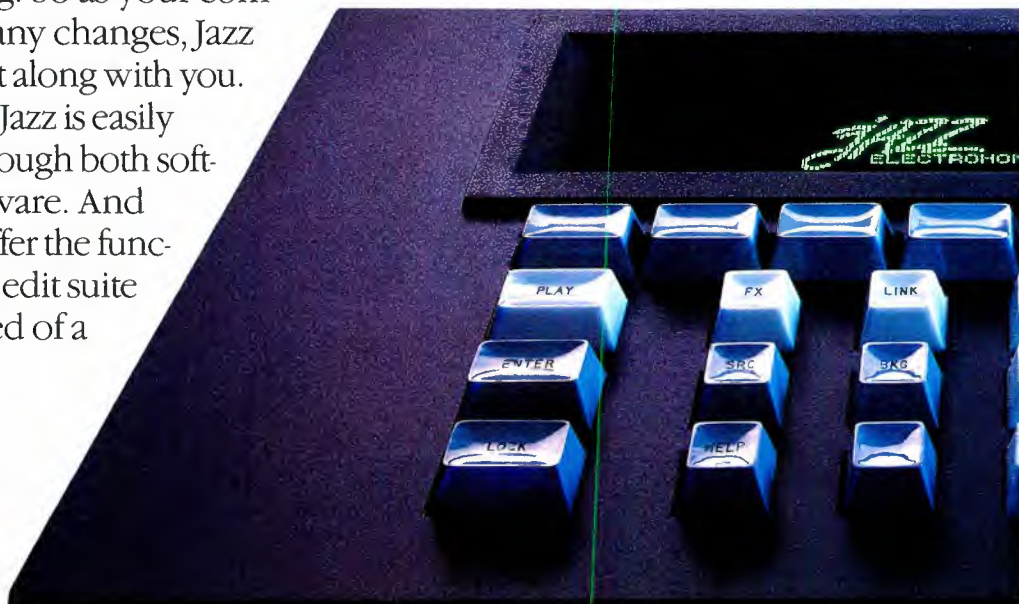
And our Posterization is as pretty as a picture. It operates to an infinite level with a surprising smoothness.

**\$14,995**

A SMALL PRICE FOR /  
GREAT SYSTEM. AND  
SOON YOU CAN ADD  
EDIT SUITE  
FUNCTIONALITY  
WITHOUT THE NEED  
FOR A SWITCHER.



OUR KEYFRAME  
EDITING ALLOWS YOU  
TO PRE-PROGRAM  
ALL YOUR EFFECTS.  
(AND STORE ALL YOUR  
SECRETS ON DISKS.)



DON'T LET THE SIMI  
INTERFACE FOOL YC  
JAZZ IS ONE OF THE



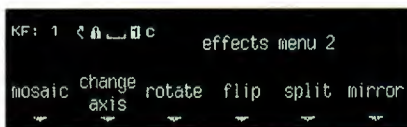
# to perform great video effects.

You can crop an image. Pan a crop over an image. Pan an image within a crop. Or just pan a cropped image. Sounds confusing? It's not. And if you want to change it again, you can. It's easy and it's fast.

That brings us to another key function. Jazz's Link Function allows you to manipulate a keyframe like never before. And virtually eliminates the kind of guesswork and legwork usually associated with creating key sequences.

And Jazz also creates Mirror Image. Horizontal and Vertical Inversion. Borders of any size or colour. And in the near future we'll be adding Dissolve Functionality and

Transparent Drop Shadows.



NO COMPLICATED  
NUMBERS OR QUOTIENTS  
HERE. JAZZ PLAYS  
RIGHT ALONG WITH  
YOU USING A SIMPLE  
SET OF WORDS.

Of course it all comes together with our Keyframe Editing capabilities. It's the ultimate in cut and paste. You just step through the key-

frames and modify any or all of the variables that have been recorded. And we don't have to tell you how helpful that is when a job is tight for time or money. How can we sum it up? It's fast, clean and direct. You don't have to be a techno-wizard to operate it. And you don't have to be a financial wizard to see that it's profitable. Jazz keeps your production services flexible. And it keep your company growing.

So if you're looking for a new system, or a change of systems, look to the one that's always changing.

Jazz from Electrohome.



JAZZ  
IS FAST ENOUGH  
TO STICK WITHIN A  
BUDGET. AND IT'S  
SO INTUITIVE, IT'S A  
JOY TO OPERATE!



POWERFUL TOOLS FOR  
JAZZ'S PROFESSIONAL  
PRODUCER.

For more information, contact Marilyn Weber at Jazz Systems, 809 Wellington St. N., Kitchener, Ontario Canada N2G 4J6. 1-519-749-3134. Jazz is a trademark of Electrohome Limited.

Circle (84) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)





## RCA BROADCAST

Focused On Your Parts / Field Service Needs

- Maintenance/Repair Service
- Studio and transmission equipment parts support
- Equipment refurbishment
- Technical Assistance
- Extensive parts inventory
- 24-Hour emergency parts and field service

United States 609.866.3147

International 609.866.3148

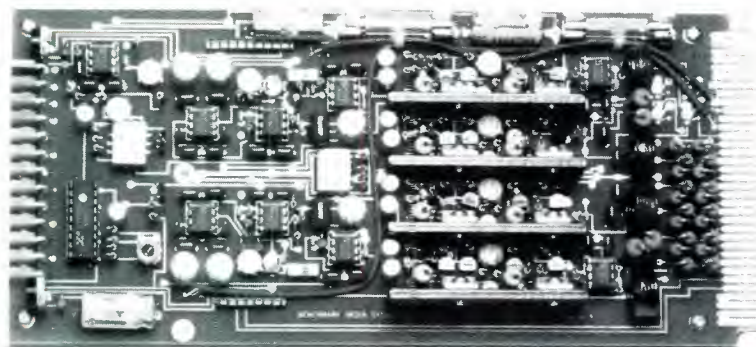


GE Support Services  
RCA Broadcast

Visit us at NAB Booth 5946!

Circle (85) on Reply Card

## The 21 Bit Stereo Audio DA



The application of the digital process to audio has been well received. Unfortunately, digital audio has been given a 1970s standard of 16 bits, with its 96 dB dynamic range. To improve upon this, some are using 18 bit converters with 16 bit data, to wring the last drop from an undersized pipe line. Even when an 18 bit standard comes, it's dynamic range will be limited to 108 dB.

Compare that with the spectacular DA-102, and its dynamic range of 130 dB, (21 bits +). That's 34 dB beyond current digital and 22 dB beyond a future 18 bit standard. With digital still in its infancy, the mature analog technology of the System 1000 is the safe long term investment. At an affordable price, you can have the finest today, and build confidently for the future.

Benchmark - anything less is 2 bit technology!

*Benchmark*  
...the measure of excellence™

Call 1-800-BNCHMRK (262-4675) Nationwide

**BENCHMARK MEDIA SYSTEMS, INC.**  
3817 Brewerton Rd. North Syracuse, NY 13212

Circle (86) on Reply Card

**Applied Research & Technology** 8117  
Digital audio delays, stereo equalizers; dynamics processors.  
Circle (552)

**Arben Design** 3906  
Modular, custom studio fixtures, sets; consoles; hard cycloramas; facilities designs.  
Circle (553)

**Arrakis Systems** 4052  
On-air, production mixers; audio distribution switchers, DAs.  
Circle (554) [See ad page 21](#)

**Arriflex** 5314  
Film cameras, lenses, accessories; lighting ballasts, accessories; time code products; video accessories; studio grid systems.  
Circle (555)

**ASACA ShibaSoku** 5152  
Video monitors; AF, RF, video test equipment; demod; VTR test systems; videotape, videodisc automation; HDTV products; magneto-optical recorders. (S6, V2, V7, V8)  
Circle (557) [See ad pages 68-9](#)

**Associated Computer Services** 9024  
Automation software.  
Circle (558)

**Associated Production Music** 6438  
Production music library, services. (S8)  
Circle (559)

**Aston Electronics** 1106  
Still stores; titling, graphics systems. (V5)  
Circle (560)

**AT&T Graphics Software Labs** 3433  
Graphic software; graphics boards.  
Circle (561)

**ATI/Audio Technologies** 5051  
Audio mixers, processors; mic, phono, headphone, monitor amps, DAs; monitor, test equipment. (A4)  
Circle (562)

**Audi-Cord** 4204  
Audio cart recorder.  
Circle (563)

**Audio Accessories, Inc** 4810  
Printed circuit board jacks; prewired patch panels, patch cords, jacks.  
Circle (564) [See ad page 202](#)

**Audio Broadcast Group** 4039  
Studio furnishings; facility designs, turnkey installations; mobile radio studios. (S3, S7)  
Circle (565)

**Audio Developments** 1942  
Audio mixers for ENG, editing; modular mic/line distribution systems. (A1, S5)  
Circle (566)

**Audiopak** 4811  
Audio cartridge tape.  
Circle (571)

**Audio Precision** 3252  
PC-based audio test, proof of performance measurement systems. (S6)  
Circle (567) [See ad page 95](#)

**Audio Processing Technology/SSL** 1321  
Digital audio compressors. (A2)  
Circle (568) [See ad page 182](#)

**Audio-Technica US** 4214  
Portable audio mixers; instrument, wired,





# THINK OF US AS A UNITED NATIONS OF SOUND

Anywhere you find MTE sound equipment — that's practically everywhere in the world — you'll find Magna-Tech service readily available. Not only when you buy your equipment, but for as long as you own it. Our service engineers are on the road virtually every day of the year, calling on customers, checking on equipment, working with local service people.

With sales offices on six continents, we can provide the right post production equipment from a full line that includes magnetic film recorders and reproducers,

telecine magnetic followers, video tape-film interlocks, electronic looping systems, dubbing systems, 16-and-35mm electronic projectors. Or, we can provide total facility engineering and consultation.

More awards have been won for theatrical and television films on MTE equipment than all others combined. We're ready to help you win some too.

Magna-Tech Electronic Co., Inc.  
630 Ninth Ave., N.Y., NY 10036  
Telephone 212-586-7240  
Telex 126191. Cable "Magtech"  
Fax 212-265-3638.

## MAGNA-TECH ELECTRONIC

NEW YORK • LOS ANGELES • LONDON • PARIS • BRUSSELS • KEHL (WEST GERMANY)  
STOCKHOLM • ROME • BARCELONA • ATHENS • JOHANNESBURG • HONG KONG • TOKYO  
SEOUL • TAIPEI • MANILA • SYDNEY • AUKLAND • KUALA LUMPUR • MADRAS • CARACAS



The Sound Heard Round the World™

Circle (87) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



wireless microphones; headphones. (A4)  
Circle (569)

## Audio-Video Engineering 4740

Hum-stop coils.  
Circle (570) [See ad page 196](#)

## Auditronics 4542

Audio DAs; on-air, audio production consoles, console mix-minus systems. (A1)  
Circle (572) [See ad page 153](#)

## Aurora Systems/Chyron Group 1834

Graphics paint systems. (V5)  
Circle (573)

## Autogram 4806

Audio on-air, production mixers.  
Circle (574)

## Automated Business Concepts 3813

Automation software.  
Circle (575)

## Automation Associates 5352

Video keyers. (V7)  
Circle (576) [See ad page 274](#)

## AVCOM of VA 3151

RF measurement equipment. (S6)  
Circle (577)

## AVID 1119

Non-linear video editing systems.  
Circle (578)

## Avitel Electronics 3006

DAs, distribution switching, patching equipment; time code systems. (S5, V2)  
Circle (579) [See ad page 140](#)

## AVS/Applied Video Systems 1756

TV standards converters. (V7)  
Circle (580) [See ad page 93](#)

## AVS/Audio Visual Systemes 7009

A/V DAs; video titling inserters. (V5)  
Circle (581)

## B&B Systems 1116

Test, monitoring equipment; facility design, consulting services. (S6)  
Circle (582)

## BAF Communication 1564, A238

Satellite uplinking, radio/TV production, ENG vehicles. (R6, S7)  
Circle (583)

## BAL Components 9050

TV timing systems; delays, filters.  
Circle (584)

## Barbervision 1901

Camera support equipment.  
Circle (585)

## Barco Industries 2944

Video monitors; TV modulators, demods; signal switching equipment. (A4, S5, V8)  
Circle (586) [See ad page 151](#)

## Barrett Associates 4606

Audio mixers, processors, recorders, monitors; transmitter, microwave systems; signal distribution, test equipment.  
Circle (587)

## BASYS 1256

Newsroom automation; machine controllers; recording systems; prompters, cap-

tioning equipment; camera support controls. (S1)  
Circle (588)

## BCS Broadcast Store 9019

Broadcast equipment brokers.  
Circle (589)

## Beaveronics 4740

Video production switchers; timers, clocks; A-V Engineering hum-stop coils. (S1)  
Circle (590)

## Beekman Laboratories 7117

Circle (591)

## Belar Electronics Lab 4308

Radio, TV modulation, frequency monitors. (R4)  
Circle (592) [See ad page 210](#)

## Belden Wire & Cable 6007

Wiring, cables; optical fiber materials.  
Circle (593) [See ad page 33](#)

## Belko Konnektor BV 7012

Coaxial cable, connectors.  
Circle (594)

## Bencher 3105

Camera support, lighting, copy stands. (V1)  
Circle (595)

## Benchmark Media Systems 1318

Microphone/audio amps, buffer/mixer, matrixing, gain control modules. (A4)  
Circle (596) [See ad page 138](#)

## BEXT 8104

FM amplifiers, exciters, generators. (R1, R2, R4)  
Circle (597) [See ad page 252](#)

## beyerdynamic 1938

Wired, wireless microphones; headphones; infrared headsets; audio cable, connectors; microphone cases. (A4)  
Circle (598)

## BMS 5108

ENG transmitters, receivers, antenna pointer; RF power amplifiers, exciters, generators. (R2)  
Circle (603)

## Bogen Photo 5948

Camera support products.  
Circle (604)

## Bogner Broadcast Equipment 2028

TV UHF/VHF broadcast antennas.  
Circle (605)

## Boonton Electronics 1437

Microwave power meters, sweepers; audio distortion, impedance analyzers; modulation monitors. (R4)  
Circle (606)

## Bowen Broadcast Service 3008

RCA TCR-100 modification, repair kits. (V2)  
Circle (607)

## Brabury/Porta-Pattern (BPI) 2518

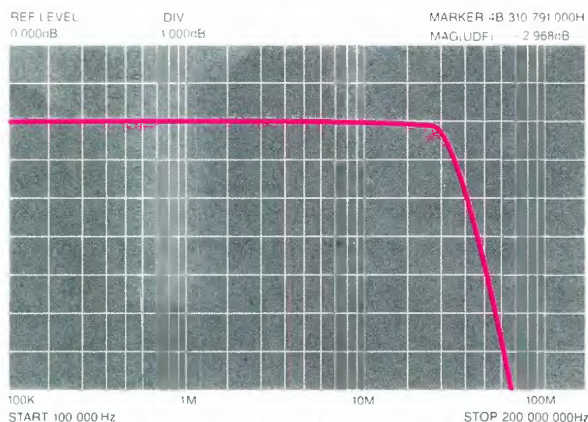
A-V DAs; camera test charts. (V1)  
Circle (608)

## Bradley Broadcast Sales 6354

Audio mixers, processor systems, analog/digital recorders; racks, cases, studio furnishings; tape, tape maintenance products; signal distribution equipment.  
Circle (609)

## Bretford Manufacturing 3637

Video equipment carts, cabinets; video



# AVITEL. THE BEST LINE IN THE BUSINESS.

Avitel introduces a new high performance, modular line of equalizing Video Distribution Amplifiers. Utilizing extensive hybrid-SMD technology, Avitel is setting the standard for VDAs with an impressive list of features which include: ■ integral 3dB cable equalization, ■ 7 matched 75ohm outputs per DA, ■ differential looping input, ■ 13 modules per frame, ■ front panel controls for gain and equalization. In addition, the Avitel DA has the following plug in, user installed module options: ■ variable clamp, ■ user adjustable video delay, ■ extended cable equalizer, ■ DARTbus sync signal monitoring, ■ dual power supplies, ■ 30 MHz HDTV bandwidth. But that's not all. Avitel, with over 10 years of worldwide product leadership, has put a highly competitive price tag on each of their new DA's. Now that's a line too good to resist.

AVITEL ELECTRONICS CORPORATION 3678 W. 2100 S., SALT LAKE CITY, UTAH 84120. (801)977-9553



Circle (88) on Reply Card



# Who makes the best ENG wireless microphone system?



## The best mini-receiver . . .

The CR185 offers a six-pole helical resonator front-end, followed by narrow-band crystal IF filtering at 21.4 MHz. This provides unmatched selectivity and sensitivity, and minimizes drop-outs and interference. A balanced, XLR output interfaces with any professional camcorder.



## The best belt-pack transmitter . . .

The M185 is a highly refined belt-pack transmitter. It matches any input requirement and provides "phantom power" for almost any lavalier microphone via a standard 5 pin jack. The belt-clip is constructed of machined aluminum and steel parts, spring-tensioned for a secure fit on any belt or fabric. Audio level LEDs are provided on the control panel for accurate level adjustment.

## The best "plug-on" transmitter . . .

The H185 introduces new flexibility to your ENG operations. It makes any hand-held or shotgun mic with an XLR connector wireless. The microphone body becomes part of the antenna circuit, forming a very efficient RF radiator. The audio input level is indicated by two LEDs next to the microphone coupler. These LEDs are clearly visible with the microphone attached for accurate level adjustment.



## The best construction . . .

All external parts are constructed of machined aluminum for ruggedness and durability. Shock-mounted crystals are used in the IF filtering and oscillators for reliable operation. The transmitters and receiver are built for the real world of hard knocks.

## The best factory support . . .

Whether it's frequency coordination or follow-up service, Lectrosonics will come through. Our commitment to the needs of broadcasters is second to none. Call us with questions, and you will get answers that make sense.

Call us toll-free to locate  
your nearest dealer:

**1-800-821-1121**



**LECTROSONICS, INC.**

P.O. Box 15900 • Rio Rancho, NM • 87174  
581 Laser Rd. NE • Rio Rancho, NM • 87124  
(505) 892-4501 • (800) 821-1121



# Make order out of your audio cabling chaos



Cannon MASSCON Connectors:  
up to 216 contacts per cable

Get rid of your audio cabling chaos once and for all. Get massive, single-cable connection with field-proven MASSCON circular connectors from Cannon. Originally developed for hostile environment applications, these rugged and versatile mating devices are manufactured in 122, 176 and 216 pin versions.

Cannon MASSCON connectors have hermaphroditic polarization: their self-mating design incorporates hooded, closed-entry contacts with rear insulators for positive retention. Cable repair is quick and simple; protective caps are provided for use when connectors are unmated. All contacts are gold plated.

End cabling chaos now. Get in touch with ITT Cannon today for the information you need about MASSCON.

ITT Cannon, Dept. BE-90  
Four Cannon Court  
Whitby Ontario  
Canada L1N 5V8  
Phone (416) 668-8881  
Fax (416) 668-4152



**ITT Cannon**  
An ITT ElectroMechanical Components Worldwide Company  
*Discover our strengths.*

Circle (89) on Reply Card

screens; wall-mount brackets, shelves. (S3)  
Circle (610)

**Brite Voice Systems/Cityline** 3203  
Interactive voice information services.  
Circle (611)

**Broadcast Audio** 4452  
Audio on-air, production mixers, distribution equipment.  
Circle (612)

**Broadcast Automation** 8121  
IGM automation; audio recorders, processors.  
Circle (613)

**Broadcast Electronic Services** 8047  
Computer peripherals, interformat editing equipment, interfaces, accessories.  
Circle (614)

**Broadcast Electronics** 4500  
FM transmitters; audio mixers; cart recorders; radio program automation; stereo exciters, generators; pre-amp; phono systems; remote control equipment.  
Circle (615) [See ad page 11](#)

**Broadcast Products** 6454, A201  
Promotional vehicles for radio stations.  
Circle (616)

**Broadcast Supply West/BSW** 4046  
Distributor; audio mixers, recorders; processors; mic, phono, CD players; tape storage racks; audio distribution equipment.  
Circle (617) [See ad page 164](#)

**Broadcast Technology Partners** 1415  
FM broadcast enhancement products.  
Circle (618)

**Broadcast Video Systems/BVS** 5041  
Video encoders, keyers; RGB processors; safe-area, time/date character generators; video, pulse delays; test equipment; title assembler; multistandard decoders. (S5, V7)  
Circle (620) [See ad page 250, 254](#)

**Broadcast Yellow Pages** 1143  
Industry directories.  
Circle (621)

**Broadcasters General Store** 8016  
Newsroom workstations; audio processors, noise reduction; remote controllers. (A2, S1)  
Circle (622)

**Bruel & Kjaer Instruments** 8029  
Low-noise, high-intensity microphones; recording, measurement simulator. (A5, S6)  
Circle (623)

**Bryston Ltd** 6039  
Audio monitor amplifiers.  
Circle (625) [See ad page 218](#)

**BSM Broadcast Systems** 3210  
Distribution systems, routing switchers; patch panels. (S5)  
Circle (626)

**BTC Test & Measurement/Philips** 1914  
Test equipment, signal generators, modulators, demods.  
Circle (627) [See ad page 99](#)

**BTS** 5808  
Cameras; analog, digital video recorders, editing equipment; telecines; digital graphics systems; production, master control switchers; audio, digital video signal

processors, format converters, sync generators; routing, DA, test equipment. (A5, S1, S5, V1)  
Circle (628) [See ad pages 81, 97](#)

**Burk Technology** 9022  
Transmitter remote control systems. (R1)  
Circle (629)

**BURLE INDUSTRIES** 5024  
Video camera tubes. (V1)  
Circle (630) [See ad page 245](#)

**Cablewave Systems/RF Systems** 4020  
Coaxial, waveguide transmission line; tower, antenna products, services. (R1)  
Circle (631) [See ad page 49](#)

**Cal Switch** 1453  
Test, measuring products distributors.  
Circle (632)

**Calculated Industries** 1455  
Time code, accounting calculators.  
Circle (633) [See ad page 199](#)

**Calzone Case** 2045  
ATA-rated transport cases; permanent, portable rack-mountable workstations; editing system racks. (S3)  
Circle (634)

**Cam-Lok** 9017  
Multiconductor control wiring, power connectors, interlocks.  
Circle (635)

**Camera Mart** 6330  
Distributor, audio, video products; cameras, recorders, lighting; batteries, chargers; audio mixers; sales, rentals. (V7)  
Circle (636) [See ad page 72](#)

**Camera Platforms Int'l** A254  
Circle (637)

**Canare Cable** 3730  
Video coaxial cable, component cable, BNC plugs, jacks, terminations. (S2)  
Circle (638) [See ad page 76](#)

**Canon USA/Broadcast Optics** †3134  
TV camera lenses; camera support products; still video cameras, reproducers; HDTV signal coders, decoders. (V1, V2, V7)  
Circle (639) [See ad page 241](#)

**Capitol/Production Music** 5047  
Production music libraries.  
Circle (640)

**Carpel Video** 1153  
New, reconditioned, recycled videotape.  
Circle (641)

**CASCOM** 1206  
Animation services; telecine accessories; camera support systems. (S8)  
Circle (642)

**Case Editing Systems** 7205  
Videotape editing systems.  
Circle (643)

**Catel Telecommunications** 5510  
Modulators, demodulators; multichannel transmission systems.  
Circle (644)

**CBSI Custom Business Systems** 4652  
Station business automation software. (S1)  
Circle (646)

**CCA Electronics** 4442  
AM, FM radio transmitters, FM exciters. (R5)  
Circle (647)





# GO AHEAD! MAKE YOUR DAY.

**Panasonic**

Show Panasonic Broadcast Systems **your busiest log, your toughest break. We'll make your day**, and we'll make it easier.

Over 50 systems operate worldwide with Panasonic's M.A.R.C. —relied upon to handle every scheduled playback from I.D.'s, spots and promos to programs and network. M.A.R.C. works elegantly with traffic systems from Bias, JDS, Columbine or Enterprise, and finds trouble long before it hits air. As-run logs document what ran, when, and if not, why not.

The M.A.R.C. is one tough customer. Its superior

1/2-inch MII image quality, its street-smart software and its advanced Matsushita robotics make the M.A.R.C. unbeatable.

Panasonic's M.A.R.C. stays ahead technologically. Optional VTR interfaces control three cutboard 1-inch VTR's; a new Off-Line Cassette Dub System enables dubbing material onto MII cassettes with minimal operator entry.

So, go ahead. Sit down at M.A.R.C.'s keyboard, and let M.A.R.C. make your day.

Booth 2534

Panasonic Broadcast Systems Company, Field Offices: (Northeast) Washington, DC (703) 759-6900; (Southeast) Norcross, GA (404) 925-6721; (Midwest) Arlington Heights, IL (312) 481-7325/(312) 852-3715; (Southwest) Fort Worth, TX (817) 685-1152; (Western) Cypress, CA (714) 373-7209; (Northwest) (408) 866-7974.

Panasonic Broadcast Systems Company, One Panasonic Way, Secaucus, NJ 07094 (201) 348-7671

## Panasonic Broadcast Systems

Circle (91) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



**CEL Electronics** 1212  
Digital video effects systems, standards converters; editing control accessories. (V2, V5, V7)  
Circle (648) [See ad page 107](#)

**Central Dynamics** 2052  
Production, master control switchers; digital encoding, decoding, translators. (V7)  
Circle (649)

**Central Tower** 6602  
Tower products; tower maintenance, installation services. (R1)  
Circle (650)

**Century 21 Programming** 4203  
Radio programming services.  
Circle (651)

**Century Precision Optics** 3808  
Lenses, special purpose optics; wide-angle, telephoto, zoom accessories. (V1)  
Circle (652)

**Channelmatic** 6014  
Videocassette record/play automation, commercial insertion, related products; signal distribution systems. (S1)  
Circle (653)

**Chapman/Leonard Studio** 8031, A244  
**Equipment**  
Circle (654)

**Christie Electric** 1419  
Batteries, chargers, analyzers. (V4)  
Circle (656)

**Chyron Group** 1834  
*See:*  
*Aurora Systems*  
*Chyron*  
*CMX*  
*Digital Services/DSC*

**Chyron** 1834  
Character generators; electronic graphics, paint systems. (V5)  
Circle (657)

**Cine 60** 3129  
Batteries, belts, packs; battery chargers, conditioners; portable lighting products.  
Circle (658)

**Cinema Products** 2124  
Cine cameras; camera stabilizers; wireless camera control equipment; video assist units; film-transfer accessories. (V1, V3)  
Circle (659)

**Cinemills** 1546  
Lighting equipment, accessories, gels. (V4)  
Circle (660)

**Cipher Digital** 1800  
A-V editing controllers; transport synchronizers, controllers; time code

products. (V2)  
Circle (661)

**Circuit Research Labs** 4656  
Audio processors; radio, TV stereo, subcarrier generators, exciters. (A2)  
Circle (662)

**Clear-Com Intercoms** 1407  
Digital matrix, analog intercom systems; single, multichannel wired/wireless headset, speaker, mic operation; IFB, ISO interfaces; stereo monitors, speakers. (A4)  
Circle (663) [See ad page 276](#)

**CMC Technology** 5754  
Replacement videotape recorder heads; upper drum refurbishing.  
Circle (665)

**CMX/Chyron** 1834  
Videotape editing controller systems. (V2)  
Circle (666)

**Coaxial Dynamics/Kirkwood Ind** 6816  
Power terminations, loads; RF test equipment, wattmeters. (S6)  
Circle (667)

**Colorado Video** 2933  
Slow-scan video transmission systems; still stores; video noise reduction equipment.  
Circle (668)



With the new TEAC LV-250 HC high-resolution laser videodisc system you can record broadcast quality video images on a recorder small enough to sit on a desktop. And it's as easy as using a VCR. With TEAC direct color laservideo recording, you get instant random access to 27,000 coded still images or 15 minutes of motion video including 2 channels of audio, all on a no-wear media. Broadcasters can store logos, ID frames, and station breaks with an access time of less than 1 second.

**ACCESS FRAME 1-27,000  
IN A SECOND.**

The wider bandwidth of the TEAC LV-250 HC direct color recording system is ideal for reproducing high-resolution video graphics in their purest form. Frame-by-frame animation or "paint-box" generated images can instantly be recorded without tape roll or cue times.

The TEAC LV-250 HC is the most cost-effective way to record and reproduce air quality high-resolution video images. In fact, it's causing a lot of people to look at recordable laservideo in a whole new light.

Visit us at NAB Booth #3352

**TEAC**  
Recordable Videodisc Division

COPYRIGHT 1990. TEAC AMERICA, INC. 7733 TELEGRAPH ROAD, MONTEBELLO, CA 90640. TELEPHONE: (213) 726-0303 EXT. 675

Circle (92) on Reply Card



# PAG CHARGES INTO THE 1990s

With  
the World's most  
advanced Superfast  
Charger – PAG SF1



INCORPORATING  
**PAG ACS**

## PAG SF1, a new microcomputer-controlled four channel multi-function charger.

- PAG SF1 has 3 charging programs:  
*Superfast charge - one battery every 30 minutes.*  
*Fast charge - two batteries every 60 minutes.*  
*Slow charge - four batteries in eight hours.*
- Accepts NP1 type batteries of any manufacture, voltage or capacity.
- Maintains the balance of individual cells, thereby removing the most common cause of battery failure.
- Fully indicates the charge status of each battery.
- Detects and indicates faulty batteries.
- Adjusts automatically to AC power supplies, permitting use virtually anywhere in the World.
- Incorporates the advanced charging system - PAG ACS.

Circle (93) on Reply Card

**Frezzi**  
**PAG**

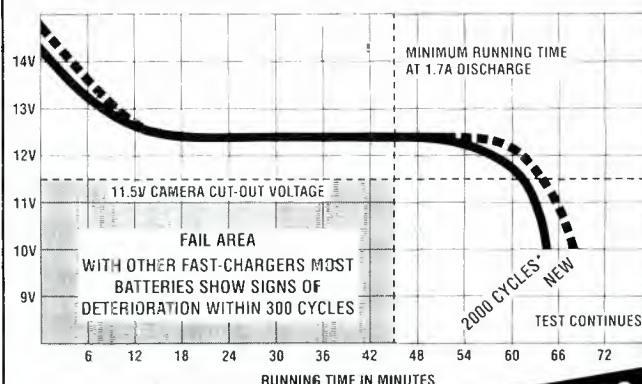
For full details contact:

**Frezzolini Electronics Inc.** 5 Valley Street, Hawthorne NJ 07506.  
(201) 427-1160 (800) 345-1030 FAX: (201) 427-0934 TWX: 710-988-4142.

So accurate is the PAG ACS two wire sensing and full charge detection that the duty cycle life of a battery is significantly increased, beyond that achievable by any other system.

### PAG ACS PERFORMANCE TEST

Over 60 minutes running time achieved from NP1A battery after 2000 cycles. Charged in 30 minutes and discharged at 1.7A.

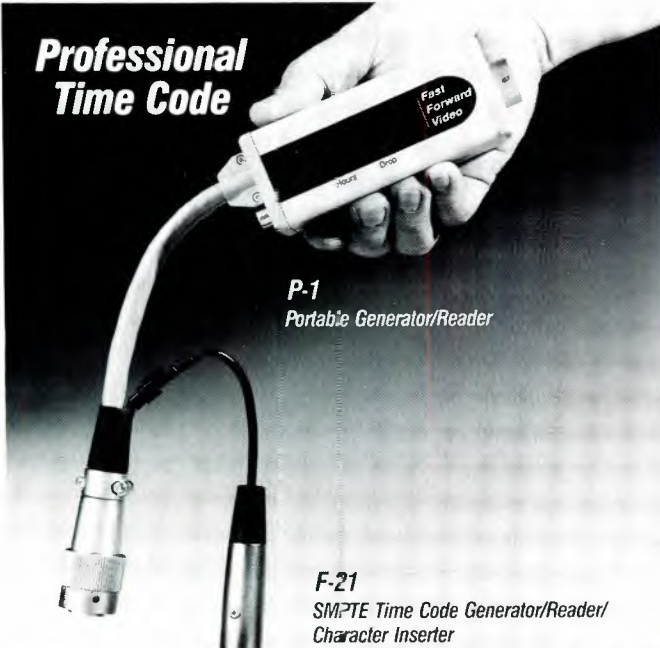


**SEE US AT NAB 90**  
**BOOTH #2834 + 2836**  
**TO OBTAIN PAG SF1**



|                                                                                                                                                                    |                                                                                                                                                                                                                                                                                |                                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <b>ColorGraphics Systems/Dynatech</b> 6030<br>Electronic graphics equipment; weather graphics, data services. (V5)<br>Circle (669)                                 | <b>Compact Storage Systems</b> 9000<br>Videotape storage systems.<br>Circle (677)                                                                                                                                                                                              | IFB, off-air cuing equipment. (A2)<br>Circle (684)                                                                        |
| <b>Columbine Systems</b> 2522<br>Music library/programming, newsroom, traffic management software.<br>Circle (670)                                                 | <b>Comprehensive Video Supply</b> 1660<br>Pro videographer equipment; computer-aided video; editing systems; S-VHS titlers, video processors; script software; lighting; modular effects, keyers, A-V mixer, DA products. (A1, A4, S2, S5, V2, V4, V5, V7, V8)<br>Circle (678) | <b>Comsat World Systems</b> 3316<br>Satellite system video codecs, modems.<br>Circle (685)                                |
| <b>Comad Communications</b> 2448<br>FM radio, TV antennas; distributors, SIRA Sistemi Radio antennas. (R1)<br>Circle (671)                                         | <b>Comprompter</b> 6355<br>Electronic newsroom, prompting systems.<br>Circle (679)                                                                                                                                                                                             | <b>Comtech Antenna</b> 3002<br>Earth station antennas. (R6)<br>Circle (686)                                               |
| <b>Comark Communications</b> 5920<br><b>Thomson-CSF</b><br>UHF TV transmitters, solid-state, Klystron designs. (R1)<br>Circle (672) See ad page 156, 173, 234, 256 | <b>Computer Concepts</b> 4040<br>Broadcast automation, business hardware, software; programming services. (S1)<br>Circle (680)                                                                                                                                                 | <b>ComTek</b> 3908<br>Wireless microphone, receiver systems. (A4)<br>Circle (687)                                         |
| <b>Comband Technologies</b> 3439<br>ITFS, MMDS equipment. (R2)<br>Circle (673)                                                                                     | <b>Computer Engineering Associates</b> 1102<br>Circle (681)                                                                                                                                                                                                                    | <b>COMWAVE</b> 2904<br>Microwave equipment. (R2)<br>Circle (688)                                                          |
| <b>COMLUX</b> 9037<br>Fiber optic transmission, terminal equipment; video codecs. (S1, V7)<br>Circle (674)                                                         | <b>Computer Music Consortium</b> 9006<br>Computer-generated music equipment.<br>Circle (682)                                                                                                                                                                                   | <b>Concept Productions</b> 4330<br>Computer-assisted programming systems for radio; radio formats on DAT.<br>Circle (689) |
| <b>Commodore Business Machines</b> 165W<br>Personal computers, peripherals. (S1)<br>Circle (675)                                                                   | <b>Computer Prompting</b> 3137<br>Video promptings, monitors; automation hardware, software. (V5)<br>Circle (683)                                                                                                                                                              | <b>Conifer</b> 1334<br>ITFS, MMDS antennas, electronics. (R2)<br>Circle (690)                                             |
|                                                                                                                                                                    | <b>Comrex</b> 5214<br>Audio mixers; telco frequency extenders;                                                                                                                                                                                                                 | <b>Connectronics</b> 1922<br>Multipair, audio cables, connectors. (S2)<br>Circle (691)                                    |
|                                                                                                                                                                    |                                                                                                                                                                                                                                                                                | <b>Connolly Systems Ltd</b> 1256<br>Automation systems.<br>Circle (692)                                                   |

**Professional Time Code**



**P-1**  
Portable Generator/Reader

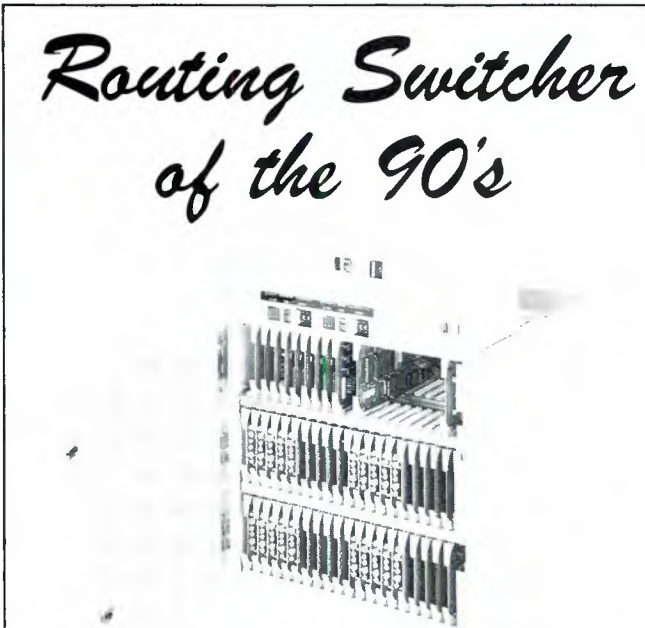
**F-21**  
SMPTE Time Code Generator/Reader/  
Character Inserter

On Fast Forward Video F21 SMPTE Time

Call your local dealer or contact us at (714) 852-8404

**Fast Forward Video**

**Routing Switcher of the 90's**



SMALL TO MEDIUM SCALE  
ROUTER SPECIALIST

- \* STANDARD NTSC/PAL SPEC.
- \* COMPONENT AND Y/C
- \* HI-RES. COMPUTER GRAPHICS
- \* AUDIO/TIME CODE/RS232/RS422

**OMICRON VIDEO** TEL: (818) 700-0742  
FAX: (818) 700-0313  
21822 LASSEN ST. UNIT L, CHATSWORTH, CA 91311-3680





# ***The standards converter with the smoothest moving image of any system.***

OKI's Digital Television Standards Converter Model LT2000 achieves *True Motion Continuity*. Next Generation Technology has produced the "Motion Vector System" (MVS™), making possible the first portable standards converter to eliminate motion discontinuity, or jerkiness, that occurs with high-speed camera panning and fast-action video program material. Other standards converters, using the 2-and 4-field interpolation systems, fail to reduce motion discontinuity, and as a result have been objectionable to the professional market.

MVS™ divides each field of video into pixel sections for motion vector detection and measurement, using the Interactive Gradient Method (IGM). IGM, the most advanced method ever

developed for precise and finite motion detection, allows the LT2000 to produce the smoothest moving image of any system available. MVS™ accomplishes this without the resolution loss common on other high-end standards

converters. The displayed video picture is not only free from conversion artifacts, but also without interpolation resolution loss. The end result... a clean, sharp picture with *True Motion Continuity*!

With the LT2000, your only problem is telling the output from the input!

\*IGM is a development of Kokusai Denshin Denwa Co., Ltd.



TV STANDARDS CONVERTER

## **LT2000TSC**

**Head Office:**  
Overseas Marketing & Sales  
10-3, Shibaura 4-chome,  
Minato-ku, Tokyo 108, Japan  
Tel (03) 454-2111  
Fax (03) 452-5214  
Telex J22627  
Cable OKIDENKI TOKYO

**Local OKI Distributor**  
**MAL-Danmon Ltd.**  
Dancon House,  
North Circular Road  
London NW 10 7SS, U.K.  
Tel (01) 965-9575  
Fax (01) 961-9329  
Telex 923056

**SAECO INTERNATIONAL**  
1122 East Chevy Chase Drive  
Glendale, CA 91205  
U.S.A.  
Tel. (213) 245-7708  
Fax (818) 241-2691

**ALEX L. CLARK LTD.**  
30 Dorchester Avenue  
Toronto, Ontario M8Z 4W6,  
Canada  
Tel. (416) 255-8594  
Fax (416) 255-9260

# **OKI**

**Oki Electric Industry Co., Ltd.**  
Tokyo, Japan

Circle (96) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



|                                                                                                                                                                                                      |                                                                                                                                                                                                                                                 |                                                                                                                                                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Conrac Display Products</b> 5800<br>Video monitors. (V8)<br>Circle (693)                                                                                                                          | <b>Delta Electronics</b> 4518<br>RF test products; transmitter control, transfer switching, power, modulation controllers; AM stereo processors; HV toroidal current transformers. (R1, R4, S6)<br>Circle (715) <a href="#">See ad page 249</a> | <b>Dubner Computer Systems</b> 5830<br>Still store; digital graphic art, titlers, master control systems. (V5)<br>Circle (736)                                                          |
| <b>Continental Electronics/Varian</b> 4316<br>AM, FM broadcast radio transmitters. (R1)<br>Circle (694) <a href="#">See ad page 100</a>                                                              | <b>Denon America</b> 8114<br>Compact disc player systems.<br>Circle (716) <a href="#">See ad page 205</a>                                                                                                                                       | <b>Duggan Manufacturing</b> 8027<br>Case hardware.<br>Circle (737)                                                                                                                      |
| <b>Control Concepts</b> 2025<br>Power line filters, conditioners. (S6)<br>Circle (695) <a href="#">See ad page 154</a>                                                                               | <b>DeSisti Lighting/DESMAR</b> 6100<br>Studio rigging, fixtures; lighting instruments, mounting, lamps; light controllers.<br>Circle (717)                                                                                                      | <b>Dwight Cavendish</b> 3804<br>Videocassette duplicators, QC units. (V2)<br>Circle (738)                                                                                               |
| <b>Convergence</b> 1734<br>Video editing controller systems. (V2)<br>Circle (696)                                                                                                                    | <b>DeWolfe Music Library</b> 2758<br>Production music, effects libraries.<br>Circle (718)                                                                                                                                                       | <b>DX Communications</b> 3113<br>Satellite receivers.<br>Circle (739)                                                                                                                   |
| <b>Corporate Communications</b> 2602<br>Film-to-video transfer, signal correctors.<br>Circle (697)                                                                                                   | <b>Di-Tech</b> 2954<br>Distribution routers; tally systems. (S5)<br>Circle (719) <a href="#">See ad Inside Back Cover</a>                                                                                                                       | <b>DYNAIR Electronics</b> 5122<br>Routing switchers; modular distribution equipment. (S5)<br>Circle (740) <a href="#">See ad page 216</a>                                               |
| <b>Cortana Corporation</b> 3734<br>Lightning protection systems.<br>Circle (698) <a href="#">See ad page 252</a>                                                                                     | <b>DIC Digital</b> 7002<br>Circle (720)                                                                                                                                                                                                         | <b>Dynatech Corporation</b> 6030<br><i>See:</i><br><i>ALTA Group</i><br><i>ColorGraphic Systems</i><br><i>Dynatech NewStar</i><br><i>LEA</i><br><i>Quanta</i><br><i>Utah Scientific</i> |
| <b>Countryman Associates</b> 2043<br>Microphones, audio accessories.<br>Circle (699)                                                                                                                 | <b>Dielectric Communications</b> 4108<br>Transmission line, waveguide; CP, panel antennas; RF switching, patch panels, power combiners, diplexers.<br>Circle (721)                                                                              | <b>Dynatech NewStar</b> 6030<br>Newsroom automation systems, software.<br>Circle (742)                                                                                                  |
| <b>Crosspoint Latch</b> 3308<br>Video production switchers, switcher/TBC production systems. (V5, V7)<br>Circle (700)                                                                                | <b>Digital Arts</b> 1464<br>PC graphic software. (V5)<br>Circle (722)                                                                                                                                                                           | <b>E-N-G Mobile Systems</b> 5307<br>ENG, news gathering vehicles.<br>Circle (743)                                                                                                       |
| <b>Cubicomp</b> 6700<br>Digital graphics, animation systems (V5).<br>Circle (701)                                                                                                                    | <b>Digital Audio &amp; Video</b> 3742<br>Circle (723)                                                                                                                                                                                           | <b>Eastman Kodak</b> 1905<br>Videotape products; photographic films; HDTV film-to-video. (V3)<br>Circle (744)                                                                           |
| <b>Current Technology</b> 9026<br>Power line conditioners. (S6)<br>Circle (702)                                                                                                                      | <b>Digital Audio Research</b> 8000<br>Digital audio disk-based workstations; dialog synchronizers. (A5)<br>Circle (724)                                                                                                                         | <b>Echolab</b> 6716<br>Video production switchers; digital effects systems. (V5, V6)<br>Circle (745)                                                                                    |
| <b>Cybermation</b> 8046<br>Circle (703)                                                                                                                                                              | <b>Digital Dynamics</b> 7024<br>Audio hard disk recorder, workstation. (A5)<br>Circle (726)                                                                                                                                                     | <b>Econco Broadcast Service</b> 5756<br>Power transmitter tube, low power reflex klystron rebuilding service.<br>Circle (746)                                                           |
| <b>Cycle-Sat</b> 3428<br>Satellite program and commercial relay services; addressable receivers. (S8)<br>Circle (704) <a href="#">See ad page 203</a>                                                | <b>Digital F/X</b> 5308<br>Video effects, production systems. (V5)<br>Circle (727)                                                                                                                                                              | <b>Editing Machines Corporation</b> 1006<br>Videotape editing controller equipment.<br>Circle (747)                                                                                     |
| <b>Data Center Management</b> 1002<br>Electronic newsroom systems.<br>Circle (706)                                                                                                                   | <b>Digital Microwave</b> N.A.<br>Video microwave systems. (R2)<br>Circle (728) <a href="#">See ad page 74-5</a>                                                                                                                                 | <b>EEG Enterprises</b> 2838<br>On-screen text, caption, vertical interval data encoders, decoders. (S1)<br>Circle (748)                                                                 |
| <b>Data Security</b> 7001<br>Degaussers videotape, metal particle, instrumentation, computer recording media.<br>Circle (707)                                                                        | <b>Digital Processing Systems</b> 3234<br>Digital frame synchronizer, TBCs. (V7)<br>Circle (729)                                                                                                                                                | <b>EEV</b> 6310<br>Leddicon camera tubes; high-efficiency, UHF TV klystrons; RF power devices; satellite electronics. (R3, V1)<br>Circle (749) <a href="#">See ad page 189</a>          |
| <b>Datacount</b> 8030<br>Station management software.<br>Circle (708)                                                                                                                                | <b>Digital Services-DSC/Chyron</b> 1834<br>Digital video effects, compositing systems, digital disk recorders. (S5, V2)<br>Circle (730)                                                                                                         | <b>EG&amp;G/Electro-Optics</b> 5031<br>Tower lighting, controls, beacons.<br>Circle (750)                                                                                               |
| <b>Datatek</b> 5652<br>Signal routing, distribution equipment. (S5)<br>Circle (709) <a href="#">See ad page 31</a>                                                                                   | <b>DKW Systems</b> 1115<br>Automation systems.<br>Circle (731)                                                                                                                                                                                  | <b>Elcom Bauer</b> 1036<br>AM, FM transmitters.<br>Circle (751)                                                                                                                         |
| <b>Dataworld</b> 4456<br>Broadcast engineering databases; mapping services; allocation, interference, population studies; subscriber databases. (S7)<br>Circle (710) <a href="#">See ad page 277</a> | <b>Dolby Labs</b> 4443<br>Audio noise reduction systems; aural spectral enhancement processors; digital audio coding/decoding equipment. (A2, A5)<br>Circle (733) <a href="#">See ad page 45</a>                                                | <b>Electro Impulse Laboratory</b> 4305<br>RF loads, colorimeters, wattmeters.<br>Circle (752)                                                                                           |
| <b>dbx/AKG Acoustics</b> 6500<br>Noise reduction equipment. (A2)<br>Circle (1263)                                                                                                                    | <b>Dorrough Electronics</b> 5506<br>Audio test equipment; audio mixers, dynamics processors; exciters. (S5, S6)<br>Circle (734) <a href="#">See ad page 46</a>                                                                                  | <b>Electrohome/Jazz Systems</b> 2850<br>Video monitors/projectors; digital video ef-                                                                                                    |
| <b>DEC/Digital Equipment</b> 1600<br>Computer hardware.<br>Circle (712)                                                                                                                              | <b>DSI Communications</b> 1512<br>Remote transmitter controls; site monitoring; design, installation, consulting.<br>Circle (735)                                                                                                               |                                                                                                                                                                                         |
| <b>Delcom USA</b> 3204<br>Facilities designs, construction.<br>Circle (714)                                                                                                                          |                                                                                                                                                                                                                                                 |                                                                                                                                                                                         |



Quality Equipment for Professional Audio and Broadcast

aeq



Circle (127) on Reply Card

APLICACIONES ELECTRONICAS QUASAR S.A.

Pel. Inc. Leganés. C/Rey Pastor, 3 28914 LEGANÉS, MADRID (SPAIN)

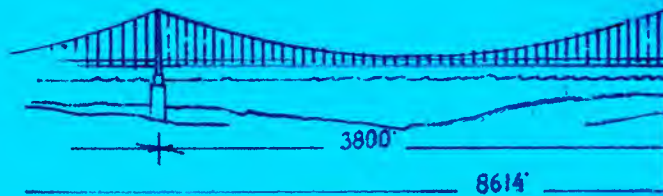
[www.americanradiohistory.com](http://www.americanradiohistory.com)



|                                                                                                                                            |                   |                                                                                                                                                                                                |                                                                                                                                                                                                                                                                 |                     |
|--------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| fects systems. (V5)<br>Circle (754)                                                                                                        | See ad page 136-7 | <b>Ferno Washington/Salesmaker</b> 3117<br>A/V carts; batteries, lighting accessories.<br>Circle (773)                                                                                         | <b>Garner Industries</b> 2027<br>Tape degaussing systems. (S4)<br>Circle (792)                                                                                                                                                                                  | See ad page 110     |
| <b>Electronic Research</b> 4013<br>FM antennas, duplexers, notch filters.<br>Circle (755)                                                  |                   | <b>FGV Panther</b> 6822<br>Studio cranes; HMI lighting. (V1, V4)<br>Circle (774)                                                                                                               | <b>GDI/Generic Designs</b> 3026<br>Machine control equipment. (V2)<br>Circle (793)                                                                                                                                                                              |                     |
| <b>Electronic Script Prompting</b> 8039<br>Prompter systems.<br>Circle (756)                                                               |                   | <b>Fiberbilt Cases</b> 6017<br>Shipping, carrying cases, containers. (S3)<br>Circle (775)                                                                                                      | <b>GE American Communications</b> 5722<br>Satellite services for radio, TV; C-/Ku-band;<br>international interconnections; SCPC, SNG,<br>occasional, business video, digital audio.<br>Circle (794)                                                             |                     |
| <b>Electro-Voice</b> 4618<br>Audio mixer; microphones, speakers.<br>Circle (753)                                                           | See ad page 161   | <b>Fidelipac</b> 4624<br>Dynamax cart recorders; Audimax audio<br>recording tape; on-air warning lights.<br>Circle (776)                                                                       | <b>GE Lighting</b> 5500<br>Stage, studio lamps.<br>Circle (795)                                                                                                                                                                                                 |                     |
| <b>EMCEE</b> 2440<br>TV transmitters, ITSF, MMDS equipment;<br>tower products, services. (R1, R2)<br>Circle (758)                          |                   | <b>Field Engineering</b> 1146<br>Video safe area/title generators. (V7)<br>Circle (777)                                                                                                        | <b>Gefen Systems</b> 8038<br>CD players; computer software; sound ef-<br>fects libraries.<br>Circle (796)                                                                                                                                                       |                     |
| <b>Emcor Products/Crenlo</b> 3064<br>Modular electronic equipment enclosures,<br>components, accessories.<br>Circle (759)                  | See ad page 211   | <b>Film House</b> 4053<br>TV spots for radio stations.<br>Circle (778)                                                                                                                         | <b>Gennum/Video Broadcast</b> 7126<br>Wideband switching components, ICs.<br>Circle (797)                                                                                                                                                                       |                     |
| <b>Emergency Alert Receiver</b> 6442<br>EBS receivers; SCA receivers. (R4)<br>Circle (760)                                                 |                   | <b>FirstCom</b> 6733<br>Financial services.<br>Circle (779)                                                                                                                                    | <b>Gentner Electronics</b> 5852<br>Transmitter controllers; audio processors;<br>telco interfaces; recording systems; dis-<br>tribution equipment; patching. (A2, R5)<br>Circle (798)                                                                           | See ad page 65, 225 |
| <b>Energy-Onix</b> 4746<br>FM transmitters, exciters, amplifiers; AM<br>NRSC filters. (R1, R4)<br>Circle (761)                             |                   | <b>Flash Technology</b> 5612<br>Tower obstruction lighting, beacons. (R1)<br>Circle (780)                                                                                                      | <b>Geocam</b> 9035<br>Video matte boxes, brackets; camera<br>mounting base plates; follow focus<br>modules. (V1)<br>Circle (799)                                                                                                                                |                     |
| <b>Enterprise Electronics</b> 6047<br>Weather radar systems. (V5)<br>Circle (762)                                                          |                   | <b>FloriCal Systems</b> 6730<br>Automated videotape record, playback,<br>tape-delay systems; TV automation; video<br>compositing systems. (S1, S6)<br>Circle (781)                             | <b>Giant Boom Box Industries</b> 4116<br>Mobile promotional vehicles. (S7)<br>Circle (801)                                                                                                                                                                      |                     |
| <b>The Equipment Broker</b> 1017<br>Broadcast equipment broker services.<br>Circle (763)                                                   |                   | <b>Focal Press</b> 1946<br>Books on video, photographic techniques,<br>digital audio, audio/video equipment.<br>Circle (782)                                                                   | <b>GLW Enterprises</b> 4124<br>Audio consoles, console automation. (A1)<br>Circle (802)                                                                                                                                                                         | See ad page 156     |
| <b>ERGO 90</b> 1060<br>Equipment rack, slide kits; lighting, battery<br>products. (S3)<br>Circle (764)                                     | See ad page 210   | <b>Folsom Research</b> 7014<br>Computer-to-video conversion equipment.<br>Circle (783)                                                                                                         | <b>GML</b> 3744<br>Mics; motorized faders; console automa-<br>tion; audio processors. (A1, A2)<br>Circle (803)                                                                                                                                                  |                     |
| <b>ESD/Environmental Satellite Data</b> 6538<br>Weather graphics, displays, services.<br>Circle (765)                                      |                   | <b>FOR-A</b> 3522<br>Audio mixers; DAs; video processors, TBCs,<br>synchronizers, format converters; titling,<br>digital effects systems; video switchers. (S5,<br>V1, V6, V7)<br>Circle (784) | <b>Gorman-Redlich</b> 4902<br>EBS encoders, decoders; NOAA weather<br>radios; digital AM array antenna monitors.<br>Circle (804)                                                                                                                                |                     |
| <b>ESE</b> 6714<br>Time code equipment, clocks; DAs; graphic<br>titlers; video black generators; video faders.<br>(S5, V7)<br>Circle (766) | See ad page 261   | <b>Fort Worth Towers</b> 4730<br>Broadcast, communications towers, ser-<br>vices; equipment shelters.<br>Circle (785)                                                                          | <b>Gotham Audio</b> 2342<br>Neumann microphones; EMT-Franz audio<br>noise reduction, signal processors; CD re-<br>corders, players; audio recorders; K&H<br>speakers; complete digital studio; A&D<br>processors, R-DAT equipment. (A2, A4, A5)<br>Circle (805) |                     |
| <b>Eventide</b> 6701<br>Digital audio delays, effects processors;<br>time modification systems. (A2)<br>Circle (767)                       |                   | <b>Fostex</b> 2506<br>Audio recorders, event controllers; head-<br>phones, microphones.<br>Circle (786)                                                                                        | <b>Graham-Patten Systems</b> 1654<br>Audio edit mixers; component video keyers;<br>audio signal transmission systems. (A1)<br>Circle (806)                                                                                                                      | See ad page 195     |
| <b>Evertz Microsystems</b> 6444<br>Time code systems; editor controllers. (V2)<br>Circle (768)                                             | See ad page 266   | <b>Frezolini/PAG Electronics</b> 2834<br>Batteries, chargers, analyzers; portable<br>lighting equipment. (V4)<br>Circle (787)                                                                  | <b>Grass Valley Group</b> †5830<br>Routing, production, master control<br>switchers; video effects, Dubner graphics<br>systems; analog, digital, component video<br>products; edit controllers; fiber optic<br>products. (S5, V5, V7)<br>Circle (807)           | See ad page 9, 229  |
| <b>Excalibur Industries</b> 6200<br>Equipment transport cases.<br>Circle (769)                                                             |                   | <b>Fujinon Optics</b> †1700<br>TV camera lenses.<br>Circle (789)                                                                                                                               | <b>Great American Market</b> 5300<br>Studio, location lighting; visual effects, pat-<br>tern projectors; lamps. (V4)<br>Circle (809)                                                                                                                            |                     |
| <b>Fairlight ESP Pty. Ltd</b> 1046<br>Video effects computers.<br>Circle (770)                                                             |                   | <b>Future Productions</b> 3201<br>Videotape duplicators; camera control<br>units; audio, video DAs. (S5, V1, V2)<br>Circle (790)                                                               |                                                                                                                                                                                                                                                                 |                     |
| <b>Faroudja Laboratories</b> 5938<br>Video encoders, decoders; video com-<br>ponent transcoders; scan converters. (V7)<br>Circle (771)     | See ad page 109   | <b>G&amp;M Power Products</b> 3633<br>Battery products.<br>Circle (791)                                                                                                                        |                                                                                                                                                                                                                                                                 |                     |
| <b>Fast Forward Video</b> 3143<br>Time code systems; editing interfaces. (V2)<br>Circle (772)                                              | See ad page 146   |                                                                                                                                                                                                |                                                                                                                                                                                                                                                                 |                     |



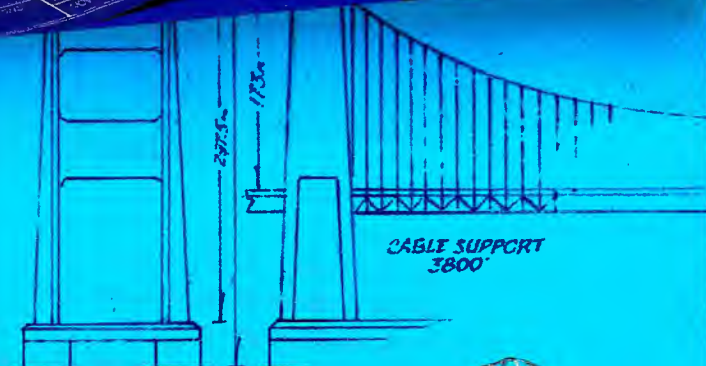
# BRIDGING THE GAP.



**BARCO intelligence—spanning the distance between independent products to create an intelligent system.**

The BARCO EVRS Routing Switcher extends the concept introduced by the Emmy Award-winning BARCO CVS monitor, the first broadcast monitor crafted with micro-processor control of every function. Designed to accept any composite or component source, the routing switcher reaches new horizons in flexibility, and can be easily expanded to meet future needs. Used in conjunction with the CVS monitor, the switcher provides an unambiguous on-screen source or "destination" ID, while the monitor functions as a menu-driven remote control panel for the routing switcher.

See us at NAB Booth #2944



For more information on the CVS monitor and EVRS Routing Switcher, contact us at:

BARCO, Inc.  
One Cobb Place Blvd.  
Kennesaw, Georgia 30144  
(404) 432-2346  
Northeast: (201) 729-0710  
Southeast: (404) 432-2346  
Midwest: (708) 213-3114  
Western: (916) 631-8113

Circle (98) on Reply Card



# BARCO

## INTELLIGENCE RUNS IN THE FAMILY

[www.americanradiohistory.com](http://www.americanradiohistory.com)



|                                                                                                                                                                                                                     |                                                                                                                                                                                             |                                                                                                                                                                                                                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Grunder &amp; Associates</b> 1212<br>Distributor; CEL effects, standard converters; edit controllers. (V2, V5, V7)<br>Circle (810)                                                                               | <b>Hughey &amp; Phillips Inc</b> 8107<br>Tower lighting equipment. (R1)<br>Circle (832)                                                                                                     | <b>Interactive Motion Control/IMC</b> 1308<br>Camera control systems for animation. (V2)<br>Circle (855)                                                                                                                         |
| <b>GTE Spacenet</b> 1648<br>Satellite transmission services; news, voice, data services; signal-turnaround, bandwidth conversions.<br>Circle (811)                                                                  | <b>ICA/Miralite Communications</b> 9018<br>Satellite antennas, receiving equipment.<br>Circle (834)                                                                                         | <b>International Tapetronics/ITC</b> 3422<br>Audio reel, cart recording equipment. (A3)<br>Circle (856) <a href="#">See ad page 29, MAP</a>                                                                                      |
| <b>GTE Sylvania Lighting</b> 5904<br>Stage and studio lamps.<br>Circle (812)                                                                                                                                        | <b>IDB Communications</b> 3634<br>Satellite mobile uplink services, C-/Ku-band equipment; flyaway systems.<br>Circle (835)                                                                  | <b>IO Research/Electronic Graphics</b> 1428<br>Electronic graphics equipment.<br>Circle (857)                                                                                                                                    |
| <b>H&amp;E Micro-Trak</b> 4722<br>Portable audio mixers, audio recorders.<br>Circle (813)                                                                                                                           | <b>I•DEN Videotronics</b> 1016<br>TBCs; component video transcoders. (V7)<br>Circle (836)                                                                                                   | <b>ISS Engineering</b> 6648<br>Satellite receiver equipment. (R6)<br>Circle (858)                                                                                                                                                |
| <b>Hallikainen &amp; Friends</b> 4202<br>Earth station remote controllers; news wire computer software; audio mixers; automation equipment. (R1, R6)<br>Circle (814)                                                | <b>IGM Communications</b> 4612<br>Radio broadcast automation; multideck audio playback equipment. (S1)<br>Circle (837)                                                                      | <b>ITELCO</b> 1416<br>FM, TV transmitters; microwave systems; RF power amplifiers; receivers, demods; exciters, RF generators.<br>Circle (859)                                                                                   |
| <b>Harris Broadcast Division</b> 4430<br>Audio mixers, recorders; AM, FM, TV transmitters; terrestrial microwave; modulation monitors; RF exciters, generators. (R1)<br>Circle (815) <a href="#">See ad page 27</a> | <b>Ikegami Electronics (USA)</b> †6216<br>Cameras, camcorders; monochrome, color monitors; ENG microwave; telecines; projection equipment.<br>Circle (838) <a href="#">See ad page 84-5</a> | <b>ITS/Information Transmission</b> 1622<br>VHF TV exciters, modulators; ITFS, MMDS transmitters, amplifiers. (R1, R2, R5)<br>Circle (860)                                                                                       |
| <b>Harris Video Systems</b> 6700<br>TBCs, frame synchronizers; graphics workstations. (V5, V7)<br>Circle (816) <a href="#">See ad page 239</a>                                                                      | <b>ILC Technology/Daymax Lamp</b> 3048<br>TV lighting equipment; Daymax DMI studio lamps, accessories.<br>Circle (839)                                                                      | <b>J-Lab</b> 1146<br>Video recorder interfaces. (S5, S6)<br>Circle (861)                                                                                                                                                         |
| <b>HEDCO</b> 3416<br>Audio, video, and data routers. (S5)<br>Circle (817)                                                                                                                                           | <b>Image Video</b> 2910<br>Master control, production, routing switchers; digital audio recorder, editing systems; station automation. (S1, S5)<br>Circle (840)                             | <b>Jampro Antennas</b> 5030<br>FM, TV transmitting antennas; towers, guys, lighting; tower services.<br>Circle (863) <a href="#">See ad page 30</a>                                                                              |
| <b>Hi-Tech Furnishings</b> 3910<br>Studio furnishings.<br>Circle (818)                                                                                                                                              | <b>Industrial Acoustic/IAC</b> 6818<br>Acoustic structures, components, materials; sound-absorptive modules, HVAC silencers for studios.<br>Circle (842)                                    | <b>JBL Professional</b> 2916<br>Audio monitor amplifiers, speakers. (A4)<br>Circle (864) <a href="#">See ad page 55</a>                                                                                                          |
| <b>Hipotronics</b> 5912<br>Voltage regulators, power line conditioners.<br>Circle (820) <a href="#">See ad page 226</a>                                                                                             | <b>Inline</b> 7110<br>Video format convertors, distribution switchers. (S5, V7)<br>Circle (844)                                                                                             | <b>Jefferson Pilot Data/JDS</b> 5014<br>Station business systems software. (S1)<br>Circle (865)                                                                                                                                  |
| <b>Hitachi Denshi</b> †2034<br>TV cameras; video recorders; encoders; HDTV recorders, displays; video monitors; test equipment; microwave systems.<br>Circle (821) <a href="#">See ad page 3, 197</a>               | <b>Innovative Automation</b> 8113<br>Automation hardware, software.<br>Circle (845)                                                                                                         | <b>Jem-Fab Corporation</b> 6644<br>Digital signal patching, distribution products.<br>Circle (866) <a href="#">See ad page 252</a>                                                                                               |
| <b>Holiday Industries</b> 5049<br>RF radiation, EMF metering; data recorders. (S6)<br>Circle (823)                                                                                                                  | <b>Innovative TV Equipment/ITE</b> 5714<br>Camera support, tripods, pedestals, pan/tilt heads. (V1)<br>Circle (846)                                                                         | <b>Jensen Tools</b> 4117<br>Electronic tool kits, tools, cases; fiber optic maintenance, VCR alignment tools. (S6)<br>Circle (867)                                                                                               |
| <b>Hollywood Film Music Library</b> 1141<br>Circle (824)                                                                                                                                                            | <b>Innovision Optics</b> 9032<br>Portable lighting; specialty lenses systems; animation motion control tables. (V2, V4)<br>Circle (847)                                                     | <b>JNS Electronics</b> 5601<br>A-V routing, distribution systems. (S5)<br>Circle (862) <a href="#">See ad page 78</a>                                                                                                            |
| <b>Hoodman</b> 6628<br>Monitor, viewfinder sun shades. (V1)<br>Circle (826)                                                                                                                                         | <b>Inovonics</b> 5601<br>Audio processors; magnetic recording electronics; RF FM generators; video processors. (A2, R5)<br>Circle (848) <a href="#">See ad page 200</a>                     | <b>JVC</b> †3116<br>Tube, CCD cameras; video recorders, edit controllers, duplicators; TBCs, frame synchronizers; video monitors, effects generators, switchers. (A5, V1, V2, V6)<br>Circle (868) <a href="#">See ad page 19</a> |
| <b>Horita</b> 9012<br>Timers, time code equipment.<br>Circle (827)                                                                                                                                                  | <b>Integrated Arts Ltd</b> 5354<br>Circle (850)                                                                                                                                             | <b>K&amp;H Products</b> 6055<br>Camera support products; equipment carrying, transport cases. (S3)<br>Circle (869) <a href="#">See ad page 272</a>                                                                               |
| <b>Hotronic</b> 2935<br>TBCs, frame synchronizers; solid-state V/A recorder. (V2, V7)<br>Circle (828) <a href="#">See ad page 186</a>                                                                               | <b>Intelliprompt</b> 1457<br>Video prompting systems.<br>Circle (853)                                                                                                                       | <b>Kahn Communications</b> 4410<br>Audio processors; telephone bandwidth extenders; AM stereo equipment. (A2)<br>Circle (870)                                                                                                    |
| <b>Hudson Audio Video Enterprises</b> 7106<br>Audio, video equipment distributors.<br>Circle (830)                                                                                                                  | <b>Intelvideo</b> 6509<br>Video encoders, decoders; video-to-film accessory. (V7)<br>Circle (854)                                                                                           | <b>Kalamazoo Technical Furniture</b> 9052<br>Equipment racks, studio furnishings.<br>Circle (871)                                                                                                                                |
| <b>Hughes Communications</b> 6554<br>Satellite communications services.<br>Circle (831)                                                                                                                             |                                                                                                                                                                                             | <b>Kalamusic</b> 8119<br>Radio broadcast programming services, all music formats on tape.<br>Circle (872)                                                                                                                        |



# Get Auditronics' IFB/Mix-Minus System!

**Because people can't think when they hear themselves talk.**

Now you can have multiple mix-minus feeds with IFB for super smooth newscasts, commercial production, sports events, and more with Auditronics' revolutionary new 1900 IFB/Mix-Minus system, voted a "Pick Hit of the 1989 NAB" by Broadcast Engineering Magazine.

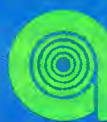
Simply speaking, the 1900 offers eight discrete mix-minus outputs to eight remote locations, plus IFB busses for direct communications, and more than a dozen other state-of-the-art features — just what you'd expect from Auditronics, of course.

Call these factory direct engineering representatives today for information.

Audio Images 415-957-9131 • Audio Broadcast Group 616-452-1596  
GP Enterprises 817-572-0132 • Broadcast Services 919-934-6869  
**See us at NAB. Booth #4542**

Circle (99) on Reply Card



 **auditronics, inc.**



**Kangaroo Video Products** 2945  
Equipment transport cases.  
Circle (873)

**Karl Heitz** 5916  
Camera pan/tilt heads, tripods. (V1)  
Circle (874)

**Kavouras** 1628, A226  
Weather graphics displays, map files. (V5)  
Circle (875)

**Kay Industries** 4051  
Phase converters, power conditioners. (S6)  
Circle (876)

**Keith Monks Audio** 5946  
Audio accessory products.  
Circle (877)

**Kings Electronics** 3133  
RF, video, coaxial, triaxial connectors; satellite-related equipment. (S2)  
Circle (878)

**Kintronic Laboratories** 6638  
Antenna phasors, tuners, inductors; RF connectors, switching panels; HV insulators; tower transformers, lighting chokes; equipment shelters; shortwave antennas. (R1)  
Circle (880)

**Klark Teknik** 8109  
Audio processors; DDA mixing consoles; Milab microphones.  
Circle (879)

**Kliegl Brothers Stage Lighting** 1552  
Lighting instruments, lamps; lighting con-

trol systems.  
Circle (881)

**Kline Towers** 8034  
Design, fabrication, erection, maintenance, inspection services; guyed, self-supporting, platform, multi-array towers, antenna support structures.  
Circle (882)

**Knox Video/GML Grove** 3060  
Digital graphics, titlers; video switchers; video processors. (V5)  
Circle (883)

**L. E. Nelson Sales** 3147  
Lighting instruments, lamps; accessories.  
Circle (884)

**Laird Telemedia** 2350  
Distribution equipment; telecines; video processors; character generators. (V5)  
Circle (885)

**Lake Systems** 1712  
Facility design, construction; distributors, audio, video, support products; cable, patching systems; studio furnishings; video format converters.  
Circle (886)

**Laserdub** 1044  
Circle (888)

**LDL Communications/Larcan** 1634  
FM, TV transmitters, transmitting antennas; multistation power combiners; towers. (R1)  
Circle (889) [See ad page 23](#)

**LEA Dynatech** 6030  
Lightning deterrents; surge suppressors.  
Circle (890)

**Leach Microwave Systems** 7108  
Circle (891)

**Leader Instruments** 3012  
Sync, video, test signal generators; waveform, vector monitors; oscilloscopes; video level meters; video monitors. (S6, V8)  
Circle (892) [See ad page 135](#)

**Lectrosonics** 8043  
Wireless microphone systems.  
Circle (893) [See ad page 141](#)

**Lee Colortran** 5452  
Lighting instruments, lamps, gels. (V4)  
Circle (894)

**Leitch Video** 3516  
Sync, test signal generators; VBI inserters; video processors; DAs, master clock systems; still stores. (S1, S5, V2, V7)  
Circle (895) [See ad page 105](#)

**LEMO USA** 2949  
Audio, video coax, triax, multicore, mixed coax-multiple pin connectors. (S2)  
Circle (896)

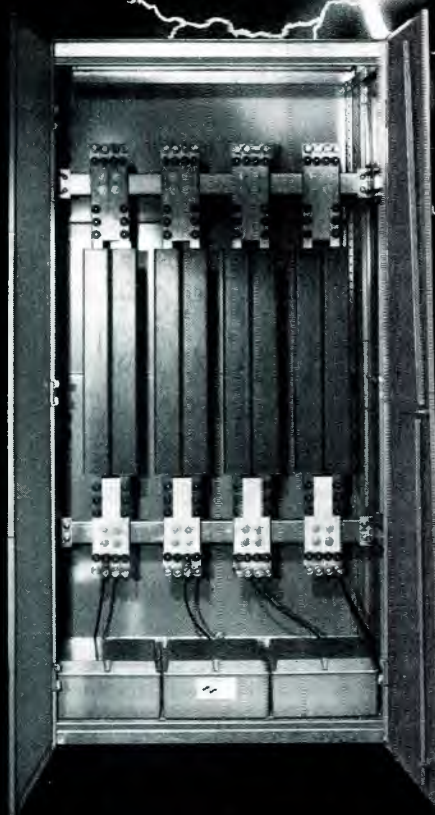
**Leonetti Company** 9028  
HMI, SunRay lighting products.  
Circle (897)

**Lexicon** 2452  
Digital audio production systems; time compressors/expanders; audio effects, processors; MIDI equipment. (A2, A5)  
Circle (898)

**Light Sales** 8055  
Studio lighting products.  
Circle (899)

# Islatron®

## before the "damage" is done...



Islatron power line protection safeguards both your income and your broadcast investment.

Islatron's patented Active Tracking® technology not only protects your station from lightning induced voltages, but also from the cumulative daily degradation of your equipment caused by electrical disturbances present on your distribution systems. This constant protection means longer equipment life and less maintenance.

I.E.E. studies indicate every location has at least 3 damaging disturbances per day. Remote control systems, satellite links, VCR's, switchers, carts, microprocessors and solid state equipment all need Islatron protection. Units are available for your lowest power requirements up to the largest FM and TV transmitters. MTBF more than Ten Years, 5 Year Warranty.

**Free:** Get the facts on the exclusive Islatron Active Tracking system...before the damage is done.

**CONTROL CONCEPTS CORPORATION**

CONTROL CONCEPTS BROADCAST GROUP  
P.O. BOX 1380  
328 WATER STREET  
BINGHAMTON, NY 13902  
(607) 724-2484

See us at NAB Booth #2025

Circle (100) on Reply Card



# AKG's DSE 7000. Digital Solutions to Analog Problems.

Creating polished audio tracks with analog equipment while under the gun is a real problem.

Have you ever ruined a track by punching in or out at the wrong moment? AKG's Digital Sound Editor stores your takes in RAM memory, so you can "undo" any mistakes and make adjustments quickly and precisely.

Have you ever had to hand-synchronize three or more analog decks in order to time-align narration with music and effects? The DSE 7000 allows you to synchronize any combination of tracks in perfect timing.

Have you ever used your last track and wished you had more? The DSE 7000 provides 8 tracks plus lossless digital bounce to give you all the freedom of multi-track, and more.

Have you ever wished for a sound editor that's as powerful and easy-to-use as your word processor with controls as familiar as your mixer and tape deck? With the DSE 7000, you can easily cut, copy, move, slip and adjust sound elements. It's an AT compatible-based, digital sound editor that combines both record and mix functions together in one convenient unit — with ease, speed and flexibility.

Contact AKG to learn how the affordable DSE 7000 will provide digital solutions to your analog problems.



**Focusing on new technology.**  
77 Selleck St., Stamford, CT 06902  
(203) 34E-2121

**See us at NAB Booth #4308**

© AKG 1989 ©Akustische und Kino-Geräte GmbH, Austria

Circle (131) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



**Lighting Methods** 3445  
Lighting dimmers, dimmer controllers. (V4)  
Circle (900)

**Lightning Eliminators, Consultants** 5027  
Lightning deterrents; power conditioning  
consultation; grounding systems.  
Circle (901)

**Listec Video** 5042  
Video prompters, prompter displays. (V5)  
Circle (903)

**Lites** 9015  
Studio lighting products.  
Circle (904)

**Logitek** 4750  
Audio mixers, monitor amps, speakers; im-  
pedance interfaces; DA amplifiers, LED  
audio metering units.  
Circle (906)

**Lowel-Light** 6210  
Studio, portable lighting instruments,  
lamps.  
Circle (908)

**LPB** 4512  
Audio mixers; phono pre-amps; studio fur-  
nishings; low power AM transmission. (A1)  
Circle (909)

**LTM Corp of America** 2608  
Location, portable, studio lighting instru-  
ments, ballasts, follow spots; microphone  
accessories. (V4)  
Circle (910)

**Lynn Greenberg Electronic  
Teleprompting** 2035  
MS DOS-based teleprompters. (V5)  
Circle (912)

**Lyon Lamb Video Animation** †1540  
Video animation controls; video encoders,  
scan converters, transcoders. (V7)  
Circle (913)

**M&R Data Services** 8101  
PC-based video editing systems; PC-based  
transmitter remote controllers. (R1, V2)  
Circle (915)

**M/A-COM MAC** 2152  
Microwave radio; 18GHz and 23GHz. (R2)  
Circle (916)

**3M Magnetic Media** 1824  
Video, audiotape products.  
Circle (917) [See ad pages 82A-B, 83](#)

**Macrovision** 7123  
Videotape copy protection systems.  
Circle (918)

**Magni Systems** †1026  
Video test equipment; waveform, vector  
monitors; SC/H-phase measurement  
products; video encoding systems. (S6, V7)  
Circle (919) [See ad page 193](#)

**Magnum Tower** 6712  
Broadcast towers, accessories; services.  
Circle (920)

**Manhattan Production Music** 6618  
Production music, effects libraries.  
Circle (921)

**Marconi Communications Systems** 1825  
Telecines; frame synchronizers, decoders;  
UHF, VHF TV transmitters.  
Circle (922)

**Mark Antennas/Radiation Systems** 3100  
Microwave antennas.  
Circle (914) [See ad page 62](#)

**Markertek Video Supply** 9007  
Distributors of cable, wire, connectors; bat-  
teries, mics, stands; components.  
Circle (923) [See ad page 250](#)

**Marshall Electronics** 9031  
Circle (924)

**Marti Electronics** 4400  
STL microwave receivers, transmitters; RF  
exciters, generators. (R2)  
Circle (925)

**Mastercraft Woodworking** 7109  
Studio furniture.  
Circle (926)

**Matco Mfg. & Test** 3641  
Machine sequencers, routers; DAs; dubbing  
controllers, commercial insertion. (S1)  
Circle (927) [See ad page 200](#)

**Matthews Studio Equipment** 2720  
Camera pedestals, cranes, tracks; grip  
equipment; lighting products.  
Circle (928)

**Matthey Electronics** 5501  
Video, HDTV filters, delays; digital audio  
filters.  
Circle (929)

**Maxell Corporation of America** 2248  
Audio, video recording media for analog,  
digital systems. (S4)  
Circle (930)

**Maze Broadcast** 1150  
Pre-owned equipment; equipment broker-  
ing, appraisals, liquidation services.  
Circle (931)

**McCurdy Radio Industries** 5322  
Audio consoles, delays, intercoms,  
speakers; automation; signal distribution;  
audio test equipment; telco hybrids. (A2,  
A4, S1, S5, S6)  
Circle (932) [See ad page 215](#)

**Media Computing** 3540  
Automated newsroom, machine control  
software, interfaces. (S1)  
Circle (935)

**Media Touch Systems** 1200  
Touch-screen control for broadcast auto-  
mation; audio recording products; distribu-  
tion systems.  
Circle (937)

**Merlin Engineering Works** 2100  
Standards converters; HDTV-TV con-  
verters; custom VTRs, accessories; video  
encoders, decoders; time delay equipment.  
Circle (938)

**Merlin Snell & Wilcox** 1041  
Standards converter equipment. (V3, V7)  
Circle (939) [See ad page 101](#)

**Micro Communications** 2728  
RF transmission line, circular waveguide;  
switchless combiners; computer drafting;  
field service. (R1)  
Circle (940)

**Microdyne** 1433  
Satellite receivers, programmable satellite  
terminals.  
Circle (941)

**Micron Audio Products** 6727  
Wireless microphone systems.  
Circle (942)

**Microsonics** 1439  
Video filters, delay lines.  
Circle (943)

**Microtime** 5740  
TBCs, frame synchronizers; digital  
graphics, special effects systems; A/B roll,  
effects production system. (V5, V7)  
Circle (944) [See ad page 113](#)

**Microwave Radio** 2960  
ENG electronics, antennas.  
Circle (945)

**Midwest Communications** 3234, A126  
TV production facilities, vehicles; A.C.E.  
graphics, signal routers, color correctors,  
scan converters; DPS TBCs/synchronizers;  
Technalogix, Townsend, Toshiba TV trans-  
mitters; microwave, earth station systems;  
racks, studio furnishings. (R1, S5, V5, V7)  
Circle (946) [See ad page 1](#)

**Miller Fluid Heads (USA) Inc** 6204  
Camera support, tripods, pan/tilt heads.  
(V1)  
Circle (947) [See ad page 207](#)

**Minolta** 3119  
Light metering products; monitor color  
analyzer systems.  
Circle (948) [See ad page 98](#)

**Mitsubishi Electric Sales** †162W  
Video monitors, printers, projectors. (V8)  
Circle (949)

**Mobile-Cam Products** 5352  
ENG vehicles; audio/video routers; mobile  
antenna control systems. (S7)  
Circle (950)

Circle (102) on Reply Card



# WHY WTVH-TV'S BRUCE LEVY LOVES HIS EPO ROBOTIC CAMERA CONTROL SYSTEM.



For more than 20 years, WTVH-TV, the CBS affiliate in Syracuse, N.Y., has broadcast its news using EPO remote camera control systems. During that time, the systems have outlasted four sets of cameras—a clear testament to EPO's durability and reliability.

For most of those years, as Bruce Levy, the production chief at WTVH-TV, will tell you, the station was virtually alone among American broadcasters.

Now, of course, all that has changed. Americans are beginning to wake up to what their European brethren have known for some time—that **EPO Camera Control Systems can save them money. Lots of money!**

But even EPO Robotic Camera Systems don't last forever. Recently, when WTVH-TV's 20-year-old unit began to show some wear and tear, Bruce Levy confidently ordered three new ones from A.F. Associates, thereby continuing his and WTVH-TV's long association with the EPO systems.

If you would like to know more about Bruce Levy's favorite way to save money, call A.F. Associates. In the east: (201) 767-1201; in the west: (619) 277-0291.

## **THE RADAMEC EPO ROBOTIC CAMERA CONTROL SYSTEMS.**

Distributed exclusively in the U.S. by



**NAB  
BOOTH  
#1756**

### **A.F. ASSOCIATES INC.**

ADVANCED SYSTEMS AND PRODUCTS FOR THE VIDEO INDUSTRY  
100 STONEHURST COURT, NORTHVALE, NJ 07647  
A.F. Associates, Inc. is a Video Services Corporation company.

Circle (103) on Reply Card



**Modulation Sciences** 4802  
MTS TV, FM exciters, generators; RF composite signal distribution; aural spatial image enlargers; test equipment, modulation monitors. (R4)  
Circle (951)

**Mole-Richardson** 5600  
Lighting instruments, lamps.  
Circle (952)

**Moseley Associates** 4336  
Remote control systems; STLs; RF generators, exciters; audio processors. (R1)  
Circle (953) [See ad page 223](#)

**Motorola C-Quam/AM Stereo** 4704  
AM stereo radio exciters, modulation monitors, receivers; communications

products; semiconductors. (R2, R4, R5, S6)  
Circle (954)

**MSE Video Tape Services** 8057  
Circle (955)

**Musco Mobile Lighting** A269  
Self-contained, remote production lighting.  
Circle (956)

**MYAT** 6708  
Rigid coaxial transmission line. (R1)  
Circle (911) [See ad page 70](#)

**MZB/Gray** 2500  
Mobile production vehicles; cameras, video recorders, processors, displays; routing, DA equipment; ENG microwave.  
Circle (957)

**Nady Systems** 6505  
Wireless microphone systems. (A4)  
Circle (958)

**Nagra** 2128  
Audio recorders, film, video applications.  
Circle (959)

**Nakamichi** 6614  
Audio cassette recorders/players.  
Circle (960)

**Nalpak Video Sales** 1401  
Rack, tripod cases; production vests; lens accessories. (S3)  
Circle (961)

**Narda Microwave/Loral** 5757  
STL, ENG electronics, signal feed line components; RF radiation measurement equipment. (R2, S6)  
Circle (962)

**National Photonics Inc** N.A.  
Fiber optic remote camera control systems. (S2)  
Circle (963)

**Naute** 4144  
Solid-state AM transmitters. (R1)  
Circle (964) [See ad page 158](#)

**NCA Microelectronics** N.A.  
Transmitter remote control equipment. (R1)  
Circle (965) [See ad page 240](#)

**NEC** †1524  
Solid-state video recorders; TBCs, frame synchronizers; digital video effects systems; CCD cameras.  
Circle (966) [See ad page 58-9, 185](#)

**Nemal Electronics International** 7203  
Wire, cable, connectors.  
Circle (967) [See ad page 272](#)

**Neotek** 8116  
Reinforcement, production audio consoles.  
Circle (968)

**Network Music** 4220  
Music, sound effects libraries.  
Circle (969)

**Neutrik USA** 6610  
Digital audio equipment; wire, cable, connectors; audio test equipment. (S6)  
Circle (970) [See ad page 178](#)

**Neve** 4152  
Audio consoles production, post production; console automation; digital audio recorders. (A1, A5)  
Circle (971) [See ad page 115](#)

**New England Digital** 161W  
Digital audiodisc recorders, effects, edit systems. (A5)  
Circle (972)

**Nexus Engineering/Broadcast Div** 7018  
Circle (973)

**Nielsen Media Research** 1545  
Audience research.  
Circle (974)

**Nikon Photo/Electronic Imaging** 6512  
TV camera lenses; still video systems; HDTV products; video printers. (V1, V3, V8)  
Circle (975) [See ad page 5](#)



**BOOTH #4144 - NAB '90**

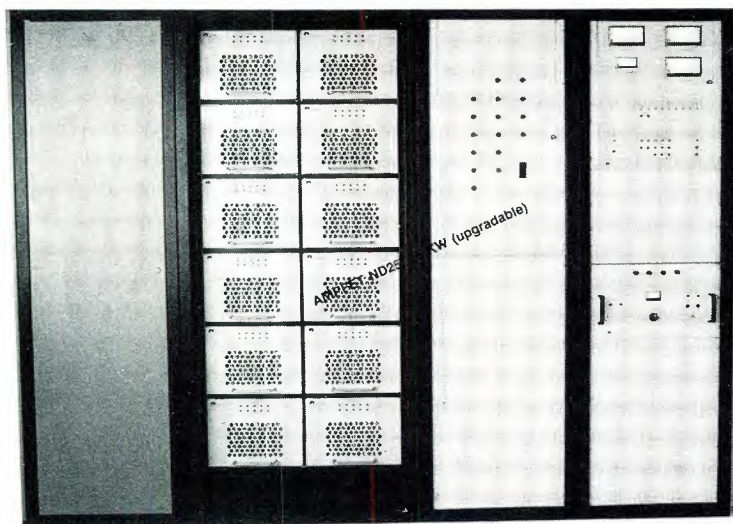
**INTRODUCING :**



## NAUTEL AMPFET ND25/50, 25 KW & 50 KW

### SECOND GENERATION ALL SOLID STATE AM TRANSMITTERS

- Solid state design utilizing digital circuit techniques results in superior audio performance and high efficiency
- Specifically designed for NRSC Standards compatibility and AM Stereo operation in support of improved AM radio
- Parallel modular configuration provides true active reserve without need for operator intervention
- On air serviceability features allow module removal without interruption in broadcasting
- Built-in duplicate exciter sections offer complete backup of critical low level control circuitry



**ALL SOLID STATE AMPFET ND SERIES AM MEDIUM WAVE TRANSMITTERS**

**POWER RANGE UP TO 100 KW**

Phone:(902)823-2233 Canada-Fax:(902)823-3183-Tlx:019-22552



**NAUTEL**  
(Nautical Electronic Laboratories Limited)  
RR#1, Tantallon, Halifax County  
Nova Scotia, Canada B0J 3J0

**Naute Maine Inc.**  
201 Target Industrial Circle  
Bangor, Maine  
04401 U.S.A.



Circle (104) on Reply Card



**New Products.  
New Research & Development Center.  
New Manufacturing Center.  
New Service Centers.**



(1), (4) & (5) Routing switches  
(2) InterCom  
(3) Signal monitoring & terminal equipment  
(6) Character Generators

## **The New PESA America, Inc.**

PESA recently acquired 3M's R&D, production and service facilities for audio/video routing systems and character generators. With our new combined facilities, we can now offer you an extensive range of quality products which are presently used by broadcasters, corporate and teleproduction studios, video conferencing and government communication centers.

Our new company, staffed with experienced people you know, is committed to providing you with the very best customer service and sales support from eleven offices located close to you.

Pesa America, Inc. Sales & Service Centers.  
East Coast: (516) 360-7382 West Coast: (818) 563-4566  
Customer Services Dept.: (205) 883-7370

**PESA**  
Circle (105) on Reply Card



*Meet your new  
old friends.  
Booth 2708, Hall B*

### **WIN A PRIZE!**

Bring this coupon to  
PESA Booth 2708, Hall B  
East Exhibit Area  
(at bottom of escalators)  
any time during show hours.  
A drawing every day...  
with the Grand Prize drawing  
Tues. April 3 at 3 PM.  
(You do not have to be present to win.)  
For the prize you may win?  
Look for this ad every day  
in NAB Daily News.

Name \_\_\_\_\_

Title \_\_\_\_\_

Company \_\_\_\_\_

City/State \_\_\_\_\_

Phone \_\_\_\_\_



**Norpak** 3915  
Teletext, NABTS data delivery equipment.  
Circle (976)

**Nova Systems** 2922  
TBCs, frame synchronizers; video format conversions. (V7)  
Circle (977) [See ad page 162](#)

**NPR Satellite Services** 6545  
Satellite interconnections for radio broadcasters; transportable uplink facilities; digital fiber-optic audio channels; audio signal distribution on occasional, full-time bases.  
Circle (978)

**Numark Electronics** 8040  
Audio, MIDI products. (A4)  
Circle (979)

**Nurad**  
ENG, STL electronics, antennas.  
Circle (981)

**Nytone Electronics** 3054  
Flying spot slide-to-video telecines; color analyzers, integrated production units. (V3)  
Circle (982)

**O'Connor Engineering Lab** 5930  
Camera tripods, pan/tilt heads. (V1)  
Circle (983)

**Odetics Broadcast** 5704  
Automated video large-library management systems. (S1)  
Circle (984) [See ad page 187](#)

**OKI Electric Industry** 3806  
TV standards converters. (V7)  
Circle (985) [See ad page 147](#)

**Olesen** 2618  
Lighting instruments, accessories.  
Circle (986)

**Omicron Video** 2953  
Routing, production switchers; signal distribution equipment; video format converters, computer-to-video scan converters. (V7)  
Circle (987) [See ad page 146](#)

**Omnimusic** 4343  
Production music libraries.  
Circle (988)

**Optical Disc** 3415  
Videodisc recorders, playback systems; digital audio processing equipment. (A5)  
Circle (989) [See ad page 194](#)

**Optima Enclosures** 7112  
Equipment racks, studio furnishings.  
Circle (990)

**Orban/AKG Acoustics** 4208  
Audio processors for AM, FM, TV, studio; equalizers; stereo synthesizers; sibilance controllers. (A2)  
Circle (991) [See ad page 7, 17, MAP](#)

**Orion Research** 3440  
Software-based audio mixers. (A1)  
Circle (992)

**Osram/Siemens** 6518  
Lamps for stage, studio lighting. (V4)  
Circle (993)

**Otari** 4352  
Digital, analog audio recorders; video duplicators; audio mixers. (A1, A3, V2)  
Circle (994) [See ad page 15](#)

**Pacific Radio Electronics** 9045  
Video cable, connectors; utility lighting; test, monitoring equipment. (S2, S3)  
Circle (995)

**Pacific Recorders/Engineering** 4130  
Audio mixers; audio cart recorders, reproducers; signal processors, distribution equipment.  
Circle (996)

**Paco Electronics USA** 6726  
Batteries, charger systems. (V4)  
Circle (997)

**Paltex** 1734  
Videotape editing control systems, VTR interfaces; Quantum/Weircliffe tape degaussers. (V2)  
Circle (998) [See ad page 89](#)

**Panasonic Industrial/Broadcast** †2534  
TV cameras; digital, analog videotape recorders. (S1, V1, V2)  
Circle (999) [See ad page 36-7, 50A-H, 51](#)  
143, 176-7

**Pansophic Systems/Graphics** 3140  
Electronic graphics systems, ancillary equipment. (V5)  
Circle (1000)

**Patch Bay Designation** 1346  
Designation labels for patch bays.  
Circle (1002)

**AMCO CATALOG 500B**

**5 Work Day Shipments From Stock 10 Days with Color Selection**

**Consoles  
Computer Desks  
Desk Top Cabinets  
Blowers and Fans  
Accessories & Hardware**

**New Styles...24" Panel Widths...Fans...Accessories**

**For Your FREE Catalog 500B**  
Call 1-800-833-3156  
In Illinois, Call 708-671-6670

**Amco Engineering Co.**  
3801 N. Rose Street  
Schiller Park, IL 60176-2190  
TWX: 918-227-3152  
FAX: 708-671-9489

See us at NAB Booth #2009-2013

Circle (106) on Reply Card



# Rack up twice the performance in the same amount of space.



## The Problem

How to upgrade and increase your microphone mixing capability without sacrificing your valuable rack space or your budget.

## The Solution

The new ELX-1R.

## Here's Why

The ELX-1R is a portable, four-channel mic/line mixer.

It's half the size of our nearest competitor, the Shure M267, and fits into a single rack-mount space. Think of it. By utilizing two ELX-1R's, you can double your mixing capabilities in the same amount of space it takes to mount one M267.

Also, it's less expensive than the M267 because our rack mount is standard—you have to pay for theirs.

And it offers you the kinds of features that theirs doesn't . . .

Like half the distortion. Or individual input LED clip indicators. Or a 10-segment, three-color LED

PPM bargraph display. Or 1/4" auxiliary phone connections, as well as professional XLR input-output. Or positive action push-button switching.

And last but not least—better specs across the board and a two-year warranty opposed to one.

## You Decide

Naturally, we don't expect you to take our word on this . . . you have to see for yourself. Contact your local EV dealer today. Ask for our comparison chart and an engineering data sheet. Better yet, ask for a no-pressure demonstration.

We think you'll be pleasantly surprised.



**Electro-Voice®**  
a MARK IV company

600 Cecil Street  
Buchanan, Michigan 49107  
Phone: 616/695-6831

In Canada: P.O. Box 520  
Gananoque, Ontario K7G2V1  
Phone: 613/382-2141

See us at NAB, Booth #4618



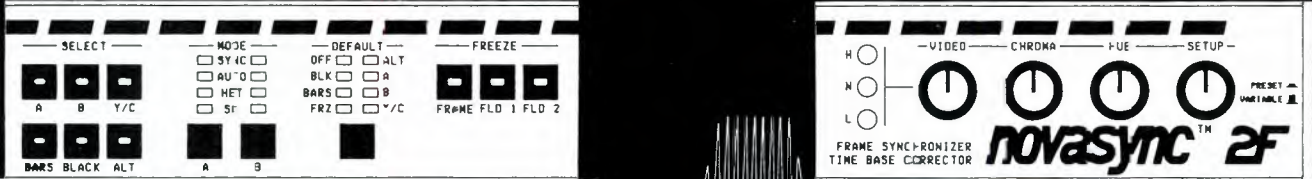
Circle (107) on Reply Card

www.americanradiohistory.com



|                                                                                                                                                                                                                       |             |                                                                                                                                                                                                       |                       |                                                                                                                                                                                           |                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| <b>Peerless Sales</b><br>Utility equipment carts. (S3)<br>Circle (1003)                                                                                                                                               | <b>3821</b> | modulators, demods.<br>Circle (1010)                                                                                                                                                                  | <b>See ad page 99</b> | integral effects features. (V7)<br>Circle (1018)                                                                                                                                          | <b>See ad on MAP</b> |
| <b>Penny &amp; Giles</b><br>Audio, video faders; motorized faders; joyst-<br>tick controllers; patch panels, accessories.<br>Circle (1004)                                                                            | <b>6804</b> | <b>Pinnacle Systems</b><br>Digital graphics, effects, video worksta-<br>tions. (V5)<br>Circle (1012)                                                                                                  | <b>2101</b>           | <b>Pro Battery</b><br>Batteries, chargers.<br>Circle (1019)                                                                                                                               | <b>3125</b>          |
| <b>PEP</b><br>Batteries, charger systems.<br>Circle (1005)                                                                                                                                                            | <b>5700</b> | <b>Pinzone Communications</b><br>Specialized subcarrier communications;<br>AM antenna designs.<br>Circle (1013)                                                                                       | <b>1558</b>           | <b>Pro Co Sound/Pro Division</b><br>Circle (1020)                                                                                                                                         | <b>3109</b>          |
| <b>Perrott Engineering Labs</b><br>Batteries, chargers; equipment covers; op-<br>tical filters; portable lighting. (V4)<br>Circle (1006)                                                                              | <b>2939</b> | <b>Pivotelli/USA</b><br>Equipment mounting, support products.<br>Circle (1014)                                                                                                                        | <b>7116</b>           | <b>Professional Design Products</b><br>Circle (1021)                                                                                                                                      | <b>1948</b>          |
| <b>PESA Electronica</b><br>Character generators; master control,<br>production switchers; video processors,<br>monitors, test equipment; TV transmitters,<br>translators; intercom/talkback systems.<br>Circle (1007) | <b>2708</b> | <b>Potomac Instruments</b><br>Antenna monitors; field strength meters;<br>remote, programmable transmitter control-<br>lers; RF generators, detectors; audio test<br>equipment. (R1)<br>Circle (1015) | <b>4406</b>           | <b>Professional Label Service</b><br>Videocassette label materials, label printing<br>software. (S1, S4)<br>Circle (1022)                                                                 | <b>1020</b>          |
| <b>Philips Components</b><br>Camera tubes; RF power tetrodes,<br>klystrons. (R3, V1)<br>Circle (1008)                                                                                                                 | <b>5512</b> | <b>Practel Sales International</b><br>Audio source, monitoring products; signal<br>distribution, video processing equipment.<br>Circle (1016)                                                         | <b>9048</b>           | <b>Professional Sound Corporation</b><br>Wireless mic, recorder accessories;<br>Sonosax mixers; rental plans for motion pic-<br>ture, video production. (A3, A4, S5, V8)<br>Circle (1023) | <b>9001</b>          |
| <b>Philips Lighting</b><br>Lamps for stage and studio. (V4)<br>Circle (1009)                                                                                                                                          | <b>1352</b> | <b>Premier Metal Products</b><br>Equipment racks, cabinets. (S3)<br>Circle (1017)                                                                                                                     | <b>6334</b>           | <b>Profit Plus Software</b><br>Circle (1024)                                                                                                                                              | <b>8041</b>          |
| <b>Philips Test &amp; Measurement/BTC</b><br>Test equipment, signal generators,                                                                                                                                       | <b>1914</b> | <b>Prime Image</b><br>Timebase correctors, synchronizers with                                                                                                                                         | <b>7010</b>           | <b>Progressive Computer Products</b><br>TBC/effects generators; video format con-<br>verters; computer video encoders. (V7)<br>Circle (1025)                                              | <b>8012</b>          |
|                                                                                                                                                                                                                       |             |                                                                                                                                                                                                       |                       | <b>Promusic</b><br>Circle (1026)                                                                                                                                                          | <b>9035</b>          |

# INTRODUCING



# PERFECT

# TIMING

**NOVA SYSTEMS, INC.**  
50 Albany Turnpike, Canton, CT 06019  
Tel (203) 693-0238 • Fax (203) 693-1497

**NAB BOOTH 2922**

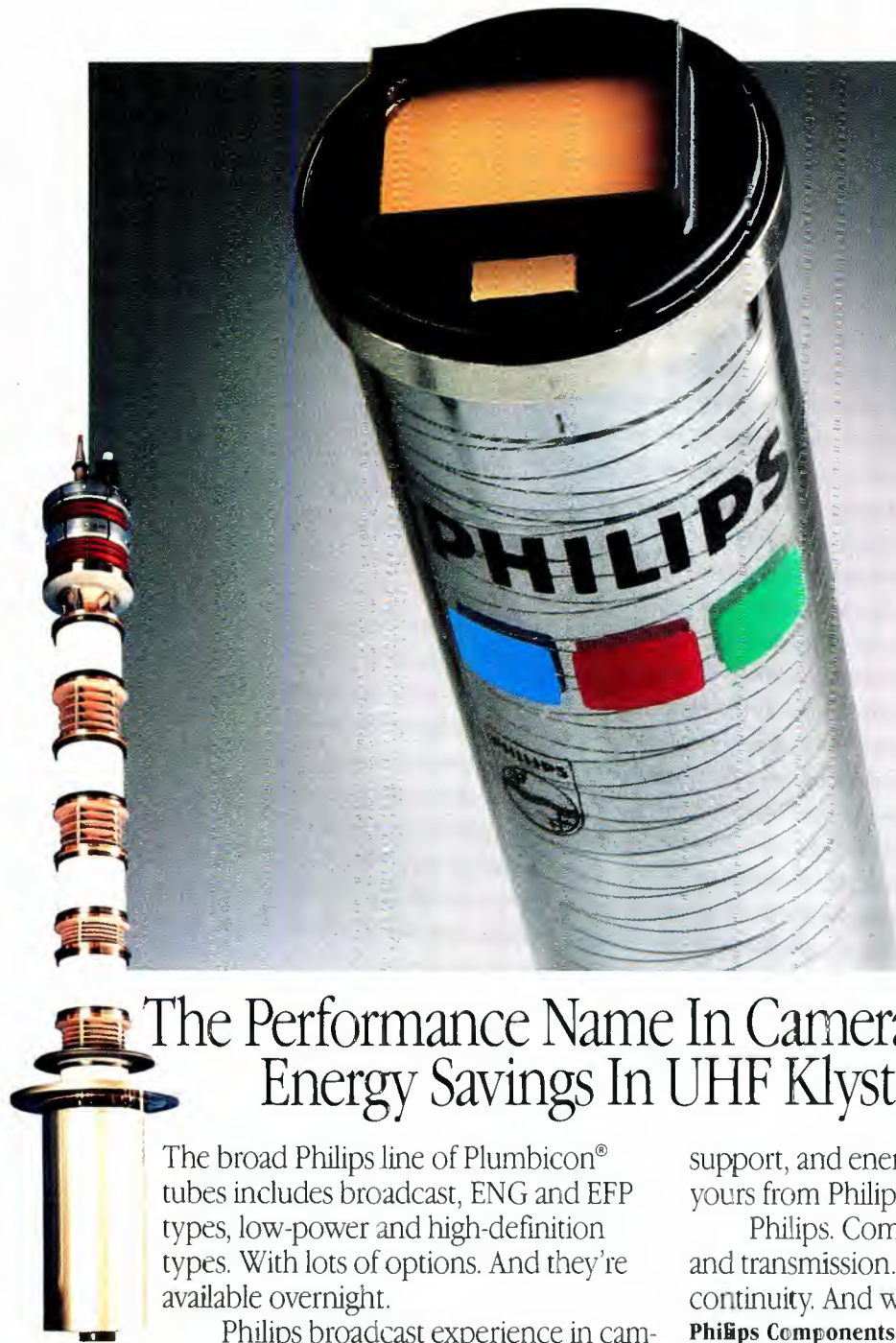


THE CLEAR CHOICE IN VIDEO TECHNOLOGY

Circle (108) on Reply Card



Visit Us At Booths  
5512-5518 At NAB Show.



## The Performance Name In Camera Tubes Means Energy Savings In UHF Klystrons Too.

The broad Philips line of Plumbicon® tubes includes broadcast, ENG and EFP types, low-power and high-definition types. With lots of options. And they're available overnight.

Philips broadcast experience in camera tubes also covers UHF transmission. With UHF klystrons, Philips is a global leader in terms of market share and innovation. Immediate U.S. availability, strong technical field

support, and energy-saving MSDC design are yours from Philips.

Philips. Components for TV imaging and transmission. With guaranteed supply continuity. And worldwide availability.

**Philips Components  
Discrete Products Division**

**1-800-447-3762**

2001 W. Blue Heron Blvd.  
P.O. Box 10330  
Riviera Beach, FL 33404

Fax: 407-881-3300

*More Products. More Solutions.*

### Philips Components



# PHILIPS

Circle (109) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



# In Broadcasting, Time Can Be Your Toughest Competitor.



## Put Time On Your Side With BSW

Deadlines are a given in broadcasting. When the pressure's on, you need a company you can depend on. Look to BSW. We understand that people who are accustomed to measuring time in seconds, can't wait weeks and months for equipment to arrive from their supplier. That's why we work overtime, every-day, to deliver equipment from our million dollar inventory with unmatched speed and accuracy. Should items ship directly from the factory, our sterling reputation with over 200 manufacturers insures prompt attention to your order. No company is better qualified to put time on your side than BSW, America's Full-Time Broadcast Supplier.

# BSW<sup>®</sup>

**BROADCAST SUPPLY WEST**

America's Full-Time Broadcast Supplier

**1-800-426-8434**

ORDERS • INFORMATION • SPECIFICATIONS

BSW • 7012 27th Street W • Tacoma, WA 98466 • FAX 206-565-8114

Circle (110) on Reply Card

**Q-TV** 2234  
Video prompting equipment. (V5)  
Circle (1027)

**QEI** 4300  
FM transmitters; modulation monitors;  
studio-transmitter T1 links. (R1, R2, R5)  
Circle (1028)

**QSI Systems** 3034  
Video SID, message generators; video  
processors, switch-over units. (R4, V7)  
Circle (1029)

**Quality Video Supply** 1446  
Video and audio accessories; supplies.  
Circle (1030)

**Quanta/Dynatech** 6030  
**Quanta Editing Products**  
Anti-aliased character generators; 2D, 3D,  
paint, titling, animation system; videotape  
editing controllers. (V2, V5)  
Circle (1031) [See ad page 201](#)

**Quantel** 1134  
Digital video effects, graphics/paint sys-  
tems; caption generators; still library sys-  
tems. (V5)  
Circle (1032) [See ad page 34](#)

**Quickset** 5048  
Camera tripods, pan/tilt heads, dollies. (V1)  
Circle (1034)

**R-Columbia Products** 3000  
Headphones, camera operator headsets; in-  
tercom systems. (A4)  
Circle (1035)

**Radiation Systems Inc/RSI** 3100  
Earth station antennas, controllers; flyaway  
systems; Mark microwave antennas. (R6)  
Circle (1037) [See ad page 62](#)

**Radio Computing Services** 8024  
Automated music, commercial verification  
equipment. (S1)  
Circle (1038)

**Radio Design Labs** 6646  
Circle (1039)

**Radio Systems** 4903  
Audio mixers; SCA receivers; audio DAs,  
preamps, monitor amps; cart machines;  
studio cabinetry. (A5)  
Circle (1041)

**RAM Broadcast** 6820  
Distributor, audio, radio, video equipment;  
audio phase monitors, routing switches;  
video monitors; studio furniture, cabinetry;  
consultant service.  
Circle (1042)

**Rampart Cases** 7020  
Equipment cases.  
Circle (1043)

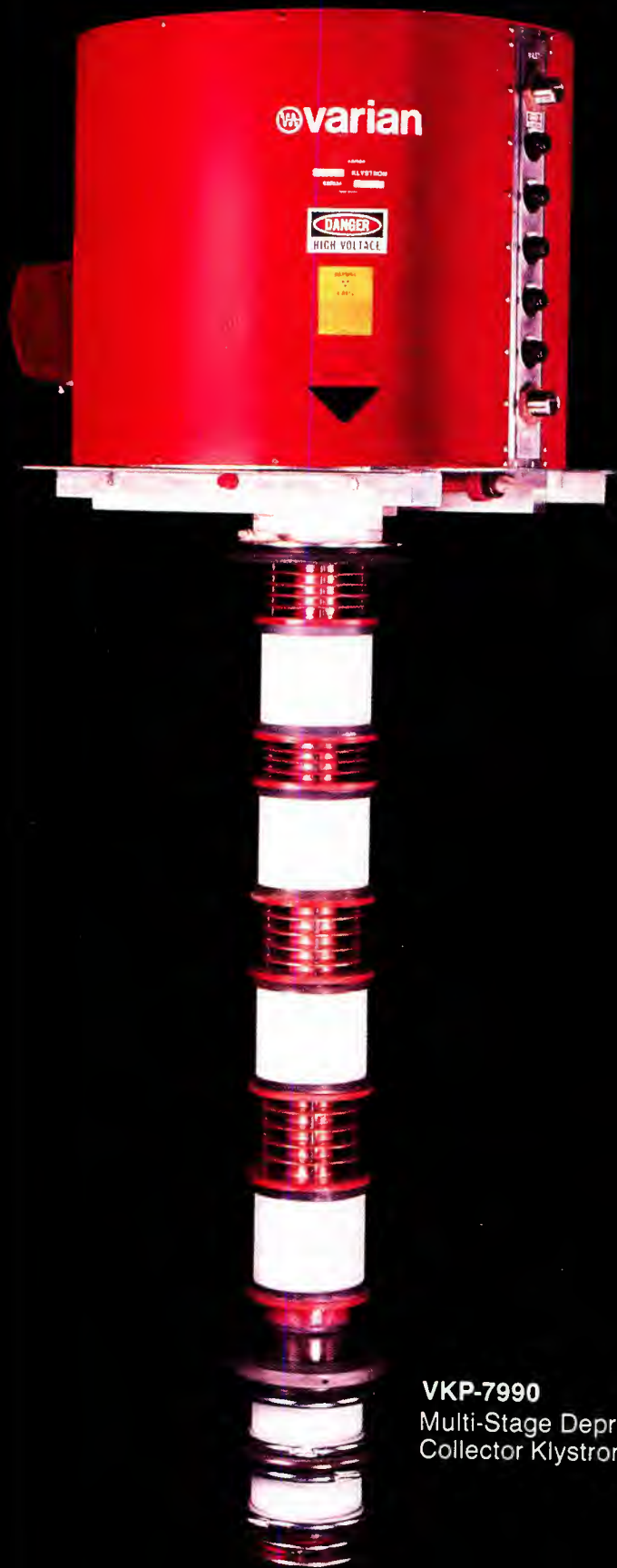
**Ramsa Audio/Panasonic** 2534  
DAT recorders; CD players; mixers;  
speakers. (A4)  
Circle (1044) [See ad page 209](#)

**Rangertone Research** 1952  
**Multi-Track Magnetics**  
Audio film recorders; film projection equip-  
ment. (V3)  
Circle (1045)

**Rank Cintel** 3156  
Telecines; still stores; disc-based video re-  
corders; graphics systems; weather receiv-



# THE SHAPE OF THINGS TO COME...



... CAN SAVE YOU  
MORE THAN  
**50%**  
ON POWER COSTS\*  
WITH THE  
**MSDC  
KLYSTRON!**

\*Compared to a typical UHF-TV transmitter

SEE THE SHAPE OF THINGS  
TO COME AT VARIAN BOOTH  
5100 — NAB 1990, ATLANTA

**VKP-7990**  
Multi-Stage Depressed  
Collector Klystron

**varian** 

*microwave power tube division*

611 Hansen Way / Palo Alto, CA 94303 / 415•493-4000



ing, display equipment; color correction equipment. (V3)  
Circle (1046)

See ad page 179

**Reach Electronics/Vetronix** 5908  
Electronic components.  
Circle (1047)

**REBO** HDTV  
High definition TV products. (S2, V2, V7)  
Circle (1048)

**Recortec** 2557  
Videotape conditioners; VHS adaptations.  
Circle (1049)

**Rees Associates** 2037  
Studio, production facility design.  
Circle (1050)

**Register Data Systems** 6106  
Traffic, accounting business systems. (S1)  
Circle (1051)

**Research Technology Int'l/RTI** 2049  
Videotape degausser, evaluators, cleaners;  
film cleaning equipment. (S4)  
Circle (1052)

**RF Technology** 2612  
ENG transmitters, receivers, power  
amplifiers, antennas; fiber optic systems;  
delay lines; video processing. (R2, S2, V7)  
Circle (1053)

**Richardson Electronics** 2844  
Power grid tubes, rectifiers; klystrons,  
TWTs, RF transistors; RF cavities, com-

ponents; camera, video display tubes.  
Circle (1054)

**Rockwell International** 1924  
STL/ICR microwave systems; weather  
radar, displays.  
Circle (1056)

**ROH/Anchor Audio** 6430  
Intercoms, headsets; audio routers, mixers;  
audio, time code monitors; PA automation.  
(A1, A4)  
Circle (1057)

**Rohde & Schwarz** 5408  
Audio, video, RF test, analyzer systems; sig-  
nal generators, modulation monitors; FM,  
TV demods; automatic test equipment. (S6)  
Circle (1058)  
See ad page 73

**ROHN** 6400  
Tower products, design, construction;  
maintenance services.  
Circle (1059)

**Rosco Laboratories** 1808  
Chroma-key background fabrics, paints;  
visual effects; lighting gels, projectors; stage  
electrical plugs. (V4)  
Circle (1060)

**Roscor** 6524  
Mobile production, news vehicles.  
Circle (1061)

**Ross Video** 5304  
Video production switchers, keyers. (V6)  
Circle (1062)

**RRN Inc.** 9034  
Packaged sales promotions, specialized  
programming for radio, TV, cable. (S8)  
Circle (1064)

**RTNDA** 6705  
Circle (1065)

**RTS Systems** 2624  
Multiple-channel, programmable, modular  
intercom systems; headsets; intercom  
telephone couplers; hard-wired systems;  
audio test tone generators. (A4)  
Circle (1066)  
See ad page 198

**Sachtler** 1610  
Camera support equipment; lighting instru-  
ments for studio, ENG. (V4)  
Circle (1067)  
See ad page 71

**SAIC/IDS** 163W  
Large screen projectors, Eidophor dis-  
tributor.  
Circle (1068)

**Samson Technologies** 6542  
Wireless microphones, receivers. (A4)  
Circle (1069)

**San Francisco Satellite** 3913  
Satellite communications services.  
Circle (1070)

**Sanken/Audio Intervisual Design** 1340  
Stereo field microphones. (A4)  
Circle (1071)

**SAS Institute** 8061  
Circle (1072)

**SBE** 1043  
Circle (1073)

**Scala Electronic** 4224  
Antennas for radio broadcast, microwave.  
Circle (1074)



In the olden days, film cameras had to be operated by hand...

...today even camera dollies have a fully automatic computer for movements



Our dolly offers you the opportunity of riding with the camera in a comfortable, seated position to every possible height for shooting - without any craning or contorting. The Panther's computerized column is moved to every desired position - jolt and vibration-free - by pressing the handset control.

**SEE US AT NAB BOOTH NO 6822.**

**PANTHER CORP. OF AMERICA**  
4242 Lankershim Blvd.  
North Hollywood, CA 91602  
FAX: (818) 761-5455  
Phone: (818) 761-5414

**PANTHER GMBH (Head Office)**  
Grunwalder Weg 28c  
D-8024 Oberhaching-Munich  
West-Germany  
Telefax (089) 6131000  
Telex 528 144 panth d  
Phone (089) 6131007

Circle (112) on Reply Card



**You are invited**  
to the premiere showing of  
**360 SYSTEMS'**

# Digital Audio Cart Machine

The Broadcast Products Group of 360 Systems is pleased to present the first digital recorder/reproducer designed specifically for the needs of today's broadcasters. Key features include:

- Removable low-cost recording medium
- Instant cueing to any selection / Zero start time
  - Highly reliable drive and cartridge
  - True 16-bit stereo performance
  - Standard half-rack form factor
  - Standard cart operating controls
- Price competitive with analog tape carts

Please join us for demonstrations at the  
NAB Convention March 31 through April 3, 1990  
**Booth 7201 East Concourse, Level 3**

*360 Systems*

18740 Oxnard Street, Tarzana, California 91356  
Phone: 818/342-3127 • Fax: 818/342-4372

Circle #113 on Reply Card  
www.americanradiohistory.com



|                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Schafer World Communications</b> 4602<br>Automated CD players.<br>Circle (1075)                                                                                                                        | <b>Skotel</b> 1536<br>Time code generators, readers, inserters.<br>(V2)<br>Circle (1096)                                                                                                                                                                                                                       | <b>Sprague Magnetics</b> 5406<br>Audio heads, head refurbishing service.<br>Circle (1115)                                                                                                                                          |
| <b>Schmid Telecommunication</b> 1035<br>Audio system test equipment. (S6)<br>Circle (1076) <a href="#">See ad page 213</a>                                                                                | <b>SMPTE</b> 6720<br>Circle (1097)                                                                                                                                                                                                                                                                             | <b>Stainless/SG Communications</b> 5613<br>Broadcast towers, accessories, services.<br>Circle (1116)                                                                                                                               |
| <b>Schneider Corp of America</b> 5616<br>TV camera zoom lenses; optical filters for<br>TV, film. (V1)<br>Circle (1077)                                                                                    | <b>Snell &amp; Wilcox</b> 1041, 2100<br>Standards converters. (V3, V7)<br>Circle (1098) <a href="#">See ad page 101</a>                                                                                                                                                                                        | <b>Standard Communication</b> 3900<br>Earth station electronics.<br>Circle (1117) <a href="#">See ad page 253</a>                                                                                                                  |
| <b>Schwem Technology</b> 3153<br>TV camera lenses, stabilizers. (V1)<br>Circle (1078)                                                                                                                     | <b>Soc. of Professional Videographers</b> 1055<br>Circle (1099)                                                                                                                                                                                                                                                | <b>Stanton Magnetics</b> 4726<br>Phono cartridges, headphones. (A4)<br>Circle (1118) <a href="#">See ad page 48</a>                                                                                                                |
| <b>Scientific Atlanta</b> 5730<br>Earth station antennas, electronics, control-<br>lers. (R6)<br>Circle (1079)                                                                                            | <b>Solid State Logic</b> 1321<br>Audio consoles; integrated digital audio<br>production, post systems. (A2, A5)<br>Circle (1100) <a href="#">See ad page 182</a>                                                                                                                                               | <b>Stanton-Video Services Unlimited</b> 9043<br>Camera cranes, booms. (V1)<br>Circle (1119)                                                                                                                                        |
| <b>SECK</b> 2916<br>Production, remote audio mixers.<br>Circle (1080)                                                                                                                                     | <b>Solutec</b> 6800<br>Automation hardware, software; A-V DAs;<br>audio level monitor equipment. (S1, S5, S6)<br>Circle (1101)                                                                                                                                                                                 | <b>Stantron Unit/Zero</b> 3534<br>Modular equipment cabinets, consoles;<br>VTR/VCR dubbing/duplicator racks, editing<br>workstations; wood trims, fan, rack slide<br>accessories.<br>Circle (1120) <a href="#">See ad page 106</a> |
| <b>Selco/Sifam</b> 5504<br>Wire, cable, connectors, patching products;<br>instrument knobs, lighting kits. (S6)<br>Circle (1081)                                                                          | <b>Sono-Mag</b> 4301<br>Radio program automation; multicart audio<br>carousel players, audio recording<br>source/monitoring equipment.<br>Circle (1102)                                                                                                                                                        | <b>Star Case</b> 3810<br>Equipment transport cases. (S3)<br>Circle (1121)                                                                                                                                                          |
| <b>Sellmark Electronic Services</b> 7101<br>Circle (1083)                                                                                                                                                 | <b>Sony Communications/Broadcast</b> †5130<br>Video cameras, camera-recorders; analog,<br>digital video signal conversion, processing<br>products; editing systems; video monitors;<br>videocassette automation systems. (S1, V1,<br>V2, V6, V8)<br>Circle (1103) <a href="#">See ad page 24-5, 102-3, MAP</a> | <b>Steady-Film (VTA/Atlanta)</b> 3446<br>Motion control systems; telecine acces-<br>sories.<br>Circle (1122)                                                                                                                       |
| <b>Sennheiser Electric</b> 3101<br>Studio, field microphones, dynamic, con-<br>denser designs; headphones, headsets.<br>(A4)<br>Circle (1084)                                                             | <b>Sony Communications/Pro Audio</b> 5130<br>Analog, digital audio recorders; analog-digi-<br>tal signal conversion products; audio<br>mixers; wireless microphones. (A1, A3)<br>Circle (1104) <a href="#">See ad page 43</a>                                                                                  | <b>Steenbeck</b> 6408<br>Film, mag film editing tables, film-to-video<br>transfer equipment. (V3)<br>Circle (1123)                                                                                                                 |
| <b>SESCOM</b> 2015<br>Modular audio DAs, mic/phono preamps;<br>line, monitor amps.<br>Circle (1085)                                                                                                       | <b>Sony Magnetic Tape</b> 5130<br>Video tape, analog, digital in reel, cassette<br>formats; audio tape.<br>Circle (1106) <a href="#">See ad page 257</a>                                                                                                                                                       | <b>Storeel</b> 2434<br>Videotape storage systems. (S3)<br>Circle (1124)                                                                                                                                                            |
| <b>Shima Seiki</b> †3241<br>Electronic graphics equipment.<br>Circle (1086)                                                                                                                               | <b>Sony Still Imaging</b> †5130<br>Still image cameras, recorder/reproducers,<br>transmission equipment.<br>Circle (1107) <a href="#">See ad page 169, 171</a>                                                                                                                                                 | <b>Strand Lighting</b> 3148<br>Stage, studio lighting instruments, dim-<br>mers, controllers, accessories.<br>Circle (1125)                                                                                                        |
| <b>Shively Labs</b> 4030<br>Transmission line; antenna radomes; direc-<br>tional array consultants. (R1)<br>Circle (1087)                                                                                 | <b>Sound Ideas</b> 5011<br>Production music, sound effects. (S8)<br>Circle (1108)                                                                                                                                                                                                                              | <b>Studer EdiTech</b> 1406<br>Hard-disk digital audio recording, editing<br>equipment. (A5)<br>Circle (1126)                                                                                                                       |
| <b>Shook Electronics USA</b> A100<br>Remote TV production vehicles. (S7)<br>Circle (1088)                                                                                                                 | <b>Sound Technology</b> 4344<br>Audio test equipment, signal analyzers.<br>Circle (1109)                                                                                                                                                                                                                       | <b>Studer ReVox</b> 4552<br>Audio consoles; analog, digital tape and<br>hard-disk audio recorders, synchronizers;<br>FM monitor/tuners; CD players, controllers;<br>monitor speakers. (A1, A3, A4, A5)<br>Circle (1127)            |
| <b>Shure Brothers</b> 4524<br>Microphones, wireless mics; audio mixing<br>systems; signal distribution systems. (A4)<br>Circle (1089) <a href="#">See ad page Inside Front Cover</a>                      | <b>Soundcraft/USA</b> 2916<br>Audio consoles. (A1)<br>Circle (1110)                                                                                                                                                                                                                                            | <b>Studio Technologies</b> 5605<br>Microphone preamps; stereo simulation,<br>stereo signal identification products. (A4)<br>Circle (1128)                                                                                          |
| <b>Siemens Components</b> 3546<br>Circle (1090)                                                                                                                                                           | <b>Soundmaster International</b> 3720<br>Integrated audio editing systems; transport<br>synchronizers, controllers. (A5)<br>Circle (1111)                                                                                                                                                                      | <b>Sure Shot Satellite Network</b> 8112<br>Mobile, fixed production services; uplink,<br>satellite time brokers. (S7)<br>Circle (1129)                                                                                             |
| <b>Sierra Video Systems</b> 9005<br>Distribution, routing switchers. (S5, V7)<br>Circle (1091) <a href="#">See ad page 254</a>                                                                            | <b>Soundtracs</b> 6542<br>Audio mixers. (A1)<br>Circle (1264)                                                                                                                                                                                                                                                  | <b>Swintek Enterprises</b> 6531<br>Wireless mics; intercoms; headphones. (A4)<br>Circle (1130)                                                                                                                                     |
| <b>Sigma Electronics</b> 6300<br>Distribution equipment; videographics<br>devices; sync, test signal, video ID gener-<br>ators. (S5, V5, V7)<br>Circle (1092) <a href="#">See ad page 268-9, 271, 273</a> | <b>Spaceward Systems</b> 7022<br>Electronic paint, 3-D graphics, titling equip-<br>ment. (V2, V5)<br>Circle (1113)                                                                                                                                                                                             | <b>Switchcraft</b> 6043<br>Audio patch panels, cords, jacks. (S2)<br>Circle (1131)                                                                                                                                                 |
| <b>Signature Music Library</b> 7015<br>Music, effects libraries; CD formats.<br>Circle (1093)                                                                                                             | <b>Spectra Image/Spectra Systems</b> 8042<br>Videodisc recorders, playback equipment.<br>Circle (1114)                                                                                                                                                                                                         | <b>SWR</b> 5005<br>FM, TV antennas; transmission line.<br>Circle (1132)                                                                                                                                                            |
| <b>Singer Products</b> 4611<br>Distributor, audio, radio products.<br>Circle (1094)                                                                                                                       |                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                    |



# The new Sony Video Scanner. The most successful screen debut since the copy stand.



No light! No cameras! Just action! The new Sony UY-T55 Color Video Scanner plays the role of a copy stand. With a performance that matches high-end copy stands, yet at a price and convenience they can't match. The Sony UY-T55 Video Scanner converts flat art into high quality video images for video production, broadcast presentations and computer/video graphics for frame capture applications. And in a lot less space than

conventional copy stands. What's more, the Sony Color Video Scanner captures an image in full color, and finishes



© Copyright 1990 Sony Corporation of America. All rights reserved. Monitor picture simulated.

its performance in a mere 6 seconds. All without focusing or lighting. And if you need to crop and zoom, you can do it in one take. To give this talented video scanner a screen test, call Sony at 1-800-833-6302. We'll put you in touch with a Sony dealer, and he'll show you why the new Sony Color Video Scanner is a tough act to follow.

## SONY®

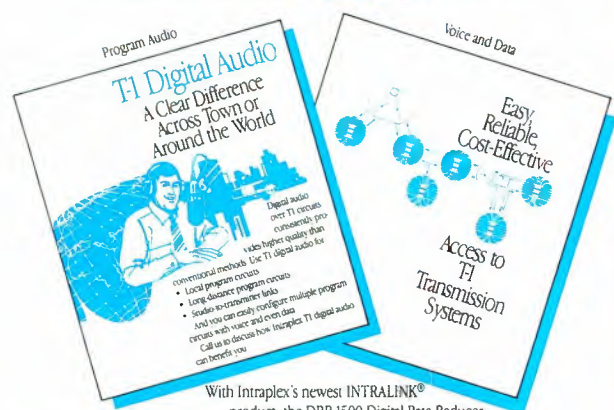
Circle (114) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



|                                                                                                                          |              |                                                                                                                                                                                 |                   |                                                                                                                                                                                                                                                                        |              |
|--------------------------------------------------------------------------------------------------------------------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| <b>Symbolics/Graphics Div</b><br>Digital graphic systems.<br>Circle (1133)                                               | <b>†1156</b> | <b>Tapscan</b><br>Business software systems.<br>Circle (1144)                                                                                                                   | <b>3817</b>       | backdrops; studio rail systems.<br>Circle (1153)                                                                                                                                                                                                                       |              |
| <b>Symetrix</b><br>Audio processors, phone hybrids; digital audio recorders; audio meters. (A2, A5, S6)<br>Circle (1134) | <b>6342</b>  | <b>Target Tuning</b><br>Promotional specialty products.<br>Circle (1145)                                                                                                        | <b>8110</b>       | <b>Tekskil Industries</b><br>Computer prompters. (V5)<br>Circle (1154)                                                                                                                                                                                                 | <b>3802</b>  |
| <b>Synergistic Batteries</b><br>Battery products.<br>Circle (1135)                                                       | <b>6540</b>  | <b>TASCAM</b><br>Reel, cassette audio recorders; audio consoles; signal processors; transport synchronizers. (A1, A3, A5)<br>Circle (1146) <a href="#">See ad page 265, 267</a> | <b>3352</b>       | <b>Tektronix</b><br>Component/composite video signal generators; transmission test signal generator; video measurement sets; aural modulation monitor with remote monitoring; signal development software. (S6)<br>Circle (1155) <a href="#">See ad page 52-3, 181</a> | <b>†2016</b> |
| <b>System Associates</b><br>Used broadcast TV equipment brokers.<br>Circle (1136)                                        | <b>1429</b>  | <b>Taurus Communications</b><br>Satellite communications services.<br>Circle (1147)                                                                                             | <b>8049, A265</b> | <b>Tektronix-Telcom</b><br>Circle (1156)                                                                                                                                                                                                                               | <b>1425</b>  |
| <b>Systemation</b><br>Radio automation hardware, software.<br>Circle (1137)                                              | <b>6722</b>  | <b>TEAC</b><br>Videodisc recorders, players. (V2)<br>Circle (1149) <a href="#">See ad page 144</a>                                                                              | <b>3352</b>       | <b>Telcom Research</b><br>Time code products.<br>Circle (1157)                                                                                                                                                                                                         | <b>3046</b>  |
| <b>Systems Wireless Ltd</b><br>Wireless microphones.<br>Circle (1138)                                                    | <b>7113</b>  | <b>Teatronics/Lighting Innovations</b><br>Lighting dimmers, controllers. (V4)<br>Circle (1150)                                                                                  | <b>2820</b>       | <b>Telemet</b><br>TV demods; routing switchers, DAs; video encoders, decoders; fiber optic products; sync, test signal generators; sideband analyzers, envelope delay test sets; video switchers, keyers; titling generators. (V5)<br>Circle (1158)                    | <b>5114</b>  |
| <b>Taber/AVSC</b><br>Audio recording heads; degaussers, cleaners, conditioners; recording tape.<br>Circle (1139)         | <b>2556</b>  | <b>Teccom</b><br>Distributor, video products.<br>Circle (1151)                                                                                                                  | <b>3434</b>       | <b>Telemetrics</b><br>Triaxial camera control systems; pan/tilt camera support with computer control. (S1, V1)<br>Circle (1159) <a href="#">See ad page 220</a>                                                                                                        | <b>1449</b>  |
| <b>Tamron Industries</b><br>Camera lenses; video printers. (V1)<br>Circle (1141)                                         | <b>3050</b>  | <b>Techni-Tool</b><br>CRT degaussers; tool cases; cleaning products. (S6)<br>Circle (1152)                                                                                      | <b>2857</b>       |                                                                                                                                                                                                                                                                        |              |
| <b>Tannoy North America</b><br>Audio reference monitors. (A4)<br>Circle (1142)                                           | <b>6630</b>  | <b>TEKNO</b><br>Lighting products, lamps; cycloramas,                                                                                                                           | <b>1110</b>       |                                                                                                                                                                                                                                                                        |              |

## Save Money With Fractional T-1



With Intralex's newest INTRALINK® product, the DR-1500 Digital Rate Reducer, you obtain immediate and ongoing transmission cost savings over satellite and terrestrial digital networks. By linking T-1 equipment at fractional T-1 rates, you:

- Save "space segment" costs
- Can link N. American T-1 channels to  
- CCITT 2.048 Mb/s or  
- Japanese 1.544 Mb/s networks.

Call Intralex to put the INTRALINK® series of products to work for you. Save money at fractional T-1 rates.



Intralex, Incorporated, 59 Porter Rd., PO. Box 2427, Littleton, MA 01460-3427  
TEL: (508) 486-3722 / FAX: (508) 486-0709

Circle (115) on Reply Card

## B C A M MAINTENANCE MANAGEMENT SOFTWARE

"FOR YOUR PC"

### KEEP TRACK OF

- \* EQUIPMENT REPAIRS
- \* EQUIPMENT HISTORY
- \* EQUIPMENT INVENTORY
- \* WARRANTY STATUS
- \* PARTS INVENTORY
- \* PERSONNEL ACTIVITIES
- \* PROBLEMS & SOLUTIONS
- \* PREVENTIVE MAINTENANCE

### Computer Assisted Technologies

847A Second Avenue Suite 175  
New York, NY 10017  
Tel. (212) 360-2591  
Fax (212) 573-8362

Circle (116) on Reply Card





# Sony's new definition of still video recording: 500 lines of resolution.

Words can hardly describe the image clarity when viewing 500 lines of resolution. Which is precisely what Sony has added to the new MVR-5600 still video recorder/player. It lets you record, play back and store video signals from just about any video source, in never before seen sharpness. Whether it's still video pictures, frames from video cameras, videotape recorders, copy stand and video scanner images or computer graphics. With the MVR-5600, you have immediate

random access to any image on the 2" floppy disc in as little as 30 milliseconds. Which in turn makes it easy to integrate high quality images into broadcasting, video pro-



duction, computer imaging, business presentations and demonstrations. You can even use it as a low cost video still-store device or for image-archiving applications. For a demonstration of this revolution in resolution, call Sony at 1-800-833-6302. We'll put you in touch with a Sony Still Image dealer who'll show you our full line of products. And what 500 lines of resolution means for you.

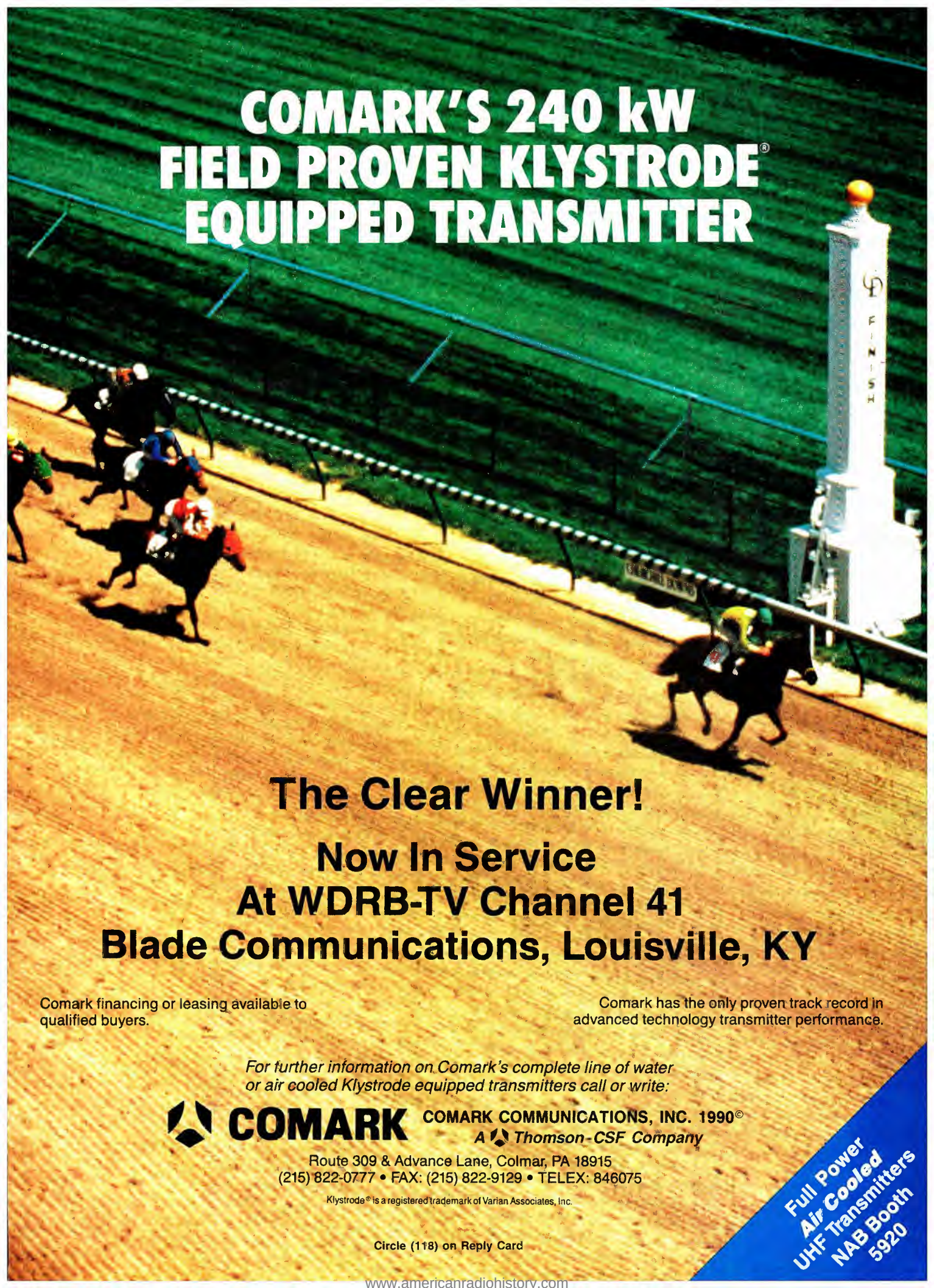
## SONY®

Sony Still Image Systems Division, Sony Drive, Park Ridge, New Jersey 07656. © Copyright 1989 Sony Corporation of America. All rights reserved. Monitor picture simulated.



|                                                                                                                                                                                                                              |                                                                                                                                                                                           |                                                                                                                                                                                                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Telepak San Diego</b> 3815<br>Soft cases for professional cameras, recorders, monitors, accessories. (S3)<br>Circle (1160)                                                                                                | <b>Thomson Video Equipment</b><br>See ad pages 61, 90, 156, 173, 234, 235, 256                                                                                                            | <b>27th Dimension Inc</b> 6817<br>Production music libraries on CD. (S8)<br>Circle (1193)                                                                                                                                           |
| <b>Telesat Canada</b> A228<br>Satellite communications services.<br>Circle (1161)                                                                                                                                            | <b>Thomson Digital Image/TDI</b> 1424<br>Digital graphics, computer animation software.<br>Circle (1176)                                                                                  | <b>TWR Lighting</b> 6539<br>Tower lights, beacons, controllers.<br>Circle (1194)                                                                                                                                                    |
| <b>Telescript</b> 1934<br>Video prompting systems, accessories. (V5)<br>Circle (1162)                                                                                                                                        | <b>Thomson Electron Tubes &amp; Devices</b> 6348<br>RF power tubes, solid-state devices; camera tubes, CCDs. (R3, R6)<br>Circle (1177) See ad page 90                                     | <b>Ultimatte</b> 1122<br>Video compositers; computer-controlled camera mounting systems. (V7)<br>Circle (1195)                                                                                                                      |
| <b>Television Engineering</b> 2240<br>Facilities designs, production vehicles; equipment packages, systems. (A4)<br>Circle (1163)                                                                                            | <b>Thomson Video Equipment</b> 5920<br>EDTV/HDTV, CCD studio/OB cameras; component digital, production, routing switchers, color correctors. (V1, V6, V7)<br>Circle (1178) See ad page 61 | <b>Uni-Set</b> 1959<br>Studio fixtures, furniture, set pieces.<br>Circle (1196)                                                                                                                                                     |
| <b>Television Equipment Associates</b> 5501<br>Matthey video delays, filters; audio anti-aliasing filters; Racal headsets, 2-way radio accessories; miniature camera; miniature video transmitter. (R1, V1)<br>Circle (1164) | <b>Thomson-LGT</b> 5920<br>VHF, UHF solid-state TV transmitters, transposers; FM transmitters.<br>Circle (1179) See ad page 235                                                           | <b>Union Connector</b> 3260<br>Studio wiring, connectors; power contactors, panels. (S2, V4)<br>Circle (1197)                                                                                                                       |
| <b>Telex Communications/Pro A-V</b> 2116<br>Wired, wireless microphones; intercoms; headphones, headsets. (A4)<br>Circle (1165) See ad page 63                                                                               | <b>360 Systems</b> 7201<br>Permanent playback digital audio message systems; audio routing equipment. (A5, S5)<br>Circle (1172) See ad page 167                                           | <b>Unique Business Systems</b> 9008<br>Rental system software. (S1)<br>Circle (1198)                                                                                                                                                |
| <b>Telmak Television</b> 1009<br>Modular video switcher, distribution products.<br>Circle (1166) See ad page 202                                                                                                             | <b>Tiffen Mfg</b> 1916<br>Optical filters, lens accessories for film, video. (V1)<br>Circle (1180)                                                                                        | <b>United Ad Label</b> 1348<br>Adhesive label products.<br>Circle (1199)                                                                                                                                                            |
| <b>Telnox Telecommunications</b> 8025<br>Digital signal routing switchers.<br>Circle (1167)                                                                                                                                  | <b>TimeLine</b> 4345<br>Console automation; time code equipment, transport synchronizers. (V2)<br>Circle (1181)                                                                           | <b>United Media</b> 2826<br>Videotape editing controllers; editing switchers; time code products. (V2)<br>Circle (1200)                                                                                                             |
| <b>Telos Systems/TLS</b> 6354<br>Telephone hybrid systems. (A2)<br>Circle (843)                                                                                                                                              | <b>Titus Technological Laboratories</b> 4430<br>Audio distribution equipment; FM stereo signal analyzers, synthesizers. (A2)<br>Circle (1182)                                             | <b>United Ropeworks (USA)</b> 5406<br>Tower guy materials, accessories.<br>Circle (1201) See ad page 248                                                                                                                            |
| <b>Teltest</b> 2934<br>Video production switcher. (V6)<br>Circle (1168)                                                                                                                                                      | <b>Torpey Controls &amp; Engineering</b> 5404<br>Master clock, central timer, central thermometer systems. (S1)<br>Circle (1184)                                                          | <b>UREI</b> 2916<br>Audio processor; on-air audio mixers. (A4)<br>Circle (1202)                                                                                                                                                     |
| <b>Tennaplex Systems</b> 4325<br>FM, TV antennas; music automation systems. (S1)<br>Circle (1169) See ad page 196                                                                                                            | <b>Toshiba /OEM Div</b> †3322<br>Miniature video cameras; transmitter equipment; HDTV products.<br>Circle (1185)                                                                          | <b>US Tape &amp; Label</b> 4804<br>Cassette labels; promotional materials.<br>Circle (1203)                                                                                                                                         |
| <b>Tentel</b> 2033<br>Tools, gauges for VTR/VCR alignment. (S4)<br>Circle (1170)                                                                                                                                             | <b>Total Spectrum Mfg</b> 1814<br>Camera mounting systems; remote, automation controllers; ENG accessories.<br>Circle (1186) See ad page 227                                              | <b>Ushio America</b> 9041<br>Halogen studio lamps. (V4)<br>Circle (1204)                                                                                                                                                            |
| <b>TFT Inc</b> 4642<br>AM, FM, TV modulation monitors; STL equipment; remote pickup systems; transmitter remote control systems; FM generators, exciters. (R2)<br>Circle (1171)                                              | <b>Townsend/Midwest</b> 3106<br>UHF TV transmitters.<br>Circle (1187) See ad page 1                                                                                                       | <b>Utah Scientific/Dynatech</b> †6030<br>Automation equipment; distribution, routing, master control switchers, production switchers. (S1, S5, V6)<br>Circle (1205) See ad page 47                                                  |
| <b>Theatre Service &amp; Supply</b> 2903<br>Theatre, studio lighting instruments, lamps; facility design, construction, consulting.<br>Circle (1173)                                                                         | <b>Transmission Structures</b> 4025<br>Communications, broadcast towers, services.<br>Circle (1188)                                                                                       | <b>Utility Tower Company</b> 4717<br>Tower products; maintenance services. (R1)<br>Circle (1206)                                                                                                                                    |
| <b>Theatre Vision/TVI</b> 3040<br>Studio fixtures, lighting dimmers, power distribution systems; cys, tracks, chroma-key fabrics.<br>Circle (1174)                                                                           | <b>TRF Production Music Libraries</b> 3010<br>Production music, effects.<br>Circle (1189)                                                                                                 | <b>Valentino Production Music</b> 5400<br>Music, sound effects library. (S8)<br>Circle (1207)                                                                                                                                       |
| <b>Thermodyne International</b> 6154<br>Cases, protective shipping containers, support systems for electronic equipment. (S3)<br>Circle (1175) See ad page 219                                                               | <b>Trompter Electronics</b> 2854<br>Distribution patch panels, cords, connectors; cable assemblies.<br>Circle (1190)                                                                      | <b>Valley International</b> 6710<br>Analog, digital audio processors, audio distribution products. (A2)<br>Circle (1208)                                                                                                            |
| <b>Thomson-CSF</b> 5920<br>See:<br>Comark Communications<br>Thomson Digital Image<br>Thomson Electron Tubes & Devices<br>Thomson-LGT                                                                                         | <b>TrueVision</b> 8051<br>Computer graphics display equipment.<br>Circle (1191)                                                                                                           | <b>Valmont Industries</b> 6626<br>AM radio antennas, support products.<br>Circle (1209)                                                                                                                                             |
|                                                                                                                                                                                                                              | <b>TTC/Television Technology</b> 2006<br>FM translators, solid-state transmitters; UHF TV transmitters. (R1)<br>Circle (1192)                                                             | <b>Varian Associates</b><br>See:<br>Continental Electronics<br>Varian EIMAC Salt Lake City<br>Varian EIMAC San Carlos<br>Varian Microwave Equipment<br>Varian Microwave Power Tubes<br>Varian TVT<br>See ad pages 13, 100, 165, 237 |





# COMARK'S 240 kW FIELD PROVEN KLYSTRODE® EQUIPPED TRANSMITTER

**The Clear Winner!**  
**Now In Service**  
**At WDRB-TV Channel 41**  
**Blade Communications, Louisville, KY**

Comark financing or leasing available to  
qualified buyers.

Comark has the only proven track record in  
advanced technology transmitter performance.

*For further information on Comark's complete line of water  
or air cooled Klystrode equipped transmitters call or write:*



**COMARK**

COMARK COMMUNICATIONS, INC. 1990®

A Thomson-CSF Company

Route 309 & Advance Lane, Colmar, PA 18915  
(215) 822-0777 • FAX: (215) 822-9129 • TELEX: 846075

Klystrode® is a registered trademark of Varian Associates, Inc.

Circle (118) on Reply Card

**Full Power  
Air Cooled  
UHF Transmitters  
NAB Booth  
5920**



**Varian EIMAC Salt Lake City** 5100  
RF power triodes, tetrodes.  
Circle (1210) [See ad page 13](#)

**Varian EIMAC San Carlos** 5100  
RF power amplifiers, devices, Klystrones.  
Circle (1211) [See ad page 13](#)

**Varian Microwave Equipment** 5100  
RF microwave amplifier assemblies.  
Circle (1212) [See ad page 237](#)

**Varian Microwave Power Tube** 5100  
RF power devices, klystrons, circuitry. (R3)  
Circle (1213) [See ad page 165](#)

**Varian TVT** 4316  
FM radio, TV transmitters. (R1)  
Circle (1214)

**VEAM/Litton Systems** 6547  
Quick-disconnect, multiwire, power connectors, distribution panels. (S2)  
Circle (1215)

**Vector Technology** 1364  
TV transmitters, exciters; FM exciters. (R4)  
Circle (1216)

**Vega** 4618  
Wireless microphones, receivers.  
Circle (1217)

**VGV Incorporated** 5522  
Video switchers; digital effects systems.  
Circle (1218)

**Vicon Industries** 9039  
Remote controllable camera mounting, sup-

port equipment.  
Circle (1219) [See ad page 191](#)

**Video Accessory** 1330  
Sync, color, video black generators, DAs; monitor power controls. (V7, V8)  
Circle (1220)

**Video Associates Labs** 1910  
Video, computer titling keyers.  
Circle (1221)

**Video Brokers** 1056  
Equipment broker services.  
Circle (1222)

**Video Communications** 1412  
Station business systems; traffic, accounting, film/automation interfaces. (S1)  
Circle (1223)

**Video Design Pro** 1356  
CAD, engineering design stations, engineering documentation software. (S1)  
Circle (1224)

**Video Engineering Ltd** 7105  
Circle (1225)

**Video International Development** 3020  
Video standards converters. (V7)  
Circle (1226)

**Video Lab Para Technologies** 1005  
3/4" VCR retrofits; time code, RS-422 interface, shuttle retrofits.  
Circle (1227)

**Video Logic** 7120  
Computer software for automated logging of videotape. (S1)  
Circle (1228)

**Video Technics/Pixelator Graphics** 7115  
Circle (1229)

**Videomagnetics** 1445  
Tape degaussers; VPR video head refurbishing services. (S4, V2)  
Circle (1230)

**Videomedia SED** 1434  
Video editing, animation controllers. (V2)  
Circle (1231)

**Videotek** 1246  
Frame-store, synchronizers; video production switchers; color monitors, receivers, demods; blackburst DAs; waveform, vector monitors. (R4, S6, V7, V8)  
Circle (1232) [See ad page 57](#)

**Videssence** 1122  
Lighting for video compositing/keying.  
Circle (1233)

**Viking Cases** 5855  
Transport cases, equipment enclosures.  
Circle (1234)

**Vinten Broadcast** 1452  
Camera support, pedestals, pan/tilt heads; camera support automation. (V1)  
Circle (1235) [See ad page 231](#)

**Vistek Electronics** 1010  
Standards transcoders; distribution matrix amplifiers. (V6, V7)  
Circle (1236)

**Vortex Communications** 5214  
A-V DAs, routers; video encoders/decoders, format transcoders; audio detectors, VCAs; clock systems; time code products.  
Circle (1237)

**Attention  
ENG Managers...  
NEW PRODUCT!**

**CAMPLEX**

**World's First Universal Camera Adapter and  
Control Unit for ENG/EPF Color Cameras**

**\$2,995**

Expands and Enhances Versatility for SNG/ENG/EPF Applications



- The CAMPLEX CP-201 CAMERA ADAPTER and CONTROL UNIT extends camera range up to 5000' on a single coax without bulky, expensive multi-core and triax cables. No more need to tie cumbersome multiple video and audio cables together. Forget siamese cables - all you need is a single inexpensive coax cable.
- CAMPLEX CP-201 CONTROL UNIT is counter top or rack mountable and produces and processes necessary SEND/RECEIVE signals from the control location.
- The 1 1/4 lb. CAMPLEX CP-201 CAMERA ADAPTER connects to camera via standard 14 pin multiconductor VCR cable or standard BNC connections and clips to operators belt.
- Delivers multi-purpose, bi-directional video and audio signals via a single coax cable for short and long range distances.
- Set up time & labor is reduced significantly because of the elimination of problems associated with expensive triax, multi-core and multiple video and audio cables.
- Adaptable to any camera having BNC 75 ohm connections for Video out and Genlock; or to any camera configured to interface with a standard 14 pin VCR connection.

**Overall System Video Performance**

- Frequency Response - 40 Hz - 4.2MHz +/- 1db
- Differential Gain - +/- 2%
- Differential Phase - +/- 2 degrees
- Signal to Noise Ratio - Better than 55 db

**Product Functions:**

1. Genlock (black burst feed to camera)
2. Camera Video
3. Universal Intercom (2 or 4 wire)
4. Call/Tally Function (to camera)
5. Mic./Line Audio (standard mic. or line level in.)
6. Aux. Audio Return/IFB (from production)
7. Remote Power (power sent down coax to operate Camera Adapter only)



"CAMPLEX CP-201 CAMERA ADAPTER SYSTEM" adds new dimension and flexibility to your portable color camera operations.

**All This Via One Coax Cable**



© 1990

**Concept W Systems, Inc.**

3302 W. 6th Ave. / Emporia, KS 66801 USA  
Phone 316-342-7743 / Fax 316-342-7405

Circle (58) on Reply Card





# THE PROFESSIONAL CD PLAYER FOR THE PROFESSIONAL CD PLAYER.

Like all professional CD players, the new Technics SL-P1300 is technologically advanced.

But you don't have to be a technical genius to operate it.

In fact, even if you haven't spent years in the studio, it will only take you a few minutes to figure it out.

You see, the SL-P1300 is ergonomically designed to give you greater control over playback than you've ever had before.

Perhaps that's because it's built like a recording console. Which means the disc well and all the other controls are right at your fingertips.

First, the control panel features a long stroke sliding pitch control. It's continuously variable with a range of  $\pm 8\%$ . In addition, it lets you restore quartz lock accuracy at the touch of a button.



There's also our two-speed search dial with audible pause. Which makes finding your in point extremely easy.

Our professional CD player has other features professionals enjoy working with. Like one-touch memorization by time code, A-B repeat, and our exclusive rocker control search buttons. It's the digital equivalent of dragging your

finger on the edge of a record.

A great deal of thinking also went into things like our balanced outputs ( $-10$  dBm nominal into 600 ohms). There's even a port for a wired remote. And separate power supplies for digital and analog circuits. Given this, it's not surprising that its S/N ratio is 112 dB.

If you're a professional CD player, chances are you're ready to hear what our professional CD player can do.

Call your Technics representative. You'll find that our pro CD player isn't the only thing from Technics that's a pleasure to work with.

**Technics**  
The science of sound



# THINK SYSTEMS. THINK PANASONIC BROADCAST SYSTEMS.

You know about our recording systems—from players to editors to the sophisticated M.A.R.C. automated cassette system. You know about our unmatched standards for price/performance with component analog VTRs at 3/4" prices.

But we want you to know we're more than that. We are the source of the world's first digital

processing cameras, as well as some of the most cost-effective analog cameras ever made.

And, we've got just about everything in between: auto-setup monitors, cables, adapters, switchers, editors, etc.

When you're looking for value, performance and innovation, think systems. Panasonic Broadcast Systems.

**Panasonic**  
**Broadcast Systems**

Value and innovation. First and foremost.

Panasonic Broadcast Systems Company, One Panasonic Way, Secaucus, NJ 07094 (201) 348-7671

Panasonic Broadcast Systems Company Field Offices (Northeast) Washington, DC (703) 759-6900, (Southeast) Norcross, GA (404) 925-6721 (Midwest) Arlington Heights, IL (312) 981-7325/(312) 852-3715 (Southwest) Fort Worth, TX (817) 685-1132, (Western) Cypress, CA (714) 373-7209 (Northwest) (408) 866-7974. Parts, Service, Technical Information: 1-800-222-7401

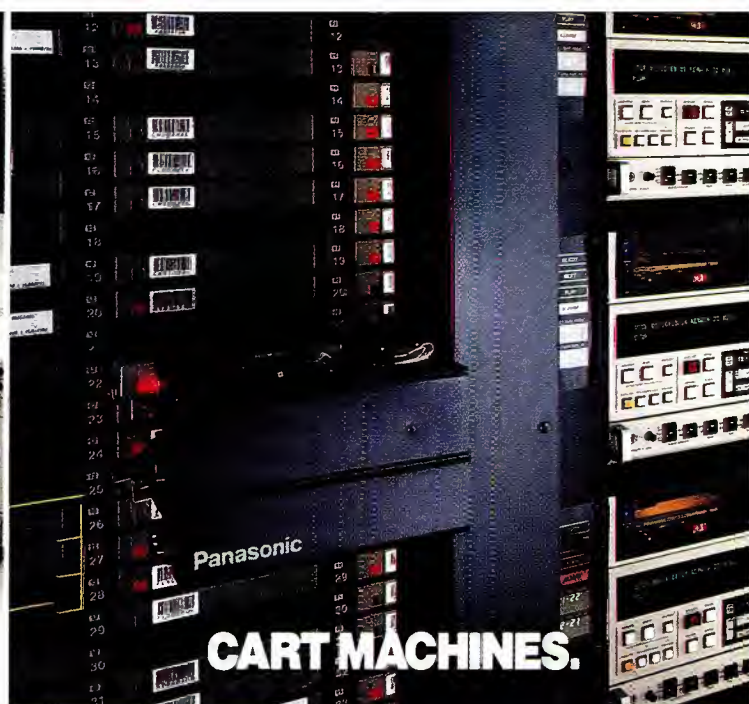
Circle (126) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)





**VTRs.**



**CART MACHINES.**



**PORTABLE CAMERAS.**



**AUTO SETUP MONITORS.**



**FIELD OPERATIONS.**



**ACCESSORIES.**



|                                                                                                                                                                        |             |                                                                                                                                                                                       |             |                                                                                                                                                            |             |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>VTE</b><br>Solid-state digital video recorders. (V2)<br>Circle (1238)                                                                                               | <b>HDTV</b> | <b>Weircliffe</b><br>Tape degaussers. (S4)<br>Circle (1247)                                                                                                                           | <b>1734</b> | <b>Wolf Coach</b><br>Mobile production vehicles; mobile unit antenna masts, accessories.<br>Circle (1257)                                                  | <b>2928</b> |
| <b>Ward-Beck Systems</b><br>Audio consoles; intercom systems; signal distribution equipment; test products. (A4)<br>Circle (1239) <a href="#">See ad on Back Cover</a> | <b>5002</b> | <b>Wheatstone Broadcast Group</b><br>Stereo switching, audio DAs; audio consoles for on-air, production, MTS. (A1, A4, S3)<br>Circle (1248)                                           | <b>4010</b> | <b>World Tower</b><br>Broadcast towers, services.<br>Circle (1258)                                                                                         | <b>5023</b> |
| <b>WaveFrame</b><br>Digital audio sampling conversion. (A5)<br>Circle (1241)                                                                                           | <b>164W</b> | <b>Whirlwind</b><br>A-V cable, connectors; turnkey design of A-V interface systems; transformers; press boxes, distribution systems; patch bays, reels, rack panels.<br>Circle (1250) | <b>5052</b> | <b>Yamaha Music</b><br>Audio consoles, digital mixing processors; A/D, D/A converters; powered monitor speakers; effects processors. (A1)<br>Circle (1259) | <b>1440</b> |
| <b>Wavefront Technologies</b><br>Videographics systems, workstations.<br>Circle (1242)                                                                                 | <b>3642</b> | <b>Will-Burt/TMD</b><br>Pneumatically-controlled antenna supports, positioning controls. (R1)<br>Circle (1252)                                                                        | <b>6806</b> | <b>Yamashita Engineering Mfr./YEM</b><br>Video scan converters, sync generators, encoders. (V7)<br>Circle (1260)                                           | <b>1312</b> |
| <b>Weather Network</b><br>Weather service, data.<br>Circle (1243)                                                                                                      | <b>1100</b> | <b>Winsted</b><br>Videotape storage systems; workstation furniture; utility equipment carts. (S3)<br>Circle (1254) <a href="#">See ad page 77</a>                                     | <b>5748</b> | <b>Zaxcom Video</b><br>TBC control systems; camera accessories; video processing equipment. (V1, V7)<br>Circle (1261)                                      | <b>6543</b> |
| <b>Weather Services Corp</b><br>Weather data services.<br>Circle (1244)                                                                                                | <b>3024</b> | <b>Wireworks</b><br>Audio, mic, video cable, multipair audio cable; stageboxes, racks, isolation splitters, multitail fan-outs; test equipment. (S6)<br>Circle (1255)                 | <b>4800</b> | <b>Zonal</b><br>Audio tape, reel, cassette formats; magnetic sound recording film.<br>Circle (1262)                                                        | <b>6812</b> |
| <b>Weathernews America</b><br>Weather forecast services.<br>Circle (1245)                                                                                              | <b>3023</b> |                                                                                                                                                                                       |             |                                                                                                                                                            |             |
| <b>Wegener Communications</b><br>SCPC, microwave, earth station electronics; digital audio, data, video systems. (R6)<br>Circle (1246)                                 | <b>6530</b> |                                                                                                                                                                                       |             |                                                                                                                                                            |             |

Uniquely portable and user friendly, Fast and accurate measurements, Unlimited test sequence potential, Complete setups stored in non-volatile memory, Auto-calibrating, Auto-ranging

## The Intelligent Vademecum\* Audiolab

Mainframe 3302 plus Analyzer 3337

A versatile combination of the Audiograph 3300 System

Plots level, gain, distortion vs. frequency/amplitude/time.

4 colors, automatic control of paper speed for optimum resolution, automatic synchronization with external frequency sweeps.



"Vademecum (Lat)  
"Go with me"

Source selector.  
LCD display for all oscillator and analyzer data and user instructions. Bargraph.

Softwheel or numeric entry of frequency and amplitude in selected units.

Same entry keys to program individual setups.

**Leaders in  
audio  
instrumentation**

Direct function keys:  
Level, level ratio, gain/loss,  
THD, K2-K5, DFD, IMD,  
frequency.

Keys to select sweep functions,  
three user definable programs.

Operating keys (Paper scale,  
activate graphs and plots)

Menu Selection

Programming and recalling  
setups

**See us at NAB, Booth #6610-6612**

**1600 Malone Street • Millville, NJ 08322 • TEL: 609 327-3113 • FAX 609 825-4804**



Circle (184) on Reply Card



# The Telecine People...

## URSA

URSA offers the quality of flying spot, the accuracy of digital processing and the flexibility of video effects by combining advanced CRT technology, totally new scanning techniques and a full digital color channel.

The premium 100 of the line film transfer equipment.

## ADS-2

Rank Cintel's versatile multi-purpose CCD Telecine featuring a unique electronic dirt and scratch concealment system, lever operated film gauge change and "state of the art" 135 sensors. The ideal transfer telecine for dailies, features, archival, broadcast and documentary use.

Now with optional AMIGO pre-programming system.

## MK III TURBO

The Unimedia MKIII TURBO, based on Rank Cintel MKIII Telecine. The outstanding features and quality of flying spot technology at an economical price.

## MK III HDTV

Available now, HD version of the world acclaimed MK III telecine. A flying spot high definition equipment to meet all proposed HDTV standards.

## TO THE FUTURE

A joint venture between Rank Cintel and Kodak to develop a CCD HDTV TELECINE.

### Rank Cintel Inc.

East Coast Sales Office,  
704 Executive Blvd, Valley Cottage,  
New York 10989 9998  
Tel: 914-268-8911  
Fax: 914-268-5939



**Rank Cintel**  
IMAGES OF EXCELLENCE

Circle (123) on Reply Card

### Rank Cintel Inc.

National Headquarters,  
13340 Saticoy, North Hollywood,  
California 91605, U.S.A.  
Tel: 818-765-7265  
Fax: 818-765-3315  
Telex: 182694



# NEW AT NAB

The following pages provide brief descriptions of new products that exhibiting manufacturers plan to debut at NAB '90. Products included are those items brought to market following the '89 exhibition, unless there were indications noted of enhancements to previous models. Some products shown as prototypes last year have been brought back as production models this year.

The BE "New at NAB" contains four general categories: audio, RF, support and video products. Each category is further subdivided and given a two character code. The codes, shown in boldface type below are cross-referenced in "Exhibitors at NAB," which begins on page 133. Parenthetical numbers following the codes below are page numbers upon which that equipment type begins.

## **Group A - Audio Products**

**A1** (183): Mixers, console automation.  
**A2** (183): Processor systems (dynamics, delay, effects, noise reduction), telephone-related equipment.

**A3** (184): Recording systems (all analog formats), ancillaries.

**A4** (184): Sources, monitors (wired, wireless mics, intercoms, headphones, speakers; RPU, phono, CD).

**A5** (188): Digital audio, MIDI.

## **Group R - RF Products**

**R1** (192): Broadcast transmitters, antennas, transmission line; remote controllers; towers, tower ancillaries.

**R2** (196): Terrestrial microwave (aural, video; ENG, STL, ITFS/MMDS; electronics, antennas).

**R3** (199): Power amplifiers, cavities, power devices.

**R4** (199): Receivers, demodulators; modulation monitors.

**R5** (199): Exciters, generators (SCA, MTS stereo, SAP, PRO, FM, AM).

**R6** (199): Satellite antennas, electronics.

## **Group S - Support Products**

**S1** (200): Automation; computer hardware, software; timers, clocks; data transmission systems.

**S2** (204): Cable, wire, fiber-optic products; connectors, patch panels, cords.

**S3** (204): Bags, cases, racks, studio furnishings; acoustic treatments.

**S4** (208): Recording media; degaussers,

tape maintenance products; film, film maintenance products.

**S5** (208): Distribution amplifiers, routing switchers.

**S6** (210): Test, measuring equipment; tools; filters, delay lines; power conditioners.

**S7** (214): Fixed, mobile facilities design, construction; consulting services.

**S8** (214): Program services, music/effects libraries; promotional products.

## **Group V - Video Products**

**V1** (217): Cameras; lenses; camera support products.

**V2** (218): Recording systems (all video formats); still-stores; video editing controllers; animation products; time code equipment.

**V3** (222): Cine/film cameras, telecines.

**V4** (222): Batteries, support products; lighting instruments, lamps; grip equipment.

**V5** (224): Graphics, titling, effects equipment; weather graphics systems; prompting, captioning.

**V6** (228): Production, master-control switchers.

**V7** (228): Processing systems (TBC, synchronizer, standards conversion; sync, VID generators; keyers, compositors).

**V8** (232): Monitors, projectors; video printers.



# Just what you're looking for in a television generator.



## The performance. The price.

**Tektronix offers the industry's most complete line of sync and test signal generators.** Each one precisely matched to your specific application requirements. You don't pay for capability you don't need and won't use. Ask your Tek representative for a demonstration. There's a perfect fit, whatever your format.

|                      |                                                                                                                                                                                                                                                                                                                                  |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>TSG-170A</b>      | NTSC sync and test signal generators.                                                                                                                                                                                                                                                                                            |
| <b>TSG-170D</b>      | Correctly SCH-phased outputs.<br>Genlock sync generator with timing presets.<br>Character identification with ID presets and tape leader countdown.                                                                                                                                                                              |
| <b>TSG-170D Only</b> | D-2 digital video output plus parallel and serial audio outputs.<br>Ideal for the NTSC house with D-2 in its future.                                                                                                                                                                                                             |
| <b>TSG-370</b>       | Simultaneous and independent component and NTSC composite test signal generators.<br>Up to eight color black outputs for equipment synchronization.<br>Ideal for component edit suite operation and maintenance.<br>A hedge on the future for NTSC houses contemplating but not yet using analog component.                      |
| <b>TSG-422</b>       | 4:2:2 digital component test signals per CCIR Rec. 601 and SMPTE RP 125.<br>Full test signal complement including signals for testing co-siting, dynamic range and digital/analog blanking width.<br>Receiver test facilities including digital gray signal and data-to-clock timing offset.<br>Genlock and color black outputs. |
| <b>1910</b>          | NTSC Test Signal Generator/VITS Inserter.<br>NTC7, FCC, ANSI T1.502 and EIA RS-250-B test signals.<br>Provisions for insertion of externally generated signals.<br>Remote control via RS-232-C.                                                                                                                                  |

**Tektronix**  
COMMITTED TO EXCELLENCE



# ScreenSound. A fully integrated audio for video editing suite



Post production facilities need to take advantage of the efficiency offered by today's technology. Speed and creative flexibility are essential to commercial success. Digital sound quality is no longer a luxury.

ScreenSound is a fully integrated audio for video editing suite. It combines digital audio storage and editing with machine control of multiple VTRs, Laserdisc or film reproducers. It also interfaces with Quantel's digital video editor, Harry.

Simple to learn and fast to use, a cordless pen, tablet and RGB monitor provide control of all ScreenSound functions.

Multiple sound reels enable music,

dialogue and effects to be laid back to picture and synchronised to the exact video frame.

Edit, review, time offset, track slipping, cross fades and many other production techniques are available at the touch of a pen. Gain and stereo pan controls can be automated to timecode.

AES/EBU interfacing keeps digital audio transfers free of analogue distortions and losses, preserving the highest audio integrity through to the final format.

Above all, ScreenSound is a dedicated system - purpose-built to bring the advantages of hard disk sound manipulation to audio post production.

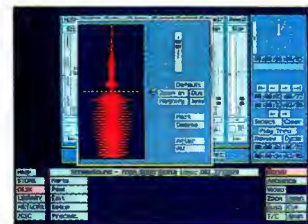
## AUDIO STORE

The hard disk store of sound clips gives title and duration, in addition to powerful search and sort routines.



## SCRUB EDITOR

Provides accurate edit marking and scrub of audio waveform.



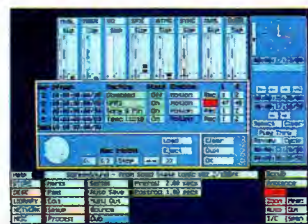
## OPTICAL LIBRARY

An off-line library of sound clips and effects can be compiled on a Write Once Read Many (WORM) optical disc.



## MACHINE CONTROL

For control of multiple VTRs, laserdisc or film reproducers.



**SSL DIGITAL**  
Solid State Logic

Begbroke, Oxford, England OX5 1RU (0865) 842300

London (01) 706 4948 • Paris (1) 34 60 46 66 • Milan (2) 612 17 20 • New York (212) 315 1111 • Los Angeles (213) 463 4444

• Toronto (416) 363 0101 • Tokyo (03) 5474 1144

U.S. Toll Free Number 800 343 0101

Circle (125) on Reply Card



# Audio Products

## A1: Mixers

- Console automation

### AMEK Consoles/TAC 3164

*TAC AFV Bullet:* 10/4/2 format compact console; rack-mount or free-standing; used with Sony BVE900 video editor.

*Serial interface:* links Bullet to edit control with ESAM protocols.

*MOZART:* 40-, 56-, 80-input audio console frames; *all-input* avoids in-line, split monitoring concepts; 32 mix buses, 12 stereo aux returns, 16 aux send paths; on-board grouping computer.

Circle (536)

### Audio Developments 1942

*Editing mixers:* emphasis on interfacing with a range of edit controllers.

*ENG series* audio mixers.

Circle (566)

### Auditronics 4542

*Model 900:* TV on-air and production audio console; computer control system.

Circle (572)

### Comprehensive Video Supply 1660

*Primebridge mixer:* includes audio mixer, monitoring, audio ADs, balanced/unbalanced inputs, outputs; battery power or external DC.

*MM-3100:* EFP mixer; three balanced inputs.

Circle (678)

### GLW Enterprises 4124

*PRO-790:* enhanced 8-track production console.

*AP-100:* enhanced software; sequencing; selective operator lock-out of assignment, other functions; European fader logic.

Circle (802)

### GML 3744

*Series 2000:* automated graphics unit; provides total recall of console automation.

Circle (803)

### Graham-Patten Systems 1654

*D/ESAM 800:* digital edit suite audio mixer; ESAM II protocol but will operate with any editor using any ESAM protocol; Motorola DSP-56000 device; 32-input, 4-output analog or digital audio.

Circle (806)

### LPB 4512

*C2-10:* audio console from the Citation II series; for on-air, production use.

Circle (909)

### Neve 4152

*VRP:* post production console.

Circle (971)

### Orion Research 3440

*NewsMaker-II:* broadcast, production software-based console; enhanced software, metering and audio features.

Circle (992)

### Otari 4352

*TC-100 transfer console:* for transfer/dubbing in film/video production; rack-mount card frames with meter panel, 4-bus; 9-18 inputs per audio rack.

*Series 54:* consoles in 24-, 36-input models; DISKMIX 3 VCA/moving fader automation

option; from Sound Workshop division.

Circle (994)

### ROH/Anchor Audio 6430

*ROHPAC I:* programmable audio control system; for automated PA.

Circle (1057)

### Sony Communications/Pro Audio 5130

*MXP-2000 series:* new, enhanced models.

*MXP-3000:* mixer with GML fader automation.

*VSP-8000:* digital mixer; complements D-1/D-2 VTRs, CD mastering; 48kHz, 99.7kHz.

Circle (1104)

### Soundcraft/USA 2916

*Model 200 Delta:* audio production console.

*Model 8000:* audio production console.

Circle (1110)

### Soundtracs, PLC 6542

*FMB console:* on-air for community, local radio stations; production work; mono, stereo inputs; telco, mix-minus modules; talkback.

Circle (1264)

### Studer ReVox 4552

*A-779:* 6x2 expandable (to 12x2) portable mixer; VCA gain elements, allowing optional, external dc remote control of channel levels, mutes.

*Model 990:* digitally controlled, analog mixer; VCA level automation with optional Studer proprietary motorized faders; storage, retrieve all control settings; 4-band EQ, two inserts per channel; 16 aux masters, four independent accessible stereo masters.

Circle (1127)

### TASCAM 3352

*M-3500:* 24-, 32-channel in-line mixer; 28dB headroom, -130dB DIN mic preamps; supports 24-track ATR, MIDI; linear faders; in-line monitor section; *Flip* function doubles input capability.

Circle (1146)

### Wheatstone Broadcast Group 4010

*A-32ex, A-50:* radio on-air consoles.

*TS-500:* talent station.

Circle (1248)

### Yamaha Music 1440

*MT3X:* 6-input combo mixer unit with pan control, 2-band EQ; for line and mic level signals; 4-track audiocassette recorder.

Circle (1259)

# Audio Products

## A2: Processors

- Compressor, limiter, EQ
- Delay, effects, noise reduction
- Telephone equipment.

### Allied Broadcast Equipment/Harris 4430

*Gentner PeopleLink:* broadcast telephone system.

Circle (527)

### AMEK Consoles/TAC 3164

*Medici equalizer:* dual-path, each with 4-band EQ, high-/low-pass filters; paths combine to form one 8-band equalizer.

Circle (536)

### Aphex Systems Ltd 6054

*Expressor:* full feature compressor, limiter;

for voice, music or single tracks; creates sounds, enhances detail often lost in wideband systems.

Circle (550)

### Audio Processing Technology/SSL 1321

*Enhanced apt-X 100:* production models of encoder/decoder cardsets; includes AUTO-SYNC features for synchronous operation of decoder for use with satellite and radio transmissions.

Circle (568)

### Broadcasters General Store 8016

*S.M.O. 900:* stereo modulation optimizer, by Hit Design.

*Tailor:* Hit Design dynamic equalizer.

*Digimod 2000:* replacement processor cards for Orban Optimod 8100 from California Digital.

Circle (622)

### Circuit Research Labs 4656

*Audio Signature:* programmable 4-band EQ and compressor system.

*IPP-100R:* remote control unit for IPP-100 mic processor.

*MBL-100 series:* 7.5kHz model for news/talk AM radio.

Circle (662)

### Comrex 5214

*Multiline Frequency Extender:* 1, 2, or 3 dial telco lines; 1-button auto dial, setup; auto line EQ; multiband noise reduction; real-time processing; supports 1s satellite delay differential.

Circle (684)

### dbx Pro Products/AKG Acoustics 6500

*140X Type II:* noise reduction system; dual channel type II encode, decode electronics; inputs, outputs at standard professional line levels; for all broadcast tape.

Circle (1263)

### Dolby Labs 4443

*MT series:* 24-channel noise reduction; switches between Dolby SR or A-type NR.

Circle (733)

### Gentner Electronics 5852

*Prizm:* digital processor for FM broadcast.

*PeopleLink:* multiline, modular broadcast telephone system.

Circle (798)

### GML 3744

*Model 8900:* compressor, limiter.

Circle (803)

### Gotham Audio 2342

*Processing systems:* Audio+Designsuper-dynamic limiter, SPLSX2 PsychoDynamic processor.

Circle (805)

### Inovonics 5601

*Model 222:* NRSC AM processor; international shortwave version.

Circle (848)

### Kahn Communications 4410

*POWER-talk:* audio processor; maximize coverage for all-talk, all-news AM; with POWER-side, Good-n-Loud systems; FCC compliant filtering.

Circle (870)

### Lexicon 2452

*LXP-5 multi-effects processor:* five simul-



taneous effects; 3-octave pitch shift; wide-range delay sweeps; chorus, flanging, ambience, reverb; dynamic MIDI interface; complements LXPI.

*Model 300*: digital effects, reverb, pitch shift; fluorescent display, menu-driven; 50-event, time code triggering; dynamic MIDI; DAT interface; keypad, softknob, dedicated key control.

*480L cartridge #10*: four algorithms load without chip change; Ambience, Random Hall, Panorama; stereo digital compressor/expander, 0.1 to 100:1; adjust attack, release, gain, rotation.

Circle (898)

**McCurdy Radio Industries 5322**  
*TIF-800*: eight telephone hybrids in one 3RU rack.

*TIF-951*: telephone interface; DTMF decoding; 1RU cabinet for use with McCurdy intercom systems.

Circle (932)

**Orban/AKG Acoustics 4208**  
*Model 4000*: transmission limiter; controls peak modulation level for analog, digital microwave, telco lines; holds on-air loudness with peak-to-average ratio changes in program audio.

Circle (991)

**Solid State Logic 1321**  
*Logic FX G383*: dual mic amplifier, equalizer.  
*Logic FX G384*: stereo compressor.  
*apt-X digital audio* compression system.

Circle (1100)

**Symetrix 6342**  
*SX-206*: multimode dynamics control; compressor, limiter, expander, gate, duck and slave; LED GR display; balanced or unbalanced output, mono with stereo link.

Circle (1134)

**Telos Systems/TLS 6354**  
*Link interface*: telephone-to-intercom interconnection; maintains full-duplex operation without gain or feedback problems; direct connection with RTS, ClearCom and other intercom systems; metering of intercom, telco levels; auto-answer function, filtering for hum and high-frequency interference.

Circle (843)

**Titus Technological Laboratories 4430**  
*TLW-2*: The Last Word 2 automatic stereo synthesizer, corrector; avoids problems of loss-of-channel, loss of signal and inverted polarity; use in stereo production for TV.

Circle (1182)

**Valley International 6710**  
*Model DCE*: digital compressor, expander system; stereo.

Circle (1208)

## Audio Products

### A3: Recorders

- Non-digital equipment
- Editing, synchronizing
- Ancillary equipment

**Accurate Sound Corp 4111**  
*MCS-500*: cassette recorder/logger; runs at 15/64ips to 33/4ips; 4-8 channel; uses standard Philips cassette, dual transport, time code

read/write; 16-hour continuous record.

Circle (507)

**Adams-Smith 6808**  
*System 2600 A/V*: enhancements and features.

Circle (510)

**ADx Systems 7119**  
*ADx-25*: multitransport synchronizer.  
*ADX-10*: "Smart machine" TC-based controller.

Circle (516)

**Apollo Lighting/Audio-Visual 3800**  
*PA-2060*: portable cassette recorder with public address system.

Circle (551)

**International Tapetronics/ITC 3422**  
*Series 1*: NAB cartridge machine; available as playback, record/play systems; numerous standard features.

Circle (856)

**Otari 4352**  
*MX-5050 MKIV-2, -4, -8*: 1/4", 1/2" transports, 2-, 4-, 8-track; three memory point autolocator; 20% varispeed, display; TC-based synchronizing; gapless, seamless punch-in/out editing.

*MTR-15*: 1/4", 1/2" widths; mono, stereo, 2-track, 2-track with center track time code.  
*MX-5050 B-III*: 1/4" 2-channel ATR; three memory point autolocator; vari-speed; SMPTE/EBU interface; time code-based synchronizing.

Circle (994)

**Professional Sound Corporation 9001**  
*PSC sound assist* tape counter for Nagra recorders.

Circle (1023)

**Studer ReVox 4552**  
*Model A807TC*: 2/2-TC 2-channel recorder; SMPTE center-track time code; rack, console configurations.

Circle (1127)

**TASCAM 3352**  
*MSR-24*: 24-track ATR; 1" tape, 10 1/2" reels, 7 1/2"ips or 15"ips; dbx Type 1 noise reduction; 108dB S/N at 15ips; 8-bit  $\mu$ P logic, record/bias control.

*688 Midistudio*: portable 8-track mixer, recorder; 20 position mixer, gain, pan, effects, four effects returns; 10x2 form; 99-scene storage; LED metering; cassette ATR; serial interface.

Circle (1146)

## Audio Products

### A4: Ancillary audio

- Wired, wireless mics
- CD, phono equipment
- Headphones, headsets
- Intercoms, speakers

**AKG Acoustics 6500**  
*K280*: parabolic headphone; produces L/R perspective of concert hall.

*Micromic series*: miniature clip-on electrets; better stage mobility, micing convenience for musicians.

*C1000S*: multiple pattern mic; 9V or phantom power; pattern change from cardioid to

hypercardioid.

*C525S*: budget-priced electret; fast transient response; 9V or phantom power.

*K 270-S*: switched headphones; auto muting when removed from a listener's head to avoid stray leakage into open mic; sealed circumaural design; parabolic setting of two transducers per muff.

Circle (520)

**Alpha Video & Electronics/AVEC 3111**  
*NC-102*: telephone IFB system.  
*SI-106*: IFB switching interface.

Circle (531)

**AMS/Calrec 6338**  
*ST250*: stereo mic; remote control unit selects X-Y, M-S stereo; adjustable from end-fire to vertical operation; 20Hz-20kHz response; 110/250Vac, dc power.

Circle (541)

**ATI/Audio Technologies 5051**  
*SDA200, SMDA200*: stereo 1x4 modular DAs; meter option for L, R, Sum signals; dipswitch selects stereo, sum, difference, L only 1x8, R only 1x8; plugs into ATI DA-10000 equipment frame.

Circle (562)

**Audio-Technica US 4214**  
*AT825*: X-Y stereo microphone.  
*AT841a*: OmniPlate, omnidirectional boundary mic.  
*AT851a*: cardioid boundary mic.  
*Series 600*: studiomphones.

Circle (569)

**Barco Industries 2944**  
*Professional CD* player system.

Circle (586)

**Benchmark Media Systems 1318**  
*System-1000 modules*: 1201 input buffer/mixer; 1202 matrixed output module; 1203 gain control modules.

Circle (596)

**beyerdynamic 1938**  
*DT 158/159*: headset microphones; on-air, intercom applications.  
*HM 560*: headworn microphone.  
*SHM 20*: podium condenser mic.  
*M260DJ, M500DJ*: ribbon mic for on-air talent.

Circle (598)

**Clear-Com Intercoms 1407**  
*ICS-1000, -1500 Matrix Plus*: point-to-point user stations; 12-, 24-key stations for digital system; cost effective station where full feature ICS-2000 is more than necessary.  
*Model 1021*: stereo monitor; fully amplified; fits in one rack unit; front panel mono-stereo switch.

Circle (663)

**Comprehensive Video Supply 1660**  
*Wireless* microphone systems.  
*Headphones*: stereo; dynamic design.  
*Microphones*: unidirectional, concert dynamic, special purpose types.

Circle (678)

**ComTek 3908**  
*M-182*: hand-held wireless mic; 50mW rating; 50-hour operation; all metal package.  
*MR-180*: portable wireless receiver used with ENG cameras.

Circle (687)



*Because it takes many cuts  
to make a gem . . .*



*VUES™ gives you sparkling simplicity  
in digital video editing.*

Fifty eight facets make a perfect diamond. In the editing business, you make as many cuts as you need to create a gem. VUES is a simple, economical editing system designed to make every cut look brilliant.

VUES is the first fully-integrated system for digital composite video editing. It makes dissolves and wipes as easy as cuts and offers high-powered features including infinite digital layering.

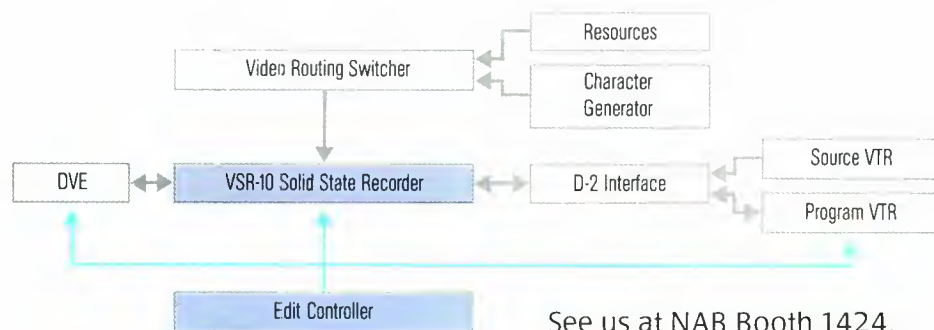
Engineered around NEC's RAM-based VSR-10 digital video sequence recorder, the VUES system uses a popular PC to let you control all video equipment with full-list management.

To provide all the capabilities of

a complex A-B-C-roll editing studio, VUES needs only a single source VTR of any format, plus one channel for digital video effects, and one channel for character generation. Forget about a costly production switcher, still-store and disk system. The VSR-10 incorporates

all their functions.

From any viewpoint, the VUES system offers outstanding economy. It uses less hardware, saves space, cuts power, shrinks cooling and maintenance costs. And VUES lets you achieve highly polished results with true economy of effort.



See us at NAB Booth 1424.

VUES is a product of NEC Corporation in coordination with Videofonics, Inc., U.S.A. VUES is a trademark of Videofonics, Inc.

**For further information, please contact:**

**NEC America, Inc.** Broadcast Equipment Division 383 Omni Drive, Richardson, TX 75080-3545, U.S.A.  
Tel: 214-907-4710. Fax: 214-907-4711.  
**NEC Corporation** Overseas Department, Broadcast Business Promotion Division Tokuei Building, 33-7,  
Shiba 5-chome, Minato-ku, Tokyo 108, Japan. Tel: 03-798-6364. Telex: 22686.

Circle (129) on Reply Card

**NEC**



# NEW SMPTE-EBU Time Code Analyzer

## Model TCA-143

If your edit problems are SMPTE Time Code related, Gray Engineering's new Time Code Analyzer pinpoints the error, displays code faults and corrects for phase and amplitude error.



### Code Conditions at a Glance

- Phase Error/Display
- Sync Word Error
- Bit Count Error
- Sequential Count Error
- Color Sync Frame
- Code Level
- Flag Bits
- Video Sync Loss
- Code Loss

When a time code error occurs, a front panel light is illuminated, and an audible alarm is activated.

### 3 Output Modes

- :BY-PASS—(E to E)
- :RESTORE (restores amplitude and reshapes) (DUB)
- :REPHASE (rephases, restores amplitude and reshapes)

**List Price \$2595.00**  
5-Year Warranty—  
Parts & Labor



**GRAY ENGINEERING LABORATORIES**

INCORPORATED

504-P W. Chapman Avenue • Orange, CA 92668 714-997-4151

© 1988 Gray Engineering Laboratories

Circle (130) on Reply Card

COMPATIBLE  
WITH S-VHS,  
VHS, U-MATIC  
& U-MATIC SP,  
Y/C INPUT AND OUTPUT

- Time base correction for Heterodyne VTRs
- Frame synchronization with full frame memory
- Adaptive comb filter
- Full bandwidth freeze field/freeze frame (Field 1 or Field 2 selectable)
- Y/C in, Y/C out and simultaneous composite out
- Composite in, composite out and simultaneous Y/C out (Composite and S-VHS Y/C transcoder)

**AF75**  
**TBC/Frame**  
**Synchronizer**

SEE US AT NAB BOOTH #2935, 2937



**HOTRONIC, INC.**

1875 S. Winchester Blvd.  
Campbell, CA 95008 408/378-3883

Circle (131) on Reply Card

**Gotham Audio** 2342  
*KM-100 series:* Neumann unit; with AK43 wide cardioid capsule, fet-100 transformerless system.  
*Audio Tool Kit:* Audio+Design Proboxes, Propacks, ModeDefier for digital interfacing.  
Circle (805)

**JBL Professional** 2916  
*Control 1 Plus:* personal monitor loudspeaker system; high performance design.  
*SR series:* power amps in 2RU package; air-cooled; 150W, 300W, 500W; 4Ω 0.1% THD.  
Circle (864)

**McCurdy Radio Industries** 5322  
*ISO-950:* camera ISO software enhancement for McCurdy CS-9500 intercoms.  
*CDP-100:* camera delegate panel for CS-9500 intercoms.  
Circle (932)

**Numark Electronics** 8040  
*CD6020:* dual-drive CD player; independent controls for both players with mixer system; beat sync feature for fades from one drive to the other.  
Circle (979)

**Professional Sound Corporation** 9001  
*PSC universal power supply:* supports 12T, 48V phantom-powered microphones.  
Circle (1023)

**R-Columbia Products** 3000  
*TR-160:* FM wireless intercom headphones; long range covers 1-2 miles with VHF, UHF models; full 2-way operation.  
Circle (1035)

**Ramsa Audio/Panasonic** 2534  
*500 series:* modular speaker components; WS-A500 mid-high, WS-A550 low frequency modules for full range, high output; acoustically inert enclosures in slate grey or white.  
Circle (1044)

**ROH/Anchor Audio** 6430  
*192S-2D:* stereo audio monitor; with time code monitoring, Dorrough metering.  
Circle (1057)

**RTS Systems** 2624  
*MRT 327:* modular intercom user station component for TW intercom system.  
*2100 series:* wireless intercom system.  
*2200 series:* wireless IFB system.  
Circle (1066)

**Samson Technologies** 6542  
*Super TD wireless:* improved concert TD system; dual power supply, doubled sensitivity, increased headroom; powered antennas; 14 VHF frequencies standard.  
Circle (1069)

**Sanken/Audio Intervisual Design** 1340  
*COS-11, COS-12:* lavalier mics; wide frequency response, high sensitivity; miniature size.  
Circle (1071)

**Sennheiser Electric** 3101  
*HD450 studio headphones:* Open-Aire model; high-Z with neodymium ferrous magnets; 10-foot cable, 1/4" stereo phone plug.  
Circle (1084)





## “For Dependability and Quality, You Can’t Beat the Odetics Cart Machine...”

“Since we switched over to the Odetics TCS2000 Cart Machine, on-air discrepancies have dropped from about six per day to virtually none. And the quality has improved dramatically .

Our old machines were labor intensive. Too much time was spent daily pulling carts from storage and programming. We needed a machine that would do away with human effort...and human error.

I shopped and compared for over two years before I settled on the TCS2000. The other machines I researched didn’t have the Odetics level of automation, and they were not nearly as dependable.

I’ve been especially impressed with the Odetics machines ability to download from our traffic computer and generate a play list. Not only does that feature save time and effort, it eliminates

the error factor. And, of course, if we don’t have on-air failures, we don’t worry about makegoods.

The on-air appearance of the station is 100% better now. That’s a big morale booster for everyone here. And the machine has certainly made my job easier. I don’t miss those phone calls about our old machines problems at all hours of the night.

I didn’t know a lot about Odetics before I bought their equipment, so I asked for a factory tour and demonstration. After I saw the large-scale robotics work the company was doing for the space industry as well as the broadcast business, I knew Odetics had the automation expertise I needed. In fact, I would strongly recommend that any chief engineer looking at cart machines take that factory tour. Also, I knew

Odetics had already installed about 80 machines at other stations, so I called some of those chief engineers. I didn’t talk to anyone who wasn’t happy with the Odetics machine.

Most of the engineers I talked to emphasized the exceptional after-sale service and support Odetics provided. We found that out for ourselves when our new machine was installed. The training and support our operations people got was efficient, thorough and highly professional.

If you’d like to know about what the Odetics cart machine has done for KPHO, why not get some firsthand information? Feel free to give me a call at (602)264-1000.”

**Bill Strube, Director of Engineering  
KPHO, Phoenix**

### ***Odetics Broadcast***

1515 South Manchester Avenue, Anaheim, California 92802-2907 Phone (800) 243-2001 or (714)774-2200

Circle (132) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



**Shure Brothers** 4524  
*Model VP 88:* Mid-Side stereo condenser microphone.  
*LS24/58, LS24/96, LS24/Beta 58:* handheld wireless mics (SM58, SM96, Beta 58 capsules); MARCAD diversity receiver.  
 Circle (1089)

**Stanton Magnetics** 4726  
*890AL:* back-cue phono cartridge; extra stylus; tracks 2-7gr.  
*45M/MC:* headphone, unidirectional mic; for DJ, studio announcers.  
*ST-10:* headphone; closed-back, dual-driver design; titanium diaphragm, rare earth magnetic materials.  
 Circle (1118)

**Studer ReVox** 4552  
*A-723:* active studio monitor system.  
*A-729:* CD player system controller; operates four players; RS-422 port.  
 Circle (1127)

**Studio Technologies** 5605  
*IFB system:* production intercom equipment.  
 Circle (1128)

**Swintek Enterprises** 6531  
*MARK 200D/RJ:* remote telephone link.  
*MARK QDC-HiFi:* high fidelity pocket-size receiver.  
*MARK 50A-HiFi:* high fidelity pocket-size

transmitter.  
 Circle (1130)

**Tannoy North America** 6630  
*AVM-DMT:* shielded, high resolution A/V reference monitor.  
*NFM8-DMT:* reference monitor.  
 Circle (1142)

**Television Engineering** 2240  
*IFB-19:* audio controller; monitor programs, cue talent for easier live feeds.  
*FM-19:* audio controller; source monitoring system.  
 Circle (1163)

**Telex Communications/Pro A-V** 2116  
*PC-25 carrying case:* for FMR-25/-25TD wireless equipment; holds 10 AA batteries for 10-15 hour operation; *rubber duck* antenna.  
*RADIOCOM:* wireless intercom; 150-216MHz; *BTR-200* base station with 4-channel receive, one transmit; *TR-200* belt-pack transceiver, one receive/transmit channel.  
*BP-1, BP-2 belt-packs:* 1-, 2-channel intercom units for AUDIOCOM series; match balanced or unbalanced systems with integral selector switch; light-signalling; male/female XLR connectors.  
 Circle (1165)

**UREI** 2916  
*SR power amplifiers:* air-cooled, two rack-space; high frequency power conversion;

loads into 2Ω, balanced bridging input; stereo/dual mono; SR6615/6630/6650, 150W/300W/500W, 4Ω with 0.1% THD.  
 Circle (1202)

**Ward-Beck Systems** 5002  
*M7884/M7885:* communications terminals for WBS MicroCOM II digital communication system; enhanced software to extend power of the intercom.  
 Circle (1239)

**Wheatstone Broadcast Group** 4010  
*Intercom:* station communications system.  
 Circle (1248)

## Audio Products

### A5: Digital, MIDI

- Recorders, workstations
- Editing, interfacing

**AKAI Professional/IMC** 3902  
*DD-1000:* stereo recorder/editor; records directly to optical disk.  
*DIF-1200:* AES/EBU interface for Akai A-DAM digital MTR.  
 Circle (519)

**AKG Acoustics** 6500  
*DSE-7000:* digital sound editor; new features, enhancements.  
 Circle (520)

**Allied Broadcast Equipment** 4430  
*AKG DSE-7000:* digital workstation, sound editing system.  
*Digispot:* commercial spot system; digital storage with touch-screen control capability.  
 Circle (527)

**Alpha Audio** 6701  
*DR-2:* digital hard disk recorder; *tape recorder* style control; 60 minutes capacity of 16-bit stereo at 44.1kHz, 48kHz sampling; emulates BVU-800 for serial control.  
 Circle (529)

**AMEK Consoles/TAC** 3164  
*M.I.C.E.:* multiple interface control element; allows MIDI control for mute switches.  
 Circle (536)

**Bruel & Kjaer Instruments** 8029  
*R-DAT archiving system:* set contains two Type 4006 microphones, stereo mount, nosecones; battery, charger; Panasonic SV-255 portable R-DAT recorder; packaged in FAA-spec carry-on luggage case.  
 Circle (623)

**BTS** 5808  
*BAC-3000 encoder, decoder:* converts stereo/mono analog audio or stereo to digital AES/EBU spec digital signals; bidirectional process.  
 Circle (682)

**Digital Audio Research** 8000  
*SoundStation II:* enhanced multichannel digital audio recorder, editor; optical disc subsystem for 2-hour rewriteable storage; removable 650Mbyte 5.25" magneto-optical cartridge; multidrives.  
*WORDFIT:* automatic dialogue synchronization.  
 Circle (724)

**Digital Dynamics** 7024  
*Cue List:* software for ProDisk-464 digital re-

## Camera cable information from the company that knows best...Mohawk!

### Mohawk offers superior broadcast camera cable and a free, newly expanded camera cable and connectors information kit!

If the job demands flawless broadcast transmission, order the best cable—Mohawk. Count on Mohawk's quick response to assembly orders and repairs to save you precious time.

Our expanded product line features:

- Ultra-flex VTR cable assemblies for Hitachi, Ikegami, Panasonic, Sony and others
- Slimline studio camera cables
- Waterproof, high strength three-piece connector design
- Customized lengths

Mohawk's entire team of engineers, technicians, and sales and service professionals are committed to providing product and service excellence. Our strict performance standards exceed even industry requirements.

Get your information from the reliable source! Mohawk's new edition of the TV camera cable and connectors information kit is available free. Just call or write Mohawk today!

**MOHAWK**

Wire and Cable Corporation

9 Mohawk Drive • Leominster, MA 01453 • (508) 537-9961  
 Toll free: 1-800-422-9961 • In MA: 1-800-642-9961



Circle (133) on Reply Card





**Nature has its own  
professionals of  
sound and vision.**



The wonders of sound and vision found in nature are hard to reproduce. In fact, if anyone has come close it's EEV.

Whatever your broadcast requirements, you'll find EEV has the technology to match. High-efficiency UHF Television Klystrons from 5kW to 70kW for Television Transmitters. A range of Broadcast Tetrodes and Vacuum Capacitors for AM and FM transmitters, and Leddicon® camera tubes to fit virtually every broadcast color camera available today.

Our experience is the key to technological leadership. Our manufacturing know-how ensures the highest quality and reliability. Above all, our professional dedication to our customers' needs makes us the natural choice of broadcasters the world over.

® Leddicon is the Registered  
Trade Mark of EEV Lead Oxide  
Camera Tubes.

**See us at NAB Booth #6310**

**EEV**

**Technology for the Broadcast Industry**



USA: EEV Inc, 4 Westchester Plaza, Elmsford, NY 10523. Telephone: (914) 592 6050 or 'Toll Free' 1-800-DIAL EEV Telex: 6818096 Fax: (914) 682 8922  
CANADA: EEV Canada Ltd, 67 Westmore Drive, Rexdale, Ontario M9V 3Y6. Telephone: (416) 745 9494 Telex 06 989363 Fax: (416) 745 0618  
UK: EEV, Waterhouse Lane, Chelmsford, Essex CM1 2QU, England. Telephone: (0245) 493493 Telex: 99103 Fax: (0245) 492492

Subsidiary of the General Electric Company plc of England. **S&C**

Circle (135) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)

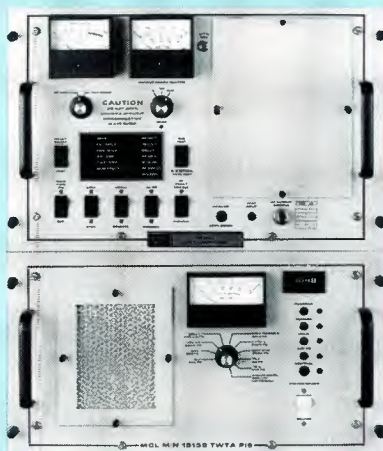
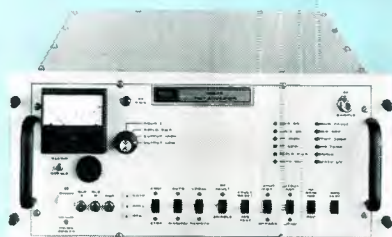




# GLOBAL SUPPORT FOR GLOBAL COMMUNICATIONS

## C-Band, Ku-Band and D.B.S. High Power TWT Amplifier Systems

For Video, Voice and Digital Communications  
50-3000 Watt



Designed exclusively for satellite earth station use, MCL's High Power TWT Amplifier Systems meet the demand and discriminating stringent requirements for maximum signal purity and uncompromising reliability. All MCL amplifiers share commonality in operation, design and mechanical layouts to facilitate interchangeability and to minimize maintenance and repair. MCL equipment is depended upon worldwide to operate at optimum efficiency . . . even in the most remote, unattended locations and under the most adverse conditions.

MCL offers a host of C-Band, Ku-Band, and D.B.S. High Power TWT Amplifier Systems featuring:

- Double Drawer Amplifiers (300 to 750 C, Ku and D.B.S. Band)
- Single Drawer Amplifiers (50-300W Ku; 75-700W C-Band)
- Single Cabinet Amplifiers (2.5K-Ku; 3KW-C-Band)
- Special Tube/Helix Protection Measures
- Amplifier Performance Readout/Control
- High Voltage Component Protection
- Build-in "Remote" Capability

Turn to MCL for high quality, competitively priced satellite communications equipment of truly unequalled performance . . . guaranteed.

See us at NAB,  
Booth #6270



Technical specifications and details on the complete line of MCL C-Band, Ku-Band, and D.B.S. High Power TWT Amplifier Systems may be obtained by writing or calling MCL today. Simply request your complimentary copy of MCL's New, comprehensive Brochure #6008.

### MCL, INC.

501 S. Woodcreek Road  
Bolingbrook, IL 60439  
708-759-9500 TWX 910-683-1899  
FAX 708-759-5018



Manufacturers of TWT and Klystron Amplifiers for Satellite Communications.  
24-Hour Sales and Technical Support for Immediate Service Worldwide.

corded/editor; prepares EDL to control editing operation of 4-64 tracks.  
Circle (726)

### Dolby Labs

4443

DP501/DP502: digital encoding system; 2-channel audio coding for data storage or transmission; 128 kbits/s/channel operation.

Circle (733)

### Gotham Audio

2342

HMA BA-102: modular digital broadcast system; source-to-telco-lines processing in the digital domain.

Ferroglyph 9500: digital disk recorder; upgraded software for central library network.

SPOT 90: recordable CD system; PQ codes for fast, accurate cuing; allows any CD player to become a digital cart machine.

All Digital DJ Suite: from Harmonia Mundi Acustica.

A+D ProDat: electronically balanced inputs, outputs, XLR connectors; Apogee filters; AES/EBU, S/PDIF formats; 44.1kHz, 48 Hz sampling; copy protect switch.

Circle (805)

### JVC

3116

Professional DAT recorder, player.

Circle (868)

### Lexicon

2452

MRC software V 3.00: MIDI remote control; talks with 16 machines; controls LXP-1, LXP-5 with storage for 64 setups each; two slider pages; user-defined SysEx strings; upgrade has hardware change.

OPUS/e: editing system; random access; use with existing consoles or as stand-alone unit; multitrack edit/record; multifunction I/O, soft patching; compatible with, expands to OPUS.

Circle (898)

### Neve

4152

Mitsubishi X-880: 32-track digital tape recorder.

Mitsubishi X-86: 2-track, 20-bit recorder.

Circle (971)

### New England Digital

161W

Release 2.2: digital recorder control for Macintosh PC; graphic environment; Edit-View point-and-click marking of changes; Autoconform creates CMX format EDL; optical disk option.

PostPro SD: Direct-to-Disk series; sound design system; 16-track with 60 minutes record time; integrated Synclavier; 32 voices; 64Mbytes RAM in single workstation; MIDInet, digital I/O.

Circle (972)

### Optical Disc

3415

Model 534: EFM digital processor encodes digital audio, subcodes into standard CD format; provides sound channel for videodisc, CD; transfers direct from AES digital or D-1/D-2 video.

Circle (989)

### Radio Systems

4903

RS-1000: DAT machine production models; hybrid of Sony DTC-1000,  $\mu$ P control for studio interface; balanced audio.

Circle (1041)



**SHOOT  
FROM  
THE  
HIP**

**STUDIO  
NEWSROOM  
LECTURE HALL  
O.R.  
CEILING  
CONFERENCE  
ROOM  
STADIUM  
COURTROOM**

**Only  
Vectorcam™ by Vicon  
offers all these  
pan/tilt possibilities.**

Vicon Vectorcam™ camera positioning systems put professional-quality camera control at your fingertips — whether the camera is in your corporate conference room or positioned out of reach on the ceiling of a sports arena.

There's a Vectorcam™ system for your application from under \$4,000 for a basic system to under \$40,000 for a 4-camera programmable system with memory, 99 presets per camera station and RS232 compatibility. And Vectorcam's rugged construction, close-tolerance gearing and high quality components ensure accurate positioning with precise stops, pans, tilts, zooms and focus.

The Vectorcam™ remote control unit is available in desktop or rack-mount configurations and can be tailored to your application.

#### **New From VICON AT NAB**

Triple 6-inch rack-mounted preview monitor fits in the same rack space as a triple 5-inch monitor.



**Vicon Industries Inc.** 525 Broad Hollow Road,  
Melville, New York 11747-3703, 516-293-2200,  
Fax: 516-293-2627.

**Professional  
Products  
Division**



**VICON**



V6035PT



V6033PT



V7000C



V7100C

V6100PT/V6000PT

Circle (137) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



**Solid State Logic 1321**

*SoundScreen*: production model with enhanced software; audio-for-video editing system.  
Circle (1100)

**Sony Communications/Pro Audio 5130**

*PRO RDATE*: editor, player.  
Circle (1104)

**Soundmaster International 3720**

*Soundmaster*: integrated editing system.  
*SyncRAM*: random access digital editing system.  
Circle (1111)

**Studer EdiTech 1406**

*Studer Dyaxis 2+2*: multichannel hard disk recorder, editing system; 4 mono or 2 stereo channels; full DSP, EQ, pan, metering, level control; VPR3 emulation; full system synchronization.  
Circle (1126)

**Studer ReVox 4552**

*Dyaxis 2+2*: hard disk digital recorder, editor.  
*D820-48*: digital 48-channel recorder; compatible with multitrack DASH; high-precision A/D converters, matched low-noise passive filters, 4x oversampling D/A converters; internal synchronizer; selectable cross-fade times; integral digital test signal generator.  
Circle (1127)

**Symetrix 6342**

*DPR-100 enhancements*: Apple Macintosh system control accesses 40 channels of recording in blocks of eight; real-time level control, EQ, compression, limiting, gating; dynamic recall all parameters.  
Circle (1134)

**TASCAM 3352**

*DA-800*: 24-track digital ATR; pinch roller tape drive; zero-distortion circuitry; two analog audio, time code, control tracks.  
Circle (1146)

**360 Systems 7201**

*Digital cart machine*: 16-bit audio; instant cuing; removable media; all standard cart operating features.  
Circle (1172)

**WaveFrame 164W**

*CyberSound-Editorial*: digital editorial automation system for audio post production in film, video; tools for ADR, dialogue, effects, music editing; auto assembly by time code or EDL data.  
Circle (1241)

## RF Products

### R1: Transmission

- Antennas, masts, towers
- Transmission line
- Remote control

**Alpha Video & Electronics/AVEC 3111**

*SR-2100*: safety riser; power line sensor attaches to mobile masts.  
Circle (531)

**Andrew Corporation 1860**

*SCL 950*: 9" diameter semi-flexible feedline.  
*HELIAX*: plenum-rated feedline; additional materials to product line.  
Circle (543)

**BEXT 8104**

*LPTV, broadcast systems*: 5W, 25W drivers; 100W, 1kW amplifiers; complete transmitters.  
Circle (597)

**Burk Technology 9022**

*CI-16 interface*: enhanced unit for ARC-16 remote control system.  
*Options* for TC-8, ARC-16 transmitter control systems, including dialup feature.  
Circle (629)

**Cablewave Systems/RF Systems 4020**

*FM broadcast antenna*: non-directional; high power.  
*Semiflex transmission line*: 5", 6" diameters; connectors.  
Circle (631)

**Central Tower 6602**

*Single source option*: complete program of custom in-house engineering, fabrication, installation; structural analysis service.  
Circle (650)

**Comad Communications 2448**

*UTV-7, UTV-08*: SIRA UHF panel TV receiving antennas; H and V polarization; narrow-beam, high-gain; low sidelobe increases rejection of interference.  
Circle (671)

**Comark Communications 5920**

**Thomson-CSF**  
*CCT-U-30SKA*: UHF transmitter with Magic Tee; 30kW air-cooled; Klystron PA device.  
*CCT-U-60SKA*: 60kW UHF TV transmitter; air-cooled Klystron PA circuitry.  
*CCT-U-70S*: UHF TV transmitter; 5-cavity, water-cooled klystrons; 70kW rating; includes control cabinet.  
Circle (672)

**Continental Electronics/Varian 4316**

*Model 813A*: 500W solid-state FM transmitter.  
*Model 814E*: 1kW solid-state FM transmitter.  
Circle (694)

**Delta Electronics 4518**

*TCT-XHV*: super high voltage toroidal current transformers.  
Circle (715)

**Energy-Onix**

*SST-30, -500, -1000*: solid-state FM exciter, amplifiers; 30W, 500W, 1kW power ratings; broadband, programmable.  
*Low-power AM*: 2.5-10kW transmitters; solid-state control systems; conventional high-level plate modulation; low cost PA, modulator tubes; NRSC options.  
Circle (761)

**Flash Technology 5612**

*SC-110*: tower lighting controller.  
*FTB-301, 205*: medium, high intensity obstruction lights.  
Circle (780)

**Hallikainen & Friends 4202**

*DRC200*: transmitter remote control; standard CRT terminal/computer at studio; program *throughspread sheet* for logging; alarms, auto control; communications through telco, subcarrier, UHF radio.  
Circle (814)

**Harris Broadcast Division 4430**

*Gates series*: medium wave transmitters;

solid-state design; 1kW, 2.5kW, 5kW ratings.  
*DX-100*: solid-state medium wave transmitter; digital modulation; 100kW rating.  
*HT 1FM*: 1kW solid-state FM transmitter.  
*HT 7FM*: FM transmitter; rated 3-8kW; single, 3-phase models.  
*HT 1LS*: 1kW solid-state low band VHF TV transmitter; Platinum series.  
Circle (815)

**Hughey & Phillips 8107**

*KG225F00010*: medium intensity strobe light; requires no new wiring for retrofit to existing *red light* systems.  
Circle (832)

**ITS/Information Transmission 1622**

*ITS-230A*: 1kW UHF TV transmitter; compact, simplified design.  
Circle (860)

**LDL Communications/Larcan 1634**

*Lambda CP antenna*: production model; circularly polarized lowband VHF system.  
*Spearhead*: FM master antenna; for 10 full-power, Class C FM stations.  
*Larcan 30kW*: solid-state VHF transmitter; multiple 1.5kW modules, combine through printed-circuit wiring to achieve desired output power.  
Circle (889)

**M&R Data Services 8101**

*RF Manager*: PC-based enhancement for TFT-7900 transmitter controller; versions includes direct interface to 7900 systems and three levels of stand-alone remote control systems.  
Circle (915)

**Micro Communications 2728**

*FM, UHF, HDTV SPI*: super power isolator; protects transmitter from reflections from antenna system; reduces VSWR.  
*Coaxial transfer switching*: 1½", 3¼", 6½" coplanar coax switch; high-torque ac motor, manual override.  
*MicroSwitcher*: EPROM µP-based controller; local, remote; 12-input, expandable.  
*Slide hangers*: for UHF waveguide; eliminates rail-mounting system on tower.  
*Flange tuners*: for UHF waveguide; cancels reflections and permits use of different length line sections.  
*LPTV combiner*: multichannel for two or more UHF transmitters to one antenna; inter-digital filter design.  
*UHF 2-channel combiner*: dual-channel system; two waveguide bandpass filters, hybrids; more than 35dB isolation.  
Circle (940)

**Midwest Communications 3234**

*UHF transmitters*: Townsend and Technalogix TV transmitters.  
*VHF transmitters* by Toshiba.  
Circle (946)

**Moseley Associates 4336**

*MRC1620*: remote control system; Task-Master 20 PC, Smart options.  
*MRC2*: remote control; Master Controller PC, Smart options.  
*Multiplex, SCA*: series of products.  
Circle (953)

**MYAT 6708**

*Transmission line*: 50 Ω coaxial material, now available in 9¾" as well as standard



# WHY SETTLE FOR SECOND PLACE?

| 1985-86                                                                                                                                                                                                                                                   | 1987                                                                                                                                                                                                                              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><u>First</u> waveform/vector/test signal generator combination</p> <p><u>First</u> fully programmable test signal generator</p> <p><u>First</u> PC-based test signal design software</p> <p><u>First</u> component/composite test signal generator</p> | <p><u>First</u> component/composite waveform monitor</p> <p><u>First</u> component/composite vectorscope</p> <p><u>First</u> dual-standard vectorscope</p> <p><u>First</u> D1 test signals</p>                                    |
| 1988                                                                                                                                                                                                                                                      | 1989                                                                                                                                                                                                                              |
| <p><u>First</u> programmable HDTV test signal generator</p> <p><u>First</u> D2 test signals</p> <p><u>First</u> Betacam SP test signals</p> <p><u>First</u> S-VHS test signals</p>                                                                        | <p><u>First</u> component/composite waveform/vector combination</p> <p><u>First</u> half-rack programmable test signal generator</p> <p><u>First</u> PAL D2 test signals</p> <p><u>First</u> S-VHS waveform/vector monitoring</p> |



**MAGNI®**

MAGNI SYSTEMS, INC.  
9500 SW Gemini Drive  
Beaverton, OR 97005 USA  
(503) 626-8400  
(800) 237-5964  
FAX (503) 626-6225  
TLX 650-2769743MCI

Magni is a registered trademark of Magni Systems, Inc. Emmy © NATAS. Calendar based on published product introductions

Circle (138) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



sizes from 7/8" to 6 1/8".  
Circle (911)

**Nautel** 4144  
*AMPFET ND1, ND25, ND50*: solid-state AM transmitters; NRSC-2 compliant; 1kW, 25kW upgradable, 50kW; second generation design; distortion below 0.5%, response 0.25dB; 80% efficiency.  
Circle (964)

**NCA Microelectronics** N.A.  
*R-2000*: transmitter monitor, remote control system; uses DTMF Touch-Tones on telco line; synthesized voice report; CRT, keypad; 32-input analog, digital; alarm reporter dials

up to four phone numbers.  
Circle (965)

**Potomac Instruments** 4406  
*Type 1900*: directional antenna monitoring system.  
Circle (1015)

**QEI** 4300  
*BTT-500*: exciter/transmitter in 10 1/2" x 19" rack-mount package; FET PA available from 10W to 600W; full remote control; could replace IPA of older FM transmitter.  
Circle (1028)

**Shively Labs** 4030  
*Balanced* band-pass combiners, protection systems.  
*Antenna spacing* configurations for special situations.  
Circle (1087)

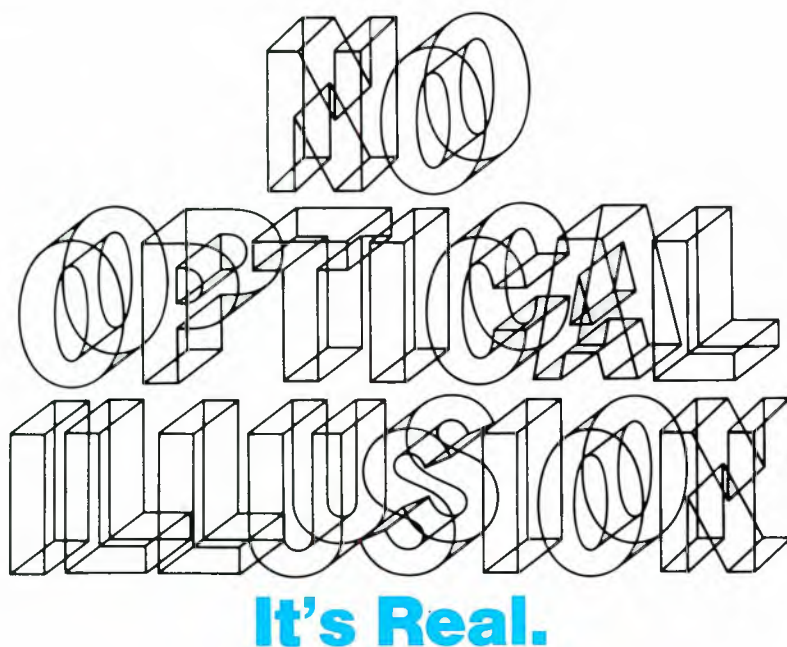
**Television Equipment Associates** 5501  
*Model 200*: miniature video transmitter; special-purpose roving camera for security camera applications.  
Circle (1164)

**TTC/Television Technology** 2006  
*FMS series*: solid-state FM transmitters; 1kW, 4kW, 8kW output levels; no tuning required; modular *fail-on* design for improved reliability.  
Circle (1192)

**Utility Tower Company** 4717  
*Type 920*: 84" face tower; design capable of heights to 1,500 feet.  
Circle (1206)

**Varian TVT** 5100  
*1891+90 enhancement*: 120kW VISTA TV transmitter; including MSDC high efficiency UHF klystrons.  
Circle (1214)

**Will-Burt/TMD** 6806  
*Model 6-25-357/367*: pneumatic, telescoping mast assembly; includes low profile pan/tilt



A recorded videodisc for \$300. At last, it's possible to obtain a single recorded videodisc with all the features of replicated discs, but not the expense.

Almost anywhere you look, you'll find ODC's RLV, the Recordable Laser Videodisc. At trade shows, training centers, exhibits and presentations. And the price is right.

For as little as \$300, cost-conscious, low volume users around the world are taking advantage of all the quality and features these LaserVision® compatible videodiscs deliver...and without owning a recorder.

**AVAILABILITY** - There's an "RLV Recording Center" at a facility convenient to you — New York, Los Angeles, Chicago, Atlanta, Orlando, Dallas, plus locations in Europe and the Far East.

**AFFORDABILITY** - Recorded RLVs can easily fit within your budget and provide the quality, durability and performance you'd expect from leading edge optical disc technology.

**COMPATIBILITY** - ODC's RLV is compatible with LaserVision, the standard of the industry. This means that RLVs can be used with your existing high performance, inexpensive, industrial and consumer disc players.



**OPTICAL DISC CORPORATION**

ODC's Recordable Laser Videodiscs are truly within your reach.

Turn your illusions into reality.

Call ODC and ask about the "RLV Recording Center" near you.

(213) 946-3050 ■ (714) 522-2370 ■ (800) 350-3500

Circle (139) on Reply Card

The latest  
developments  
in laser  
videodisc  
technology  
just might  
surprise you.

**At NAB—BOOTH  
#3415**



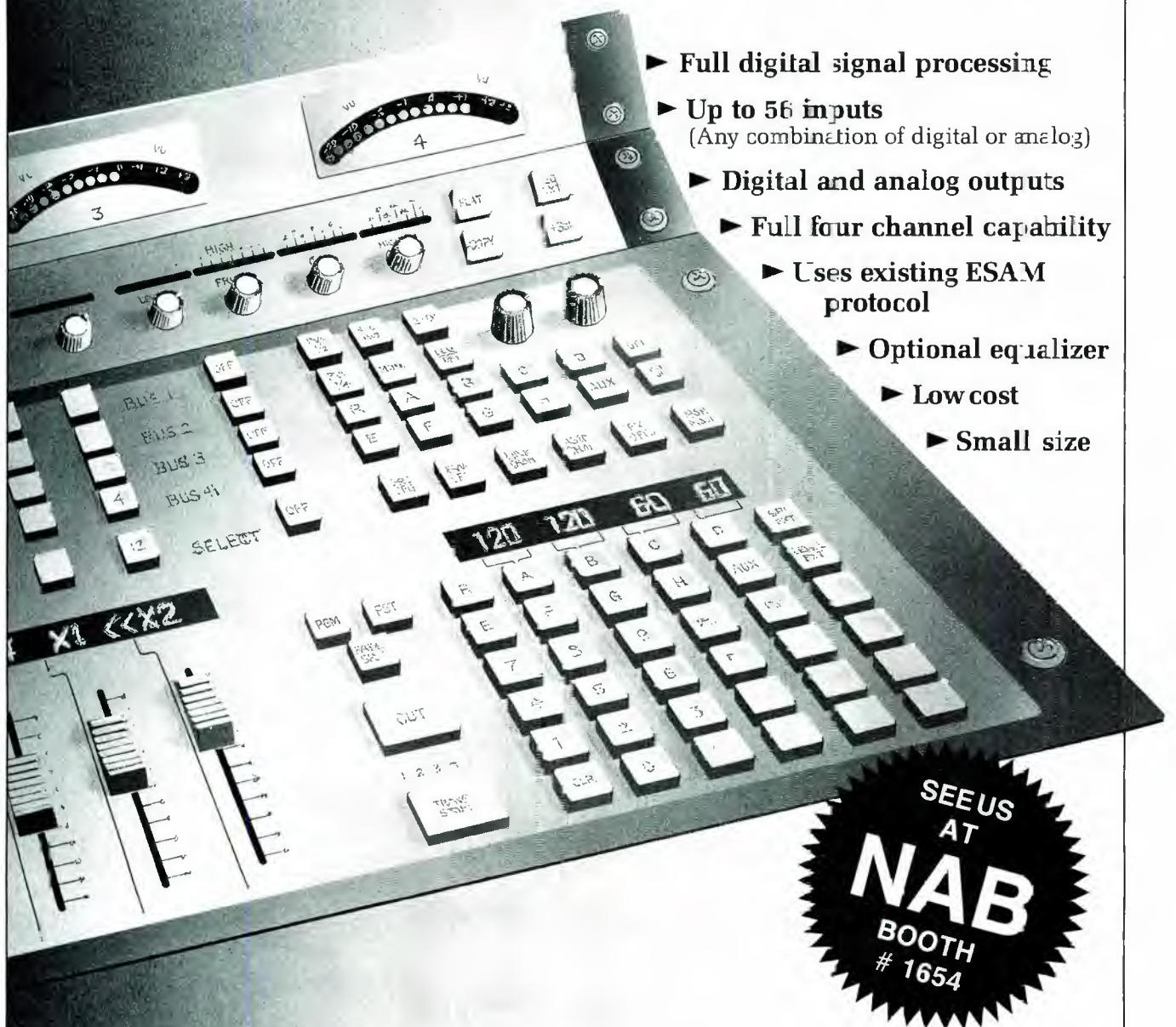
**OPTICAL DISC CORPORATION**



**NEW! from GPS**

**D/ESAM™ 800 - EDIT SUITE AUDIO MIXER**

# Four Channel Audio Mixing



- ▶ Full digital signal processing
- ▶ Up to 56 inputs  
(Any combination of digital or analog)
- ▶ Digital and analog outputs
- ▶ Full four channel capability
- ▶ Uses existing ESAM protocol
- ▶ Optional equalizer
- ▶ Low cost
- ▶ Small size

SEE US  
AT  
**NAB**  
BOOTH  
# 1654



GRAHAM-PATTEN SYSTEMS, INC.  
P.O. Box 1960, Grass Valley, CA 95945

800 547 2489 • IN CA 800 422 6662



positioner.  
Circle (1252)

## RF Products

### R2: Microwave

- Antennas, electronics
- ENG, ITFS, MDS, STL

**BEXT** 8104  
*LC series:* composite aural STL system; programmable from front panel.  
Circle (597)

**BMS** 5108  
*BMT-2GP:* 2-2.5GHz microwave transmitter; 30-channel, frequency agile.  
Circle (603)

**Combant Technologies** 3439  
*Baseband scrambling:* addressable scrambling equipment for *wireless cable* MMDS distribution.  
Circle (673)

**COMWAVE** 2904  
*SBM1-8:* multichannel transmitter; supports eight 1W composite television signals.  
*SBR-11:* response transmitter; for voice, data; output power rated to 1W.  
Circle (688)

**Conifer** 1334  
*QL-1015:* 31-channel wireless cable

downconverter for marginal reception areas; internal GaAs FET preamp; noise figure below 2dB with 35dB conversion gain.  
*2.1-2.7GHz preamps:* low-noise, GaAs FET design; enhances fringe area reception; operates as microwave line amplifier.  
*Beam bender:* wireless cable/ITFS repeater.  
Circle (690)

**Digital Microwave** N.A.  
*DMC 18V:* digital video microwave radio; operates in 18GHz range; audio, video performance unaffected by signal levels; spectrum conservation; secure signals; forward error correction; STL/ICR.  
Circle (728)

**ITS/Information Transmission** 1622  
*ITS-1640D:* 31-channel MMDS/ITFS/OFS transmitter; frequency agile, 20W.  
*ITS-1694D:* 4-channel ITFS/MMDS/OFS channel combiner; 1-4 model configurations; optional remote switching for backup.  
Circle (860)

**M/A-COM MAC** 2152  
*MA-23CX:* 23GHz video microwave system.  
Circle (916)

**Marti Electronics** 4400  
*Model PA-48:* full parabolic reflector; 940-960MHz operation; 4-foot diameter structure.  
Circle (925)

**Motorola C-Quam/AM Stereo** 4704  
*Communications systems:* microwave; 2-way radio, cellular telephone equipment.  
Circle (954)

**Narda Microwave/Loral** 5757  
*Expanded line:* coaxial and waveguide components.  
Circle (962)

**QEI** 4300  
*CAT-LINK:* STL/TSL for BTSC TV stereo; auxiliary channels for PRO, SAP baseband; configured for T1 phone line; may carry BTSC digitally on standard subchannel above video; digital encoding causes no delay.  
Circle (1028)

**RF Technology** 2612  
*RF-C series:* miniature portable microwave equipment; 1.8-15.6GHz; frequency agile, dual audio (mic, line), high transmitter outputs; low-noise receivers.  
*RF-QUADSCAN:* central receiver horn antenna; ENG system with dual, quad polarization, high gain; low profile horn elements.  
Circle (1053)

**TFT Inc** 4642  
*Model 9000:* aural STL transmitter; economically priced, meets FCC 1 July '90 rules.  
*Model 8600A:* monaural STL system.  
Circle (1171)

## STOP GROUND-LOOP HUM!

### VIDEO HUM STOP COIL...HSC 2

Will ELIMINATE HUM and other INTERFERENCE in Video Lines caused by differences in Ground Potential.

- Rack Mountable.
- FLAT-DC to 6.5 MHz.
- No Low-Freq or Hi-Freq. Roll-off.
- No Differential Phase Distortion.
- No Differential Gain Distortion.
- No Envelope Delay.
- Passive Device - Failure Free-Low Price.
- Small Compact Package 4" x 4" x 2-1/4".

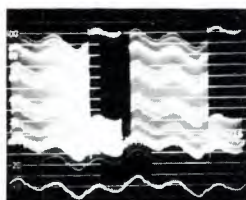
### ELIMINATES HUM AND INTERFERENCE:

#### IN STUDIO

- Between Buildings
- On long runs in Buildings
- Between Studio and Transmitter
- On Incoming Circuits
- On Outgoing Circuits

#### IN FIELD

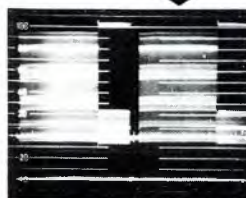
- Betw. Remote Truck and Telco
- Betw. Remote Truck and Microwave
- For Intertruck Hookup
- For VTR Units
- For Monitoring Lines



NEW!



\$210  
F. O. B.  
N.Y.



Available on  
10 day free trial

AUDIO-VIDEO ENGINEERING COMPANY  
65 Nancy Blvd., Merrick, N.Y. 11566  
Tel. (516) 546-4239

Circle (141) on Reply Card

## We Design and Supply

### TV & FM ANTENNAS

- without need for deicers
- broadband for single or multichannel use
- rugged, reliable and reasonable cost

### TV & FM COMBINERS

- minimum size, uncomplicated
- without need for environmental control
- stable, efficient and reasonable cost

### COAXIAL HARDWARE

- superior design
- less VSWR, more power
- problem solvers

NAB BOOTH 4220/4235

Bring floppies for Antenna Program latest —  
mono or VGA



## TENNAplex SYSTEMS LTD.

21 Concourse Gate  
Nepean, Ontario K2E 754  
(613) 226-5870 FAX (613) 727-1247

Circle (142) on Reply Card





# One of Our CCD Cameras Should Be One of Yours

Presenting the Hitachi SK-F Series...  
A Line-up of Five High Performance  
Broadcast CCD Cameras.

Use the **SK-F700/710**  
for studio & field production  
work. A choice of RGB  
Triax, Composite Triax or  
Multicore gives you total  
system flexibility.



The **SK-F3** is our top-of-the-line EFP portable with 400,000 pixel FIT CCD's.

The **SK-F2** is our Broadcast ENG camera featuring IT CCD's with 700 lines of resolution.

The **SK-F1** is our ENG/EFP model that makes FIT technology affordable.

**Hitachi Denshi America, Ltd**

150 Crossways Park Drive, Woodbury, New York 11797 Tel: (516) 921-7200

Circle (143) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



# Improve The Means to the End

*Introducing Our New Extended Benefits Package:*

Model MCE325 Programmable User Station



Think of it...

a versatile intercom user station with a wide range of operational and packaging formats.

Physical benefits include a five way modular packaging technique for permanent or portable applications. While headset operation comes standard, adding our MCS325 Speaker and a plug-in microphone supports an open-listening setting.

Operator benefits sport user-friendly software and hardware based programming; the MCE325 can be operationally and functionally configured to suit individual requirements.

As for the small print: the MCE325 works in conference-line or dedicated-line environments, with 2-channel split talk/listen or 4-channel combo talk/listen, in 2-wire or 4-wire line mode, or a combination of both. Also featured are two channels of IFB, two program inputs, and call signaling. Modular packaging includes: rack mount or portable headset station, rack mount or portable speaker station, or console mount headset station.

Please call or write for details.

The First Name In Intercommunications

Professional Intercommunications  
Professional Audio Products

1988 - 1989  
Engineering  
Emmy Award



**RTS SYSTEMS**

A Telex Communications Company

1100 West Chestnut Street  
Burbank, California 91506  
Phone 813-566-6700  
Fax 818-843-7953



## RF Products

### R3: RF amplifiers

- Cavities, devices

**EEV 6310**  
UHF TV devices: high power amplification equipment.  
Circle (749)

**Philips Components 5512**  
UHF klystrons: depressed collector design for high efficiency operation.  
Circle (1008)

**Thomson Electronic Tubes/Devices 6348**  
TH 563 tetrode: for UHF TV service; 35kW separate visual or 25kW multiplexed visual/aural amplification; Pyrobloc grids, Hypervapotron cooling.  
TH 558 tetrode: 600kW for long/medium wave.  
TH 537 tetrode: 350kW LW/MW service, 300kW SW.  
TH 343: 25kW coaxial metal-ceramic tetrode; 17dB gain; operates to 120MHz; use with TH 18230G cavity in grounded grid configuration for FM.  
Circle (1177)

## RF Products

### R4: Reception

- Demodulators, receivers
- Modulation monitors

**Allied Broadcast Equipment 4430**  
SqueezePlay: AM/FM radio/cassette system; integrated skimmer.  
Circle (527)

**Belar Electronics Lab 4308**  
Modulation minder: new concept for accurate monitoring of L+R or loudness content and stereo composite; simultaneous view on two displays; complies with pre-'83 FCC rules; FM, TV versions.  
Circle (592)

**BEXT 8104**  
LCR-FM: composite FM receiver; covers 88-108MHz; front panel programmable controls.  
Circle (597)

**Boonton Electronics 1437**  
Model 8220: modulation meter; 0.01-1.3GHz carrier range; to 500kHz FM deviation, 99% AM, 0-500 rad; -27dB to 19dB level range; ratio or level display of modulation; IEEE-488 interface; RMS, peak.  
Circle (606)

**Delta Electronics 4518**  
Metering panel: for AM/FM modulation monitoring.  
Peak hold: option for SM-1 splatter monitor.  
Circle (715)

**Modulation Sciences 4802**  
ModMinder: measures, displays peak FM deviation; digital design uses one millisecond delay before registering peaks to avoid transient overshoot; allows improvement in modulation 1-4dB.  
Circle (951)

**Motorola C-Quam/AM Stereo 4704**  
Receivers: C-QUAM type AM stereo

receivers.  
Model 1410: modulation monitor.  
Circle (954)

**QSI Systems 3034**  
Demod: TV tuner.  
Circle (1029)

**Videotek 1246**  
DM-141S: TV demod; stereo audio, dual buffered outputs of composite baseband video; 139-channel access to UHF, VHF, CATV signals.  
DM-14: 69-channel demod for VHF, cable, CCTV; IR remote control.  
Circle (1232)

## RF Products

### R5: Exciters, generators

- Radio, TF, stereo

**CCA Electronics 4442**  
Model FM 30G: high performance FM exciter.  
Circle (647)

**Gentner Electronics 5852**  
Lazer: digital FM limiter, stereo generator.  
Circle (798)

**Inovonics 5601**  
Model 706: FM/FMX stereo generator, production models.  
Circle (848)

**ITS/Information Transmission 1622**  
ITS-20A: exciter-modulator retrofit upgrade; 3W visual, 3W aural to drive UHF TV transmitter.  
Circle (860)

**Motorola C-Quam/AM Stereo 4704**  
Model 1400: C-Quam AM stereo exciters.  
Circle (954)

**QEI 4300**  
695-SYNC: synchronized FM exciter system; permits sync of multiple auxiliary 695 exciters to a master exciter; sync can be sent through SCA channel or CAT-LINK auxiliary channel.  
Circle (1028)

## RF Products

### R6: Satellite

- Antennas, electronics
- SNV systems.

**Advent Communications 1300**  
Mantis 1900: SNG flyaway, phase-combined system.  
AVM2700: video modulator; 70MHz.  
AVC27XX range: satellite up/down converters.  
LYNX: vehicle-based uplink systems.  
Circle (515)

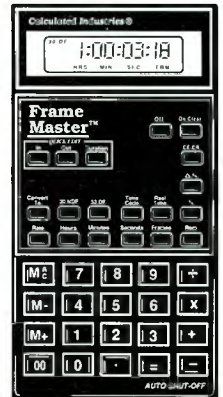
**Andrew Corporation 1860**  
ASC 2000: satellite earth station antenna controller.  
FLY-AWAY: 1.8 meter system, 8-piece segmented reflector.  
Circle (543)

**Antenna Technology 6406**  
Simulsat series: multibeam antennas; view 70° arc from 69°W to 139°W simultaneously; three models.  
Parabolic antennas: 8m to 32m diameters;

## NEW TIME CODE CALCULATORS!

Put an end to complex production problems without tying up an editor with the amazing all-new **Frame Master™** and **Frame Master Plus™** SMPTE/EBU Time-Code calculators.

Ideal for everything from finding Durations and In/Out Points to creating to Edit Decision Lists to Budget and Shoot Ratios — even On-Line Editing!



The New **Frame Master**

### Both Calculators:

- Work directly in 30 Non-Drop-Frame, 30 Drop-Frame, Frames, and Real Time
- Convert between Non-Drop, Drop, Real Time and Total Frames
- Feature Manual or Auto-Entry options, just like an editor — [1][00][0][3][1][8]
- Have In/Out/Duration keys to instantly figure edit points
- Figure Rates/Costs for any time/time code format, including Frames

### Frame Master Plus also features:

- 24fps, 25fps (PAL/SECAM), Custom (user-set) fps Frame-Rate Speeds
- 16mm & 35mm Feet-Frames with full conversion capabilities
- Adjusted Running Times, Rank Rates and Δ%
- Both include Memory, Display Retention, User's Guide, Carrying Case, Long-life Batteries, Auto Shut-Off and 1-Year Warranty.



See the New **Frame Masters** at the NAB Show Booth #1455

**Frame Master Plus**  
(Both sized: 2 1/4 x 5 1/8 x 1 1/4")

Order Today!  
**30-DAY MONEY-BACK GUARANTEE!**  
Call Toll-Free: **1-800-854-8075**

Calculated Industries, 22720 Savi Ranch, Yorba Linda, CA 92686

| Qty. | Product           | Price    | Shpg.*              | Total |
|------|-------------------|----------|---------------------|-------|
|      | Frame Master      | \$99.95  | \$3.95              |       |
|      | Frame Master Plus | \$129.95 | \$3.95              |       |
|      | Leather Case      | \$10.00  | —                   |       |
|      | Gold initials     |          | \$1.50 each initial |       |

\* For each additional unit ordered add \$1.50 shpg. (In CA add 6.25% tax)

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City/State/Zip \_\_\_\_\_  
☐ Check ☐ VISA ☐ MasterCard ☐ Am/Exp  
Acct# \_\_\_\_\_ Exp. \_\_\_\_\_  
Sign Here \_\_\_\_\_ BE-390



new, used available.  
Circle (547)

**BAF Communication 1564**  
*Models 450-D, 450-C:* satellite news vehicles with 6- and 4-camera production capability; -D, 32-foot; -C, 29-foot.  
Circle (583)

**Comtech Antenna 3002**  
*EC-6:*  $\mu$ P-based antenna controller.  
*2.4M:* Ku-band transmit, receive antenna; 2.4m diameter.  
Circle (686)

**Hallikainen & Friends 4202**  
*SAT201:* satellite dish steering system; multipoint control for multiple antennas, receivers; 3-axis steering; preprogram-mable for antenna steering, receiver tuning; telco, subcarrier communications.  
Circle (814)

**Radiation Systems Inc/RSI 3100**  
*Model 5000:* enhancements; to earth station control system software.  
Circle (1037)

**Scientific Atlanta 5730**  
*Model 7530:* broadcast quality satellite receiver.  
*Model 7790:* data up/down converter.  
*Model 8880:* satellite data modem.  
*Antenna:* 6m satellite antenna for transmit-

ting, receiving.  
Circle (1079)

**Thomson Electronic Tubes/Devices 6348**  
*TH 2456:* 14GHz klystron for satellite uplink service; 3kW minimum output power at saturation with instantaneous bandwidth of 85MHz; servo tuning to six or 12 preset channels, depending on model.  
Circle (1177)

**Wegener Communications 6530**  
*Series 1800:* addressable satellite video receiver.  
*Series 2800:* compact satellite data receiver.  
Circle (1246)

## Support Products

### S1: Automation

- Hardware, software
- Business, program
- Newsroom, equipment
- Clocks, timers
- Data transmission

**Alamar Electronics 2948**  
*MC-2055:* 3rd generation automation links traffic, switching, playback transports; LAN via IBM/compatible PCs; optional net delay, record playback; GP machine control.  
Circle (521)

**American Lightwave Systems N.A.**  
*LC series:* Lightwave, compact fiberoptic transmission systems; single, multimode fiber; 67dB S/N with audio; meets RS-250B over 15.5-mile links; NTSC, PAL, SECAM versions; to audio subcarriers.  
Circle (537)

**Ampex Corporation 2200**  
*ACR-225:* automation video cart system; *automatic conflict resolution* makes break tape when multiple cuts from one cart are to closely spaced or short duration events are too short; *precue* feature.  
Circle (539)

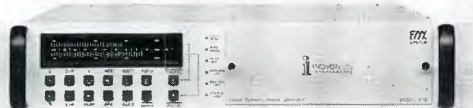
**BASYS 1256**  
*PET:* portable editing terminal compatible with BASYS newsroom computers; software for IBM/compatible laptops; terminal becomes a field extension of the newsroom system.  
Circle (588)

**Beaveronics 4740**  
*QMS series:* station clocks from Favaq & Bosshard.  
*Master Clocks:* for station time keeping.  
Circle (590)

**Broadcasters General Store 8016**  
*R.F.C. 1B:* Sine Systems remote facilities controller; dial-up capability.  
Circle (622)

## Audible Improvement!

### FM



Our 706 FM Stereo Generator maintains 16kHz response and 75dB separation through *digital synthesis* of pilot and subcarrier. This assures **full modulation** with an *inherent* low residual above 54kHz, though an adjustable pre-pilot composite clipper is included.

The 706 also features internal combining and metering of up to 3 SCA/RDS channels, and has two independent composite outputs. It is 100% - compatible with *your choice* of audio processing, and the FMX™ System is a plug-in option.

### AM



Inovonics' 222 is the simple, effective and affordable path to NRSC compliance. Its built-in peak control, adaptive preemphasis and no-overshoot 10kHz filter make you *sound better* too!

**See these and other sonically-superior products at NAB Booth 5601/5603.**

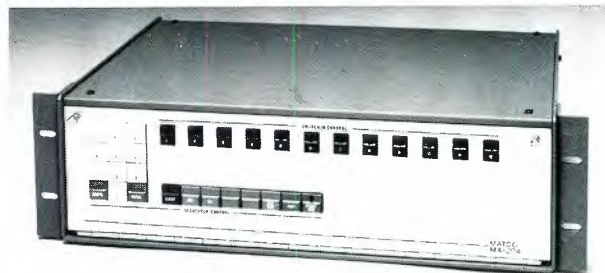
**Inovonics Inc.**

1305 Fair Ave., Santa Cruz, CA 95060  
CALL: 1-800-733-0552 - FAX: (408) 458-0554



Circle (146) on Reply Card

## THE AFFORDABLE PLAYBACK SYSTEM MA-204



SEE US AT NAB BOOTH #3641

### STANDARD FEATURES:

- Simple, dedicated control panel
- 700 Event capability
- Battery backed real time clock and event memory
- 12 X 1 Stereo AFV switcher

### OPTIONS INCLUDE:

- SVHS Switching
- SYNC Distribution
- 2 or 3 Channel configuration
- PC Enhancement to allow downloading of events list

**MATCO**

427 Perrymont Avenue  
San Jose, California 95125  
(408) 998-1655 • FAX (408) 998-8020

Circle (147) on Reply Card



# Stifle Your Imagination

PLACE  
TEXT  
HERE



## Free-Form, Anti-Aliased Text and Image Generator

Free your imagination with Quanta's Delta 1, the anti-aliased character generator with a unique angle.

In addition to unsurpassed character resolution, Delta 1 can position text or graphic elements at any angle, on unlimited planes, in any size. And, each

character, border and shadow can include texture maps, color spreads — and more.

With all these capabilities, Delta 1 offers you the freedom to create exciting graphic displays — any way you can imagine.

For more information call Quanta at 1-800-637-6488.



Quanta Corporation • 2440 South Progress Drive • Salt Lake City, Utah 84119 • (801) 974-0992 • FAX (801) 974-5147

In the Northeast and Southern California call 1-800-84BEERS

Circle (148) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



*The Neriki Image Master™ Genlock.*

# It works with the Amiga.® Not in it.

That means no expansion slots are wasted, no added load on the power supply, and none of the keyboard commands that have to be used with internal genlocks.

More important, the Neriki Image Master meets NTSC standards. It encodes at 5.5 MHz and delivers full 500 line resolution. Even third generation tapes are broadcast quality. It works with any Amiga computer and all Amiga text, graphics, paint and animation software. It genlocks to any video source—including S-VHS—and puts out high

quality composite or R-G-B baseband video for flawless productions. It can be used up or down-stream. And it gives you simple and instant front panel controls.

The RS-179A approved Neriki Image Master is available now—with a full one-year limited warranty. More information is yours for the asking. Just call or write.



TELMAK USA INC. 1101-A Air Way, Glendale, California 91201  
1-800-637-4540 In CA 1-818-547-3720 FAX 818-240-1828

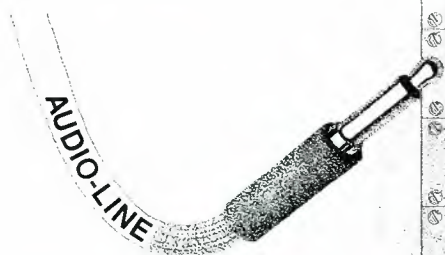


Image Master™ and DeskTop™ are trademarks of Fordray Manufacturing Pty Ltd. Amiga® is a trademark of Commodore Electronics Limited.

See us at NAB Booth #1009

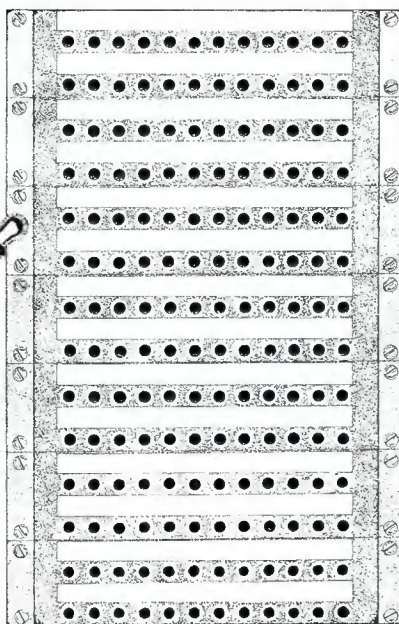
Circle (149) on Reply Card

## WHEN YOU'RE CONSIDERING PATCH PANELS THINK AUDIO-LINE



### Long-Frame & MINI:

- Jack Panels with Jacks
- Pre-Wired Audio Patch Panels
- Audio Patch Cords
- Custom Wired Audio Patch Panels
- Video Panels & Accessories



*Call or write for information on these and  
other Audio-Line products.*

**audio accessories**   
**audio line**

AUDIO ACCESSORIES, INC., MILL STREET, MARLOW, NH 03456 (603) 446-3335

Circle (150) on Reply Card

www.americanradiohistory.com

### BTS

5080

BCS-3000: LAN-based facility control system; supports multistage routing switchers; permits routers from 160x160 to 2000x2000. BRC-2000 series; automation systems; BRC-2000 configuration editor, captures, restores router crosspoint settings; BRC-2100 for real-time control of TVS/TAS distribution system; BRC-2200 switcher automation controller for real time control of TVAS/TAS distribution and TCS-1 machine control system.

Circle (628)

### CBSI Custom Business Systems

4652

IAS software: interactive accounting system. Circle (646)

### Channelmatic

6014

CARE: Channelmatic automated recording/editing system; 2-9 VCR capacity; SMPTE/EBU time code; 3,000 event EDL; generates spot tapes for ad insertion playback; serial, parallel interfaces.

SCU-2A: enhanced control unit for Adcart ad insertion system; remote system monitor produces remote error, system status report; parallel printer serves all channels operating.

CCU-202A: channel control unit for Adcart systems; for one VCR per channel using run of system; flexibility to operate two VCRs on two channels with some configuration variations.

Circle (653)

### COMLUX

9037

Models 3581/82: 780 Mbits/sec optical terminal set; eight video channels per fiber; 29dB optical span for 50km separation between units.

Circle (674)

### Commodore Business Machines

165W

A2091, A2091-40: Amiga autoboot hard disk controller, 2Mbyte memory expansion; SCSI interface; space for 3.5" hard disk; -40 with 40Mbyte SCSI hard disk.

A2630: 68030 accelerator board for Amiga 2000, 68882 math coprocessor, 68851 memory management; 2Mbyte 32-bit memory expands to 4Mbyte; enhances 3-D modeling.

Amiga A2500/30: personal computer, DOS compatible.

A2232: 7-port serial card for Amiga; RS-232, independent or simultaneous operation at 19.2kbaud.

Circle (675)

### Computer Concepts

4040

CMS: Commercial Management System; PC-based, combines digital audio board, software; record/playback commercials, jingles, liners; integrates to Broadcast Traffic System or operates as stand-alone.

Circle (680)

### EEG Enterprises

2838

High data rate network: 9.6kbaud data service uses VBI line; forward error correction; EN512 data inserter, TE511 data bridge; DD430 video data decoder.

Circle (748)

### FloriCal Systems

6730

TimeShifter-Plus: tape delay system; flexible control includes indeterminate delay feature.

ShowTimer: program rundown sheet gener-



# Cycle Sat presents:

|      |      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|
| KVEW | WEFC | WBRZ | KGNS | KOUB | WLBW | WICD | WTVY | WTVG | KHMT | KVTV |
| WBFF | WKEF | KOTV | KPVI | KYUS | KOIA | WPTJ | WHP  | KYMA | KMSG | WRLH |
| WWUP | WCPX | WCGV | WBKO | KBLD | KIFI | WGPR | KRIS | KOBF | KFBB | KHGI |
| WVNY | WGXA | KBSD | WKBW | WCFT | WNEG | WTIC | WWTW | KASN | WBFS | WTUV |
| KZTV | WFTS | WLYH | WFLX | KDRV | KFYR | WTOK | KHSD | KOLD | KNRR | KUSI |
| KTGF | WMTW | WBAK | KOCR | KJAC | WETG | KXMC | WTVE | KVVU | WLUC | WAWA |
| WJET | KXLF | KGMC | WDZL | KSNF | KOSA | KVOA | WXIX | WWCP | KDBC | WVAV |
| WLTN | WUPW | KATC | KOMU | KLBK | KCBS | WVIR | WBKB | KXAN | KLAX | WQAA |
| KSL  | WBNS | KOBI | KFSN | WJSU | KTVI | KOAM | WACH | KBMY | KELO | WKG  |
| WXOW | WXXA | KALB | KVH  |      |      |      | WEYI | WCCB | WOAY | KYEL |
| KTVL | WAGT | KFDX | KMSS |      |      |      | WDTV | KMOT | KTKA | WVMT |
| WOWL | KCBD | WDKY | KNTV |      |      |      | WCJB | KEZI | KBJR | KIDY |
| KING | KVEO | WHTM | WTAT |      |      |      | WGHP | WBBM | KMCY | KTHV |
| KBTX | KMSB | KOLO | KEYC |      |      |      | WPIX | KNOE | KTVV | KSLA |
| KTAL | WOIO | KABC | WTKR |      |      |      | KTVY | WAXA | KARD | WHJG |
| WLAX | KNOP | WJKA | WAGM |      |      |      | WSTM | KVIO | WCNC | WUAB |
| WICZ | WSEE | WVSB | KJRH |      |      |      | KXGN | WPXT | KVHP | WDOI |
| WQAD | KEVN | WAPT | WUHF |      |      |      | KVIA | WTMV | KDLT | WOF  |
| WTOG |      |      |      |      |      |      |      |      |      | WSBT |
| KAVU |      |      |      |      |      |      |      |      |      | WGBA |
| WVII |      |      |      |      |      |      |      |      |      | WTVO |
| WYTV |      |      |      |      |      |      |      |      |      | KRBK |
| KCIK |      |      |      |      |      |      |      |      |      | WFTY |
| KCAL |      |      |      |      |      |      |      |      |      | WRRG |
| KGGM |      |      |      |      |      |      |      |      |      | KREX |
| KOKI |      |      |      |      |      |      |      |      |      | KICU |
| WATM |      |      |      |      |      |      |      |      |      | WNAC |
| KOTA |      |      |      |      |      |      |      |      |      | WEHT |
| KOB  |      |      |      |      |      |      |      |      |      | KSDK |
| WDRB |      |      |      |      |      |      |      |      |      | KHBS |
| WDBJ |      |      |      |      |      |      |      |      |      | KPDH |
| KBRH |      |      |      |      |      |      |      |      |      | WIII |
| KFDM |      |      |      |      |      |      |      |      |      | KQCD |
| WXMT |      |      |      |      |      |      |      |      |      | WBFB |
| KUPK |      |      |      |      |      |      |      |      |      | WQRF |
| KMIJ |      |      |      |      |      |      |      |      |      | WUTV |
| WNDU |      |      |      |      |      |      |      |      |      | KGET |
| KNDU |      |      |      |      |      |      |      |      |      | WAKC |
| WRGB |      |      |      |      |      |      |      |      |      | KODE |
| KETK |      |      |      |      |      |      |      |      |      | KVNB |
| KTTH |      |      |      |      |      |      |      |      |      | KXMA |
| KXXV |      |      |      |      |      |      |      |      |      | KOOG |
| WTTT |      |      |      |      |      |      |      |      |      | WNGT |
| KJTV |      |      |      |      |      |      |      |      |      | KMVT |
| WTVV |      |      |      |      |      |      |      |      |      | WDM  |
| KLMG |      |      |      |      |      |      |      |      |      | KFDA |
| KVRR |      |      |      |      |      |      |      |      |      | KOAA |
| KIDL |      |      |      |      |      |      |      |      |      | WBNN |
| KTRK |      |      |      |      |      |      |      |      |      | KAUT |
| WJWT |      |      |      |      |      |      |      |      |      | WSIL |
| WMDT |      |      |      |      |      |      |      |      |      | KCBA |
| KSNW |      |      |      |      |      |      |      |      |      | KTTY |
| KVII |      |      |      |      |      |      |      |      |      | WLEX |
| WPTA |      |      |      |      |      |      |      |      |      | WNOL |
| KTXL |      |      |      |      |      |      |      |      |      | KTBC |
| WTHR |      |      |      |      |      |      |      |      |      | WTRF |
| WXII |      |      |      |      |      |      |      |      |      | KRNV |
| WPXI |      |      |      |      |      |      |      |      |      | WVLA |
| WCHS |      |      |      |      |      |      |      |      |      | WZDX |
| KGBT |      |      |      |      |      |      |      |      |      | WTVZ |

## THE FORTUNATE 500

The 500 television stations listed all share a piece of good fortune. They all had the foresight to become part of the Cycle Sat Network\* for satellite spot delivery. And that is fortunate. Fortunate for stations because spots and

instructions are conveniently received right in their control room. And fortunate for their clients who now can traffic their television buys without the hassles of making and delivering dubs. Isn't it time your station made this list?



**CYCLE SAT, INC.**  
A COMMUNICATIONS NETWORK  
A SUBSIDIARY OF WINNEBAGO INDUSTRIES, INC.

\*Cycle Sat is adding new stations to the Cyclecypher network every week. For those stations not yet part of the network, Cycle Sat delivers spots via conventional methods.

Circle (151) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



ator; signal quality reports.  
*PrograManager*: integrated traffic, control for satellite programming.  
 Circle (781)

**IGM Communications 4612**  
*IGM-MC*: PC-based control for radio program automation; 12-channel switcher, RS-232 protocol; full automation, live assist, satellite; interface to InstaCart, Go Cart 24, reel-type, R-DAT transports.  
 Circle (837)

**Image Video 2910**  
*EDAAS*: station automation for complete TV, radio facility system; high-speed Ethernet communications with window-based operating system.  
 Circle (840)

**Jefferson Pilot Data/JDS 5014**  
*DCM NewsData*: Data Center Management newsroom computer system; DCM to provide sales and system support, installation. *SalesLine*: for DEC systems; networks sales to other station departments.  
 Circle (865)

**Leitch Video 3516**  
*UDT-5700*: up/down counter for Leitch Master Clocks.  
 Circle (895)

**Matco Mfg & Test 3641**  
*MA-204*: playback automation; 700-event capability; real-time clock, event memory with backup battery; 12x1 AFV switcher. *MA-303*: duplication control; distribution switching, verification.  
 Circle (927)

**McCurdy Radio Industries 5322**  
*Multibus automation*: LAN-based system.  
 Circle (932)

**Media Computing 3540**  
*PROtec*: PC-based programmable, remote control system for equipment.  
 Circle (935)

**Odetics Broadcast 5704**  
*CGF*: character generator/titler. *EDI-8*: external machine control interface. *LEM series*: library expanders; D-2, SP, M-II. *MCDB-I*: multicut software with conflict avoidance feature. *SCS800*: sequencing cart system; VTR cart loading management; CRT display indicates sequence, transport for loading; multicut software plays multiple segments per cartridge; 65,000 cart database. *TCS 2000D*: digital format (D-2) automation cart machine. *TCS 3000*: automation cart system with UNIX operating system. *NCT-1*: networked news control terminals.  
 Circle (984)

**Panasonic Broadcast 2534**  
*MARC system*: cost effective automated cart system.  
 Circle (999)

**Professional Label Service 1020**  
*Vid-Label*: software prints videocassette tape labels; diecut labels, LaserSheet, pin-fed material.  
 Circle (1022)

**Radio Computing Services 8024**  
*Listener*: audio recognition system; PC-

based unit for music, commercial verification.  
 Circle (1038)

**Register Data Systems 6106**  
*Traffic Master 5*: multiuser traffic, billing, accounting system.  
 Circle (1051)

**Solutec 6800**  
*SOL-6800 enhancements* and features for automated broadcast system.  
 Circle (1101)

**Sony Communications/Broadcast 5130**  
*LMS systems*: DVC-500 library management system; DVC-1000 D-2 library management system.  
 Circle (1103)

**Tennaplex Systems 4325**  
*Music Manager*: production model automated digital radio station studio; updated software.  
 Circle (1169)

**Torpey Controls & Engineering 5404**  
*CLK-50*: desktop time/temperature display; connects to CLK-5 master clock output.  
 Circle (1184)

**Unique Business Systems 9008**  
*RentTrace*: software package for integrated rental/point-of-sale system; inventory, reservations, contract processing, maintenance, invoices, accounts receivable.  
 Circle (1198)

**Utah Scientific/Dynatech 6030**  
*TAS-1C*: time code control total automation system; advanced Novell/Ethernet LAN, multichannel control; full facility interface; modular C programming, distribution process.  
 Circle (1205)

**Video Communications 1412**  
*SQL* report generator. *Film* management system. *Desktop* tools.  
 Circle (1223)

**Video Design Pro 1356**  
*Touch & Cable 2*: interface between CableDOC, VidCAD/AudCAD drawings; touch source output, destination input; automatically draws cable, documents jack field, telco block; prints labels. *Generic Designer series*: documentation tools, 2-D drawing libraries; predrawn symbols drop into drawings to reduce operator time; CableDOC, label printer, PathROUTER options.  
 Circle (1224)

**Video Logic 7120**  
*Log Producer 22*: automated tape logging for Betacam, U-matic VTRs using RS-422 ports; adapter cable, custom microchip for PC control of tape movement, search/retrieve functions.  
 Circle (1228)

## Support Products

### S2: Interconnections

- Wiring, cable
- Connectors, patch cords
- Patch panels
- Fiber optics

**Alcatel-ATFH 3107**  
*Precision video*: 75Ω; meets '87 NEC CL2 spec. *Audio cable*: single pair, multiple pair. *Audio PRJ series*: individually jacketed pairs in multipair audio cable; quick installation.  
 Circle (522)

**Canare Cable 3730**  
*VWJ2-W*: dual video jack. *VWP-C4*: video patch plug. *BCP-T*: 75Ω termination plug.  
 Circle (638)

**Comprehensive Video Supply 1660**  
*Cables, connectors*: multipin camera cables, S-VHS connectors; heat-shrink accessories; Comp-Tie fasteners. *TK-160*: field interface, repair kit.  
 Circle (678)

**Connectronics 1922**  
*Multipair 2*: flexible cable with two balanced pairs; single black jacket over both; for stereo, dual discrete mono balanced line or mic signals. *BODGE Plug line*: Bantam (T.T.), BNC male, RCA phono male/female, TRS 1/4" A gauge jack socket, mono (TS) 1/4" A gauge jack.  
 Circle (691)

**Kings Electronics 3133**  
*KS6464*: RBGS component jackfield with patch cords.  
 Circle (878)

**National Photonics Inc N.A.**  
*SEWINDER*: ENG optical fiber transceiver; for video, audio, data in ENG, EFP; portable remote transceiver mounts on heavy duty tactical fiber optic cable reel; 3-camera operation per fiber.  
 Circle (963)

**RF Technology 2612**  
*RF-FOM-13*: fiber optic link; 40-mile operation without repeaters; video, four audio; 8Mbit/sec data rate; IF signal used at repeaters.  
 Circle (1053)

**VEAM/Litton Systems 6547**  
*CIR series*: quick-disconnect, multipin connectors; 1-150 contacts, dry circuit to 1000A. *VSC series*: Socapex compatible multipin connectors. *CIR/GRH series*: UL approved, 5-wire 100A power distribution connectors. *B-Lock*: sequential power panel; 600A capacity; operator safety features. *CISS series*: ep-8 compatible connectors; stainless steel for abusive environments.  
 Circle (1215)

## Support Products

### S3: Cases, racks

- Acoustic material
- Storage systems
- Studio furnishings

**Alpha Audio 6701**  
*Sonex acoustic material*: addition to line; 2"x2" drop-in ceiling tiles; class 1 fire rating.  
 Circle (529)

**Apollo Lighting/Audio-Visual 3800**  
*Furnishings*: expanded line of mobile A/V carts, computer furniture.  
 Circle (551)



# GIVE YOUR STATION OVER 50 YEARS OF BROADCAST EXPERIENCE WITH THE DENON CD CART PLAYER.<sup>TM</sup>

**Experience.** Over 50 years of broadcast audio experience went into designing Denon's DN-950FA CD Cart Player.<sup>TM</sup> Denon has been making broadcast equipment and breakthroughs since 1935. Our trail-blazing research in digital recording paved the way for us to build the world's first digital recorder good enough for commercial record production in 1972. Denon is uniquely qualified to put CD On Air. And we stand behind that — our Professional Products staff is always just a phone call away.

**Easy.** That's the best way to describe the control panel and functions of Denon's Broadcast CD Player. You already know how to use this machine. CD in tape cart format means today's quality sound built to broadcast standards. Standard XLR outputs make for easy connections, while a fully dedicated remote control port allows this machine to talk to your console. And its small footprint takes up half the space of other players.

**Reliable.** The strong chassis and heavy duty transport ensure reliability while the cartridge protects your CD investment. Cartridges extend the life of CDs by shielding them from fingerprints, dust and scratches. They cut down on the steps from loading to play. And they're shatterproof if dropped. Just ask one of the 400 stations using our CD Cart Player.<sup>TM</sup> Denon, the choice of professionals.



**Visit us at NAB  
Booth #1326**

# DENON

*The first name in digital audio.*

DENON AMERICA, INC., 222 New Road, Parsippany, NJ 07054 (201)575-7810  
DENON CANADA, INC., 17 Denison Street, Markham, Ont. L3R 1B5 (416)475-4085  
NIPPON COLUMBIA CO., LTD., 1-4-14, Akasaka 4-Chome, Minato-Ku, Tokyo 107-11 Japan

Circle (152) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



**Audio Broadcast Group** 4039  
*Studio furniture:* for AM, FM, TV facilities.  
 Circle (565)

**Bretford Manufacturing** 3637  
*VTRPN44:* widebody cart; 8" pneumatic tires; use with screens to 35"; cart stands 44"; three shelves.  
*BBUL44, BBULC48:* widebody equipment carts; 44", 48" heights; -44 with three shelves; -C48 with two shelves and locking cabinet; 32"Wx27"D; 4" casters; safety strap secures monitors.  
 Circle (610)

**Calzone Case** 2045  
*Studio Series:* workstations for permanent installations.  
*Rack Mount* workstations for portable use.  
*Editing system cases:* rack-mount units for A/B roll editing system.  
 Circle (634)

**ERGO 90** 1060  
*EIPB series:* broadcast audio, video patch bays.  
*EIP 7500 series:* tilting rack-mount slides for S-VHS systems.  
*EICR-I:* cable retractor; spring-loaded; keeps cables out of the way.  
 Circle (764)

**Fiberbilt Cases** 6017  
*Model 909:* heavy-duty molded shipping

cases.  
 Circle (775)

**K&H Products** 6055  
*Shoulder Case:* lightly padded case for Sony BVW 200, 300 camcorders.  
*Video Vest:* production vest design for video, audio professionals.  
*Light Pack:* compact, soft-side carrying case for lighting equipment, accessories.  
*Tech Case:* over-the-shoulder bag for personal gear, engineering tools.  
 Circle (869)

**Nalpak Video Sales** 1401  
*TPA, TDA:* Tufftotes production and directors soft bags.  
*20-6, 20-14:* Tuff-Rak rack-mounted cases.  
 Circle (961)

**Peerless Sales** 3821  
*VCR/VCP mount:* yoke bracket mounting frame for small VCR/VCP units; includes space for 9" to 13" monitor.  
 Circle (1003)

**Premier Metal Products** 6334  
*Legend Series TM:* equipment racks, 22-77" heights; sloped-front cabinets, consoles with 10½-21" panel space; turrets, desk top instrument cabinets; accessories.  
 Circle (1017)

**Star Case** 3810  
*Case products:* new series; dedicated case models, broad-based application rack-mounts.  
 Circle (1121)

**Storeel** 2434  
*CD1120:* CD setup truck.  
*SCD-64D:* CD storage system.  
*RS240-II:* M-II cassette storage system.  
*S883612/10-I:* D-2 cassette storage system.  
 Circle (1124)

**Telepak San Diego** 3815  
*T-SM/CAM, T-LG/CAM:* soft carrying cases for Betacam and small cameras.  
*T-METAL:* custom cases; high shielding effectiveness; meets electromagnetic compatibility, protects sensitive data.  
 Circle (1160)

**Thermodyne International** 6154  
*Rack-Pack:* shock-mounted support system; cushioned shock mitigation.  
 Circle (1175)

**Winsted** 5748  
*Editing/Post production consoles:* low profile, "Pro-Gray" colors.  
*Instant Assembly:* console design for quick setup; ships disassembled, uses positive locking pins for 3-minute assembly.  
*Universal rack mount:* shelving for 19" racks; secure support for equipment measuring to

**THE SOUND OF  
 SUCCESS IN ASIA**

MAKE BIG SALES OF SPECIALIST  
 SOUND EQUIPMENT AT.....

**Pro Audio Asia '90**

**JULY 11-13 1990**  
**HONG KONG CONVENTION &  
 EXHIBITION CENTRE**

For details, please contact  
**BUSINESS & INDUSTRIAL TRADE FAIRS LTD.**  
 28/F., Harbour Centre, 25 Harbour Road,  
 Wanchai, Hong Kong  
 Tel : 5756333 Telex : 64882 ASIEX HX  
 Cable : BIPCCAB Fax : 8341171, 8345373

**B&I**  
 EXHIBITION  
 PAA76-90/BE

Circle (153) on Reply Card

## High Voltage Replacement Woes In Your Transmitter?



When your H.V. capacitors finally wear out and you find you must substitute parts, call P.C.I.

Our LK series of high voltage filter capacitors are installed in

broadcast & military transmitters around the world; transmitters made by many of the biggest names in the business.

We custom design many items, catalog & stock thousands of different capacitors. Voltage ranges for the standard LK series are from 600 VDC thru 50 KVDC. Other series are cataloged thru 200 KVDC.

Also available: Rf capacitors and High Voltage DC power packs. And all oil filled products utilize NON-TOXIC materials! Call us now, for full details, and catalog.



**Plastic Capacitors, Inc.**

2623 N. PULASKI ROAD, CHICAGO, IL 60639 312/489-2229  
 "HIGH VOLTAGE DEVICES MADE WITH PRIDE IN ILLINOIS SINCE 1952"

Circle (154) on Reply Card





## To avoid friction in the studio you need a good fluid head

You can now replace your not-quite-perfect cam-type friction heads.

Miller proudly announces true fluid-head performance for the studio environment.

The all-new Miller 80 Fluid Head will easily carry all

camera configurations up to 80lb (35kg) more smoothly than any other, in any studio situation.

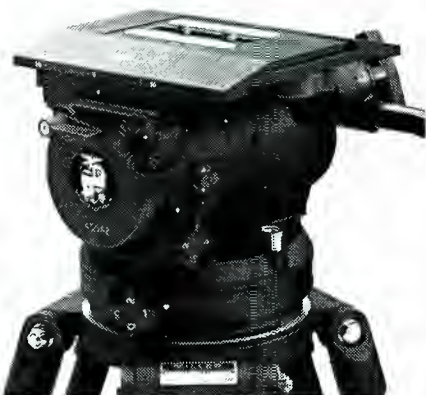
It employs an advanced viscosity drag system with an increased range of damping. It offers four preset fluid ranges in tilt action and three presets, plus free wheeling in pan action.

The Miller 80 is also designed to handle either O.B. cameras or 35mm cameras on any tripod, pedestal, dolly or crane, in ball-levelling or flat base configurations.

It counterbalances teleprompters, large zoom lenses,

or any other offset weight with fingertip control.

The new Miller 80 Fluid Head works as well in-studio as all Miller Fluid Heads work in the tough field conditions for which they were originally designed.



**Designed for the  
world's most  
challenging conditions.**

Miller Fluid Heads (USA) Inc. 410 Garibaldi Ave., Lodi, NJ 07644. Phone: (201) 473 9592. Fax: (201) 473 9693

**SEE US AT NAB BOOTH #6204**

Circle (155) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



17 $\frac{3}{8}$ "x14", 3 $\frac{1}{2}$ -10 $\frac{1}{2}$ "; 14ga, 16ga.  
Circle (1254)

## Support Products

### S4: Recording media

- Audio, video
- Cassette, reel
- Cleaners, degaussers
- Conditioners

**Accurate Sound Corp** 4111  
*AS-6000B*: tape conditioner for audio, video media; 150,  $\frac{1}{4}$ ",  $\frac{1}{2}$ ",  $\frac{3}{4}$ ", 1"; to 16 $\frac{1}{2}$ " reels.  
Circle (507)

**Ampex Recording Media** 2200  
*Hanger caps*: snap-on device permits storage of 33 Betacam shipping boxes per Storage/Rail system rail; adapts to non-Ampex systems; allows 28 U-matic cassettes per rail.  
Circle (540)

**Garner Industries** 2027  
*Model 680*: bulk eraser; -70dB erasure in less than 7 seconds; S-VHS and 850 Oe rated media.  
*Model 4000*: bulk eraser for high coercivity metal particle tape; -70dB erasure within 12 seconds.  
Circle (792)

**Maxell Corporation of America** 2248  
*D-2*: videocassette for composite digital recording.  
*Betacam SP*: videocassette for  $\frac{1}{2}$ " Betacam SP.  
*Master DA series*:  $\frac{3}{4}$ " for professional digital audio mastering.  
Circle (930)

**Professional Label Service** 1020  
*Videocassette cases*: for various format VCR tape.  
Circle (1022)

**Research Technology Int'l/RTI** 2049  
*TapeChek 400 series*: videotape cleaner, inspection system, rewinders; grades tapes, determines length with number and locations of defects; VHS format; 2-hour tape checked in two minutes.  
Circle (1052)

**Tentel** 2033  
*T2-H7-SLCX*: Tentelometer tape tension gauge for D2 recorders.  
*TSH-B7*, *TSH-M-II*: Beta and M-II spindle height, reference plane gauges.  
Circle (1170)

**Weircliffe** 1734  
*Expanded line*: BTE magnetic media degaussers.  
Circle (1247)

## Support Products

### S5: Distribution

- Routing switchers
- Patch panels, cords
- Distribution amps

**A.C.E** 3234  
*ARRAY*: production model A/V routing system; digital system handles analog and digital signals.  
Circle (501)

**ADC Telecommunications** 6001  
*MCS 3800*: video multicast switching system.  
Circle (511)

**Alpha Image** 7017  
*Alpha 264S*: D-1, D-2 digital serial router.  
*Alpha 216*: D-1, D-2 digital parallel router.  
*D1, D2 router*: serial format digital signal system; single coax flexibility; comprehensive range of simultaneous control systems.  
Circle (530)

**Audio Developments** 1942  
*Distribution systems*: 1-inx4-out to multiple-inxmultiple-out.  
Circle (566)

**Avitel Electronics** 3006  
*Digital video jackfield*: 8-bit, 25-pin jackfield; eight circuit pairs.  
*Digital video DAs*: D-1 or D-2 signals; mix in single 1RU frame; 3-input, 9-output channels; all outputs reclocked; optional cable EQ to 500 feet; remote control output module assignment.  
*3200 series*: 10 outputs per channel modular DAs; video, video EQ, video delay, extended range sub-modules; single, dual channel audio; 8x1 video switcher; pulse DAs; LTC reader, inserter; operate mixed in 3RU frame.  
Circle (579)

**Barco Industries** 2944  
*BVRS 16x16*: video routing switcher; 16x16 matrix serves composite, component signals; user reconfigurable; control from local panel, CVS series monitors, standard PCs; 40MHz bandwidth.  
Circle (586)

**Broadcast Video Systems/BVS** 5041  
*BB500/2*, *BB1200*: 4-layer, 5x1 and 12x1 passive switchers; provides stereo audio-follow-video, time code switching.  
Circle (620)

**BSM Broadcast Systems** 3210  
*MR 207*: X-Y remote controller for MODULA routing switcher; includes memory capabilities.  
*C216PP*: audio patch panel.  
*C310PP*: video patch panel.  
*C312PP*: video clamp, DA; 4x4 design.  
Circle (626)

**BTS** 5808  
*BVA-3000*, *BAA-3000*: wideband distribution amplifiers; 1-inx5-out video units with 30MHz bandwidth and crosstalk less than -70dB at 5MHz; 1-inx6-out audio unit; 20kHz bandwidth with less than 0.005% THD.  
*TDS-2000 digital audio router*: AES/EBU compliant; 10x10 matrix expandable to any size.  
*TAS/TVS-3000*: wideband routing switcher; output monitoring feature, indicates information about the output signal without disturbing the signal or its final destination.  
Circle (628)

**Comprehensive Video Supply** 1660  
*Matrix switchers*: S-VHS model; composite video model, VIS-4x4.  
*Primebridge MicroSeries*: audio DA, balanced/unbalanced interface.  
Circle (678)

**Datatek** 5652  
*D-2400 enhancement*: PC software

automates control of D-2400 routing switchers.  
Circle (709)

**Di-Tech** 2954  
*Serial routing switcher*: for D-1, D-2 signals.  
Circle (719)

**Digital Services-DSC/Chyron** 1834  
*DD-4 enhancement*: digital distribution amps; support both D-1, D-2; allows mixing internally with automatic processing of signals.  
Circle (730)

**Dorrough Electronics** 5506  
*Model 120-S*: routing chassis; interconnects multiple source signals to Model 1200 stereo signal test set.  
Circle (734)

**DYNAIR Electronics** 5122  
*DYNA MITE enhancements*: full alphanumeric source, destination displays five mnemonic characters; control for operation from any computer or a VDT.  
*Series 3100*: 30MHz utility video, equalizing, pulse DA products; 1x6 mix/match DAs in 1-2-rack unit packages; EQ compensation to 1,000 feet of Belden 8281 coax.  
*DYNASTY enhancements*: bandwidths from 60-70MHz; applications for aerospace, graphics, C3I.  
*DYNASTY 100 enhancement*: bandwidth extended to 120MHz; plug-in modules mix/match I/O connections for fiber optics, coaxial cable.  
*Series 1200*: 10MHz, 30MHz bandwidth modules for fiber optic video terminal equipment; 5km spacing between 10MHz units with high S/N ratio; numerous plug-ins for fiber-coax combinations.  
*Fiber Optic series*: in 10MHz, 30MHz, 100MHz bandwidths; CCTV, broadcast, high resolution systems.  
Circle (740)

**ESE** 6714  
*ES-227*: S-VHS compatible video DA.  
*ES-SW90*: 16x1 audio-follow-video switcher; 1RU rack space.  
Circle (766)

**FOR-A** 3522  
*VRS-3000*: video routing switcher.  
Circle (784)

**Future Productions** 3201  
*AVD-10A*, *ADV24A*: audio/video DAs; 1x10, 1x24 designs; improved models.  
Circle (790)

**Grass Valley Group** 5830  
*MAX-900 series*: 3RU modular DA frame with 12 cells, power supply; optional second power supply; component analog video DA with 3-inx6-out, single tracking gain adjustment; sync add, optional EQ, delay.  
Circle (807)

**HEDCO** 3416  
*HDV-4X*, *HDV-8X*: 4x1 and 8x1 routing switchers; for D1, D2 digital video signals.  
*Model HD*: 32x32 to 256x256 routing switcher; for audio, video, time code signals.  
Circle (817)





# Time delay.

The SV-255 portable Pro-DAT: It's *A Time Machine*. What goes in comes out, whether it's one minute or one year later!

To do this the SV-255 brings you the best pre-amps and A-D's in the DAT world. Our low noise pre-amps, with optimum headroom and "gapless" trim range, match the widest variety of sources and levels for the best possible sounding recordings.

MASH A-D converters significantly lower noise and distortion compared to conventional A-D systems, especially at low levels and high dynamic ranges only DAT lets you use. And the 64-times oversampling rate allows the use of gentle 18dB per octave filters for notably enhanced phase and frequency response.

This kind of engineering integrity has made Panasonic portable professional DAT's today's best selling DAT machines.

Come into your Panasonic Pro-Audio Dealer today and judge the superior sonic qualities for yourself.

For your nearest dealer, call 714-573-7278, or write: Panasonic DAT, 6550 Katella Avenue, Cypress, CA 90630.  
For enhanced performance use Panasonic DAT tape.

**Panasonic**  
Professional Audio Systems

Circle (156) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



**Image Video 2910**  
 9540: 40x20 video router switcher; 3RU.  
 9541: 40x20 dual audio switcher; 4RU.  
 9520/9521: 20x10 1RU video, dual audio router.  
 SDR-128 serial data router: RS-232/422 data communications switcher; to 128x128 matrix by groups of 16 in 6RU; redundant power supply.  
 Circle (840)

**Inline 7110**  
 IN3510, IN3520: utility RGB+S switchers; 4-inx1-out and 6-inx1-out; remote, RS-232 control; 200MHz video bandwidth.  
 Circle (844)

**J-Lab 1146**  
 Shirt Pocket video DA: looping balanced input; hum bucking; 5 75Ω outputs; EQ for 1000 feet Belden 8281 cable.  
 Shirt Pocket audio DA: looping balanced input; four balanced outputs; transformer input option; 9V battery operation.  
 Circle (861)

**J.N.S. Electronics 5601**  
 8000 series: "The Frame" modular audio, video, RF functions.  
 Models 8300, 9000: audio routers.  
 Additional modules: for series 8000 system.  
 Circle (862)

**Leitch Video**  
 ADA-882: stereo audio DA.  
 ADA-816: unbalanced audio DA.  
 Circle (895)

**McCurdy Radio Industries 5322**  
 MDA-100: 1x8, 8x1 mixing DA; individual level adjustments.  
 Circle (932)

**Midwest Communications 3234**  
 ARRAY: A.C.E digital router for digital or analog A/V signals.  
 Circle (946)

**Professional Sound Corp 9001**  
 CVM series: video, audio DAs.  
 Circle (1023)

**Sigma Electronics 6300**  
 Series 2100: A/V, pulse, graphics signal distribution modules; fiber-optic, wired models; 1x6 units; 6x1 switching modules, switcher control; black burst generator.  
 Circle (1092)

**Solutec 6800**  
 SOL-2510: audio DAs.  
 Circle (1101)

**360 Systems 7201**  
 AM-16/R: remote control for AM-16 series audio crosspoint router; rack-mount, customized installation; remote interface

3516 software to PC or MAC computers.  
 Circle (1172)

**Utah Scientific 6030**  
 AVS2: production models; audio, HDTV router; SMD reduces physical size.  
 Circle (1205)

## Support Products

### S6: Test equipment

• Tools

**Allen Avionics 5607**  
 Matchman Mk II: color patch generator.  
 Circle (525)

**Altronic Research 6814**  
 Model 6775: 75kW air-cooled coaxial dummy load.  
 Power test load system: complete water-cooled dummy load with calorimeter, interlock.  
 Circle (533)

**Amber Electro Design 4900**  
 Total Solution: audio measurement package; Model 5500 programmable audio measurement system and AudioCheck PC menu-driven software; available as separate generator, analyzer.  
 Circle (534)



## You can measure...

with the best monitor and the most accurate test set.

The FMM-2/FMS-2 series monitors provide an even greater degree of precision measurement than ever before... **You can measure** S/N below 90 dB, **You can measure** crosstalk below 85 dB, **You can measure** frequency response to better than 0.25 dB, **You can measure** distortions to lower than 0.01%, and much more... Our uncluttered panels and autoranging voltmeters make these measurements a dream.

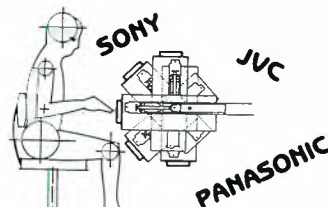


**BELAR** CALL ARNO MEYER (215) 687-5550  
**ELECTRONICS LABORATORY, INC.**  
 LANCASTER AVENUE AT DORSET, DEVON, PENNSYLVANIA 19333

Call or write for more information on Belar AM, FM, Stereo, SCA and TV monitors.

Circle (157) on Reply Card

## FINALLY, A RACKMOUNT SLIDE KIT THAT WORKS



FOR MORE INFORMATION... CALL 800-635-9297

**ERGO INDUSTRIES**

Circle (158) on Reply Card

## Highest Performance Audio Transformers!

- Wide bandwidth • Low hysteresis distortion
- Flat group delay • No overshoot or ringing

Call for free applications assistance  
 (Mon-Thurs, 9am-5pm Pacific time)

**jensen transformers**  
 INCORPORATED

10735 Burbank Blvd. • North Hollywood, CA 91601  
 FAX (818) 763-4574 Phone (213) 876-0059  
 TELEX 6502919207 MCI UW

Circle (159) on Reply Card



# When your broadcast specs call for consoles, call for *Emcor*®



You know what the station needs in its control room; now you want the right enclosures. Emcors modular design allows you to customize a console to fit your needs. Choose from slope front, vertical and low silhouette enclosures and much more — just what you need to mount your control panels, switchers and preview monitors. In all, there are 6 distinct product lines and more than 9,000 standard items, including a full range of accessories such as drawers, equipment shelves, slide out shelves and hundreds of console writing top configurations.

Emcor enclosures are attractive as well as rugged. Consider your appearance options — decorative trim in a variety of styles, 16 standard paint colors in a smooth or textured finish, and 14 standard laminates from which to choose. Also, our ACS Digital Color Computer allows us to match any color you desire.

If you need it extra fast, Instant Emcors, our off-the-shelf stock program, has a large variety of our most popular items ready to ship in just 5 working days. If you have a custom requirement, count on Emcors to provide you with the best design engineering and manufacturing services available anywhere.

No matter what your requirement, Emcors has what broadcasters want!



**Crenlo, Inc.**

1600 - 4th Ave. N.W.  
Rochester, MN 55901  
Phone 507-289-3371  
FAX #507-287-3405

**EMCOR**

**See us at the NAB Show, Booth #3064.**

Circle (160) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



**Anritsu America** 6549  
*MP1601A/MP1602A*: BER bit error rate test set; operates 50MHz-5GHz; separate receiver, transmitter units creates pseudo-random bit patterns to test digital communications systems.  
 Circle (546)

**ASACA ShibaSoku** 5152  
*Model AM50B*: 2-channel audio analyzer.  
*Model AM51A*: audio analyzer.  
*Model TG91E6*: HDTV test signal generator.  
 Circle (557)

**Audio Precision** 3252  
*APP-FM1*: audio proof of performance package for System One; performs FM stereo audio proofs.  
*Dual Domain*: production version analog, digital domain audio test package for System One.  
 Circle (567)

**AVCOM of VA** 3151  
*PSA-65A*: portable spectrum analyzer; to 1GHz in single sweep with sensitivity to -95dBm over narrow spans; battery operated; optional frequency extenders.  
*DGP-20*: dc power inserter, isolator; insertion loss less than 0.3dB through 2GHz, impedance of 50Ω; allows remote powering of in-line amplifiers, protects test equipment.  
*RFP-24 preamplifier*: enhances LSA-1000 log

surveillance antenna or other requirements where low-noise amplification is needed; 22dB gain, noise figure 2.2dB at 1.2GHz; 12Vdc.  
 Circle (577)

**B&B Systems** 1116  
*IM-IHR*: Imagescope; stereo audio display scope; available in side-by-side half-rack model.  
 Circle (582)

**Bruel & Kjaer Instruments** 8029  
*Model 2143*: portable real-time frequency analyzer; input mic preamp, direct; 80dB dynamic range; DOS compatible disk drive; 100-step learn mode; four range digital filters.  
 Circle (623)

**Coaxial Dynamics/Kirkwood Ind** 6816  
*WATTCHMAN 81072, 81080*: rack-mount station monitor, alarm systems; 250W-100kW, 8kW-80kW systems; 100μ-5mA meter movements.  
*Model 83010*: peak/CW rack wattmeter; 0.1W-5kW range.  
 Circle (667)

**Control Concepts** 2025  
*ISLATRON series*: power protection for broadcast transmission, studio equipment; *active tracking* of lightning induced spikes and other transients absorbs energy

before it damages equipment.  
 Circle (695)

**Current Technology** 9026  
*PC-series*: professional power protection for small systems.  
*MPA/MPAP*: integrated digital quality power panels.  
*OptiSifter*: data line protection; complete optical isolation.  
 Circle (702)

**Delta Electronics** 4518  
*PRH-1*: high power pulse reflectometer.  
 Circle (715)

**Dorrough Electronics** 5506  
*Model 40-P*: Loudness Meter; peak hold feature.  
 Circle (734)

**FloriCal Systems** 6730  
*Validator*: A/V signal level, timing monitor; RS-232/-422 port.  
 Circle (781)

**Holaday Industries** 5049  
*HI-3320*: data logger for FCC compliance regulations.  
 Circle (823)

**ISS Engineering** 6648  
*GL5020A*: IRD satellite receiver; shipped with proof of performance results from VM

## When the ELECTRONIC AGE was born . . .

ANVIL CASES WERE THERE



CALL FOR  
OUR NEW  
CATALOG!

- 6 distinct product lines -
- A.T.A. heavy-duty shipping to lightweight carrying cases
- Custom measuring and designing available
- 15 attractive colors
- Building quality cases since 1952

Call Today For More Information



**ANVIL CASES**

SUBSIDIARY OF ZERO CORPORATION  
 15650 Salt Lake Ave., City of Industry, CA 91745 • P.O. Box 1202, La Puente, CA 91747

(800) FLY-ANVIL (800) 359-2684

Circle (161) on Reply Card

## ADx -25 TurboLock

At last a high performance  
audio synchronizer  
that's easy to drive.



Visit us at NAB Booth #7119 for a test drive

**ADx Systems Inc.**  
 274 Madison Avenue, New York, NY 10016  
 The World Leader in Timecode.

For more information contact your local dealer or call us at 1-800-444-4-A-D-X.

Circle (162) on Reply Card



Test drive SIAT,  
the world's most advanced,  
fully automated audio testing system,  
at NAB, Booth 1035-1133



## Fast.

## Very Fast.

On your left, the Porsche 911 Targa Carrera, one of the fastest production cars in the world. It goes from 0-60 in just 6.1 seconds. *Fast.*

On your right, the revolutionary Schmid SIAT, the world's fastest, most precise audio network testing system. It features technology so advanced, you can check 10 critical parameters of your audio broadcasts, including noise, harmonic distortion, frequency/phase response, channel transposition and more, all at the push of a button.

Even more impressive, you can test *any* transmission network, from the simplest to the most complex, all from a single location. All in an amazing 5 seconds flat. *Very fast!*

No more time-consuming manual tests. No more annoying tone tests. No more service interruptions. Instead, faultless audio transmissions that will leave your viewers and listeners coming back for more.

Save time. Save money. All while revving up your audio performance. For more information and a *free* copy of our SIAT video presentation, call toll-free 1-800-955-9570 or mail the coupon today.

☐ **Yes!** Please send me the SIAT video at no cost or obligation. <sup>BT</sup>

☐ Please call with additional information.

Name \_\_\_\_\_

Title \_\_\_\_\_

Company \_\_\_\_\_

City/State/Zip \_\_\_\_\_

Country \_\_\_\_\_

Phone \_\_\_\_\_ Fax \_\_\_\_\_

**Mail to:** Schmid Telecommunication, 15 West 26 Street, 12th fl., New York, NY 10010

**U.S. Sales Office:** Holzberg Inc. ☐ P.O. Box 323 ☐ Sea Bright, NJ 07760

Tel: 201-530-8555 Fax: 201-842-7552

**Canadian Sales Office:** M.S.C. Electronics Ltd. ☐ 147 West Beaver Creek Road  
Richmond Hill, Ontario ☐ L4B 1C6 Canada ☐ Tel: 416-731-9500 Fax: 416-731-5195

**Headquarters:** Schmid Telecommunication ☐ Rieterstrasse 6 CH-8002 Zurich  
Switzerland ☐ Tel: 011 41 1 206-1111 Fax: 011 41 1 201-2372

**SZ Schmid**  
Telecommunication

Circle (163) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



700 test unit, serial communications program for remote control; prepped for Video Cipher II Plus descrambler use.  
Circle (858)

**J-Lab 1146**  
*Color bar generator:* SMPTE bars; source ID; 9Vdc operation.  
Circle (861)

**Jensen Tools 4117**  
*JTK-87TEK:* field engineer's electronic service center; deep-case tool kit; more than 70 tools; options include Fluke 88 DMM, TEK 222 scope; available without meter, scope.  
Circle (867)

**Leader Instruments 3012**  
*Model 5100:* component video waveform monitor.  
*Model 425:* component video signal generator.  
Circle (892)

**Magni Systems 1026**  
*Signal Creator:* software designs custom test signals for multiformat test signal generator.  
Circle (919)

**McCurdy Radio Industries 5322**  
*SA14023A:* audio level meter, test set; extended range capabilities.  
Circle (932)

**Motorola C-Quam/AM Stereo 4704**  
*Semiconductors:* analog and digital types.  
Circle (954)

**Narda Microwave/Loral 5757**  
*Model 8700:* RF radiation compliance meter, electric and magnetic field probes.  
*Model 8820 SMARTS:* surface-mounted compliance system.  
Circle (962)

**Neutrik USA 6610**  
*Model A1:* audio sweep generator, analyzer; dual channel.  
Circle (970)

**Rohde & Schwarz 5408**  
*TIF:* video timing analyzer; supports NTSC, PAL, SECAM color subcarriers; measures jitter from VTRs; non-volatile memory card; portable SMD, multilayer technology design.  
*SGMF, SGPF:* NTSC, PAL signal generators; 30 test patterns including composite test signal; 12-bit digital generation; optional VIT inserter and source ID; supports SMPTE, NTC-7, FCC standards.  
*UAF video analyzer:* measures 25 video signal components at three rates; eight VITS configurations; user-defined limits, parameters; non-volatile memory card retains setup, results, operation modes.  
Circle (1058)

**Schmid Telecommunication 1035**  
*SIAT system:* short-interval audio test equipment; complete audio test procedure completed within five seconds after operator presses one button; transmitter, receiver units for all audio networks.  
Circle (1076)

**Selco/Sifam 5504**  
*Meter light:* LED illumination kit for full spec VU, PPM meters.  
Circle (1081)

**Solutec 6800**  
*SOL-20/20 enhancement:* improved graticule on color-keyed in-video audio level meter.  
Circle (1101)

**Symetrix 6342**  
*SX-205:* precision audio meter; VU, PPM ballistics; 1kHz calibrator; reads power or voltage on dual LED ladder display.  
Circle (1134)

**Techni-Tool 2857**  
*Degausser:* for various CRT displays; demagnetizes tools; continuous service time 2.5 min; weight one pound.  
*Tec-Tuff tool kit:* case with valance design; 3-tumbler combination lock; durable.  
*Tech Duster:* precision cleaning system; 12oz, 20oz premeasured dry, Freon gas to remove dust; non-corrosive, non-flammable; variable flow control valve; extension applicator.  
Circle (1152)

**Tektronix 2016**  
*TSG1001:* programmable HDTV signal generator.  
*2721/2722:* non-interfering sweep transmitter, receiver; continuous swept response measurements without degrading the video signal.  
*VM700A Option 40:* audio measurement option expands capability of the video signal monitoring unit.  
*ASG-100:* audio signal generator; provides test tones, voice record source for VM700A Opt 40.  
Circle (1155)

**Videotek 1246**  
*VNG-1:* video noise generator.  
Circle (1232)

**Wireworks 4800**  
*TE-3:* mic cable tester system.  
Circle (1255)

## Support Products

### S7: Facilities

- Studio, mobile
- Construction, design
- Consultants

**Audio Broadcast Group 4039**  
*Rolling Radio II:* mobile radio studio; complete installation in a van.  
Circle (565)

**BAF Communication 1564**  
*Model ENG-18:* ENG van; on Ford E-350 chassis.  
*Model MRS-31:* mobile radio studio; 31-foot unit includes interview set for nine people; BMX-22 audio board, Marti redundant stereo transmitter.  
Circle (583)

**Dataworld 4456**  
*Engineering data:* including 3-second terrain data.  
*Engineering maps:* power density, coverage maps, population density, terrain shadowing.  
*LPTV interference studies.*  
Circle (710)

**Giant Boom Box Industries 4116**  
*Mobile studios:* oversized replicas for promotional programs; Giant Money

Machine, Giant Juke Box.  
Circle (801)

**Mobile-Cam Products 5352**  
*Modular One:* modular news truck; 4-wheel drive cab and chassis.  
*Production One:* 4-camera production vehicle.  
*Mobile-Cam Four:* Surburban-based news truck.  
Circle (950)

**Shook Electronics USA A100**  
*Model 48-63-102:* network production trailer for sports; 48-foot length.  
*Model 25-34:* mobile TV production vehicle; 25-foot length.  
Circle (1088)

**Sure Shot Satellite Network 8112**  
*Sure Shot I:* production truck and uplink service; 48-foot vehicle; 5 cameras, 4 VTRs, complete production capabilities; C-/Ku-band uplink; five units available.  
Circle (1129)

## Support Products

### S8: Programming

- Music, effects
- Services

**Associated Production Music 6438**  
*Briton Gold Classics:* recorded library of familiar classics.  
*Coombe library:* re-recorded hit songs.  
*Sound FX:* 40 digitally recorded CDs; sound effects series.  
Circle (559)

**CASCOM 1206**  
*Select Effects Vol. VII:* 200 special graphics elements; use as-is or enhance with paint systems; part of a library of more than 2,000 animated elements for video production.  
Circle (642)

**Cycle-Sat/Winnebago Industries 3428**  
*Satellite relay:* services include automated downloading of advertising and program materials during typical off-air time.  
Circle (706)

**RRN Inc 9034**  
*Year of Great Promotions:* by Mike McDaniel; how to plan, execute promotional events.  
Circle (1064)

**Sound Ideas 5011**  
*Sound Libraries:* three series of material; sound effects, production music, sampler.  
Circle (1108)

**27th Dimension Inc 6817**  
*Library additions:* Christmas music and non-seasonal material.  
Circle (1193)

**Valentino Production Music 5400**  
*Music library:* 42 production music discs; CD format.  
*Sound effects library:* CD format with 30 production sound effects discs.  
Circle (1207)



A PREVIEW PERFORMANCE

YOU ARE CORDIALLY INVITED  
TO ATTEND THE UNVEILING  
OF THE NEWEST ADDITIONS  
TO OUR LINE OF INTERCOM  
AND AUDIO SYSTEMS

BOOTH 5322

N.A.B. CONVENTION

ATLANTA, GA.

MARCH 31 - APRIL 3, 1990

**McCurdy**

**McCURDY RADIO INDUSTRIES**

LEADERS IN: INTERCOMS, CONSOLES,  
AUTOMATION SYSTEMS, AND AUDIO PRODUCTS



# PEOPLE WHO KNOW ROUTING SWITCHERS, CALL US FIRST.

FIRST - 20 MHz solid state video switching system (NASA), 1963  
FIRST - 360 x 800 20 MHz switching system —world's largest (JPL), 1964  
FIRST - 30 MHz bandwidth switching system (USAF), 1965  
FIRST - 30 MHz equalizers for up to 200 feet of coaxial cable, 1967  
FIRST - 90 MHz video matrix (Satellite Tracking Center), 1969  
FIRST - 42 MHz bandwidth switching system (USAF), 1969  
FIRST - Use of laser-trimmed hybrid video circuits, 1978  
FIRST - Switching of high res computer generated graphics, 1980  
FIRST - 120 MHz switching system, 1987  
FIRST - 135 MHz switching system, 1987  
FIRST - 150 MHz video DA's, 1988  
FIRST - 40 MHz 2 RU V/A router, 1989

It only makes sense. When you want the most advanced routing and distribution systems, you come to the people who've set the standards. The people of DYNAIR.

Just consider what the list above means for you. Because while it details our technical milestones, there's another message coming through. One of experience. And reliability. Proven reliability. Like the DYNAIR switcher at NASA's Jet Propulsion Laboratory. It's been in continuous use since its installation—26 years ago.

26 years. Isn't that the kind of dependability you need when your job counts on it?

For reliable system routing and coax/fiber connectivity. For needs ranging from CCTV to high resolution graphics. For performance that's designed in, not tweaked in, dial 800-854-2831. We'll send you information on our full line of routing switchers and distribution systems. And you'll see why for 32 years, people have called DYNAIR. First.



**DYNAIR**

*Call us first. 800-854-2831*

Circle (165) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)

See us at NAB Booth #5122



# Video Products

## V1: Cameras

- ENG, EFP, studio
- Tubes, CCDs
- Lens, filters, matte boxes
- Pan/tilt heads, tripods
- Pedestals, automation

### Ampex Corporation 2200

*Betacam production system:* HR studio CCD cameras; Betacam SP camcorders, studio recorders/players; ACE editor, ADO effects, AVC Vista switcher.  
Circle (539)

### Angenieux Corporation 6112

*Zoom lens:* for studio applications.  
Circle (544)

### Bencher 3105

*Model 900-30 Copymate II:* copy stand; light arms attach at rear of baseboard leaving copy area clear; 3200°K quartz lighting; optional safety glass, polarizers, light control.  
Circle (595)

### Brabury Porta-Pattern/BPI 2518

*# 001-50, 001-51:* concentric and radial resolution charts for CCD type cameras; in illuminator transparency, 18x24 DuraChart and 9x12 field operation forms.  
Circle (604)

### BTS 5808

*LDK 391:* frame-transfer CCD camcorder; Betacam SP VCR; FT-5 BTS chips for 700TVL resolution; highly portable; high sensitivity, resistance to smear; 1/2" format.  
Circle (628)

### BURLE INDUSTRIES 5024

*Saticons:* mixed-field types.  
*Harpicons:* HDTV camera tubes.  
Circle (630)

### Canon USA/Broadcast Optics 3134

*J55x9BIE:* field production lens; 9-500mm focal length; f/1.4 ramps to f/2.8; macro focus within millimeters of front glass; 1.5x, 2x extenders; external LED indicators of zoom, iris, extender.  
Circle (639)

### Century Precision Optics 3808

*0.6x wide-angle adapter:* for S-VHS, Hi8 industrial camcorders; converts zoom lens to super-wide fixed focal length; increases field coverage by 40%, no light loss.  
Circle (652)

### Cinema Products 2124

*EFP Steadicam:* lightweight camera support for 15-23lb cameras, EFP/ENG applications; retains standard Steadicam features.  
*Steadicam/JR:* for personal 8mm and VHS-C camcorders.  
*J-7 zoom control:* fingertip control with Steadicam EFP.  
*WRC-4:* 4-channel wireless control for focus, iris, zoom lens.  
*CP amplifier:* for Heden lens motors.  
Circle (659)

### EEV 6310

*XQ1410/06:* 30mm Leddicon camera tube; variable light bias improves picture quality, reduces picture smear, extends tube life.  
Circle (749)

### FGV Panther 6822

*Lightweight dolly:* platform design for Panther accessories; runs on floor and straight or curved track.  
*Motorized column:* for mini-Panther dolly; in-shot vertical movement from stable motor control.  
Circle (774)

### FOR-A 3522

*SA-1010:* HDTV precision analysis camera.  
Circle (784)

### Future Productions 3201

*MCU-400, PS-400:* 4-camera CCU; supports Ikegami HL-79/-95, ITC-730, Sony BVP-3, -30, -5, 50 and others; power for four cameras, each on 300 foot cable.  
Circle (790)

### Geocam 9035

*4/4.2-OB:* matte box; direct-mount to ENG lenses; carbon-fibre material.  
*GeoFX:* light weight 4x4 camera filters; optically clear resin in carbon-fibre frame.  
*GeoFocus:* follow-focus system; balanced movement adapts to any lens diameter; for ENG, film lenses.  
Circle (799)

### Hoodman 6628

*HVF37:* view finder hood; cuts glare for camera operator during outdoor operation.  
Circle (826)

### Innovative TV Equipment/ITE 5714

*T/H series:* ENG tripod/head combinations; T/H-400, low cost; T/H 500, compact unit; T/H 600, top quality.  
Circle (846)

### JVC 3116

*Cameras:* 3 FIT CCD system; 3 IT CCD system.  
*TK-1070U:* RGB frame-capture camera.  
*Triaxial* control system.  
*S-VHS-C* ENG system.  
Circle (868)

### Karl Heitz 5916

*340B3-480:* InterPro Studex Ball 3.  
*410B4-480:* Pro Studex giant ball 4.  
*505B4-480:* Tele Studex compact ball 4.  
*Models 380, 580, 680:* Gitzo fluid heads; adjustable drag for fluid motion of leveling balls.  
*Gitzo Pro 240, 245:* reporter tripods.  
*Models 583, 290:* offset bracket and intermediate bracket; simplifies camera mounting when lens, camera grips or other attachments cause interference to normal mounting.  
Circle (874)

### Miller Fluid Heads (USA) Inc 6204

*Model 155:* Miller 30 series II fluid head.  
*Model 160:* Miller 50 series II fluid head.  
Circle (947)

### Nikon Photo/Electronic Imaging 6512

*S19x8:* ENG/EFP lens; 2x extender.  
*S9x5.5:* ENG/EFP lens; 2x extender.  
*1500C:* high definition camera.  
Circle (975)

### O'Connor Engineering Lab 5930

*Ultimate 10-30:* fluid head; for cameras to 30lb; fully adjustable counterbalances, 90° tilt; smooth fluid drag performance.  
Circle (983)

### Panasonic Industrial/Broadcast 2534

*AQ-11:* portable 3-IT CCD chip camera; digital signal processing; 400,000 pixel array for 750-line resolution.  
*Prototypes:* digital camcorder and studio camera.  
Circle (999)

### Philips Components 5512

*XQ3550, XQ3555:* HDTV Plumbicon tubes.  
*XQ3477:* Plumbicon tube; ultra miniature size; all electrostatic design.  
Circle (1008)

### Quickset 5048

*QYTH-B #4-20080-4:* tripod with cam-fluid head; adjustable spreader; load capacity to 40 pounds; ±45° tilt angle; black finish; *QYTH-S 4-20090-3* has a silver finish.  
Circle (1034)

### Schneider Corp of America 5616

*Demonstrations:* B+W series color filters for color correction, compensation; series includes over 100 types in screw-in, drop-in, square, rectangular forms; also special-effects attachments.  
Circle (1077)

### Schwem Technology 3153

*GX-3 "ENG":* hand-held model of GX-3 series; integrated camera with stabilizing lens; CCD pickup for 430TVL; 6x zoom, f/1.2; stabilization 87% at 1Hz, 98% at 10Hz.  
Circle (1078)

### Sony Communications/Broadcast 5130

*HDC-300:* HDTV camera conforming to SMPTE 240M; 181b unit uses three ES focus/deflection Saticons for f/4.5 at 2,000 lx, 1,000-line resolution; emulations for ease of use by film camera operators.  
*Production models:* BVP-70, EFP camera with HAD CCD devices; BVP-270, -370.  
*One-piece* camcorder.  
Circle (1103)

### Tamron Industries 3050

*Video conversion lens kit:* 1.5x tele, 0.75x wide converters; expand typical 6x zoom on 8mm camcorders to 8-99mm.  
Circle (1141)

### Television Equipment Associates 5501

*Model 150:* miniature CCD color camera; system includes cover and camera units.  
Circle (1164)

### Thomson Video Equipement 5920

*PROSCAN camera:* production models of EDTV/HDTV camera; studio/OB system based on non-interlaced scanning; enlarged bandwidth with 16:9 aspect ratio.  
*TTV 1542:* CCD studio/OB camera; mechanically similar to 1530/1532 series; 2/3" CCDs with low fixed-pattern noise; dynamic lens correction.  
Circle (1178)

### Tiffen Mfg 1916

*New filter series:* including *Star*, *Contrast* and *Black Pro-Mist* filters.  
Circle (1180)

### Vinten Broadcast 1452

*Microswift series:* remote camera control systems; pedestals with pan/tilt heads with full remote control capability.  
*OSPREY:* portable, pneumatic pedestal; for studio, field.  
*Servo height pedestal:* with steering ring for



manual lift, steering; addition to Microswif line.  
Circle (1235)

**Zaxcom Video** 6543  
*IR10*: infrared viewing adapter.  
Circle (1261)

## Video Products

### V2: Recording

- Analog, digital
- Tape, disk
- Editing, animation
- Time code equipment

**Adams-Smith** 6808  
*Zeta-Three B*: reduced cost A/V/Midi synchronizer.  
Circle (510)

**Adrienne Electronics** 8059  
*AEC-BOX-1*: LTC to RS-232/RS-422 converter.  
*PC-VITC/RGI*: VITC reader, enhanced generator board, for IBM PCs.  
*AEC-BOX-19*: Ampex-to-Sony VTR serial protocol converter.  
*AEC-BOX-14*: VITC-to-LTC translator.  
Circle (513)

**ADx Systems** 7119  
*ADx-03*: VITC, LTC reader, generator, analyzer system.  
Circle (516)

**A.F. Associates** 1756  
*DIVA*: electronic animation system.  
Circle (502)

**Alpha Video & Electronics/AVEC** 3111  
*CVR-22ESX*: modification to Betacam SP for TBC, T/C and machine control.  
Circle (531)

**Ampex Corporation** 2200  
*ACE Micro V3.7*, *ACE 200 V8.7*: interfaces to GVG 200 switcher, AMX-170 audio mixer, Sony DVR-10, Panasonic M-II; upload, download control of AVC Vista switcher panel memory; TurboTrace.  
*VPR-300 update*: new software package upgrade available for existing systems.  
*ACE 25 V3.0 software*: expanded file input/output control; source/record VTR swap, sync roll, new interfaces.  
*ACE MIF*: serial/parallel interface box; permits control of Sony Type 5 VTRs, numerous parallel control audio transports.  
*ESS 5 networking*: permits user to record, browse on other system ESS 5s.  
*VPR-200, -250, 350*: D-2 VTRs; -200 accepts all three D-2 cassette sizes; -250/350 accept small, medium sizes; -200 series optimized for broadcast applications; -300 series targeted for post use.  
Circle (539)

**Amtel Systems** 6008  
*E-PIX*: hybrid, non-linear editing system; control for 16 transports; complete production logging; 10-input switcher, 8-input audio mixer; film conform; compatible EDL; by Evertz  
Circle (542)

**ASACA ShibaSoku** 5152  
*Model TM056A6*: HDTV, NTSC video memory system.  
Circle (557)

**Avitel Electronics** 3006  
*TPR 1040*: time code processor; 24, 25, 30, 30-drop frame formats; reads, generates sync/non-sync codes; accepts LTC, VITC, parallel, RS-232, bi-phase, sine/square wave signals; 2-input, 2-output.  
Circle (579)

**Bowen Broadcast Service** 3008  
*Canoe guide post, lower tape guide, post*: for RCA TCR-100 player, recorder; construction from super hard metal or coating.  
Circle (607)

**Broadcast Electronic Services** 8047  
*BETABOX*: converts between Betacam, M-II, U-matic for editing system.  
*GPI Network 410*: expands editor with four GPI pulses trigger 10 devices.  
Circle (614)

**Canon USA/Broadcast Optics** 3134  
*HDTV-CDDR*: prototype HDTV-compatible cassette data recorder; Canon technology for picture coding, error correction, high-density recording.  
Circle (639)

**CEL Electronics** 1212  
*P167*: video still store system.  
*P159*: ERIC Plus editing controller.  
Circle (648)

**Cipher Digital** 1800  
*CDI-1000*: VITC time code reader, translator.  
*CDI-1200*: TC reader, character inserter.  
*CDI-1400*: time code generator system.  
*Model 4815 Phantom II*: VTR emulator; protocol conversion, TC functions, synchronizer; links parallel audio, video transports to Ampex, CMX, Sony editors.  
Circle (661)

**CMX/Chyron** 1834  
*CMX OMNI*: large-scale, linear video editor.  
*CMX 300 upgrade*: 3-machine off-line, on-line; Slo-mo control; Fit/Fill calculates speed change to compress or expand material to fit available time slot; audio split; match-cut calculation.  
*CMX 3600B upgrade*: large-scale editing system; Swap, Hard disk and Bins features.  
*CMX 3100B upgrade*: multiple configuration files and Bins features.  
Circle (666)

**Comprehensive Video Supply** 1660  
*LOG MASTER*: software with TC reader board; log film, video footage; search for scenes; generate best take list or CMX compatible EDL; CVNET hardware interface for VTR control.  
Circle (678)

**Convergence** 1734  
*Enhancements*: for ECS series edit controllers and peripherals.  
Circle (696)

### AMPLIFIERS AND CONTROL PREAMPLIFIERS DEDICATED TO THE BROADCAST AND VIDEO PRODUCTION INDUSTRIES



Bryston BP-5 preamplifier

Bryston approaches the broadcast and video production industry requirements for high quality, musically accurate, and reliable power amplifiers and control preamplifiers with the same integrity and commitment to excellence that has earned Bryston its leading position in the Canadian power amplifier industry for the past 15 years.

Whether your requirements are for 50 watts, 800 watts, or anything in between Bryston amplifiers can satisfy your every power need. Standard features include such things as dual power supplies, completely independent stereo channels, balanced XLR connectors, clipping indicators, gain controls, rack mounting, and bridgeable switching.

When a highly versatile and reliable control preamplifier is needed, then the Bryston BP-1, BP-4 or BP-5 provides all the flexibility required by the professional broadcast and video production industries.



Bryston 2B-LP power amplifier.  
Other models include Bryston 3B, 4B and 6B with output range from 50 to 800 watts.

Features include such things as balanced XLR connector, cartridge load adjustment, high overload threshold, 1 space rack mount and fully discrete gain blocks. For further information contact:



Bryston Marketing Ltd.  
Tel: (416) 746-0300 Fax: (416) 746-0308  
Brystonvermont Ltd. Tel: 1-800-673-7899

Circle (134) on Reply Card



# TAKE IT ON THE ROAD. SEE WHAT IT WILL DO.

Shok-Stop™ cases are tough. Hit the road with them once, and you'll know exactly what we're talking about.

Built like no other, Shok-Stop cases can take a beating that would turn other cases into so much scrap metal and sawdust. The Shok-Stop's rugged high density polyethylene shell, with its unique ribbed design, absorbs virtually all impact shock. The little remaining vibration reaching the interior is instantly overcome by the high density custom fitted foam. And, your very valuable extremely sensitive broadcast equipment is left totally unharmed.

Shok-Stop cases are water tight, scuff resistant and are the only field repairable

cases on the market today. They can be ordered with optional EMI/RFI shielding and pressure release valves.

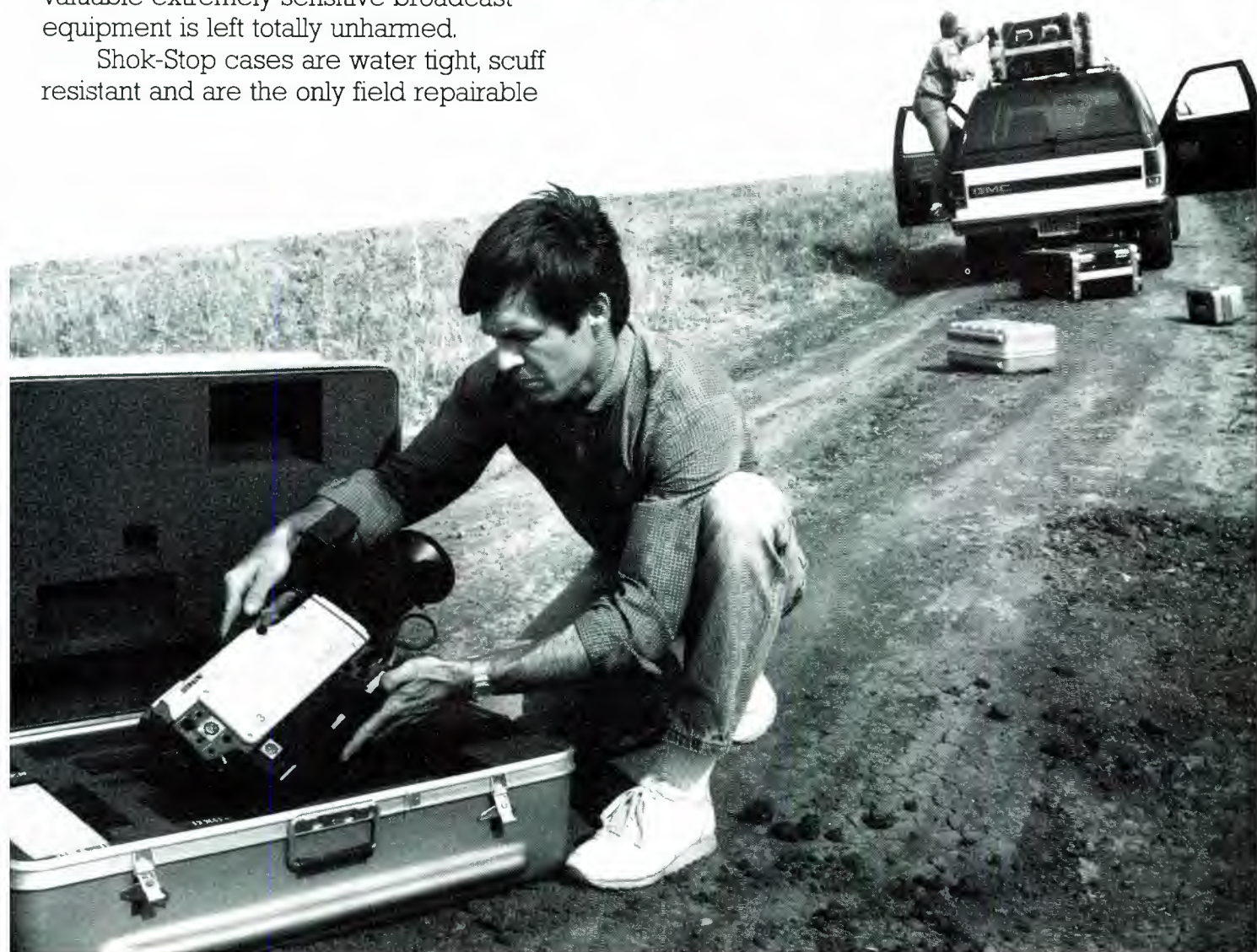
So, the next time you hit the road for one of those knock down drag-out sessions, remember to pack it all in the toughest transit cases made. The Shok-Stop from Thermodyne.



**T THERMODYNE  
INTERNATIONAL LTD**

20850 Alameda Street, Long Beach, CA 90810  
(213) 603-1976 • FAX (213) 603-1929

Call me, I'm interested. Circle (166) on reply card.  
Send literature. Circle (167) on reply card.





**Digital Services/DSC** 1834  
*DiSC production models:* digital disc recorder system; software update with shuttle, variable speed play; record protect, CMX/VPR-6 interface; 1-frame record, automation, mark-in/out.  
 Circle (730)

**Dwight Cavendish** 3804  
*CM7000:* computer-based auto quality control station; tests finished cassettes electronically; failure documentation.  
*CS811 automated VCR:* alternative to mechanical cassette changer.  
 Circle (738)

**Evertz Microsystems** 6444  
*Model 7100:* enhanced emulator ATR interface; supports automatic track arming for some ATRs.  
*Model 7200:* enhanced e<sup>2</sup> VCR interface for Sony Type 5, Ampex VPR 2, Fostex R-DAT.  
*Model 4015:* LTC/VITC generator; for video post of material originated on film.  
*Model 627:* LTC/VITC reader; serial I/O, optional character inserter.  
*LTC system:* low cost TC generator, reader, character inserter unit.  
 Circle (768)

**Fast Forward Video** 3143  
*F-22:* SMPTE/EBU TC generator, reader, character inserter; RS-422, MIDI interfacing.

*Remote Module:* SMPTE/EBU time code RS-422 edit controller interface.  
 Circle (772)

**Future Productions** 3201  
*FP series:* duplicators; three models for 80-100, 200-500, 1,000 or more VCR transports.  
*QC station:* operates 80-to-100 VCRs.  
 Circle (790)

**GDI/Generic Designs** 3026  
*GD422:* serial to parallel interface.  
*GD500:* VITC to LTC translator.  
 Circle (793)

**Grunder & Associates** 1212  
*CEL P159 ERIC Plus:* editing control system.  
*CEL P167:* video still store.  
 Circle (810)

**Hotronic** 2935  
*AL82:* solid-state frame recorder; 5.6 second time delay for audio, video, profanity delay; full bandwidth video, 16-bit digital stereo audio, 20Hz-20kHz.  
 Circle (828)

**Innovision Optics** 9032  
*Mini Motion Tables:* portable animation motion control tables; joystick controllers; for location production.  
 Circle (847)

**Interactive Motion Control/IMC** 1308  
*Model 3025H:* hand-held controller; operates with #3025 remote control head; back-lighted LCD 4-line×20-character display, 32-key keyboard, 20 user-defined functions, encoded jogging knob; provides full control of animation system.  
 Circle (855)

**JVC** 3116  
*S-VHS duplicator.*  
*BR-S411U:* dockable, portable VCR; S-VHS format; operates with any JVC CCD camcorder; integrated adapter for use as editing feeder transport; interface to RM-G410U editing controller.  
*SA-F911U:* interface with TC reader, generator; S-VHS and M-II compatible.  
*BR-S811U:* full feature S-VHS edit recorder.  
*BR-S611U:* S-VHS video recorder, optional SA-T411U TBC.  
 Circle (868)

**Leitch Video** 3516  
*Still File enhancements:* networking option 3100NW; software upgrade with Bernoulli read/write optical storage; D-2 frame buffer with composite, D-2 I/O.  
 Circle (895)

**M&R Data Services** 8101  
*ENSEMBLE:* PC-based A/B-roll editing controller system.

# Betacam® With Triax Control

Live broadcasting with ENG cameras began with Telemetrics control systems.

Controls • Video • Audio • Genlock • Power  
 Telemetrics—for over 20 years the innovators of camera control multiplexing systems.



**Telemetrics Inc.**

7 Valley St. Hawthorne, N.J. 07506  
 For Information Call (201) 423-0347

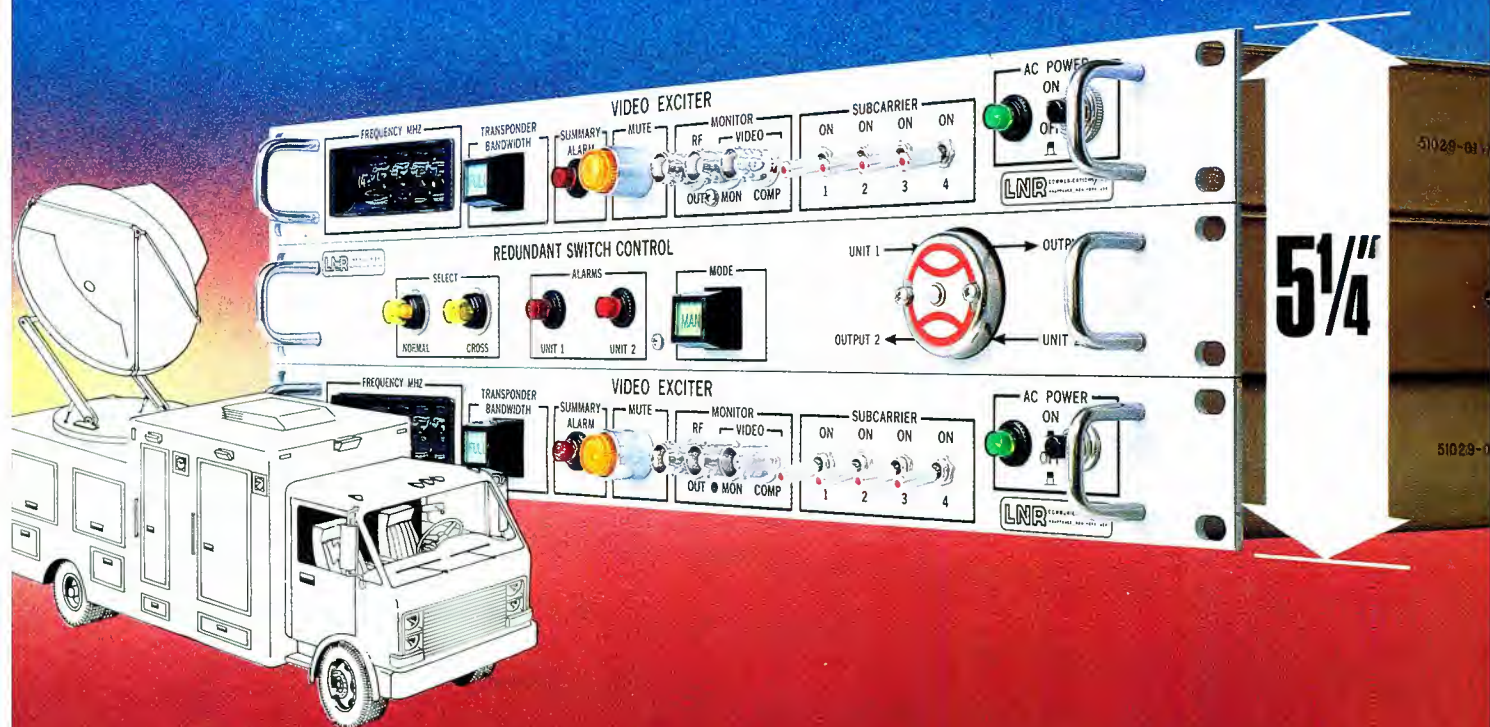
\*Ask for info on Pan/Tilt Systems.

© 1988 Telemetrics Inc. Betacam is a registered trademark of Sony Corporation

Circle (122) on Reply Card



# TWO for the Road.



**Now, LNR puts two Video Exciters and a Switch in the space of one Exciter for your SNV.**

That's right! LNR's new Video Exciter is only 1 3/4" high. Together with an automatic redundancy switch and a backup Video Exciter, the entire package fits into a 5 1/2" slot. So you can eliminate worry about down time—even uplink two simultaneous video signals if you wish.

LNR hasn't sacrificed quality in bringing you a compact video exciter. The model LVE-14 uses a highly integrated Ku-Band RF section, together with proven, reliable video circuitry to provide RS250B performance. And, for the first time, you can go from full to half transponder operation at the press of a button.

Here are a few of the special features of the new LVE-14 Video Exciter:

- Reduced size and weight
- Up to 4 synthesized audio subcarriers
- Full or half transponder operation
- High power output: 0 dBm standard, +6 dBm optional
- Compatibility with all video standards and scrambling techniques
- Optional PTT and MCPC voice channels
- 6 GHz version also available.

A new low package price is now available. For information on the LVE-14 or other new LNR slimline products for compact mobile applications, call LNR marketing today, or write for detailed literature.

**See us at the BAF booth Mobile Unit**

**LNR**

**AT THE FOREFRONT OF TELECOMMUNICATIONS TECHNOLOGY**

COMMUNICATIONS INC. 180 Marcus Blvd., Hauppauge, N.Y. 11788 • Tel: (516) 273-7111 • Telex: 221620 • FAX: (516) 273-7119

Circle (168) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



**ENSEMBLE PLUS:** enhanced and expanded upgrade for editing system.

**Video Manager:** real-time video enhancement for Symphony, Ensemble edit systems.

Circle (915)

**Otari 4352**

**TMD T-700 MK-II:** modular videotape duplicator system; forced, filtered air, digitally controlled reference levels; auto copy tape cutting; central air, water, power hookup.

Circle (994)

**Paltex 1734**

**Enhancements:** for Paltex E-series editing controller systems and peripherals.

Circle (998)

**Panasonic Industrial/Broadcast 2534**

**AU-63:** cost-effective MII player; includes autotracking feature.

**AU-410:** portable MII VTR.

**1/2 digital:** engineering models; composite D-2 format VTR; 6MHz bandwidth, 54dB S/N; full-featured studio recorder slides into same housing as M-II VTRs.

**Erasable** optical disk recorder.

Circle (999)

**Quanta Editing Systems/Dynatech 6030**

**CE-75:** expandable 3-VTR editor control; simplified keyboard design.

Circle (1031)

**Sony Communications/Broadcast 5130**

**HDD/HDDP-1000:** HDTV digital VTR; per SMPTE 240M; 1.18Gbit data rate; 30MHz luminance, 15MHz chroma for 1000-line resolution; 56dB S/N; 8-channel DASH audio format at 48kHz/16-bit sampling.

**Production models:** DVR-2, DVR-18 D-2 VTRs. **Enhanced** D-1, D-2 video recorders.

**Betacam SP:** additional equipment.

**BZE-9001/02:** version 02 editing system software enhancements.

**BKE-series:** BVE-910 accessories; serial, parallel switcher, mixer interfacing.

**EVV-9000:** dockable Hi8 VCR; shown with DXC-325 3-chip camera.

**BVE-910 editor:** low-cost, 2-VTR, cuts-only; expands to four VTRs with video switcher, audio mixer, preview switching control.

Circle (1103)

**Spaceward Systems 7022**

**Showcase:** presentation still-store.

Circle (1113)

**TEAC 3352**

**LV-220P:** recordable videodisc player; access to 108,000 stills or continuous play of a 1-hour program.

Circle (1149)

**TimeLine 4345**

**Lynx SSL Data Interface:** links SSL studio computer directly to ATRs, VTRs, film.

**Lynx KCU:** keyboard control unit; programmable to control six transports through timecode modules.

**System supervisor:** communications network for transport control from console computers, editors, computer terminals.

Circle (1181)

**United Media 2826**

**UMI 500, UMI 600:** multitasking standard keyboard videotape editors; direct serial con-

trol of 4, 6 transports; uses standard rather than dedicated key layout; amber monitor; switcher control, full EDL.

Circle (1200)

**Videomedia SED 1434**

**VLC-3:** multiprocessor cuts, A/B roll editor; 240 event non-volatile memory; upgrade to Mickey or VLC-32 systems; V-LAN universal control network.

Circle (1231)

**VTE HDTV**

**DVSR 100:** digital video silicon recorder sequencing system; internal bus structure provides simultaneous recording, display with different TV rasters; 312 MB/sec data rates; 1.8Gbyte RAM.

Circle (1238)

## Video Products

### V3: Film, cine

**Cinema Products 2124**

**SteadyMag:** extended throat magazine for Arri 2C, 3C cameras used with Steadicam.

**CP Keycode reader:** Rank Cintel accessory; transfers film frame ID data to video for recording.

**CP Workprint Logger:** automatic, accurate workprint logging; operates with CP Keycode reader.

Circle (659)

**Eastman Kodak 1905**

**HDTV telecine:** demos of film-to-tape transfer with alternate HDTV technology.

**EXR media:** enhanced motion picture films.

Circle (744)

**Merlin Snell & Wilcox 1041, 2100**

**DEFT:** digital electronic film transfer, standards conversion produces PAL copies from NTSC material originated on film; overcomes 3/2 pull-down telecine systems for reduced image blur and judder.

Circle (939)

**Nikon Photo/Electronic Imaging 6512**

**LS-3500:** film scanner.

Circle (975)

**Nytone Electronics 3054**

**Video slide scanner:** 35mm slide format; 80-slide trays for standard, glass slides; Pan, Zoom, 360° roll, 180° flips; joystick for pans, width, height; programmable, 250-steps.

Circle (982)

**Rangertone Research 1952**

**Multi-Track Magnetics**

**HS1635:** combination 16mm/35mm studio projector; high speed operation.

**HP1635:** telecine transfer system; combination 16mm/35mm operation.

Circle (1045)

**Rank Cintel 3156**

**URSA:** digitally-controlled flying spot scanning telecine; digital color channels; post production special effects; 4:2:2 sampling; X-Y zoom, pan; rotation, perspective; 5-track ball control system.

**Mk 3 Turbo:** modified 4:2:2 telecine.

Circle (1046)

**Snell & Wilcox 1041, 2100**

**DEFT:** digital electronic film transfer, standards conversion for PAL copies from NTSC material originated on film; overcomes 3/2

pull-down telecine systems for reduced image blur and judder.

Circle (1098)

**Steenbeck 6408**

**ST-7230:** magnetic film recorder; three independent film transports for 16mm, 17.5mm, 35mm film formats.

**ST-7320:** 35mm film scanner; 24-face holo-scope with JVC 3-CCD camera.

Circle (1123)

## Video Products

### V4: Batteries, lighting

- Chargers, analyzers

- Lamps, gels

**Alexander Batteries 5155**

**Beta Battery Optimizer:** one unit combines charger, discharger, analyzer, conditioner.

Circle (524)

**Apollo Lighting/Audio-Visual 3800**

**Lamps:** expanded line with SSTV, floods, spots; dichroic materials, gobos.

Circle (551)

**Christie Electric 1419**

**CASP/1200:** universal battery support system; rejuvenation, charging, analysis; computer interface to list battery condition.

Circle (656)

**Cinemills 1546**

**Silver Bullet:** HMI flicker-free lighting equipment; 1.2kW PAR; 1.2kW, 2.5kW axial design; 6kW, 12kW, 18kW Super.

Circle (660)

**Comprehensive Video Supply 1660**

**Lighting equipment:** camcorder lights, kits; Softouch Deuce with light stand; portable Fresnel kits.

**MAGNUM Logic series:** NiCad batteries; Lifesaver charger; Camchargers; surge protection.

Circle (678)

**FGV Panther 6822**

**FLIB 575:** HMI luminaire; ultra compact unit.

Circle (774)

**Frezzolini Electronics/PAG 2834**

**#9754:** advanced 4-channel charger; supports NP-1 and other batteries.

**#9704:** 8-channel battery charger, management system.

**BP-143:** Frezzi On-Board high energy pak.

**MFK-90:** professional mini-fill lighting kit.

Circle (787)

**Great American Market 5300**

**#1102 Fog machine:** heavy-duty unit; variable high volume, continuous delivery; local, remote, manual/autocycle control.

**GAMCOLOR series:** additional colors of color filter line.

**#4540 PANACHE:** memory lighting console; 250-channel; big board features.

**#4580 EASY RIDER:** ACCESS system companion; playback-only device for long continuous repetitive control needs.

**#4200:** ColorQuick rolling color changer; analog, digital dual switchable input; 110V/220V; auto pushbutton loading; variable quantity of colors.

**Lighting patterns:** including ShadowPlay 4.

**Access Pro:** lighting console; expanded with 24 overlapping pile-on Scenemasters, flash



# The Most Innovative Aural Program Links Available Today



## Features

- Frequency Agile
- Excellent Selectivity
- Switchable Monaural/Composite Operation
- Comprehensive Metering
- Built-in Receiver Transfer Circuitry

## Specifications

- 145 MHz to 1.9 GHz
- 76 dB SNR
- 100-500 KHz Channel Spacing
- 126 dB System Gain
- 0.1 dB Response

**The Moseley PCL 6020 and PCL 6030** blend technology and innovation to offer the world's first truly user-programmable transparent aural program link.

## Totally Transparent

The system specifications are the tightest in the industry with better than 76 dB Signal to Noise Ratio (SNR), 0.1 dB frequency response and 0.1% distortion for a transparent, high quality sound.

## True World Product

Both the Transmitter and Receiver are fully synthesized with up to 40 channels per link and available in all frequencies from 145 MHz to 1.9 GHz. Each unit can be operated in either monaural or stereo mode with channel bandwidth from 100 to 500 KHz.

## User-Programmable

Frequency, channel bandwidths, monaural or stereophonic operation are all user-programmable in the field eliminating costly factory/testbench realignment.

## Moseley Experience and Support

Moseley has over 30 years of experience in over 120 countries worldwide and has engineered numerous national and international program networks. All Moseley products carry a standard *2 year warranty (extended warranty is available for up to five years)*. You can put your trust in a company that has a worldwide reputation for customer support and technological leadership.

# Moseley



**The Trusted Name in Communications**

Moseley  
Associates  
Incorporated

111 Castilian Drive  
Santa Barbara, CA USA  
93117-3093

a  
Flow General  
Company

Phone 805 968 962  
Telex 658448  
FAX: 805 685 9638

Circle (169) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



buttons; 4-bank memory, 96 assignable memories, programmable labels; 96 control channels, 256 dimmers.  
Circle (809)

**Innovision Optics 9032**  
*Dedocool*: portable lighting; high-intensity units for use with specialty lens systems.  
Circle (847)

**Lee Colortran 5452**  
602-100, -102: STATUS 12/24, 24/48 control consoles.  
602-001: Scene Master 60 Plus console.  
602-030: Prestige 2000 Plus control console.  
196-001: ENR 96-dimmer rack; freestanding.  
LEC 2001: ENR 24-dimmer, wall-mount rack.  
600-106: ENR pack; portable 12-pack, 20A or 50A ratings.  
600-902: ENR universal control module.  
Circle (894)

**Lighting Methods 3445**  
*Acclaim series*: lighting consoles; -100 2-scene preset; -200 2-scene preset with memory; -300 2-scene preset, memory, patching.  
Circle (900)

**LTM Corp of America 2608**  
*Cinepar light*: 2.5kW unit.  
Circle (910)

**Osram/Siemens 6518**  
*Metal halide lamps*: HM010, 123W; HM035, 250W/SE; HM040, 400W/SE; HM086, 1.2kW/SE; HM116, 2.5kW/SE.  
Circle (993)

**Paco Electronics USA 6726**  
*DP NiCad series*: ENG camera, VTR batteries; high power cells for increased battery life; -10 12V, 1.9Ah; -11 3.2V, 1.9Ah; 1240 12V, 4.4Ah; 1340 13.2V, 4.4Ah.  
Circle (997)

**Perrott Engineering Labs 2939**  
*Mini Lite II*: dual portable light unit; two 75W lamps may be operated individually or simultaneously; metal construction; 2 lb.  
*Pouch Pak*: belt-mounted pouch for BP90 battery.  
Circle (1006)

**Rosco Laboratories 1808**  
*Super Blue video paint*: high blue content for Ultimatte compositing when shooting film with sufficient separation in blue, green without saturation of blue layer of negative; reduces noise.  
Circle (1060)

**Sachtler 1610**  
*Production 575D*: lightweight, 2-sided HMI burns; oval-shaped, reduce volume, weight.  
*Production 1200D*: location, studio open-faced HMI flood; wide focus range 1:5.  
Circle (1067)

**Teatronics/Lighting Innovations 2820**  
*Comstar Genesis 6120*: 12kW dimmer pack; dimming performed by SCR-pair modules; input from 208V "Y" 3-phase; 0-10Vdc control via AMX192, DMX512 protocol simultaneously.  
Circle (1150)

**Ushio America 9041**  
*Halogen lamps*: GCA, GCB, GCC for Pro-light, GDA for V-light from Lowel-Light; FKW for

ARRI 300 Fresnel, FRK, FRG for ARRI 650W.  
Circle (1204)

## Video Products

### V5: Digital systems

- Graphics, effects
- Titlers, prompters
- Weather graphics
- Integrated production

**Abekas Video Systems 160W**  
*A53-D enhancements*: added features for digital special effects system.  
Circle (504)

**Accu-Weather 6723**  
*UltraGraphix AniMotion*: demonstrations of animated graphics material.  
*UltraGraphix*: high color resolution weather graphics with satellite, 4-D satellite, Radar-Plus images; 240 is Macintosh-based.  
*Services*: Forecast/Briefing, WeatherShow, WeatherBreak.  
Circle (506)

**Advanced Designs 2021**  
*DOPRAD II enhancement*: Collins Doppler turbulence detection; 8-bit graphics; map builder, time-lapse animation, color mixing.  
*WDDS systems*: weather data displays with time-lapse animation.  
Circle (514)

**Alden Electronics 5153**  
*Color weather radar system*: PC-based graphics system, ingests, stores, displays HR government weather radar data; option to use with weather satellite, charts, text.  
Circle (523)

**Ampex Corporation 2200**  
*ADO 100*: component analog model; Digi-Matte key channel; X/Y/Z rotations; optional perspective 3D effects; integrates with Vista switcher for operation from switcher control panel.  
*ALEX package*: frame-based animation; definable individual paths, trajectories assignable to characters; DAM dynamic attribute manipulation; resizing font editor; integrated drawing package.  
*ADO 100*: component video effects, digital optics capability; 3-axis flips, tumbles, Z-axis spins; 2-D, true variable perspective 3-D, Autocube; DOS disk storage; switcher interface; Digi-Matte keys.  
Circle (539)

**Aston Electronics 1106**  
*Power Station*: paint, draw, slide output, 3D animation; Gouraud and other shadings of solids, outlines; three interactive screens, "instant undo" screen; polyphoto browse; 32-bit, 13.5MHz clock.  
Circle (560)

**Aurora Systems/Chyron Group 1834**  
*AU240*: paint, animation system.  
Circle (573)

**AVS/Audio Visual Systemes 7009**  
*S161 series*: superimpose messages, graphics with video images; NTSC, PAL and SECAM standards; integral or external message storage; LTC/UB data; audio VU-metering; time, symbols, logos per model.  
Circle (581)

**CEL Electronics 1212**  
*MS-851, MS-852*: digital effects units; integrates P164-38XP effects, TBC, framestore with *Maurice touch-screen* controller; integral mixer card combines 2, 3, 4-level picture with various effects.  
*P152B*: Maurice II touch-screen controller; menu-based system for CEL effects equipment; 3-axis joystick control and touch-screen; six serial ports; 3½" floppy storage.  
Circle (648)

**Chyron 1834**  
*Transform*: real-time animation for Super Scribe Graphics.  
*iNFiNiTi*: production models, the Ultimate Graphics, Animation system; options provide paint, 3-D animation, still-store functions; 2-channel titling; compatible with Chyron IV through Font Converter.  
*Scribe Jr.*: compact Scribe; latest software.  
*ACG*: compact charter, graphics generator; latest software.  
Circle (657)

**ColorGraphics Systems/Dynatech 6030**  
*Mosaic*: integrated digital paint, animation, real-time disk recorder system.  
*Morph the Animator*: 2-D animation system.  
Circle (669)

**Comprehensive Video Supply 1660**  
*CUE MASTER*: teleprompter with laptop or desktop computer; stand-alone system; wordprocessing with foreign characters, multiple fonts; hand-held controller, underlining, colors.  
*Primebridge Micro-Series*: includes portable video DA, switcher, keyer, mixer, wiper.  
Circle (678)

**Computer Prompting 3137**  
*CPC-1000*: prompting software for all IBM and compatible laptop computers.  
*CPC-1000N*: software interfaces to any TV newsroom via LAN.  
*CPC-1000D*: nine-pound gas plasma prompter display.  
Circle (683)

**Crosspoint Latch 3308**  
*Picture Mover 6063*: creates push-pull effect.  
Circle (700)

**Cubicomp 6700**  
*Vertigo 3D animation V 9.3*: Silicon Graphic-based workstations; modeling, paint, choreography, render; VideoPak interface for RGB, Beta, NTSC, PAL; D-1, D-2 options; real-time preview; variable aspect ratio rendering; luminance attenuation over distance; supports Bitstream typefaces.  
*IGES Translator*: allows files generated by specific CAD systems to be converted to Vertigo geometry formats to streamline 3D animation and rendering.  
Circle (701)

**Digital Arts 1464**  
*DGS V 3.1*: enhanced graphics system.  
*DGS/386*: graphics system uses native mode of 80386 µP; 80387 math coprocessor;  
Circle (722)

**Digital F/X 5308**  
*Composium enhancement*: removable cartridge disk drive; 40Mbyte unit fits slot in the DF/X 200 chassis; 5¼" cartridges available in preformatted programs; kit includes



*This is the most complicated control you'll find on the new PeopleLink™ telephone system.*

**P**eopleLink translates your every desire into reality. Our new multi-line modular telephone system is no more complicated to operate than a simple tone pad and most functions can be initiated with the touch of a single button. PeopleLink is a powerful multi-purpose system that is absolutely user friendly. It is expandable, allowing you to spec exactly what you need to meet today's requirements

PeopleLink provides the ability to custom program "personalized" applications. A few simple keystrokes and each operator can easily pre-set their preferred applications and quickly access their program from any control surface in the system.

*PeopleLink is human engineering with the emphasis on human.*



*The new PeopleLink integrated telephone system, designed for broadcasters by broadcasters, brings to its uniquely designed control panel every capability and every function you ever wanted.*

with an open-ended design that easily grows with you. The system handles up to 40 lines and works with any KSU.

***The First Fully Personalized Phone System***

Multiple control surfaces may be connected to the system and used in simultaneous independent operation.

***A Variety Of Applications Handled With A Single System.***

PeopleLink makes caller access clean and simple. Touch a single button to take the next call. PeopleLink ends the previous call and puts the new voice on-air. PeopleLink allows multiple callers to be on-air at the same time and,

with the GUEST feature, protects VIP callers from accidental disconnection.

Running contests on-air couldn't be easier. Simply select the number of callers, announce the contest, and punch the CONTEST button. PeopleLink answers the calls, delivers a pre-recorded message and instantly puts the "winner" at your fingertips.

Recording calls is as easy as punching one button. Depress the REC button and PeopleLink sends audio to the recorder and rolls tape. Because PeopleLink includes Gentner's DH-2 Digital Hybrid, you always get the finest audio quality possible.

***How To Get In Touch With A Very Simple Solution.***

We've only touched on the versatility of PeopleLink. To fully grasp its potential, its flexibility and expandability, its ease of installation and operation, just pick up your phone and give us a call. It's that simple.

**GENTNER**

Gentner Electronics Corporation  
1825 Research Way  
Salt Lake City, UT 84119  
(801) 975-7200  
Fax: (801) 977-0087



generic background images.  
Circle (727)

**Dubner Computer Systems 5830**

*Turbo D-1*: paint system supports analog component, D-1 video; input sync reference with auto select of 525/60, 625/50 operation; 68020  $\mu$ P and math coprocessor; uses 4:2:2 sampling format.

*GF-600/TP*: Graphics Factory magnetic tape input/output option; transfers images to, from WaveFront 3-D graphics system; introduces additional features to graphics from both systems.

Circle (736)

**Echolab 6716**

*Tempest-900*: digital effects processor; meets broadcast specifications.

Circle (745)

**Electrohome/Jazz Systems 2850**

*JAZZ*: digital video effects system for professional video producer; production models.

Circle (754)

**Enterprise Electronics Corp./EEC 6047**

*DWSR-90CTV*: Doppler radar for TV uses; complete narrow-beamwidth antenna, pedestal package with radome, transmitter, receiver, control, display console; RGB monitor; NTSC colorizer; high resolution

graphics; multicolor map drawing; full time-lapse capabilities.

*Doppler upgrades*: for WSR-74C or WR-100-2/77 EEC radar systems; 250kW peak; rain-fall intensity; more.

Circle (762)

**FOR-A 3522**

*VTG-33G*: video timer; superimpose month, day, hour, minute, second into video images. *VTW-222S*: S-VHS compatible titler; 32-page memory or 256 lines of text; 14 of 512 colors on screen.

Circle (784)

**Grass Valley Group 5830**

*KURL option*: for Kaleidoscope digital effects; non-linear transformation for page-turn, page-roll, ripple, slits, sphere, position/size modulation; XYZ axis 1-light and multilight modeling.

Circle (807)

**Grunder & Associates 1212**

*CEL P152B*: enhanced touch-screen controller for Maurice II digital effects; joystick, hard key, touch-screen selections of functions.

Circle (810)

**Harris Video Systems 6700**

*Advanced Creation*: enhanced HarrisVws workstation; 2-D Journal Animation; frame animation; capture, store, output linear key frames with associated images; erasable optical disk holds 750 images.

Circle (816)

**Kavouras 1628**

*Wx Data Base*: world-wide weather database and service.

*PC-Weather*: database with interactive 2-way service; PC-based.

*Production models*: RADAC 2100 24-bit color weather radar remote display, NEXRAD compatible; Triton A/P 32-bit weather graphic, animation system.

Circle (875)

**Knox Video/GML Grove 3060**

*K40, K40S*: professional titler; S-VHS outputs; for live or post-production use.

*IMAGR II*: high resolution titler; complex dynamic motion, picture capture, paint; 16 million colors; 4nsec resolution.

Circle (883)

**Laird 2350**

*Model 1480*: model 1450 titling generator with integrated remote disk drive.

*LEGEND-LTL*: Legend series character generator; no disk drive, but fully upgradable.

Circle (885)

**Listec Video 5042**

*A-6000*: prompter software editor.

*A-5000-NET*: LAN-based A-5000 prompter.

*A-5500*: ScrollBox Script Generator with A-2009.

*Field prompter*: 9" fold-away mirror, hood assembly.

Circle (903)

**Lynn Greenberg Electronic 2035**

**Teleprompting**

*Telescroll PC*: prompter system; MS-DOS.

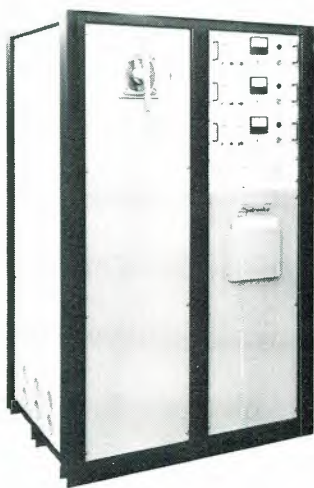
*LG-300*: universal camera prompter display.

*LG-400*: executive speech prompter system.

Circle (912)

## HIGH POWER CONSTANT VOLTAGE CONTROL

For Broadcast Transmission and Production Applications



### The Peschel® Automatic Voltage Regulator

- 99% efficient
- No waveform distortion
- Very low internal impedance
- No phase shift
- No effect on power factor
- Input ranges +9%, -14% or  $\pm 20\%$
- Output accuracy  $\pm 1\%$ , adjustable to  $\pm 5\%$
- Correction rate up to 20V/sec.

*Incorporates the patented Peschel® Variable*

*Transformer and buck/boost transformer technology to electro-mechanically control voltage with higher reliability and at lower cost than SCR or ferroresonant systems.*

**Options:**

- Line drop compensation
- Individual phase control
- Bypass switch
- Special enclosures
- Transient suppression
- Special metering

**Typical Applications:**

- UHF television transmitters
- VHF television transmitters
- MW/SW radio transmitters
- Post-production facilities
- Sound stages - Lighting grids
- FM radio transmitters

See us at NAB Booth #5912-5914



Route 22, P.O. Drawer W  
Millerton, NY 12546  
Tel: 518/789-6464  
Fax: 518/789-4866  
Tlx: 671 6516 / HIPOMIL

Circle (119) on Reply Card



# It's 5:53! Where's Charlie, Jim and Jane?

**There's nothing  
to worry about.**

**AutoCam's™ ACP-8000  
has control.**

Repetitive and boring manual camera control is eliminated. AutoCam's ACP-8000 menu driven touch screen control easily learns and reproduces precisely and consistently all camera shots and floor positions. Now, experienced personnel can accept more challenging and rewarding assignments.

**An example of AutoCam's power:** After the opening Anchor stories on the 6 o'clock news, cameras 1 and 2 are easily relocated to the Weather desk during a 2 minute video. After Weather, cameras 1 and 3 are quickly repositioned to Sports during a 30 second break... then all 3 cameras return to the Anchor desk to close the show. Preset camera shots, floor positioning and cable management are performed easily and automatically with the HS-110P Pan/Tilt head and the SP-200 servo pedestal with X-Y base.

Circle (172) on Reply Card

The proprietary X-Y base guidance system repositions the cameras within an 18 arc second rotational error. As the cameras are moved from position to position, there is zero cumulative error. Its sophisticated locating and collision avoidance system eliminates the need for rails or studio floor grids. If desired, AutoCam's manual control mode can be initiated at any time.

The AutoTrack™ talent tracking option maintains accurate framing of the Anchor even on tight head and shoulder shots. (An essential operating requirement with key shots.)

AutoCam's newsroom computer option gives the news director quick access to all camera resources. Scripted stories with all camera moves are automatically played via the ACP-8000 newsroom computer story list. Last minute changes are executed quickly and smoothly.

*AutoCam can provide you with the most efficient communication link between your director and your on-air product. And, its reliability and sophisticated moves improve your on-air image. Call for a proposal and demonstration... now.*

**NAB Booth 1814, Hall B  
East Exhibit Area**

# TSM

**TOTAL SPECTRUM  
MANUFACTURING INC.**

709 Executive Blvd., Valley Cottage, NY 10939  
914-268-0100 FAX: 914-268-0113

[www.americanradiohistory.com](http://www.americanradiohistory.com)



**Microtime 5740**

3D digital effects: reduced cost video effects; maps live video to 3-D surfaces in single pass; page turns; user-defined hard key control panel; VTR emulation; GPI triggering. Circle (944)

**Pansophic Systems 3140**

Nimble animation: 2-D system uses 80386 CPU, TrueVision Vista graphics board; 32-bit signal processing; 1024x768-pixel resolution; 300Mbyte hard disk capacity; MIDI interface. Circle (1008)

**Pinnacle Systems 2101**

Series 2100 video workstation: enhanced with optional PRIZM effects. Model 3000E: graphic design workstation. Circle (1012)

**Q-TV 2234**

MVP-II: intermediate, light-weight, studio prompter. QCP Mark II: full-scale newsroom prompter; IBM/compatible system. Circle (1027)

**Quanta 6030**

ACM all channel message system: CATV, CCTV equipment; 124 channels with 4 channels/chassis; each channel can key a unique message over program video; switches to alternate programming. Orion Business Graphics: bar, column charts, line, pie graphs; anti-aliased; animation capability for "growing" effects; graph pages fully compatible with standard Orion video pages. Circle (1031)

**Quantel 1134**

Presenter option: for Paintbox V graphics; sequences pictures, builds multiple layered graphics through sequenced cutouts; linear key channel for floating graphics effects. Paintbox V-6: software package; high-speed library browse, real-time cutout manipulation; Headup sequence animation from stylus/tablet. Circle (1032)

**Spaceward Systems 7022**

Titler II: graphic titler system; 3-D imaging capabilities. Rodin: electronic graphics system. Circle (1113)

**Tekskil Industries 3802**

SpeakEasy: speech prompter; invisible to audience. Circle (1154)

**Telescript 1934**

T'POD: off-camera monitor and prompter support device. MPS monitor prompting systems: programs for IBM, compatibles, Commodore C-64. Model E-M: monitor prompting system with Telecue or Telescript transport. Circle (1162)

## Video Products

### V6: Switching

- Master control
- Production

A.C.E 3234  
ARENA C: 13-input production switcher;

four keyers; for component video facilities. Circle (501)

**Abekas Video Systems 160W**

Enhancements: additional features to A84 digital post production switcher. Circle (504)

**ALTA Group 6030**

Pegasus: video switcher; 3-bus architecture; four video levels of keying with multilevel transitions; 8-input; linear/hard key, optional RGB modes; Y/C component capability; serial interface. Circle (532)

**Ampex Corporation 2200**

AVC VISTA component analog: 10-, 18-input configurations; integrates with ADO 100 effects system controlled from switcher panel. AVC Century software: V15.0 firmware package; user-programmable macros, macro button assignments; non-volatile storage; aux buses in panel memory; improved SMPTE communications; status monitor. Circle (539)

**Echolab 6716**

DV-7: 6-input post production switcher. DV-5: 10-input analog switcher; includes memory capabilities. Circle (745)

**FOR-A 3522**

CVM-400: component video mixer, switcher. VPS-500: integrated digital video mixer. Circle (784)

**Grass Valley Group 5830**

M-VEP option: video effects for MASTER-21 master control switcher; 10 wipe patterns; 5-input accumulative linear keyer, RGB chroma keyer; mat, background generators; optional linear BORDERLINE. Circle (807)

**JVC 3116**

KM-1600U: Y/C special effects generator. Circle (868)

**Midwest Communications 3234**

ARENA C: A.C.E production switcher; 13-input, four keyers; component video. Circle (946)

**Ross Video 5304**

Model 424: 24-input production switcher; two MLEs, downstream keyer; 12 keys, four backgrounds on screen simultaneously; 50-event memory; optional disk-based extended memory for effects dissolve, sequences, switcher setup storage. Circle (1062)

**Sony Communications/Broadcast 5130**

BVS-3200C: production switcher; diverse features, capabilities. DVS-8000: digital mixer; 2.5 mix/effects, digital multi-effects systems; digital routing of 4:2:2 D1, 4xFsc D-2, audio router. Circle (1103)

**Thomson Video Equipement 5920**

IMPULS: component digital mixer; 4:2:2 mix, switching system for medium size post-production; Key Compose creative feature. Circle (1178)

Utah Scientific/Dynatech 6030  
PVS series 2: production switcher; live or

post-production system; multimix/effects, program, preset buses; DSK, analog key edgers, automated memory effects system. Circle (1205)

**Vistek Electronics 1010**

VISION 5001: digital video mixer; post production and graphic preparation; conforms to CCIR 601, 656; digital input, output, analog component options; recall control settings from memories. Circle (1236)

## Video Products

### V7: Processing

- Compositing, keying
- Format conversion
- Signal correction
- Standards conversion
- TBC/synchronizer
- VBI ID, sync generators

**A.C.E 3234**

DMG1000: digital matte generator enhancements; optional framestore functions. Circle (501)

**A.F. Associates 1756**

DVNR 1000: digital noise reduction system; use at any junction in a video signal path, such as in dubbing/re-editing; reduces film grain, allows poor quality tapes to be enhanced; 10-bit with motion adaption, 2-D non-linear median filtering; 2-D aperture correction; from Digital Vision/Sweden. Circle (502)

**ACCOM Inc 2900**

D-Bridge 122: digital video encoder. Circle (505)

**Allen Avionics 5607**

Series 6 filters: for 4:2:2 component signal processing. Digistream Mk II: CCIR-601/656 signal decoders. BLC 100: composite video black level clamp. Circle (525)

**Alpha Image 7017**

NTSC/D-2 decoder: adaptive frame decoder. Alpha 330/340: D-1/D-2 digital serializer, deserializer. Alpha 350N: NTSC/D-2 digital frame decoder. Alpha 311/320A: digital encoders, decoders. Alpha 400: D-1 digital framestore, synchronizer. Circle (530)

**ASACA ShibaSoku 5152**

VK12A1: GCR inserter: ghost correction system. TG98AX: ghost signal generator. Circle (557)

**Automation Associates 6330**

CKM-4: multilevel keyer; provides keying, layering for various switchers. Circle (578)

**AVS Applied Video Systems 3634**

Enhancements to product line. Circle (580)

**Broadcast Video Systems/BVS 5041**

SA102: safe area generator; miniature, portable unit. Model 734: RGBS to Y/Pb/Pr transcoder; H-





# With the Master-21™ Master Control Switcher, the pressure goes off when the commercials go on.

The intelligent Master-21 Master Control Switcher will get rave reviews from a small but highly critical audience.

The people in your control room.

Thanks to the Master-21 switcher's configurable pre-set bus, you can take the guesswork out of complex set-ups by programming them in advance. And the system's RS422 Ebus port interfaces with a variety of automation systems.

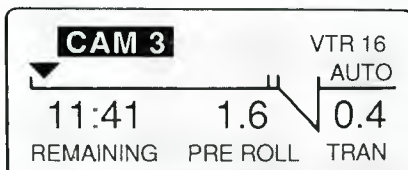
The Master-21 system is a

dedicated stand-alone matrix that's loaded with high performance features. Like 16 inputs, accumulative keying, built-in stereo, and the industry's first-ever *Transition Status Display*.

There's something else intelligent about the Master-21 Master Control Switcher: the price. It's proof you don't need a

big budget to enjoy great programming.

Who knows? With the Master-21 system, you may actually enjoy watching television again.



*Master-21's unique Transition Status Display is one of many windows inserts, that provides flexible, instant, and highly graphic access to all the information you need.*

For complete details and ordering information, contact the Grass Valley Group office nearest you.

## Grass Valley Group®

A TEKTRONIX COMPANY

THE GRASS VALLEY GROUP INC.

P.O. Box 1114, Grass Valley, CA 95945 USA  
Telephone (916) 478-3000 TRT: 160432  
FAX (916) 478-3187

OFFICES: New York (201) 845-7988; District of Columbia (301) 622-6313; Atlanta (404) 493-1255; Miami (305) 477-5583; Chicago (219) 264-0931; Minneapolis (612) 483-2594; Dallas/Fort Worth (817) 483-7447; Los Angeles (818) 999-2303; San Francisco (415) 968-6680; GVG International Ltd. (U.K.) + 44-962-843939; Grass Valley Group Asia (HK) + 852-3-7874118; Grass Valley Group Sud America (USA) (305) 477-5488.

Circle (173) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



phase adjust, adjustable Y setup.  
**Model 735:** Y/P<sub>B</sub>/P<sub>R</sub>-RGBS transcoder; jumper selects sync to any channel.  
**D100:** multiformat decoder; NTSC to Y/C, Y/R-Y/B-Y and RGB; digital adaptive comb filter for 35dB luma, chroma separation.  
**MASTERKEY:** four models; downstream, linear keyers for on-air, post production; frame accurate mix-to-key, fade-to-black, key masking, full preview, key source select with key set memory.  
**Circle (620)**

**Camera Mart 6330**  
**CKM-4:** multilevel keyer from Automation Associates.  
**Circle (636)**

**Canon USA/Broadcast Optics 3134**  
**HDTV-CODEC:** switches between satellite communications, optical fibre modes; transceiving for local area networking; new digital transmission protocol developed with KDD.  
**Circle (639)**

**CEL Electronics 1212**  
**P165 Tetra:** standards converter; 4-field temporal, four 8-line vertical spatial filtering, 8-field storage, DSP control pipelining; PAL/-M, SECAM, PAL-M, NTSC 3.58/4.43, Y/C, DUB, component signals.  
**Circle (648)**

**Central Dynamics 2052**  
**Stage-xencoder:** component analog video to NTSC composite.  
**Stage-xtranscoder:** D-1/D-2 format translator.  
**Circle (649)**

**COMLUX 9037**  
**Models 3803/04:** quad 8-bit video codec; serves NTSC and baseband video scrambling; four digital NTSC channels with 5.2MHz channel bandwidths; linear digitizing without compression.  
**Circle (674)**

**Comprehensive Video Supply 1660**  
**Signal generators, processors:** computer-to-video encoders, composite video equipment; SG-2 black burst generator.  
**S-VHS** signal corrector, decoder.  
**Circle (678)**

**Crosspoint Latch 3308**  
**Model 6901:** rack frame; supports seven plug-in transcoder modules.  
**Model 6051:** RGB-Y/C encoder.  
**Circle (700)**

**Digital Processing Systems 3234**  
**DPS-265:** 4-field frame synchronizer; TBC functions for playback of color-under VTRs; auto mode switching; 6MHz bandwidth synchronizer with fixed SC/H relationship; digital adaptive comb filter.  
**RC-270, RC-275:** remote controllers for DPS-270, DPS-275 TBC systems.  
**DPS-245:** quad framestore, synchronizer; four independent 4-field buffers, RS-170A outputs; independent freeze; 6MHz bandwidth; separate previews, GPI inputs per channel; preview channel feedback.  
**Circle (729)**

**ESE 6714**  
**ES-235:** video auto-fader with video black

generator.  
**Circle (766)**

**Faroudja Laboratories 5938**  
**CTE-3 encoder:** RGB-to-NTSC with computer output; pre-filters luminance, chroma; Y/C (S-VHS) inputs, output; locks to composite black or separate sync signals, provides advanced black reference.  
**CFD-3 decoder:** NTSC-to-RGB; active comb-filter for dot crawl suppression; 6MHz bandwidth; chroma enhancement; RGB, color difference, combed Y/C sync delayed NTSC composite outputs.  
**Circle (771)**

**Field Engineering 1146**  
**Model 389:** in-camera miniature safe action/title generator; works with most broadcast cameras.  
**Model 190:** in-monitor miniature safe action/title generator; operates with most monitors.  
**Circle (777)**

**FOR-A 3522**  
**CT-100:** component transcoder.  
**EVM-4300:** color correction system with event memory.  
**FA-425:** TBC optimized for U-matics.  
**FA-700:** dual channel TBC for S-VHS.  
**MF-1000:** TBC system with digital effects.  
**Circle (784)**

**Grass Valley Group 5830**  
**DSK-102:** control panel for DSK-101 linear keyer; rack-mount panel for vans, edit suites; luminance, linear keying; four key source/fill inputs; key mix/fade-to-black, frame accurate; GPI inputs.  
**EMPHASYS:** converts any component analog video signal to composite digital D-2, NTSC or PAL; 16 filter combinations of encode processing, artifact removal, HF boost requirements; SPG, timing function.  
**Circle (807)**

**Grunder & Associates 1212**  
**CEL P165 Tetra:** broadcast standards converter; NTSC 3.58/4.43, PAL/-M, SECAM, DUB/Y-C, component inputs, outputs; 4-field temporal, four 8-line spatial filtering; 8-field storage and DPS pipelining.  
**Circle (810)**

**Harris Video Systems 6700**  
**HarrisVws 100:** 2-channel framestore.  
**Circle (816)**

**Hotronic 2935**  
**AH91:** dual-channel TBC, digital effects; 3.58, Y/C-688, composite switching; wide bandwidth freeze frame/field; chroma noise reduction; DOC; audio switcher.  
**Circle (828)**

**I•DEN Videotronics 1016**  
**IVT-7:** TBC/frame synchronizer.  
**IVT-7P:** TBC/synchronizer for PAL.  
**IVT-9 PLUS:** production model TBC, synchronizer; multiformat transcoding.  
**IP-500:** video standards converter; supports NTSC, PAL, SECAM.  
**Circle (836)**

**Inline 7110**  
**IN2095, IN2096:** interface for NTSC, S-VHS to RGB+sync monitor or video displays; adjust color, brightness, contrast, hue, peaking.  
**Circle (844)**

**Intelvideo 6509**  
**Model IV-3A:** NTSC color encoder; dynamic enhancement of detail as a function of color and saturation; digital comb filtering, color modulation, SMPTE color bars; optional D-2 output.  
**Model IV-5 Pre-coder:** luminance correction, enhancing, color detail enhancement; used prior to NTSC encoding for improved NTSC pictures.  
**IV-6 NTSC color encoder:** digital comb filtering, color modulation; variable vertical enhancement/de-enhancement; optional D-2 output.  
**Circle (854)**

**Leitch Video 3516**  
**SPG-1302:** D-2 sync generator.  
**1300SI:** source ID module for SPG-1300N, -2600N systems.  
**SPG-2600N:** NTSC modular sync generator.  
**DFS-3002N:** D-2 frame synchronizer.  
**Circle (895)**

**Magni Systems 1026**  
**VGA Producer:** enhancements to IBM AT/compatibles video encoder; NTSC, S-VHS outputs with full genlock; remote control of effects features; 640x480 pixel with 256 colors.  
**Circle (919)**

**Merlin Snell & Wilcox 1041, 2100**  
**ME 9900Merlin:** standards converter; 4-field, 4-line aperture; *advanced motion processing*; features include TBC, synchronizer, color correction, detail enhancement, noise reduction functions.  
**Circle (939)**

**Microtime 5740**  
**FS-8, FS-10:** frame synchronizers; 8-bit, 10-bit production models; FS-10 produces D-2 composite digital outputs, 4xF<sub>sc</sub> sampling; dual inputs for AB source select; program-mable *bad video* features.  
**Circle (944)**

**Midwest Communications 3234**  
**DPS-265:** Digital Processing Systems 4-field frame synchronizer.  
**DPS-245:** DPS quad framestore.  
**RC-270, RC-275:** remote control units for DPS-270, DPS-275.  
**DMG1000:** A.C.E digital matte generator enhancements; optional framestore feature.  
**Circle (946)**

**Nova Systems 2922**  
**NOVASync 2F:** frame synchronizer, TBC with freeze; full bandwidth; A, B, S-VHS Y/C, alternate input; heterodyne, VTR-SC, S-VHS: video AGC; digital DOC; default to any input. black, color, freeze/frame.  
**NOVASync F:** synchronizer with freeze; full bandwidth; A, B, alternate inputs.  
**NOVASync 2:** TBC, synchronizer; A, B, S-VHS Y/C, alternate inputs; video AGC, DOC.  
**Circle (977)**

**OKI Electric Industry 3806**  
**LT2000:** TV standards converter; *motion vector system* reduces jerkiness, fuzzy resolution of moving objects; algorithm produces new field from previous and present fields; production model.  
**Circle (985)**

**Omicron Video 295;**  
**#481:** transcoder; for composite, com



# Osprey. Versatility in the field...



## ...or in the studio

**CAPACITY:**  
120 lbs.

Other Osprey models  
available. Please  
call for more  
information.



# Classic *From*

# Vinten

## THE PORTABLE OSPREY PEDESTAL

is based on Vinten's timeless Classic™ design for easy set-up in the studio and out in the field. With features you've come to expect from VINTEN:

- Separates into 2 parts for easy transport
- Wide range of height: Extends to 58"  
Retracts to 26"
- Adjustable base fits 27½" doorways
- Perfect balance, "on-shot" performance
- Self-pumping or externally chargeable
- Positive locking wheel brakes
- 5" floating axle studio wheels
- Interchangeable 6" OB wheels (opt.)
- Trim weights to maintain full, true counterbalance
- Crab/steer operation

### Vinten Broadcast Inc.

275-C Marcus Boulevard  
Hauppauge, New York 11788-2001  
Telex: 640470 Fax: (516) 273-9759  
Telephone: (516) 273-9750

### Branch Office:

8115-B Clybourn Avenue  
Sun Valley, California 91352-4022  
Telex: 182686 Fax: (818) 767-0772  
Telephone: (818) 767-0306

Circle (174) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



ponent, S-video and Y/C-688 formats.  
**#711:** S-video/Amiga computer genlock.  
**#721:** multiformat Amiga computer genlock system.  
**Circle (987)**

**Prime Image 7010**  
*Series 300:* 6.0MHz bandwidth synchronizers, TBCs; with, without digital effects features; NTSC, PAL models.  
*Noise reduction:* 20dB variable noise control for HR600+ and 7.5MHz systems.  
**Circle (1018)**

**Progressive Computer Products 8012**  
*V-Machine:* TBC, special effects "video computer."  
*Whackit:* S-VHS to Y/C-688 translator.  
**Circle (1025)**

**QSI Systems 3034**  
*Model 2048:* message generator.  
*Model 5400:* sync processor.  
*Model 3000:* safe area generator.  
*Model 5700:* auto video switchover system; activates on high noise or low signal levels.  
**Circle (1029)**

**RF Technology 2612**  
*RF-ACC-5L:* auto chrominance corrector; use with moving source microwave links; fast response, switchable clamp; auto reference for luminance level, adjustable gain, stabilized chroma flutter.  
**Circle (1053)**

**Snell & Wilcox 1041, 2100**  
*ME 9900 Merlin:* standards converter; 4-field, 4-line aperture; *advanced motion processing;* TBC, synchronizer, color correction, detail enhancement, noise reduction functions.  
**Circle (1098)**

**Thomson Video Equipment 5920**  
*TTV 7655:* 8-to-10 universal data converter.  
*TTV 4450 Colorado:* production model; 4:2:2 color corrector.  
**Circle (1178)**

**Ultimatte 1122**  
*Ultimatte System 6:* video compositing system with Screen Correction; permits fully linear matte even when blue screen shows results of vignetting and other imperfections.  
**Circle (1195)**

**Video Accessory 1330**  
*Black burst generator:* 9 outputs or 6 black burst plus subcarrier, and composite blanking and sync.  
**Circle (1220)**

**Video Associates Labs 1910**  
*MicroKey Mark 10 series:* expansion

products for video, text, graphics overlays; requires one slot of IBM/compatible PCs; fade, RGB, fade/RGB modules; videodisc controllers.  
**Circle (1221)**

**Video International Development 3020**  
*DTC-2504:* standards converter; digital image enhancement, noise reduction; 4-line, 4-field interpolation; NTSC, NTSC-4.43, PAL support; 8-bit quantizing of luminance and R-Y/B-Y.  
*DTC-3604:* standards converter; full-feature 4-field design; digital interface per EBU spec; includes image enhancement of DTC-2504 with comb filter decoder; 4:2:2/13.5MHz luminance sampling.  
**Circle (1226)**

**Videotek 1246**  
*RGB-I chroma keyer:* compliment to Prodigy switcher, or other systems; remote control; adjustable sensitivity; *proximity* indicator shows relative closeness of keyer setting to background color.  
**Circle (1232)**

**Vistek Electronics 1010**  
*VECTOR:* bidirectional standards conversion for NTSC, PAL (I, B, G) composite standards, analog component, 4:2:2 inputs, outputs; options for PAL-N/-M, SECAM, HDTV.  
**Circle (1236)**

**Yamashita Engineering Mfg/YEM 1312**  
*CVS-900B:* auto scan convertor; NTSC, PAL output from analog computer input, 1024x512-pixel resolution; composite, component, RGB/S, RGB/S, S-VHS outputs.  
*CVS-910 series:* real-time auto scan conversion; NTSC, PAL; RGB, RGB-TTL inputs produce RGB, sync, composite video, component video, superimpose, key outputs.  
**Circle (1260)**

**Zaxcom Video 6543**  
*ZX400:* four TBC/D-2 control system.  
*Proc Amp:* allows independent adjustment of Betacam component levels.  
*LSM1500:* TBC control for Betacart and Sony Library Management Systems.  
**Circle (1261)**

## Video Products

### V8: Displays

- Monitors
- Projection systems
- Video printers

**ASACA ShibaSoku 5152**  
*CM30A6:* 30" HDTV color monitor.  
**Circle (557)**

**Barco Industries 2944**  
*AVM series:* Grade 2 color monitor; auto alignment of color temperature, contrast; RGBS, S-VHS, Y/R-Y/B-Y component inputs; 10" HR CRT or 10", 14", 21" flat-square CRT, standard resolution.  
**Circle (586)**

**Comprehensive Video Supply 1660**  
*FDM-027:* hand-held flat display monitor.  
**Circle (678)**

**Conrac Display Products 5800**  
*Model 6545 upgrade:* Y, R-Y, B-Y input option; digital decoder; on Class A 13", 19" color video monitors.  
**Circle (693)**

**Leader Instruments 3012**  
*Model 5130:* color monitor; half-rack size.  
**Circle (892)**

**Mitsubishi Electric Sales 162W**  
*VS-F100:* rear projection system, 100" diagonal; through-the-wall operation.  
*VS-S100:* rear projection system, 100" diagonal; free-standing.  
*CP-200U:* large format color video copy processor.  
*CP-100UA:* small format color video copy processor; upgraded product, accepts higher input frequencies.  
*AM-2751A, 3151A:* 27", 31" multiscan monitors; track horizontal frequencies in 15-36kHz range.  
**Circle (949)**

**Nikon Photo/Electronic Imaging 6512**  
*Video printer:* thermal dye transfer system; accepts analog, digital inputs.  
**Circle (975)**

**Professional Sound Corp 9001**  
*CVM series:* computerized video monitoring systems.  
**Circle (1023)**

**Sony Communications/Broadcast 5130**  
*BVM-1910 video monitor:* enhanced models.  
**Circle (1103)**

**Video Accessory 1330**  
*Monitor power switch:* applies power to monitor, based on presence of a video signal.  
**Circle (1220)**

**Videotek 1246**  
*AVM-13sv:* 13" color monitor; audio, Y-C input feature.  
**Circle (1232)**

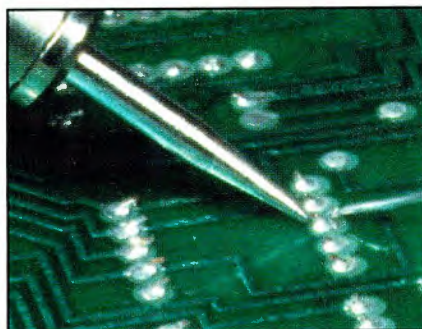


## Frame-line generator defines picture area

By John McGaughey

A common problem in TV systems is the loss of video information at picture edges. The cause is receiver overscanning, and the result is that viewers miss action and are unable to read text. Studies on this subject have led to SMPTE-recommended practice RP 27.3-1983. This recommendation specifies a safe title area in a video frame, consisting of lines defining the 10% and 90% points both horizontally and vertically. Using this as a visual aid, camera operators and directors can see where to confine information so that, statistically, the entire audience will be able to see it.

McGaughey is an engineer with the University of Georgia Telecommunications Center, Athens, GA.



### System design

The cutoff points can be generated electronically on a camera viewfinder. Two modifications to the basic pattern are to add a cross-hair defining picture center and to make the borders a black-to-white transition increasing visibility under varying video levels.

The frame-line generator is designed to work in conjunction with a video switcher to which the cameras are timed. Figure 1 shows how the generator would connect into a typical system. Frame-line timing is derived from switcher sync and blanking. To achieve correct horizontal timing of frame lines, the camera video must be timed properly to switcher black.

The generator has two sections: a digital section that generates all timing and an analog section that creates borders in the video signal. The typical system would have one digital section feeding multiple analog sections, each servicing one video source.

### Circuit description

The digital board, shown in Figure 2, separates sync into its horizontal and vertical components. To generate horizontal lines, an 8-bit counter (U7) is reset by vertical sync and clocked by horizontal sync. The count addresses a  $356 \times 8$  PROM (U11) that looks up where to create black and white lines.

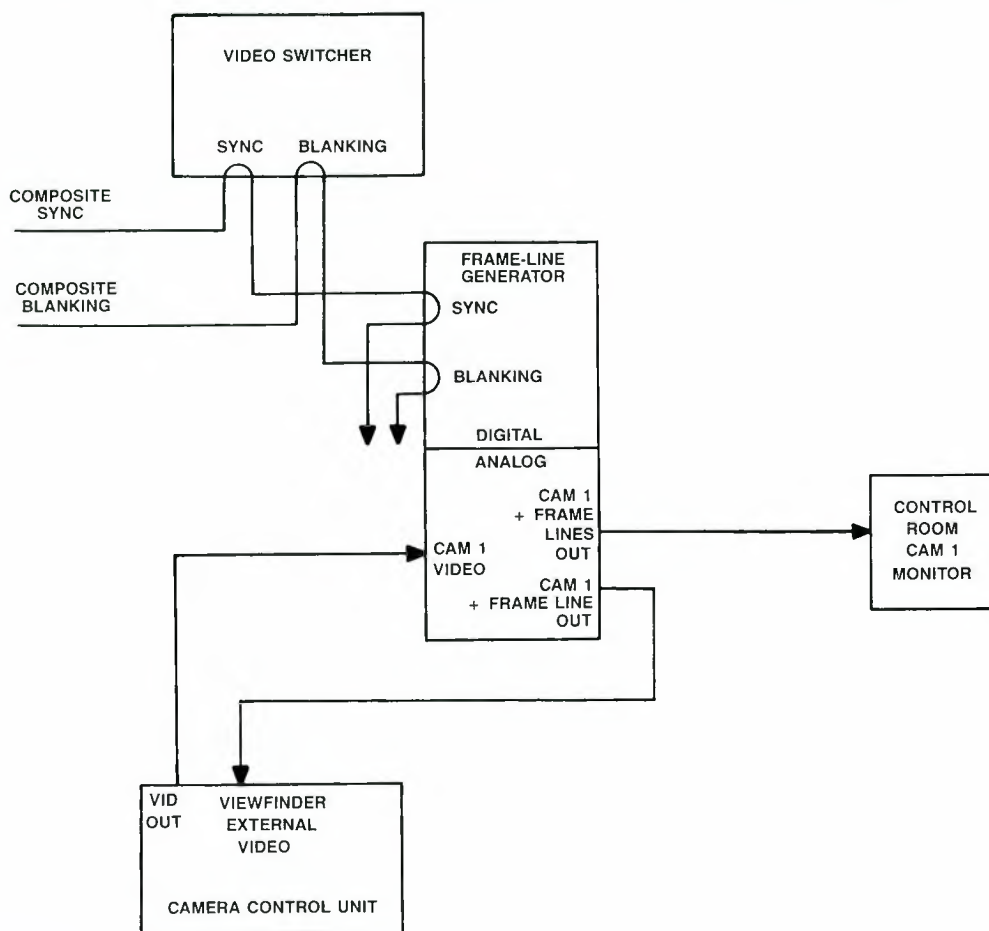
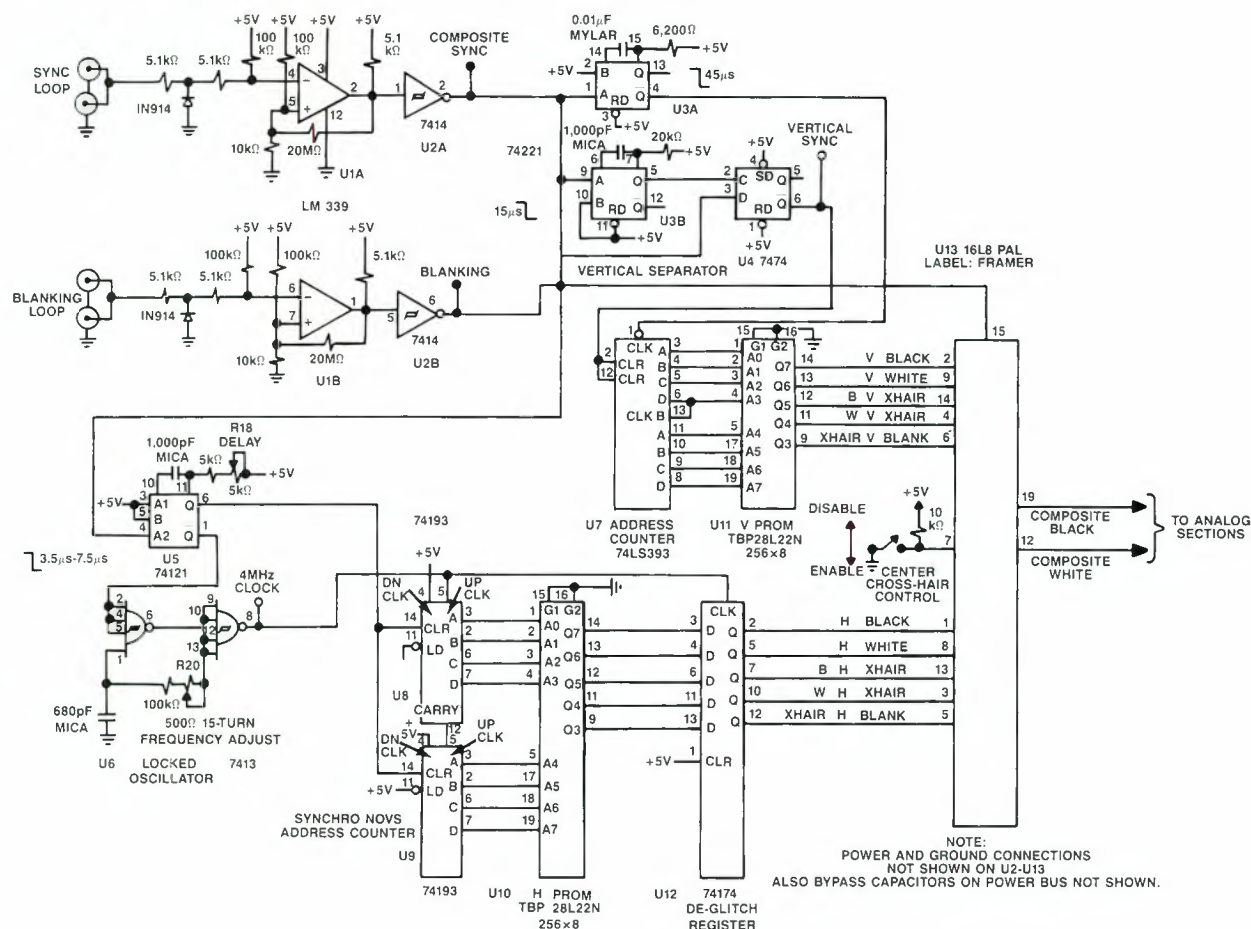


Figure 1. Frame-line generator in a typical configuration.





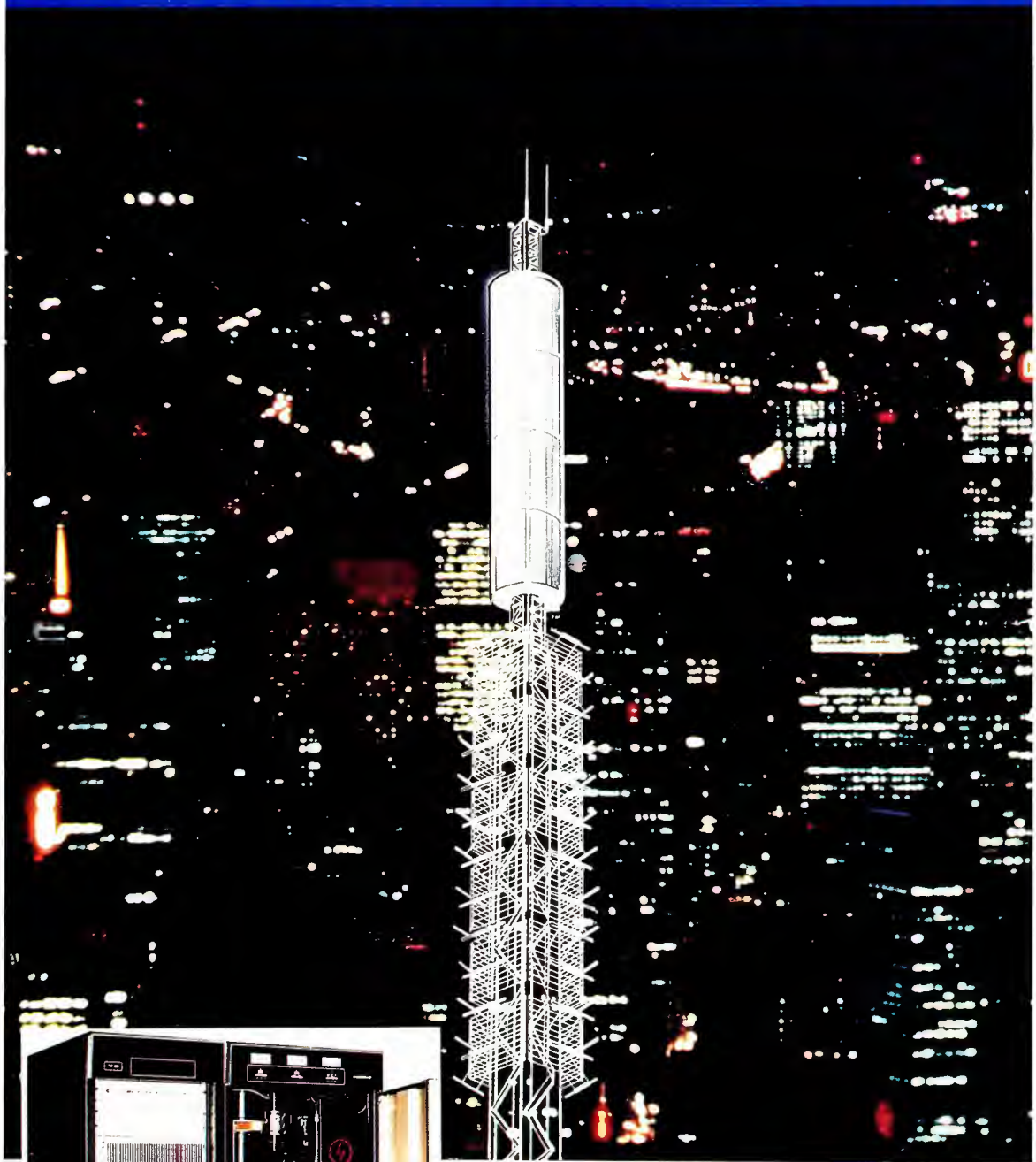
The vertical lines are created similarly using a synchronous 8-bit counter composed of U8 and U9. The counter is reset during sync and clocked by an oscillator running at approximately 256 times the horizontal rate. The count addresses PROM U10, which looks up where to place vertical black and white lines.

the horizontal and vertical PROMs into two switching signals for the analog section is implemented in a PAL (programmable array logic) chip (U13). Use of this type of device allows implementation of a rather long logic expression in one IC. Blanking is applied to this IC to stop generation during that time.





# TELEVISION TRANSMITTERS



## THE PERFECT PICTURE BY



**THOMSON-LGT**

Represented in Canada by:

**AM-AR**

BROADCASTING CANADA, LTD.

5650 BOULEVARD THIMENS

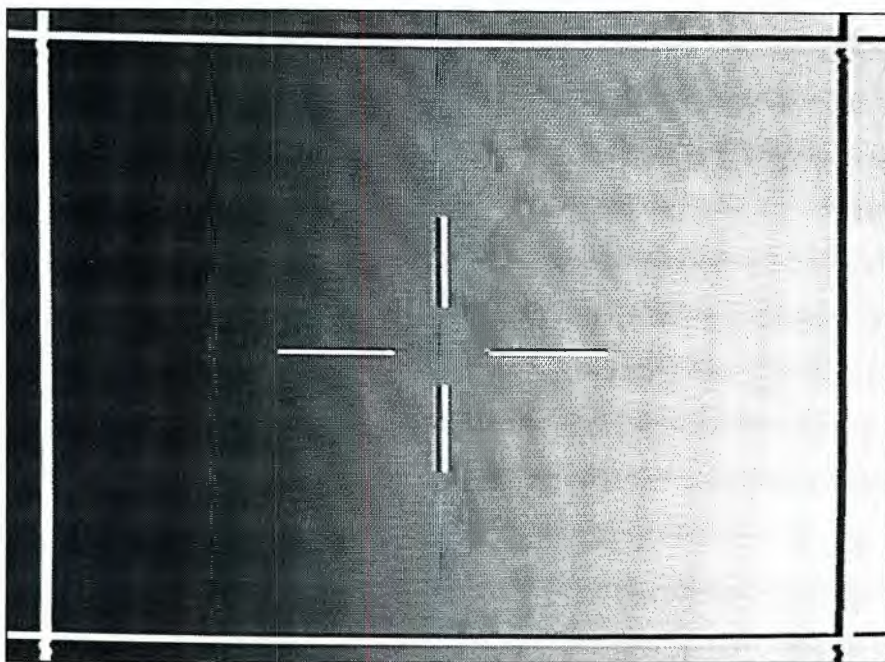
VILLE ST. LAURENT, QUE H4R 2K9 CANADA

Phone (514) 333-3393

FAX (514) 333-3043

Circle (175) on Reply Card





A cross-hair pattern defines the center of the picture. The borders have been modified to be visible despite varying video levels.

### A helping hand

To assist those who would like to build this system, the University of Georgia is making available the three programmable chips required in the digital section. The \$20 fee includes a comprehensive waveform chart to help in troubleshooting the system. Contact J.T. McGaughey, University of Georgia Television Center, Room 183, Georgia Center Building, Athens, GA 30602; telephone 404-542-1226.

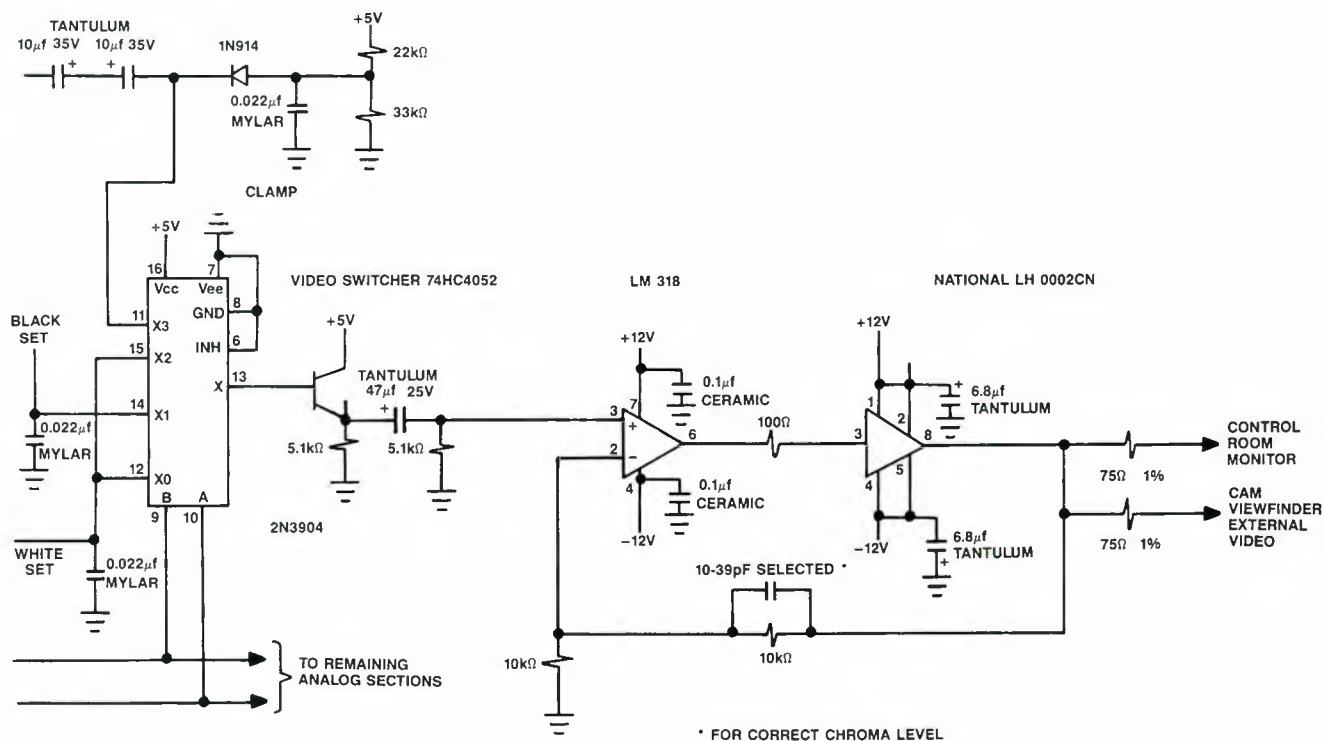
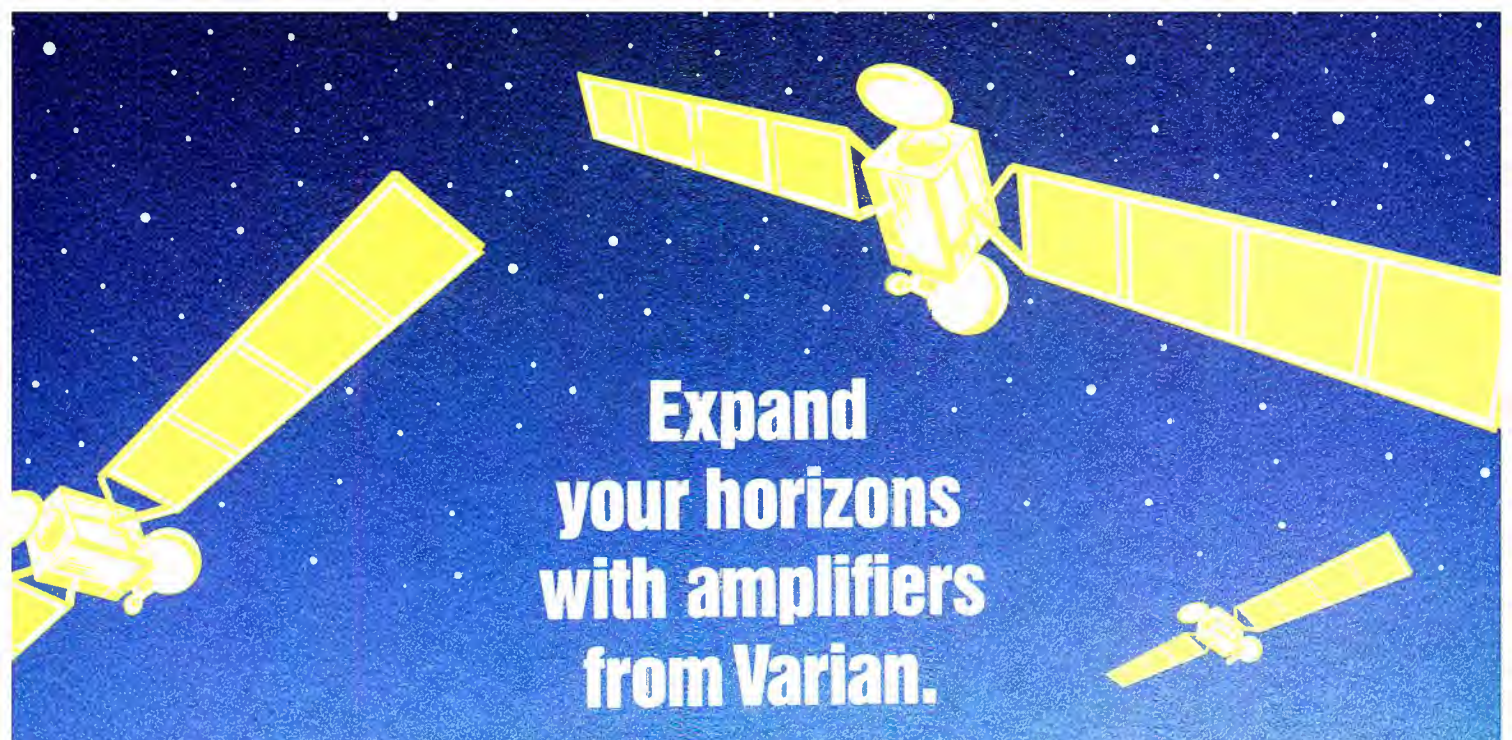


Figure 3. Analog board. Each video source is passed through one circuit. Simple construction keeps costs low and permits the circuits to be located together in a rack-mount configuration.





## Expand your horizons with amplifiers from Varian.

On the ground or in space, Varian can supply you with satellite uplink and downlink amplifiers for your communication needs. Our space- and ground-based power amplifiers operate in a broad range of frequencies and power levels and are backed by the industry's best customer support. Varian has been providing leading-edge technology for satellite communications for over 25 years.

So when it comes to transmitting signals through space, look to Varian to help expand your horizons. Call (408) 496-6273 today.

**varian** 

*microwave equipment division*

3200 Patrick Henry Drive, Santa Clara, CA 95054

Circle (176) on Reply Card





## Lexicon LXP-1, MRC MIDI controller

By John Bennett

Lexicon's LXP-1 multi-effects processing module and companion MRC MIDI remote control represent the company's first major effort to produce low-priced items of this description. Although the LXP-1 and MRC are sold as separate units, they work well as a pair. In an ideal setup, one MRC unit would control two LXP-1 units, as shown in Figure 1. Such a configuration would provide a lot of power without costing a lot of money.

### Features

The processor is rack-mountable with the proper kit. By itself, the unit occupies about half the width of a rack-mount space and weighs 3.5 pounds. The MRC will sit comfortably in almost any location and is even smaller than the processor.

The processor's front panel contains a receive signal light, a signal peaklight and controls for input, output, wet-to-dry sig-

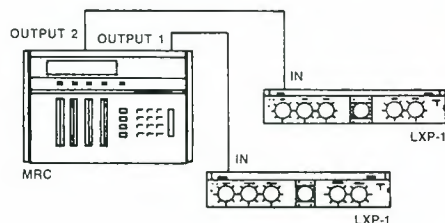


Figure 1. An optimum setup would contain two LXP-1 processors and a single MRC controller.

nal ratio, decay and delay. A program-selector knob provides access to 16 different algorithms.

A MIDI button, located in the upper right corner of the front panel, is used to assign MIDI channels. The back panel contains the stereo inputs and outputs, a defeat foot switch port and MIDI in and "thru" connections. If a mono output is desired, the unit internally sums the left and right channels.

A unique feature of the LXP-1 is that the decay and delay control knobs do not have a mechanical stop. The knobs turn freely. This feature allows the user to switch from the minimum to the maximum setting simply by turning the knob one notch counterclockwise.

The decay and delay knobs have no

Bennett is chief engineer at WVUM-FM, Coral Gables, FL.



### Performance at a glance LXP-1:

- Frequency response 20Hz-20kHz,  $\pm 0.5\text{dB}$  (dry)  $\pm 1\text{dB}$  (wet)
- Dynamic range 85dB
- THD at 1kHz  $< 0.05\%$  (dry)  $< 0.07\%$  (wet)
- Available programs:  
Reverb (halls, rooms, plates,  
Inverse room  
Gated room  
Delay 1  
Delay 2  
Chorus 1  
Chorus 2

### MRC:

- Dual MIDI outputs
- Dual MIDI inputs
- LCD display
- Operates in conjunction with the LXP-1

numbers, just markers. This means you do not know exactly what setting you've selected. I liked the fact that I was moving the dials and listening more closely rather than guessing what setting would sound good and trying to dial it in.

The LXP-1 uses 16-bit linear PCM analog-to-digital and digital-to-analog converters to process audio. It has a dynamic range of about 85dB.

### MIDI control panel

The MRC control panel contains an LCD screen with contrast control, which at

times is difficult to read. Four sliders and slider buttons control the parameters of the selected program, as well as allow you to scroll through selected menus. Several function keys are available, as well as a keypad for manual entry of data.

The way these two units work together is simple. A program is selected on the LXP-1. That same program must be selected on the MRC using one of the sliders and the *edit* and *setup* keys. Once you have selected that program, you have control over eight parameters. This configuration offers more flexibility than the processor alone could.

Two pages of parameters are available to each program, with four parameters to a page. (See Table 1.) By depressing the *page* button, you can alternate between pages. The four sliders control each of the parameters. Two 1/4-inch jack inputs at the back of the MRC provide for external control from a pedal control or other device.

Also on the back panel are two MIDI inputs and two MIDI outputs, which enable the unit to be connected to other machines. Although there are only eight user-adjustable parameters, I did not find myself at an impasse at any time. I was able to achieve awesome-sounding effects in any situation.

### Operating modes

Operating the processor is extremely easy. That's important if you'll be using it in a high-pressure studio environment. The controller, however, takes some getting used to, and I found the manual to be

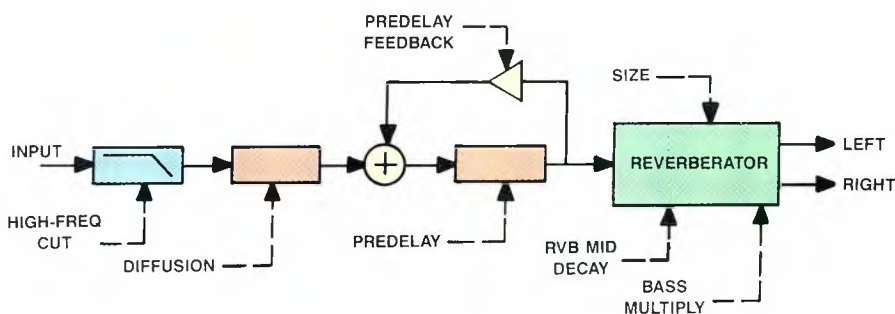
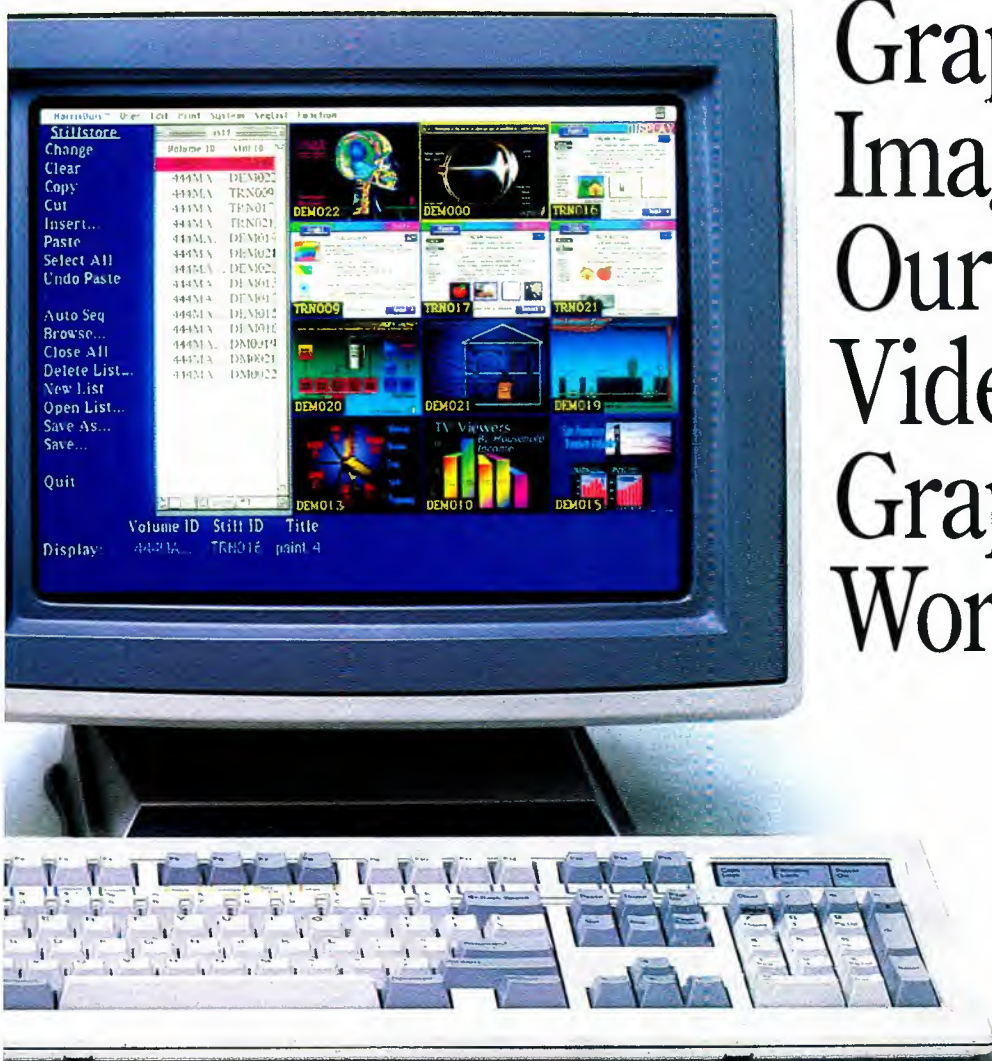


Figure 2. When using the reverb algorithm, room size, high-frequency cutoff and diffusion can be adjusted.



# Graphic Images From Our New Video Graphics Workstation



## Introducing The HarrisVws™ 100

We've combined the latest 2-D and 3-D graphics technology and high-capacity still storage in a single video-graphics workstation. The HarrisVws 100. Plus we've added loads of features that will make your job easy. In-house or in the studio.

The HarrisVws 100 offers differences that make a difference. For example:

- A single, rack-mountable unit that's simple to install and maintain



- High-capacity on-line and off-line librarying of your images
- Single-screen display of work space, menus and palettes
- Easy-to-use menu-driven commands that look the same from application to application
- Information sharing and expandability via industry-standard networks

- High-capacity magnetic and optical disk storage
- Line, preview and key outputs with transitions in NTSC composite, RGB, and 601/RP-125 video formats

The HarrisVws 100. A video graphics workstation that's high performance, not high priced. Call Harris Video Systems today. And create an image that everybody likes. 1-800-4-Harris ext. 3625.



**COME SEE US AT THIS YEAR'S NAB SHOW, BOOTH #6735.**



somewhat difficult to comprehend.

Five different *modes* are available from the MRC. Even though a diagram illustrates each mode, it takes awhile to get used to the machine. I wish that the manual had been better laid out. It really tries to be operator-friendly, but the diagrams need to be clearer and the explanations more detailed. I will say that once I got the hang of the MRC, the unit became an

invaluable tool in my studio. Because it was easy to use, I could change both the parameters and the programs quickly.

There is room in the system to store 128 user presets, which gives you a good deal of space in which to alter the LXP's initial programs. I was able to use the processor and controller in a variety of situations, from live PA to the recording studio. In all cases, the units held up beautifully.

### Multimode features

Four types of algorithms are available in the LXP: *halls and rooms*, *plates*, *reverb effects* and *delay effects*. The halls-and-rooms mode is self-explanatory. The same goes for the plates mode, which mimics the sound of reverberation off of metal plates. Reverb effects include gated reverb and inverse room. The delay effects include chorus and digital delay. The reverb mode's adjustable parameters are shown in block diagram form in Figure 2.

I found that the halls-and-rooms settings were ideal for vocals and drums. Keyboards and guitars sounded good, too. Adjustment of the room size and sound was done quickly and efficiently and allowed me to come up with some attractive reverb sounds. The inverse and gate programs both proved to be useful in making my snare drum sound great. I used a saxophone and guitar with the chorus program (see Figure 3) and found that it sweetened up the sounds nicely. The guitars came through well, and were fattened up just enough. Placing basses and keyboards through the chorus also yielded impressive results. As you might be able to tell, I was quite pleased with the sounds that the units provided.

If you're after high-quality sound at low-

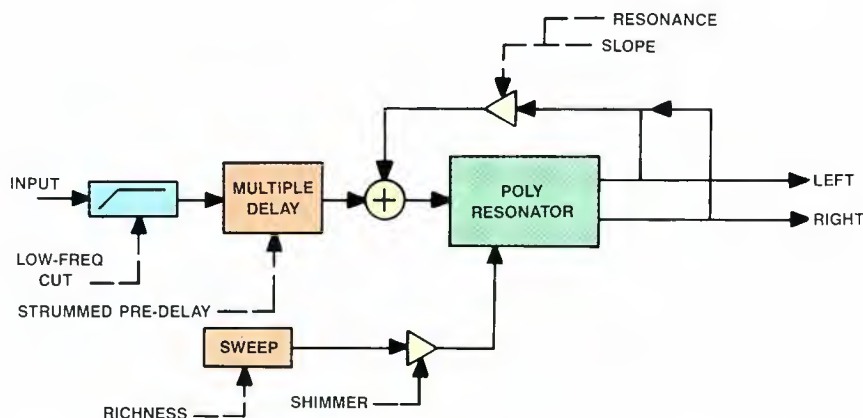
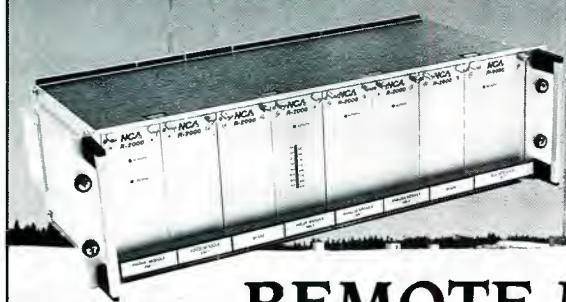


Figure 3. The chorus algorithm provides access to specialized parameters such as richness, shimmer and resonance.

# THIS ONE'S DIFFERENT



## REMOTE MONITORING

**R-2000** - The next generation of remote monitor and control systems for broadcast transmitter sites. Count on the R-2000 for those critical situations where every second off the air means lost revenue. Quick corrective action is required. The R-2000 provides this by automatically assuming control. It then informs you of the details. It does this by using a terminal found in 99% of all homes and offices... a **telephone**! All status is spoken in a pleasant digitized female voice.

R-2000, the "R" stands for "Rest Assured". Contact your nearest NCA dealer for more information.

### Uncompromised Flexibility

- Pluggable modules, rack mountable, and user friendly pop up window and menu software.
- Up to 256 inputs/outputs, controllable by telephone keypad or personal computer back at the office.

### Standard Features:

- 32 inputs (expandable to 256)
- 16 Outputs (expandable to 256)
- All inputs configurable as analog, digital or temperature
- Battery backup included with every system
- Telephone keypad access (input) with digitized voice (output)
- Completely user configurable
- Pullout drawer with keyboard and display included
- Remote data communication option
- One year warranty



MODULAR

\*TO TALK TO AN ACTUAL R-2000 DIAL OUR DEMO NUMBER (506) 634-5018

DISTRIBUTED BY:  
**MARUNO**



In U.S.A. 716-852-4521  
In Canada 416-255-9108



See us at NAB Booth #3134



## Another Winner...

...and a horse of a different color. An internal focusing system on a standard zoom lens. And only Canon has it.

The J14a x 8.5B IRS is the only standard lens in the industry with an internal focusing system. That means a new level of quality and performance never before available in a standard lens.

Internal focusing allows the use of a fixed square shade for versatile filter use and better protection from the environment.

Canon is rated the number one lens in quality. That quality is part and parcel of the J14a x and is merged with the latest developments in optical performance. You wouldn't expect anything less from the leader in the industry.

So put The Number One Lens to work on your team. Winning may just get a little easier.

**Canon**  
The Number One Lens

CANON U.S.A., INC. BROADCAST EQUIPMENT DIV.  
IEW HEADQUARTERS  
10 Palisade Avenue, Englewood Cliffs, New Jersey 07632  
Telephone: (201) 816-2900  
AX: (201) 816-9702 Telex: 43717 CANON OPTICS

CANON CANADA INC.  
6390 Dixie Road, Mississauga, Ontario L5T 1P7, Canada  
Telephone: (416) 795-1111 FAX: (416) 795-2027 Telex: (21) 6968792

CANON EUROPA N.V. TV PRODUCTS DEPARTMENT  
Bovenkerkenweg 59-61 P.O. BOX 2262 1180 EG  
Amsterdam The Netherlands  
Telephone: (020) 545-8905 Fax: (020) 545-8203 Telex: 18276

Circle (178) on Reply Card  
[www.americanradiohistory.com](http://www.americanradiohistory.com)



er prices, you'll really like the Lexicon LXP-1 processor and MRC MIDI controller combination. These units don't have all the features of higher-priced devices, such as pitch change and harmonization. However, their great sound and reasonable

price would make them a welcome addition to just about any studio.

**Editor's note:** The field report is an exclusive **BE** feature for broadcasters. Each report is prepared by the staff of a broadcast station, production facility or consulting firm.

In essence, these reports are prepared by the industry and for the industry. Manufacturer's support is limited to providing loan equipment and to aiding the author if support is requested in some area.

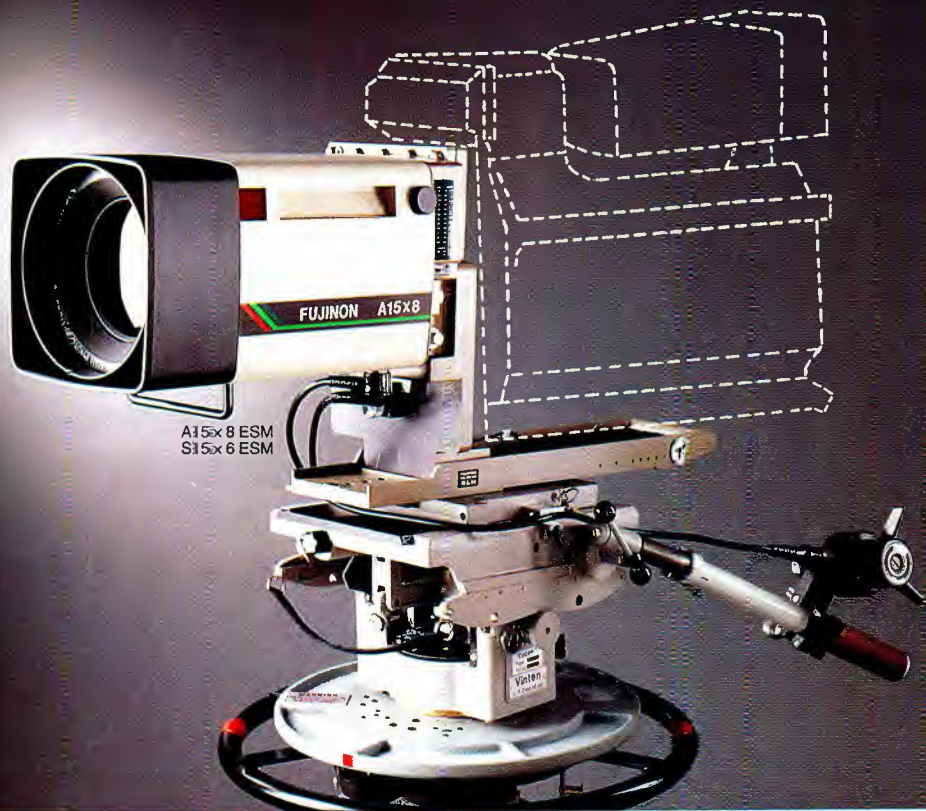
It is the responsibility of **Broadcast Engineering** to publish the results of any piece tested, positive or negative. No report should be considered an endorsement or disapproval by **Broadcast Engineering** magazine.

||:~:)))))

|                   |                                   |                                |                                     |                              |
|-------------------|-----------------------------------|--------------------------------|-------------------------------------|------------------------------|
| REVERB AND PLATES |                                   |                                |                                     |                              |
| PAGE 1            | Reverb Time<br>0.63 - 8.9 sec.    | Room Size<br>8-71 m            | High-Freq Cutoff<br>0.321 - 13.8kHz | Effects Level<br>0 - 100%    |
| PAGE 2            | Bass Multiply<br>0.3 - 2.5x       | Predelay<br>0.000 - 0.262 sec. | Feedback<br>-99 - +99%              | Diffusion<br>0-100           |
| CHORUS 1          |                                   |                                |                                     |                              |
| PAGE 1            | Rate<br>0 - 15                    | Depth<br>0.25 - 8.00ms         | Waveform<br>0 - 7                   | Effects Level<br>0 - 100%    |
| PAGE 2            | Left Delay<br>0 - 1 sec.          | Left Feedback<br>-99 - +99%    | Right Delay<br>0 - 1 sec.           | Right Feedback<br>-99 - +99% |
| CHORUS 2          |                                   |                                |                                     |                              |
| PAGE 1            | Tune<br>-64 - +63                 | Resonance<br>-99 - +99%        | Low-Freq Cutoff<br>0.002 - 27.3Hz   | Effects Level<br>0 - 100%    |
| PAGE 2            | Predelay<br>0.000 - 0.262 sec.    | Slope<br>-15 - +16             | Richness<br>0 - 100                 | Shimmer<br>0 - 100           |
| DELAY 1           |                                   |                                |                                     |                              |
| PAGE 1            | Rate<br>0 - 15                    | Delay<br>8.2 - 6.47ms          | High-Freq Cutoff<br>0.321 - 13.8kHz | Effects Level<br>0 - 100%    |
| PAGE 2            | Delay - 2<br>0 - 1.02 sec.        | Delay - 3<br>0 - 1.02 sec.     | Feedback 3<br>-99 - +99%            | Diffusion<br>0 - 100         |
| DELAY 2           |                                   |                                |                                     |                              |
| PAGE 1            | Group Delay<br>0.005 - 0.635 sec. | Feedback<br>-99 - +99%         | High-Freq Cutoff<br>0.321 - 13.8kHz | Effects Level<br>0 - 100%    |
| PAGE 2            | Left Delay<br>0 - 1.02 sec.       | Right Delay<br>0 - 1.02 sec.   | Diffusion<br>0 - 100                |                              |
| INVERSE           |                                   |                                |                                     |                              |
| PAGE 1            | Slope<br>0 - 31                   | Size<br>1 - 32                 | High-Freq Cutoff<br>0.321 - 13.8kHz | Effects Level<br>0 - 100%    |
| PAGE 2            | Feedback<br>-99 - +99%            | Predelay<br>0.000 - 0.262 sec. | Diffusion<br>0 - 100                |                              |
| GATE              |                                   |                                |                                     |                              |
| PAGE 1            | Slope<br>1 - 16                   | Time<br>150 - 390ms            | High-Freq Cutoff<br>0.321 - 13.8kHz | Effects Level<br>0 - 100%    |
| PAGE 2            | Feedback<br>-99 - +99%            | Predelay<br>0.000 - 0.262 sec. | Diffusion<br>0 - 100                |                              |

**Table 1.** There are two pages of parameters available to each program with four parameters to a page. The processor provides a great deal of flexibility.





A15x8 ESM  
S15x6 ESM



A8x8 ESM  
C8x6 ESM



A20x7 ESM  
S20x5.4 ESM



A55x9.5 ESM  
S55x7.3 ESM



A44x9.5 ESM  
S44x7.3 ESM



A34x10 ESM  
S34x8 ESM

FUJINON'S FOCUS ON THE FUTURE.

# THE BEST LENSES FOR TODAY'S CCD STUDIO CAMERAS.

BOOTH 1700 AT NAB

The reason FUJINON delivers all the performance advantages of the new 1990 CCD studio cameras is our *focus on the future*.

Long before anyone seriously considered CCD cameras for studio use (more than 3 years ago), FUJINON was developing and perfecting lenses in anticipation of today's cameras. To meet their far higher transmission requirements, the drastically lower distortion, and advanced electro-mechanical demands, FUJINON made the commitment and the investment. The same resources

and experience responsible for making FUJINON the leader in HDTV optics make FUJINON first in CCD lenses today.

Every studio and field lens shown above — for 2/3" and 1/2" cameras — is available now. And every one delivers maximum performance, total compatibility. That's a FUJINON exclusive. So is our focus on the future.

If new CCD studio cameras are in your future, focus on FUJINON. For more information or a demonstration, call your nearest FUJINON representative.

**FOCUSED ON THE FUTURE.**

FUJINON INC. 10 High Point Drive, Wayne, New Jersey 07470 (201) 633-5600  
Southern 2101 Midway, Suite 250, Carrollton, Texas 75006 (214) 385-8902  
Midwestern 3 N. 125 Springvale, West Chicago, Ill. 60185 (708) 231-7888  
Western 129 E. Savarona Way, Carson, California 90746 (213) 532-2861



**FUJINON**

10 High Point Drive, Wayne, N.J. 07470

Circle (179) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



## Ampex Vista production switcher

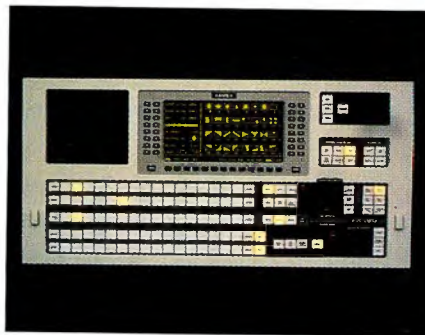
By Fred Lass

In 1928, when WRGB-TV, Schenectady, NY, began experimental broadcasts to the public, the scientists had to devise a switcher to put one of three cameras on the air. For many years, a simple mix was the only effect possible. Today, the station's engineers experience few limitations in selecting or mixing video sources. They are able to achieve a variety of transitions and effects through an Ampex 18-input Vista production switcher.

### New production demands

In 1988, station management proposed a new program that required the construction of a second control room. The program, the "Big Money Movie," presented a way for the station to beat the high cost

Lass is chief engineer at WRGB-TV, Schenectady, NY.



### Performance at a glance

- NTSC/PAL/PAL-M composite, 525/625 component standards
- 10- and 18-input systems
- Digital effects interface
- Multiple-panel storage of switcher setups, including transitions and sequences
- Three linear keyers with key memory storage and key masking
- 32-pattern mix/effects system with auto panning
- Variable border types
- RS-232, RS-422, GPI control ports

breaks, make telephone calls to viewers, who were offered prizes for correctly answering questions about the movie.

Two cameras, three VTRs and a character generator made up the complement of equipment to put the films on-air. When movies were not being broadcast, the new room would be used for dubbing the films to tape as well as editing the movies, creating promos for the films and burning in time code.

The budget limited the choices of video switchers. Because the consensus at the station was that live programming could be switched easier with program and preset buses, in addition to the effects bus, many basic switcher models were eliminated. The Ampex Vista was attractive because it had the necessary capability and offered numerous other features within

of syndicated material, by airing films from tape with live wraparounds. A host would introduce the feature and, during

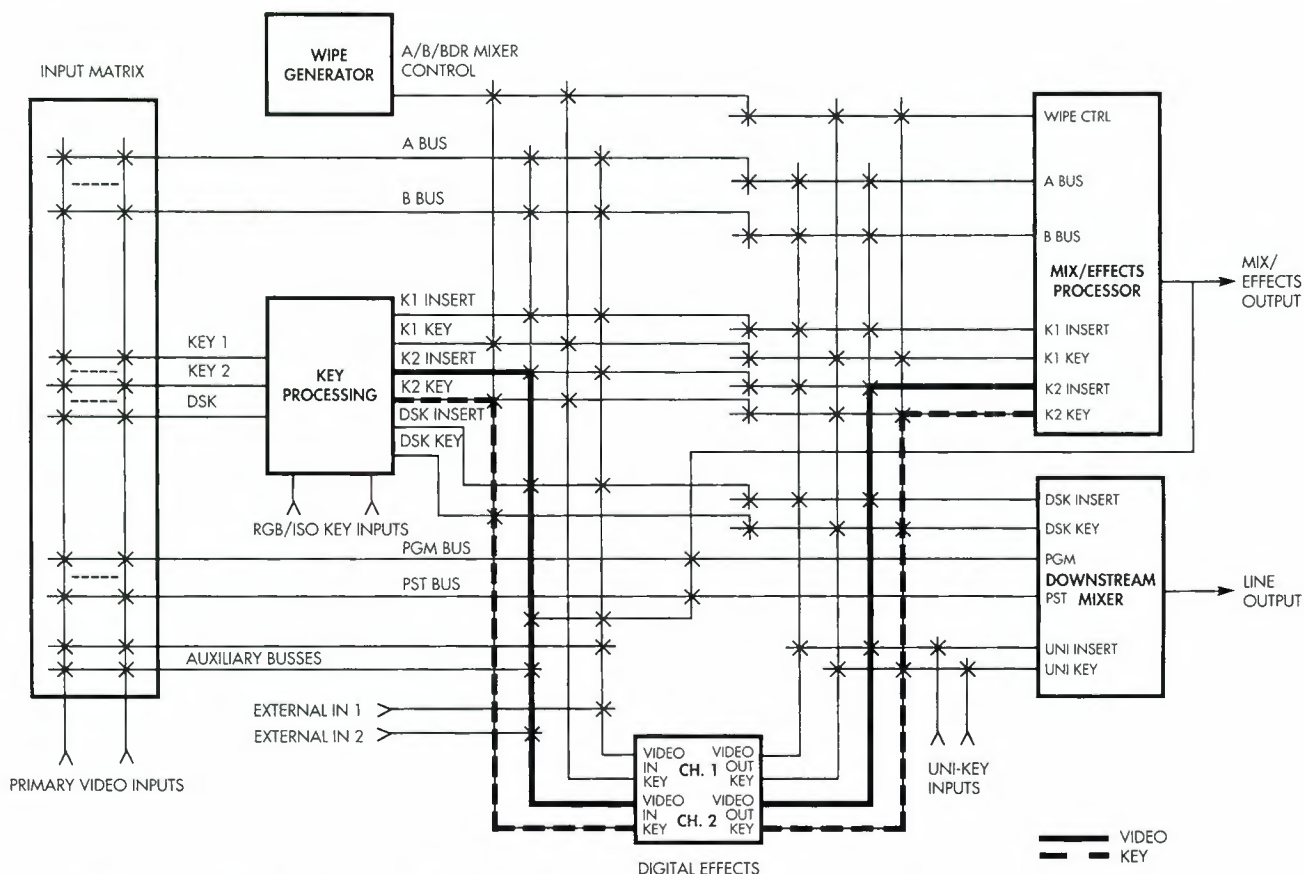


Figure 1. External routing of key signals with Digi-Loop. The feature proved important to production needs at WRGB-TV.



# In broadcasting, Image and Power are everything.

**BURLE is committed to providing a full range of camera and power broadcast tubes.**

As television celebrates its Golden Anniversary, BURLE continues a 50 year tradition of broadcast technology leadership. We've supplied you with Vistacon, Saticon and Vidicon camera tubes since their introduction. And our power tubes are the industry standard for VHF TV.



*BURLE supplies a wide variety of camera and power tubes for the broadcast industry.*

It takes a domestic source like BURLE to maintain a half century commitment to producing and supplying a full line of broadcast electron tubes. From camera to transmitter, BURLE provides the tubes that keep the broadcasting industry on the air. Count on us to keep you supplied with the full range of broadcast camera and power tubes you need. Today and tomorrow. Contact your local BURLE broadcast tube distributor, or call us at 1-800-827-TUBE.

***Experience counts.***

**BURLE** Electron  
Tubes



|                            |              |                                  |
|----------------------------|--------------|----------------------------------|
| KEYER 1: 01 CAM 1          | EFFECTS LOOP | HOLE: KEY PAT                    |
| KEYER 2: 04 VTR 1          |              | KEY 1: CH1 CH2                   |
| DSK: 04 VTR 1              |              | KEY 2: CH1 CH2                   |
| ME TRAN: 1:05              |              | DS KEY: CH1 CH2                  |
| DS TRAN: 1:05              |              | M/E: CH1 CH2                     |
| PATTERN: 04                |              | AUX: CH1 CH2                     |
| SETUP: 01 1:05             |              | EXTRA: CH1 CH2                   |
| LOOP: ch1 ch2<br>KEY 1 M/E |              | OFF: CH1 CH2                     |
| ADJ MEM SEQ ADD            |              | KVR1 KVR2 DSK MISC PAT PAT# LOOP |

Digi-Loop effects menu allows selection of any six paths for DE insertion. Selections also are shown at the bottom of the on-air area.

|                          |  |                                  |
|--------------------------|--|----------------------------------|
| KEYER 1: 01 CAM 1        |  |                                  |
| KEYER 2: 04 VTR 1        |  |                                  |
| DSK: 04 VTR 1            |  |                                  |
| ME TRAN: 1:05            |  |                                  |
| DS TRAN: 1:05            |  |                                  |
| PATTERN: 24              |  |                                  |
| SETUP: 01 1:05           |  |                                  |
| LOOP: ch1 ch2<br>OFF OFF |  |                                  |
| ADJ MEM SEQ ADD          |  | KVR1 KVR2 DSK MISC PAT PATH LOOP |

Patterns are selected by using the control panel up-down button adjacent to the desired row of patterns.

|                          |                                                            |                                  |
|--------------------------|------------------------------------------------------------|----------------------------------|
| KEYER 1: 01 CAM 1        | PATTERN 6<br>POSITION<br>AUTOPAN MOD OFF OFF<br>SYM NOR 0% | BORDER: HRD SFT HA_O A B         |
| KEYER 2: 04 VTR 1        |                                                            | BDR TRK: OFF NOR REV             |
| DSK: 04 VTR 1            |                                                            | DIR: NOR REV N/R R/N             |
| ME TRAN: 1:05            |                                                            | PAT LIM  50.1%                   |
| DS TRAN: 1:05            |                                                            | BDR HUE:  241°                   |
| PATTERN: 06              |                                                            | BDR LUM:  79.2%                  |
| SETUP: 01 1:05           |                                                            | BDR SAT:  74.1%                  |
| LOOP: ch1 ch2<br>OFF OFF |                                                            | BDR WID:  34.9%                  |
| ADJ MEM SEQ ADD          |                                                            | KVR1 KVR2 DSK MISC PAT PAT# LOOP |

A change in pattern and values. Pattern No. 6, the star, is represented in the same area used for key masks in the keying menus.

the station's budget.

Some of the primary requirements were: an editor interface; at least two levels of keying, including several internal key inputs to allow for digital effects; compact design and ease of operation.

The operators also requested switcher panel memory. The WRGB staff, using an AVC-33 in the main control room, had found that panel recall made difficult switching functions much easier for live operation. With its microprocessor control system, the Vista switcher can store 24 different panel configurations. In addition, 24 sequences, involving any combination of transition configurations, can be stored. One sequence can call another or loop back to itself, and manual control is available to the operator at all times.

### Mix/effects and keys

The mix/effects architecture also was familiar to the operators. The effects system has two keyers and can be configured to cut key No. 1 over key No. 2, or vice versa, over two background buses. Keys can be mixed or wiped with the A and B background buses individually or in combinations, with key transition functioning in concert with, or independently from, the normal M/E transition system. Both keyers are full-function linear keyers, performing luminance, RGB chroma, composite chroma and ISO-type (external) keying.

The range of 32 patterns includes rotary wipes and pixel dissolves between sources. In addition, the operator has four levels of pattern border softness — hard, soft, soft halo, half halo — and border widths that can proportionally track the size of the pattern. Key masking, which is separate from the wipe patterns, can work on key No. 1 and key No. 2 individually for different positions of the key mask.

The downstream keyer also has two independent keyers. The simple Uni-Key is a non-adjustable unity gain linear keyer with external inputs for key signal and fill video as well as digital effects re-entry inputs.

The main DSK is a full-function keyer. Like the effects keyers, it performs luminance, RGB chroma, composite chroma and ISO-type keying. Each keyer has its own, separate matte generator. The key selector does triple duty.

A single row of push buttons controls three source buses and is easily switched between key No. 1, key No. 2 and DSK. The optional ISO-key switching module was installed to route the key signal from the character generator to these three keyers.

### Digi-Loop

The capability to integrate an external digital effects system within the switcher is one feature that sets the unit apart from other systems. Although most switchers



# BERC® PRESENTS COAST TO COAST RENTAL RELIABILITY



## We know that the most important video productions

start with superior video equipment. That's why when you rent BERC® equipment, you're renting the reliability of over seventeen years of experience in the rental industry. We demand that every piece of gear is proof-of-performance tested prior to every rental and that it's packaged properly and accurately. And we stay technologically ahead of the game so you don't have to. So, from one Betacam to multiple camera air-pack systems, BERC® in Burbank, Boston and San Diego can provide your every video requirement.

# BERC®

BROADCAST EQUIPMENT RENTAL COMPANY

## 818-841-3000

SAN DIEGO, CA  
619-272-3000

4903 Morena Blvd. Ste 1206  
San Diego, CA  
FAX 619-272-2061

BURBANK, CA  
818-841-3000

4545 Chermak  
Burbank, CA 91505  
FAX 818-841-7919

BOSTON, MA  
617-229-7799

Sullivan Video Services  
111 S. Bedford St. #205  
Burlington, MA 01803  
FAX 617-229-1533

Circle (181) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



|                                                                                                                                                                               |                                                                                   |                                                                                   |                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| KEYER 1: 01                                                                                                                                                                   | CAM 1                                                                             | KEYER 1<br>INPUT 01 CAM 1                                                         | MIX TIME: 1:05                                                                                                            |
| KEYER 2: 04                                                                                                                                                                   | VTR 1                                                                             | INT KEY MASK                                                                      | MASK: <input type="checkbox"/> OFF <input type="checkbox"/> INT <input type="checkbox"/> EXT <input type="checkbox"/> INV |
| DSK: 04                                                                                                                                                                       | VTR 1                                                                             |  | KEY: <input type="checkbox"/> NORMAL <input type="checkbox"/> INVERT                                                      |
| ME TRAN: 1:05                                                                                                                                                                 |                                                                                   |                                                                                   | FILL: <input type="checkbox"/> SELF <input type="checkbox"/> MATTE <input type="checkbox"/> BUS                           |
| DS TRAN: 1:05                                                                                                                                                                 |                                                                                   |                                                                                   | MAT HUE <input type="text"/> 118°                                                                                         |
| PATTERN: 01                                                                                                                                                                   |  | TYPE<br>BORDER<br>BDR MOD<br>BDR LUM                                              | MAT LUM <input type="text"/> 50.1%                                                                                        |
| SETUP: 01 1:05                                                                                                                                                                |                                                                                   | LUM<br>OFF<br>0%                                                                  | MAT SAT <input type="text"/> 100%                                                                                         |
| LOOP: ch1 ch2                                                                                                                                                                 | OFF OFF                                                                           | GAIN<br>100%<br>BDR 0%                                                            | INS ADJ <input type="text"/> 50.1%                                                                                        |
| <input type="checkbox"/> ADJ <input type="checkbox"/> MEM <input type="checkbox"/> SEQ <input type="checkbox"/> ADO <input type="checkbox"/> KVR1 KVR2 DSK MISC PAT PAT# LODP |                                                                                   |                                                                                   |                                                                                                                           |

When a keyer value is changed, the source name appears in reverse to indicate that the current adjustments differ from key memory.



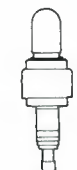
**NOW**  
THE WIDEST CHOICE OF REBUILT TUBES EVER.

TRIODES, MAGNETRONS, KLYSTRONS, ELECTRON GUNS,  
ION PUMPS, ALSO NEW TUBES.

... MAKING WAVES  
IN REBUILT TUBE TECHNOLOGY.

**CALIFORNIA  
TUBE LABORATORY, INC.**  
1305 17th Avenue  
Santa Cruz, CA 95062-3096  
408/475-2939 800/824-3197  
Established 1949  
Fax 408 475 0241

THE ELECTROMAGNETIC WAVE SPECTRUM,  
BROUGHT TO YOU BY CALIFORNIA TUBE LABORATORY

| 200 KHz                                                                             | 2 MHz                                                                               | 20 MHz                                                                              | 200 MHz                                                                             | 2 GHz                                                                                | 20 GHz                                                                                |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| INDUCTION HEATING<br>AM RADIO TRANSMISSION                                          |                                                                                     | VHF RADIO AND<br>TELEVISION<br>LINEAR ACCELERATORS                                  |                                                                                     | INDUSTRIAL<br>MICROWAVE<br>COOKING AND<br>HEATING                                    | RADAR<br>ELECTRON<br>ACCELERATORS                                                     |
|  |  |  |  |  |  |

TUBE OUTLINES NOT TO SCALE.

Circle (202) on Reply Card

**VIDEO SUPPLIES**

CABLES • CONNECTORS • CANARE • BELDEN • SWITCHCRAFT • D.A.T. • TIES •  
BATTERIES • NEUTRIK • 60 INTERFACE BOXES • TAPE • 500 DIFF TAPE LABELS • GAFFERS  
TAPE • CASES • PATCH BAYS • LIGHTS • ACOUSTIC FOAM  
• FORMS • MICROPHONES • SONEX • STANDS • MOUNTS  
• WIND SCREENS • ZEPPELINS • FIBRE OPTICS • RACKS  
• DUCT • REELS • TESTERS • FILTERS • CHEMICALS • TOOLS  
• ON-AIR LIGHTS • DEGAUSSERS • INTERFACE DEVICES  
• HEADPHONES • CLIPS • SWITCHES • CAM & S-VHS CABLE

**FREE!**  
America's most  
unique catalog  
for audio  
and video!

**MARKERTEK VIDEO SUPPLY**  
145 Ulster Ave., Saugerties, NY 12477 U.S.A.  
TOLL FREE **1-800-522-2025**  
In NY: 914-246-3036

Circle (199) on Reply Card

Want more  
information on  
advertised  
products? Use the  
Reader Service  
Card.



**MINIBOX  
SERIES**



1 RU



2 RU

Clear plex front panel included

**RACK MOUNTED OR  
STAND ALONE**

- Video and Pulse Delays
- Video Filters
- Precision Video Attenuators
- Hum Bucking Coils

**broadcast video systems ltd.**

40 West Wilmot Street, Richmond Hill, Ontario L4B 1H8  
Telephone: (416) 764-1584 Telex: 06-964652 Fax: (416) 764-7438  
See us at NAB Booth 5041

Circle (220) on Reply Card



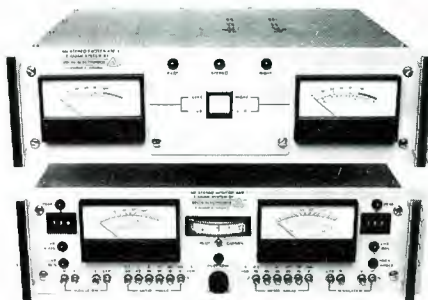
# Adhere to Broadcast Standards.

Every day, all over the world, Delta's full line of products make sure the most important broadcasting standard of all is met — your total satisfaction.



**AM Splatter Monitor** — Spectrum analyzer performance at a significantly reduced price! An inexpensive means of verifying FCC and NRSC spectral compliance. This frequency agile instrument tunes from 1700 kHz down to 450 kHz, with 9 or 10 kHz channel spacing. The monitor also measures incidental phase modulation (IPM). Designed to be rack-mounted or operated from a vehicle's 12 volt supply using an optional antenna.

Circle (186) on Reply Card



**C-QUAM® AM Stereo** — The Above Standard Industry Standard is easy to install and maintain with its modular design and construction. Offers standard features other manufacturers charge as options. A sound value, built to last.

Circle (190) on Reply Card



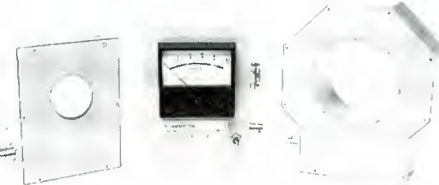
**High Power Pulse Reflectometer** — Strong interfering fields that would destroy time domain reflectometers are virtually ignored by the PRH-1. This instrument can handle up to 1,000 watts of induced power on an intermittent basis as it locates faults on transmission lines. Provides a visual representation of the transmission or sample line, STL coax, or antenna, using your oscilloscope.

Circle (193) on Reply Card



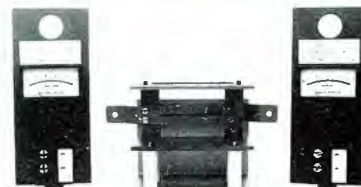
**Coaxial Transfer Switches** — These 1 3/8" and 3 1/8" motorized four port switches are designed to switch between antennas, transmitters, or dummy loads both quickly and efficiently. The switches can also be operated manually and are fully interlocked.

Circle (187) on Reply Card



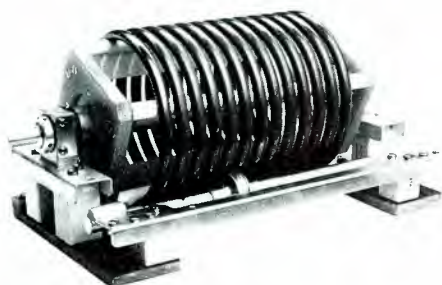
**RF Ammeters and Sampling Toroids** — Precision toroidal current transformers (TCTs) provide stable antenna monitor sampling while eliminating the problems associated with loops. TCTs also work well in supplying additional modulation monitor or test sample RF outputs. The transformer coupled ammeter (TCA) offers stable base or common point current readings, independent of modulation. The dual and single scale meters also provide remote DC outputs.

Circle (191) on Reply Card



**Low Power RF Ammeters** — When every milliamp of current counts, depend on the accuracy of the TCA-Jr. This portable RF ammeter is designed to plug into either a Delta MJ-50 Meter Jack (pictured above), or a standard J-plug jack. Two current ranges are available: 0.2 to 1.0 Ampere, or 0.4 to 2.0 Amperes.

Circle (194) on Reply Card



**Rotary Variable Inductor** — Where long life and high reliability are required, specify the RVI. Designed to provide long life, even under continuous rotation, the RVI is available in either 12  $\mu$ H or 10  $\mu$ H versions (maximum inductance). Other values by special order.

Circle (188) on Reply Card



**RF Receiver/Generator** — A rugged, high output (2 watts) generator and correlation detector receiver virtually eliminate false nulls caused by interfering signals. The RG-3A operates from 0.5 to 1.65 MHz, and the expanded range of the RG-4 generates signals from 100 kHz to 30 MHz.

Circle (192) on Reply Card

**Transmitter Power Controller** — Your insurance against over- and under-power citations. Continuously monitors transmitter power levels, compensating for AC power line sag by adjusting the transmitter to 100% power.

Circle (195) on Reply Card



**Digital Controlled Processor** — This inexpensive, stereo tri-band processor boasts user-friendly controls and an aggressive sound. Mono stations can take a step toward AM Stereo, at a price that won't break the budget.

Circle (196) on Reply Card



**Impedance Bridges** — At last, a means of measuring your impedance under full power. Both portable and in-line bridges are available, with a variety of features, for both AM broadcast and HF applications. The in-line Common Point Bridge can be supplied with a TCA RF Ammeter to permit precise current and impedance measurements.

Circle (189) on Reply Card

See us at NAB Booth #4518

The Above Standard  
Industry Standards.

DELTA ELECTRONICS



Delta Electronics, Inc. • 5730 General Washington Dr.  
P.O. Box 11268 • Alexandria, VA 22312 • U.S.A.  
Telephone: 703-354-3350  
FAX: 703-354-0216 • Telex: 90-1963

©1988 — Delta Electronics, Inc. C-QUAM is a registered trademark of Motorola, Inc. Manufactured under license from Motorola, Inc.

Circle (198) on Reply Card



**AM Antenna Monitors** — These are true ratio monitors which deliver a ratio reading without the need to continually reset the reference tower to 1.000. This simple operation reduces errors by non-technical personnel and makes tuning an array easier.

Circle (197) on Reply Card



use the M/E systems to route signals to and from digital effects units, this switcher provides an auxiliary routing scheme, called Digi-Loop. (See Figure 1.)

The Digi-Loop allows for any 1- or 2-channel digital effects unit to be interfaced within the switcher and be in both the video and key signal path at any point that the operator wishes. One of the ADO 2000 channels already owned by the station was interfaced into the Digi-Loop without tying up the effects buses. These types of considerations make the unit comparable

to switchers with multiple effects systems.

#### System control

When the switcher was unpacked, the producers were surprised at the small size of the control panel. The panel measures 12¼ inches from front to back, so it hardly seemed that it could live up to its many promises. It took a demonstration of the panel functions to convince everyone of its capabilities.

The adjustable values and status of the switcher are displayed in an elec-

troluminescent window. Although the display looks imposing at first, operators soon learn what is being shown. Setting of parameters is accomplished through a series of menu levels, selected with a row of buttons located along the bottom of the panel. Along both sides of the panel are up and down "soft keys" to digitally adjust parameters; changes are shown graphically in the display. Functions of the soft keys change, based on the current menu level. Also, complete control of the new ADO 100 is possible with this arrangement.

In addition to the menu display, two remote-control panels are available. The first is an X-Y-type bus control panel that can be used to access eight of the switcher's 12 buses from a remote position. The station opted for the second remote option, a rack-mount 24-button control panel. Linked to the setup and sequencing memories and GPI capabilities of the switcher, this panel provides immediate remote access and triggering for 24 preprogrammed functions.

This controller makes it possible to recall frequently used setups without using the menu system in the electronic display. Communication from these panels to the switcher electronics bay uses looping RS-422 connections through a 9-pin D connector.

#### Installation

Putting the switcher into service was easy, and no problems came up. It did, however, take time to get incoming video and pulse lines cut to proper lengths for timing requirements throughout the plant. After connecting the timed inputs and a reference, the staff adjusted black and background timing to match the station's sources. It then took only a slight tweak of program/preset timing. Since the installation, few adjustments have been needed. Other than indicator lamps, there have been no component failures in 14 months of continuous use.

The equipment that is tied into the switcher includes three VPR-80 1-inch VTRs and a BVU-950 ¾-inch VTR. Their inputs are fed from one of four auxiliary switching buses. Two of these buses have switcher mix/effects re-entry available as sources. Also connected is an editor, a character generator, one ADO 2000 channel, two TK-45 cameras and two router output channels for other external sources.

For audio, a reel-to-reel recorder, two cart machines and a harmonizer are connected to a 12-channel audio board. Telephone audio for the console is supplied from a speaker phone. A separate audio operator is involved only when the control room is on-air. He's often busier than the Vista operator.

## A SURE CURE FOR FLASHOVER

electrically  
transparent  
**Phillystran®**  
TOWER GUYS

Phillystran is now protecting more than a thousand broadcast towers ☐ preventing white-noise arcing across ceramic insulators (they aren't required) ☐ eliminating problems with on-off cycling due to static discharge on steel guys.

With Phillystran HPTG, tower-guy maintenance and costly re-guying are problems of the past.

For all the Facts—including "Electrical and Mechanical Analysis of Synthetic Tower Guys"—call/write



**Phillystran®**

**UNITED ROPEWORKS (U.S.A.) INC.**

151 COMMERCE DRIVE  
MONTGOMERYVILLE, PA 18936  
FAX: (215) 362-7956  
(215) 368-6611 TELEX: 846342

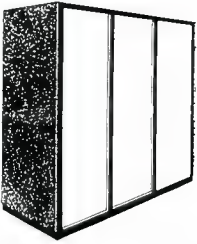
Circle (182) on Reply Card





# STS builds custom racks and consoles at modular prices.

One of the problems with buying "5-day delivery specials" and "off-the-shelf," standard-size racks and consoles is that you get standard quality. That never happens at Skaggs Telecommunications Service (STS). We specialize in fabricating high quality, uniquely designed custom racks and consoles for a wide variety of uses, from edit and master control suites to dispatch and military command centers. And you're not limited to a standard height, depth or width.



*STS custom builds racks and consoles to meet your specifications.*

We can meet your exact equipment specifications. And even though you may need only one rack or con-

sole, you can still choose from an array of woods, moldings and colored laminates to match your color scheme. Our custom racks and consoles are welded, not bolted together. A tough, baked-on epoxy-powder finish guarantees a long life and great looks. An adjustable rear rack rail allows you to position any size equipment, any way you want. There are no middlemen to mark up the price because you buy directly from us. You can receive custom racks and consoles at a modular cost. Invest the time to get the quality you deserve, call STS today.

## "I'm interested in STS custom racks and consoles."

- ☐ Please call me at your earliest convenience.
- ☐ Please send me more information about STS.

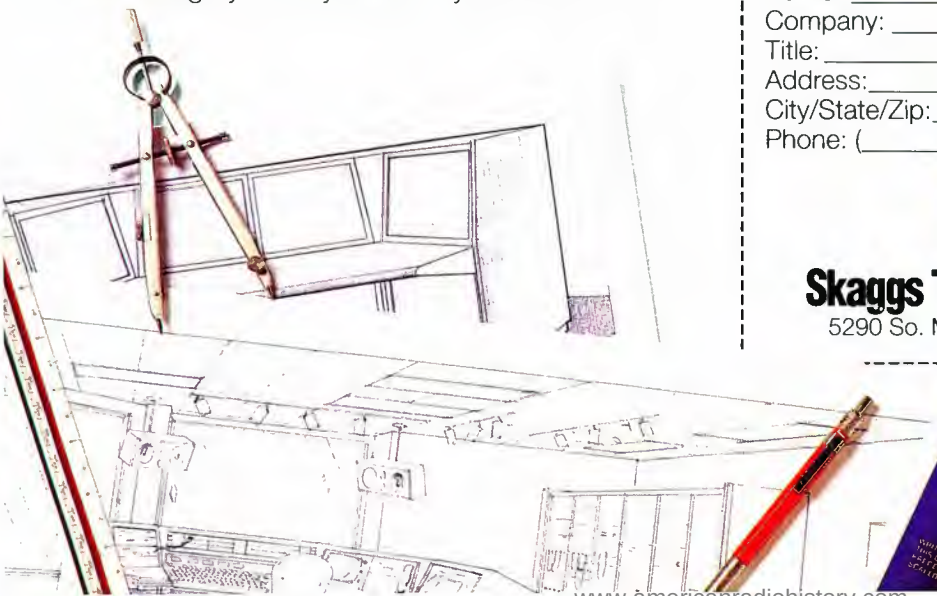
Name: \_\_\_\_\_  
Company: \_\_\_\_\_  
Title: \_\_\_\_\_  
Address: \_\_\_\_\_  
City/State/Zip: \_\_\_\_\_  
Phone: (\_\_\_\_) \_\_\_\_\_



**Skaggs Telecommunications Service**

5290 So. Main, Murray, Utah 84107 (801) 261-4400

Circle (203) on Reply Card







#### HIGH PERFORMANCE AT AFFORDABLE PRICES

- New front panel programmable composite STL's
- New directly programmable FM composite receivers
- New options for synchronous boosters and translators
- New FM exciters, transmitters, amplifiers: 2W to 30KW
- Same old price, quality, service and reliability

BEXT Inc.  
739 Fifth Ave.  
TLX 229882

Tel. (619) 239-8462  
San Diego, CA 92101  
FAX (619) 239-8474

Circle (205) on Reply Card

#### Production

The promos for the movies are completed in this room by one operator following directions from a producer. Movie editing follows a cut list prepared by the film department. A 3/4-inch cassette, with time code burned in, is made simultaneously with all film-to-tape transfers or dubbed from existing 1-inch copies of the movies. The promo producer and film department use the 3/4-inch copy to make their decisions and selections for editing and promotions.

Promos created in this control room are as good as any production originating in the large control room, which is primarily used for newscasts and commercial work. Some projects actually move faster in the smaller room. It is impressive to see how much a single operator can accomplish when given the right tools.

#### The challenge

A big test of the switcher's capabilities recently came when the station agreed to do a 3 1/2-hour telethon during prime time. The main control room was committed to preparing the newscast that immediately followed the special program, and the remote truck couldn't handle everything that was planned. Five cameras were be-

ing switched at the remote site. Two additional cameras were used in the studio.

Other local sources included preproduction tapes and a continuous keying of telephone numbers. Occasional keys of name supers and titles also were needed. The newscast ran immediately afterward, and the transition to the main control room was smooth.

The WRGB staff would like to think that the switcher was one of the reasons pledges ran \$200,000 over the goal and why reviews by the local newspaper credited the crew's efforts for this top-notch production. At any rate, the Ampex Vista brought some magic to this telethon.

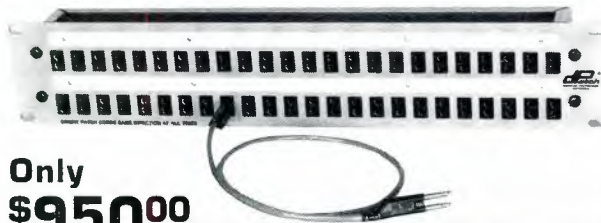
**Editor's note:** The field report is an exclusive BE feature for broadcasters. Each report is prepared by the staff of a broadcast station, production facility or consulting firm.

In essence, these reports are prepared by the industry and for the industry. Manufacturer's support is limited to providing loan equipment and to aiding the author if support is requested in some area.

It is the responsibility of **Broadcast Engineering** to publish the results of any piece tested, positive or negative. No report should be considered an endorsement or disapproval by **Broadcast Engineering** magazine.

1:2:0000

**dPatch**  
DIGITAL PATCHING  
SYSTEM



Only  
**\$950<sup>00</sup>**

#### NORMALING RS 422 EDITOR TO VTR MACHINE CONTROL PATCHING

Call Jem-Fab to order your D Patch Model I  
**(516) 867-8510 • FAX 867-8007**

**JF<sub>C</sub>**  
Jem-Fab Corp.

Circle (204) on Reply Card

**AS-101 AUDIO SWITCHER**

- Illuminated and legible control buttons
- Instant or overlap switching
- Front panel accessible level controls
- Optional RS-232 Interface
- Optional relay follow switch outputs
- Plug-in screw-clamp terminals

**CONEX** ELECTRO SYSTEMS

P.O. Box 1342 Bellingham, WA 98227 (206) 734-4323

Circle (206) on Reply Card

# Moving?

Take us with you.

Just peel off your subscription mailing label and attach it to the address change card inside this issue. Please allow 6-8 weeks to process your address change.



# In control.

Take control of news and program feeds with the new Agile Omni Broadcast satellite receiver.

Capture virtually any C/Ku band feed by manually or remotely selecting the preset satellite format and transponder position. The receiver automatically sets the satellite RF center frequency; full/half transponder channel spacing; I.F. filters; antenna polarity; audio subcarrier bandwidth, center frequency, and de-emphasis; and video polarity.

And with remote control options, you can set up one or a whole network of receivers from a master control computer. The

analog-to-digital converters allow remote diagnosis of signal strength, monitoring of receiver performance and diagnosis of problems. So you can reduce costs, human involvement—not to mention human error—and never miss an important satellite feed.

There's a lot more you should know about the Agile Omni Broadcast—and Standard—than we can tell you in a single ad. Like the RS250B (satellite) proof of

performance and certificate option, and Standard's unique Gold Standard warranty and repair program.

Which is a very good reason to call Standard today at (800) 243-1357.

We put you in control.

*Raise your standards.*



**SATCOM Division**

P.O. Box 92151

Los Angeles, CA 90009-2151

Telephone: (800) 243-1357

In California (800) 824-7766

(213) 532-5300 Telex: 67-7173

Circle 208 on Reply Card





**Greg Smith** has rejoined EEV, Elmsford, NY. He is responsible for the sale of broadcast products in Arkansas, Iowa, Kansas, Louisiana, Missouri, Nebraska, Oklahoma and Texas.

**John W. Shike** has been appointed director of marketing for CMX, Santa Clara, CA. Shikes was previously a senior product manager for the company.

**Peter du Fosse** has been appointed general manager of the traveling wave tube division (TWTD) of Varian Associates, Palo Alto, CA. He will direct the engineering, marketing, manufacturing, personnel and financial functions of the division, which has approximately 500 employees.

**Franklin B. Sullivan** and **David Hartley** have been appointed to positions with New England Digital, White River Junction, VT. Due to a realignment of the sales and marketing departments, Sullivan becomes vice president of marketing and product development. He is responsible for all of the company's marketing, market development and new product programs. He also will develop the third-party developers program and the joint product development program already under way with Lucasfilm Ltd. He was previously vice president of sales. Hartley is vice president of sales.

**Steven B. Pequinot** has been named systems sales manager, systems division, for A.F. Associates, Northvale, NJ.

AMS Industries, under the direction of Ridge Nye, president, has appointed **Interface Audio**, Atlanta, to represent its products in Tennessee, North and South Carolina, Georgia, Florida, Mississippi, Alabama, Louisiana and Texas.

**Rolando C. Esteverna** has been appointed to the newly created position of CEO for Digital F/X, Mountain View, CA. He is responsible for directing the company's business management team and developing corporate strategic plans.

**Joseph A. Flaherty**, vice president and general manager, engineering and development, CBS, was decorated as a "Chevalier dans l'Ordre des Arts et des Lettres" by the Republic of France. The award was conferred by Jack Lang, the French Minister of Culture and Communication. The decoration was presented by Annie Cohen Solal, Conseiller Culturel, at the French Embassy in New York. The award rewards persons who have distinguished themselves by creative work in the fields of the Arts and Letters and by their contribution to propagating the Arts and Letters in France and all over the world.

**Michael B. Hobart** has been appointed to the newly created position of Southern regional sales manager for For-A Corporation of America, Newton, MA. He is responsible for support of factory representatives, dealers and end-users throughout an 11-state territory.

**J. Gordon Bridge** has been appointed senior vice president of Hughes Television Network (HTN), New York. He will coordinate HTN's live TV sports transmissions, and will work with broadcast rights holders for the NHL, NFL, NBA and Major League Baseball, the main markets for HTN's backhaul transmission services. Bridge was previously vice president, communications services.

**Jerry Rankin** has been named Southeast regional sales manager for James Grunder & Associates, Mission, KS. He will handle sales for the CEL and YEM product lines in North and South Carolina, Georgia, Tennessee, Alabama, Florida and Puerto Rico.

**Mike Yoshida** has been named vice president of JVC Professional Products Company, Elmwood Park, NJ. He is responsible for overseeing the sales/marketing and administration departments.

**Ron Radio Communications**, Brightwaters, NY, is North American distributor of commercial audio and RF products for Electron Processing.

**Mark L. Sanders** has been appointed president and chief executive officer at Pinnacle Systems, Santa Clara, CA. **Walter E. Werdmuller** has been promoted to vice president, sales.

1:7-9)))

THE NEW

# MASTERKEY

SERIES FROM



Flawless LINEAR KEYS of anti-aliased DVE's and CG's. Halos, comet tails, air brushed edges and sparkles are no longer a keying problem.



FOUR MODELS WITH FEATURES  
AND CONTROL SYSTEMS FOR  
EVERY APPLICATION.

- Downstream or stand alone
  - Frame accurate mix to key, fade to black
  - Serial remote control    • GPI interface
  - Key source input switcher    • Processed black
  - Key set memory    • Preview output
  - Internal key area masking

## broadcast video systems ltd.

40 West Wilmot St., Richmond Hill, Ontario L4B 1H8

Telephone: (416) 764-1584    Fax: (416) 764-7438

**PRECISION MAGNETIC  
TEST TAPES**

**STL**

Standard Tape Laboratory, Inc.  
26120 Eden Landing Road #5, Hayward, CA 94545  
(415) 786-3546



Circle (210) on Reply Card

**Free Catalog & Audio/Video Applications**

**ROUTING SWITCHERS**  
 Routing Switchers (S1-A/V)  
 (24, 16, 12, 8, 4, 2 stations)

**VIDEO & AUDIO DIST. AMPLS.**  
 RGB-Sync Dist. Amps.

**PRESS BOXES**  
 1-1/16" Video/Audio  
 2-1/4" 24-out Audio

**OPAMP LABS INC (213) 934-3566**  
 1033 N Sycamore AV LOS ANGELES CA, 90038

Circle (211) on Reply Card

**SEE US AT  
BOOTH 9005.**

Sierra Video Systems  
916-273-9331  
Grass Valley, CA

Circle (201) on Reply Card





Professional Equipment for Radio and TV.



**May 16/19 1990**

**11:00 am to 8:00 pm**

**(closing on the 19th at 5 pm)**

**Casa de Campo. Fair Grounds  
Madrid Spain**



INSTITUCION FERIA DE MADRID



Recinto Ferial de la Casa de Campo. Avda. de Portugal, s/n. Apartado de Correos 11.011.  
28011 Madrid, SPAIN. Tel 470 10 14. Telex: 44025-41674 IFEMA E. FAX: (1) 464 33 26 / 47C 28 12

**COINCIDIENDO CON**

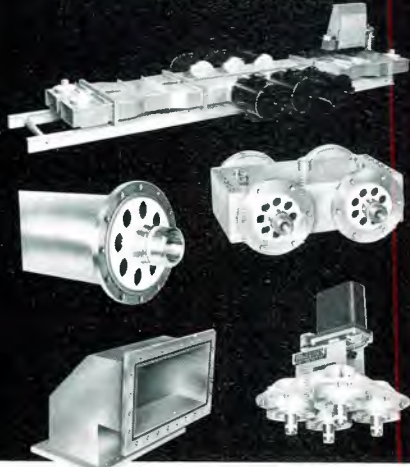




## BETTER BY DESIGN

### COMARK

#### HIGH POWER RF TRANSMISSION LINES AND COMPONENTS



- Commercial or military applications.
- Turnkey or custom designed systems.
- Full line of coaxial and waveguide transmission lines, components and accessories — off the shelf or custom designed, including: FM Antennas • elbows • couplers • diplexers • high power RF filters • color notch filters • RF patch panels • power dividers • quadrature hybrids • RF switches • tuners • transitions • impedance transformers • phase shifters • combiners

**See us at NAB Booth #5920**

For all of your High Power RF needs from 1MHz to 1GHz and up to 500kW, Write for Comark's Engineers Design Manual/Product Guide.



Contact: Ken Barker  
P.O. Box 229  
RT. 57, Feeding Hills Road  
Southwick, MA 01077  
(413) 569-0116 • Fax: (413) 569-0679  
Circle (233) on Reply Card

### Carle and Associates purchase 3M's ITC

*Carle and Associates*, in an agreement with 3M, purchased its International Tapetronics plant and operations. The acquired company operates under its previous name of International Tapetronics Corporation (ITC).

In addition to ITC's hardware lines, the company will market the ScotchCart II broadcast cartridge and Scotch 219 brand lubricated tape. These products will be manufactured exactly as they have in the past, however, the ScotchCart II cartridge will be renamed because it is a 3M trademark.

### The Radio Club of America announces competition

*The Radio Club of America*, New York, has announced a cash prize competition for the best original essay by an undergraduate or graduate student on the life and accomplishments of the founder of FM broadcasting, the late Major Edwin H. Armstrong.

Three awards of \$1,000, \$750 and \$500 will be awarded to the three best entries as determined by the prize committee. The winning entries will be published in a special issue of *The Proceedings* of the Radio Club, to be published in November, in commemoration of the centenary of Major Armstrong's birth.

Essays must be in English, should not exceed 7,500 words and must not have been previously published. Three copies of the entries must be received by June 1, accompanied by documentation of student status. Mail entries to Dr. John Ryder, chairman of the prize committee at 1839 SE 12th Ave., Ocala, FL 32670

### AMS expands U.S. operations

*AMS Industries plc*, United Kingdom, plans to relocate its wholly owned subsidiary, AMS Industries, to Northern California.

### Anvil Cases relocates facilities

*Anvil Cases* has relocated its facilities to City of Industry, CA. The new, larger facility houses more than 300 employees and features state-of-the-art equipment. Anvil also is introducing a 16-page full-line product brochure.

### Bryston announces 20-year warranty

*Bryston*, Toronto, Canada, has announced its 20-year warranty policy. It is retroactive and includes all audio products previously manufactured and sold under the Bryston name. The company will pay shipping costs one way and all parts costs and labor are fully covered. The warranty

is fully transferable from first owner to any subsequent owners. If you have any questions concerning the warranty, call Martin Bartelstone at 800-673-7899.

### Comark doubles the size of manufacturing facility

*Comark Communications*, Colmar, PA, has completed the expansion of its Southwick, MA, manufacturing facility. The plant has 40,000 square feet, which allows the company to increase the volume of its RF component manufacturing and warehousing and improve customer response time through additional stocking capability.

### Asaca signs Honeywell

*Asaca/Shibasoku*, Los Angeles, has entered into a supply agreement with Honeywell, Test Instruments Division, to sell robotic systems. Honeywell will purchase a variety of robotic configurations. It will integrate its digital tape products and control software with Asaca's robotic library management system, creating a random access data storage system. The robotic digital storage system has a formatted capacity of more than 3 terabytes and can connect to most computer systems via standard network protocols. The entire robotics systems requires only the floor space of an average office desk.

### Taurus Communications expands operations

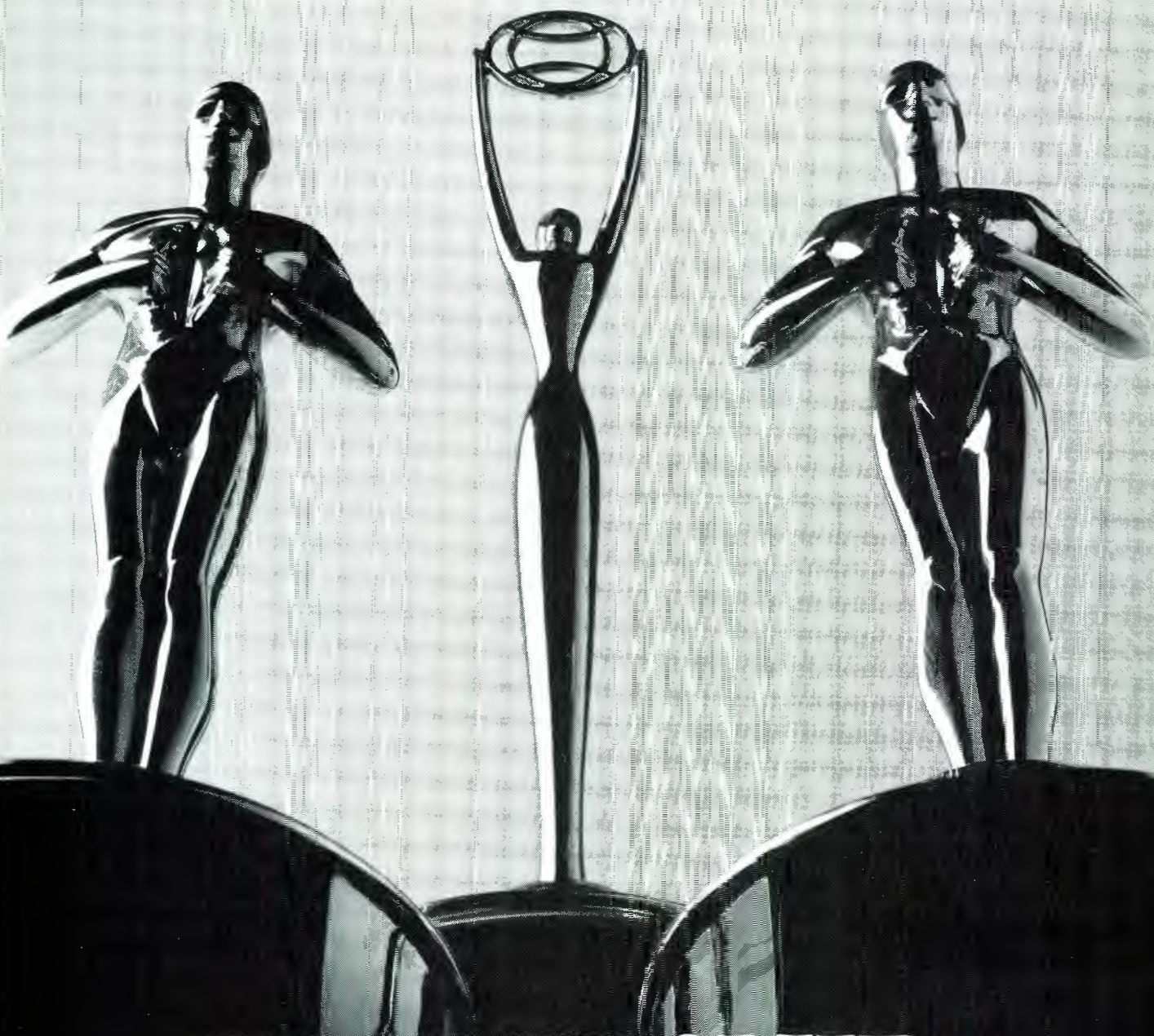
*Taurus Communications*, Framingham, MA, has begun operation in Nashville, with the affiliation of Link Up Communications. A segment of the organization's fleet of satellite transmission vehicles will be permanently assigned to Nashville, and will cover a 750 mile radius. Taurus Communications and Link Up will provide Ku-band satellite transmission vehicles carrying state-of-the-art encryption, satellite communications packages, airborne Ku-band fly-away packages and guaranteed transmission with redundant amplifier systems and equipment.

### New England Digital opens headquarters in UK

*New England Digital UK* has moved into a new 3,000 square foot state-of-the-art facility in West London's Hammersmith section. The office is comprised of three fully equipped demonstration studios (music recording, post-production and broadcast) that are all serviced by a central computer room containing five of the company's systems. The office also features seminar and classroom facilities.

*Continued on page 261*





# LEADERSHIP HAS ITS REWARDS.

Video leaders see the Sony difference not only in the quality of their pictures, but in their trophy cases.

Award-winning producers, editors, news teams and duplicators rely on Sony professional videotape to capture their best creations. They

see a virtually perfect balance of durability, reliability, audio-video performance and responsiveness in sales and service.

That's why Sony, the leader in professional videotape, is the choice of video leaders. Worldwide.



**SONY**  
PROFESSIONAL VIDEOTAPE

© 1990 Sony Corporation of America. Sony is a registered trademark.

Circle (213) on Reply Card  
[www.americanradiohistory.com](http://www.americanradiohistory.com)



MATRIX OF VIDEO SIGNAL TRANSMISSION REQUIREMENTS

|                            | Composite<br>1 Channel | Component<br>3 Channels     | Component<br>2 Channels | Component<br>1 Channel |
|----------------------------|------------------------|-----------------------------|-------------------------|------------------------|
| Analog<br>Bandwidth (MHz)  | NTSC<br>4.2            | RGB<br>30 per channel       | Y/C<br>Up to 10         | MAC<br>Up to 12        |
| Digital<br>Bit Rate (Mb/s) | D-2<br>140             | CCIR 601.1 (D-1)<br>108 (Y) | None<br>—               | D-1 Serial<br>270 Max  |

Table 1. Several interconnect options shown in the matrix of signal transmission requirements.

## TC 1280/1380

# Give us an inch...

... a foot or a meter and the new TC digital audio delays will give you precisely calculated delay times. Of course you can enter delay times as you would on any delay, choosing increments clear down to 5 microseconds. The group delay and Left-Right phase linearity are absolutely outstanding.



The TC 1280 (Stereo) and TC 1380 (3 Tap) delays are based on the technology that made the TC 2290 the most sought after delay unit in the recording industry. We have kept the superb frequency response, low distortion and noise free signal path and added the features most needed in critical applications.



Frequency response: 20-20 KHz +0/-0.5 dB 25 KHz -3dB, Dynamic range: > 100 dB, THD: < 0.05 % 1 KHz, Analog group delay: 20-20KHz (30 microS, Group delay linearity: 20-20 KHz +/- 5 microS, Stereo synchronization: +/- 1 microS (1280), Max output: +22 dBm.

... If you are a professional in the disc mastering, broadcasting, sound reinforcement or recording fields check out these latest additions to the TC family. Call for the location of your nearest TC dealer.

OF DENMARK

## t.c. electronic

INTERNATIONAL HEADOFFICE: T.C. Electronic A/S, Grimhøjvej 3, DK-8220 Brabrand, Denmark, Ph. 45 86 262800, Fax 45 86 262928 • USA: T.C. Electronic USA Inc., North Hollywood, 818 503 0404 • UK: T.C. Electronic UK Ltd, Oswestry, 691 658 550 • GERMANY: T.C. Electronic of Denmark GmbH, Dermold 05231 32972 • AUSTRIA: T.C. Electronic of Denmark GmbH, Detmold, 49 523 132972 • AUSTRALIA: East Coast Audio, Melbourne, 03 241 2244 • BELGIUM: James B. International, LE Cap af Jijel (HOLLAND), 0031 10 4588166 • CANADA: T.C. Electronic USA Inc., North Hollywood, 818 503 0404 • FINLAND: Studiotec, Espoo, 90 592055 • FRANCE: Phase Acoustic, Marseille, 91 498728 • GREECE: Lyrikon, Athens, 3628541 • HONG KONG: Jolly Sound Ltd., Kowloon, 3620202-5 • HOLLAND: James B. International, LE Cap af Jijel, 010 4588166 • ITALY: CD Videosuono S.p.A., Milano, 02 50841 • JAPAN: Otari-tec corp., Tokyo, 03 332 3211 • NORWAY: Musikk og Elektronikk A/S, Tonsberg 033 26798 • SINGAPORE: Team 108, Singapore, 748 9333 • SWEDEN: Elia Studio AB, Solna, 08 734 0750 • SPAIN: Ear Pro SA, Barcelona, 93 212 7050 • SWITZERLAND: Riverside Music, Losone, 093 352794

Continued from page 51

used as newer formats are phased in. That means that for some time, TV facilities will be hybrids of several formats, requiring several different interconnection options. (See Table 1.)

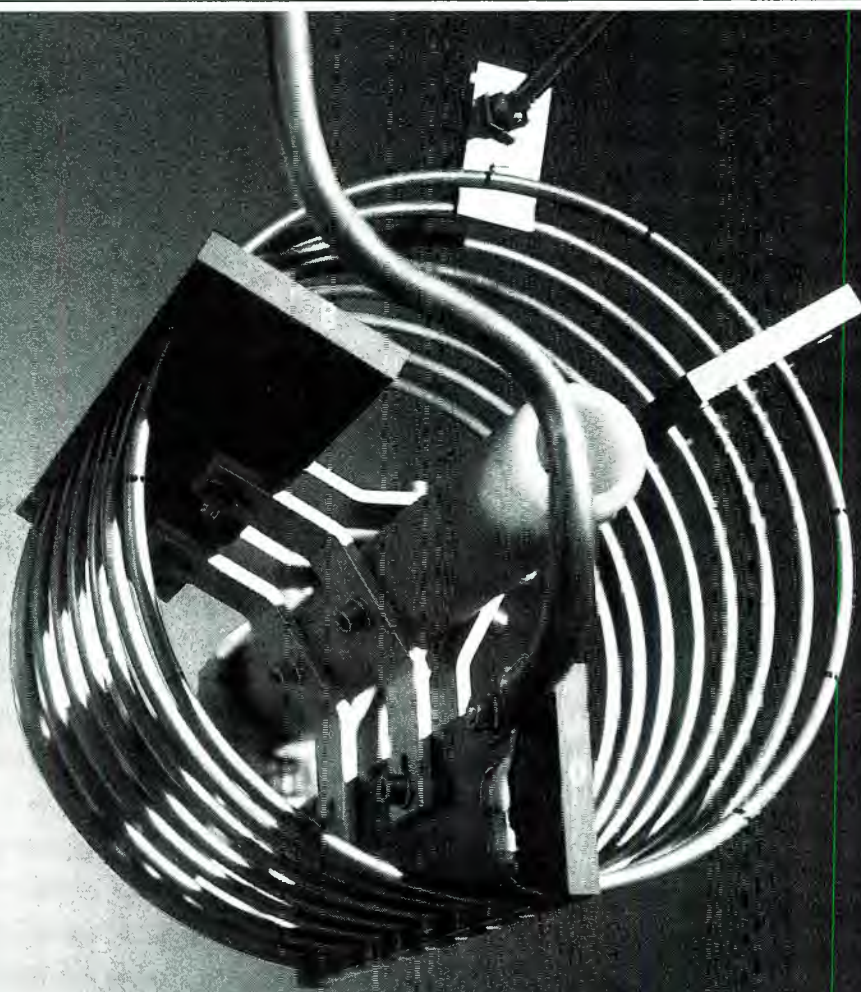
All these options call for a new generation of routing switcher, one that can keep its signals straight. This may mean that the router is built for high bandwidth and that it switches signals together, as for analog component and HDTV, or singly as for NTSC. Perhaps the incoming signals will be converted immediately to digital and switched in the digital domain, as in telephone switchgear. It remains to be seen.

Although fiber optics presents a convenient, proven method of transporting signals, with no rolloff and bountiful bandwidth, the industry still lacks a convenient, multiformat, reasonably priced interface. When this "missing link" is provided, fiber undoubtedly will become a primary system for interconnecting devices.

Until then, the signal pathway of choice is still copper.

Circle (214) on Reply Card





# On the Air with AEG.

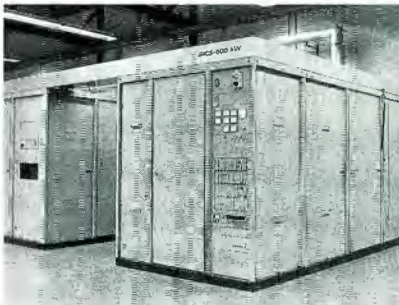
First-class technological achievements are a tradition at AEG. These successes are based on wellfounded experience, since AEG can look back on 80 years of proven transmitter design experience.

Moreover, AEG has been building broadcasting transmitters since 1923, and today it is one of the leading manufacturers offering innovative expertise in broadcasting.

Modern high-power transmitters with ratings from 100 to 600 kW, a program of long, medium and short wave broadcasting transmitters and more than 80 Pantel transmitters throughout the globe represent ultramodern engineering perfection.

Pantel is a PDM method of modulation having high overall efficiency. Significant savings of energy are achieved by using DAM (volume dependent amplitude modulation) conveniently applicable to Pantel transmitters. All short wave transmitters are offered with SSB, the operation mode of the future.

AEG supplies on a turnkey basis complete broadcast transmitting stations that guarantee high operational reliability, economic operation and long life. Further advantages are full remote-control facilities suitable for unattended operation, and compact mechanical design.



In addition to the high-power transmitters, AEG also supplies complete broadcast transmitting stations for VHF FM and Band IV/V television including suitable antenna systems satisfying all directivity and gain requirements. Of course, maintenance and thorough technical training by experts are

considered natural elements of the total AEG service.

TELEFUNKEN Sendertechnik GmbH  
Sickingenstrasse 20-28 · D-1000 Berlin 21  
Federal Republic of Germany · Telephone:  
(30) 34 63-0 · Telex 181 819 · Telefax: (30)  
34 63 24 19

## Coupon

Please send me further information on  
high-power transmitters:

Name: \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

AQ\_WAK 769 E

# AEG



Continued from page 114

with program input at a specified peak power level, which should, of course, be confirmed to be below the clipping level.

#### Calculating the odds

When A-B or A-B-X comparison tests are employed, the correlation between the subject equipment being compared to the control equipment — either straight-wire bypass or another unit — is sometimes so poor or so good that there is no question about the audibility of the factors being tested. However, on occasion, the results are a little better than 50/50. This might seem a paradox, because the results don't strongly confirm audibility, but they do appear to be a bit better than chance. Well, in statistics and probability analysis, things are not always quite what they appear to be. In the case of A-B listening comparisons, there is an underlying probability that a certain proportion of correct identifications are guesses. Consider the case of 75% correct identifications. An estimate of the proportion of *known* correct responses can be calculated as follows:

$$pk \begin{cases} 2c/n - 1 & \text{for } c/n \geq 0.5 \\ 0 & \text{otherwise.} \end{cases}$$

Where

pk = an estimate of the proportion of known correct responses.

c = total correct responses.

n = number of trials.

Solving this equation for 75% correct identification yields an estimated known correct proportion of just 50%! In other words, to be reasonably sure that something is really audible half the time requires correct identification three-fourths of the time. For small sample bases, such as the 16 trials in A-B-X comparator tests, the calculation is clearly an approximation, but more complex analysis can define the confidence limits. (The Burstein article referred to in the bibliography provides an excellent overview of listening test statistical theory, but for most station-level work the approximation described here is certainly adequate.)

#### Putting it all into perspective

The outstanding stations in the highly competitive 1990s will be those making the best use of available resources in every department. For engineering departments, this means selecting equipment that best meets the station's technical ob-

jectives and spending engineering time on those things that really matter. Most broadcasters believe that good audio and intelligent processing really matter, and so it's worth doing right.

It may take considerable extra effort to employ well-controlled procedures, but there is a special satisfaction that comes from really knowing, rather than speculating or trusting industry fairy tales. Researchers in every field of science take extreme steps to guarantee that adequate controls are in place to ensure the validity of their work. If broadcast engineering is to remain more science than voodoo, our work deserves the same structured approach.

#### Bibliography

- Burstein, H. "Transformed Binomial Confidence Limits for Listening Tests." *Journal of the Audio Engineering Society*, May 1989, Vol. 36, pp. 363-367.
- Fish, J. M. "Placebo Therapy." The Jossey-Bass Behavioral Science Series, 1973.
- Srednicki, M. "A Bayesian Analysis of A-B Listening Tests." *Journal of the Audio Engineering Society*, March 1988, Vol. 36, pp. 143-146.

1:~:~)))))

**MUSIC 4<sup>®</sup>**

**Four-Channel SCA Generator and Receiver**

SCA DATA SYSTEMS, INC.  
THE LATEST INNOVATIONS FOR  
THE SCA INDUSTRY

©Music 4 is a registered trademark  
of SCA Data Systems, Inc.

**The MUSIC 4 system represents the latest technology in SCA audio transmission. Four 5 KHz (or two 10 KHz) channels can be placed on a single 67 or 92 KHz subcarrier.**

- Superior channel bandwidth and distortion characteristics are achieved using the patented MUSIC 4 ISB subcarrier modulation.
- Superior S/N ratio when compared to conventional FM subcarrier systems.
- Advanced generator design eliminates subcarrier interference with main stereo channel.
- Generator incorporates off-the-air audio and injection monitoring.
- DATA 4 option available.

**S.C.A. Data Systems Inc.**

3000 Ocean Park Blvd. #3002  
Santa Monica, CA 90405  
(213) 452-2506 • Fax: (213) 450-5307

Circle (121) on Reply Card



## ODC triples space in new facility

## Pinnacle announces operations training courses

## Studer opens larger Los Angeles office

## NHK receives Paul Nipkow Award

worldwide contribution to communications generated by NHK's leading research, but is not specific to any particular technical or standards solution.

1:5000000

# MASTER TIMING SYSTEMS

WHEN YOU REALLY NEED TO KNOW THE TIME

**ES192A — LINE FREQUENCY ACCURACY — \$245**

FIVE SLAVES ARE AVAILABLE, AND ONE OF THEM PUTS TIME AND DATE ON YOUR MONITOR! \$183 - \$741

- FOUR SLAVES ARE AVAILABLE \$183-\$376

## PRACTICAL SOLUTIONS FOR 18 YEARS

142 SIERRA ST., EL SEGUNDO, CALIFORNIA 90245 (213) 322-2136





# New products

## Digital multimeters

By A. W. Sperry Instruments



- **DM-4100A, 4200A, 4300A:** 3½-digit multimeters; nine functions measured in 35 ranges; pocket-size, 1-hand operation; tilt stand for desktop use; models vary in capabilities with measurement options of diode, battery, HFE transistor and capacitance tests.

Circle (353) on Reply Card

## Acoustics control system

By Acoustic Sciences Corporation

- **Super Trap:** broadband sound absorber controls room resonance sometimes accentuated by dynamic speakers and subwoofers; extended base response, enhanced damping of standing waves to 70Hz; reactive acoustic circuit for self-regulating absorption; diffusion panel adjusts to scatter mid-, high-frequency components.

Circle (351) on Reply Card

## PC/digital audio

By Antex Electronics

- **Series 2/model SX-10:** plug-in card for IBM/compatible 286/386 expansion slot; digitizes two channels of audio for storage on hard disk or CD-ROM media; programmable sam-

pling from 6.25kHz-50kHz, 16-bit for 20Hz-20kHz bandwidth audio; 4:1 ADPCM data compression to reduce storage requirements; requires 1:1 data interleave controller, hard disk with less than 28msec access time and DOS 2.0 or greater; PCMEDIT option for data manipulation.

Circle (353) on Reply Card

## Digital multimeter

By Analogic



- **DP-100:** precision multimeter with 5½-digit readout; fixed, auto-ranging DMM; dc accuracy to 0.003%+2 counts; measures frequency, temperature, resistance, Vdc, true rms, Vac, current; voltage range covers microvolts to 450V, current to 2A, frequency to 25MHz; optional temperature probe.

Circle (352) on Reply Card

## Audio source

By Audio Cause

- **Reference Signal Source:** composite waveform generator; assists measurement of frequency response of audio system; output contains equal energy levels in 1/3, 1/2 and whole octave band over 20Hz-20kHz range; accuracy at 0.05dB; use instead of pink noise for tape electronics EQ, azimuth reference.

Circle (354) on Reply Card

## Swept-function source

By Beckman Instrumentation Products







## THE WORLD'S MOST SUCCESSFUL TELEVISION FAMILY

You've seen it for yourself. Many of the world's favorite television programs have been produced, edited, or broadcast on Ampex tape. From our industry standard 196 1" master broadcast video-

tape to our state-of-the-art 319 D-2 and Betacam SP metal-particle videocassettes, you get the same high quality consistently, tape after tape, carton after carton. Because every tape is manufactured to the same exacting specifications by the same experienced technicians in the

same ultraclean plant. No wonder more demanding professionals demand more Ampex tape. It's a television success story... all around the world.

**AMPEX**  
THE PROFESSIONAL CHOICE

Ampex Recording Media Corporation  
401 Broadway, Redwood City,  
CA 94063, (415) 367-3809

SEE US AT NAB BOOTH #2200

Circle (217) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)



- **FG3A:** sweep-function generator; seven frequency ranges from 0.2Hz to 2MHz; sine, triangle, square wave, TTL/CMOS pulse outputs; linear, logarithmic sweep and AM/FM modulation of internal, external signals; 5-digit counter; external control 0V-10V input provides 1,000:1 frequency change.

Circle (356) on Reply Card

### Data noise filter

By Ball Company

- **DigiFilter:** modem noise filter; for data rate range 300-4,800 baud internal, external modems; variable threshold; improves reliability of data communications on otherwise noisy telephone pairs; RJ-11C connectors; available with integrated lightning/surge protection; requires no external power.

Circle (355) on Reply Card

### Frequency measurements

By Beckman Instrumentation Products



- **FC130A:** dual-channel frequency counter; 0.01Hz-120MHz, 50MHz-1.3GHz ranges; 8-digit LED readout of frequency, period, rate/minute measurements; 10mV input sensitivity with ac/dc-coupled inputs; continuously variable gate time, triggering adjustments.

Circle (357) on Reply Card

### Lab power units

By Beckman Instrumentation Products

- **MPS60, MPS100:**  $\pm 15\text{Vdc}$  or  $\pm 30\text{Vdc}$  dual-output, benchtop power supplies, rated 2A and 3.5A; for maintenance shop or R&D facility; digital meters show voltage and current simultaneously; current limiting, reverse polarity protected; isolated outputs.

Circle (358) on Reply Card

### Power-line monitoring

By Electro Industries

- **DMMS100:** digital multifunction metering system; provides full metering of voltage, current, power, power factor and power frequency; EEPROM holds preset parameters, maximum readings, total kilowatt/kVA hour values; two alarms based on out-of-tolerance conditions; for 3-phase, 4-wire service to 600V, 12kA; software allows link to PC running MS-DOS for constant power-condition monitoring.

Circle (367) on Reply Card

### Solenoid repair

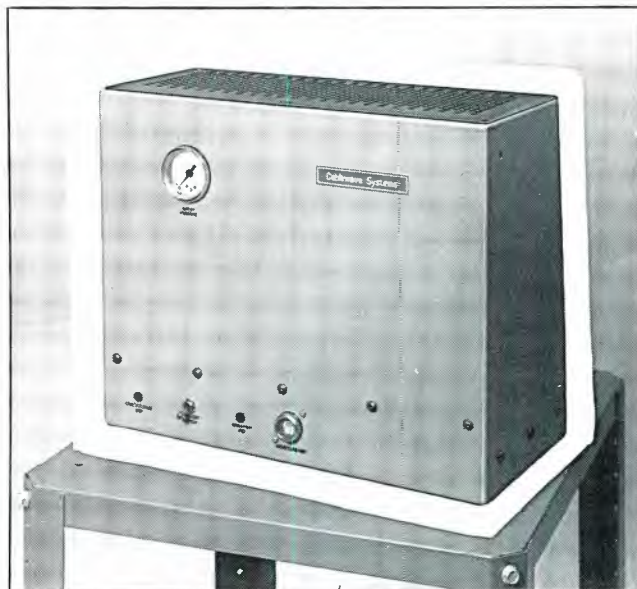
By Broadcast Automation

- **PN 250-020A:** spring-loaded solenoid plunger screw; replacement part for use with SMC 250 Carousel systems; avoids pinchroller sticking in the engaged position, which may result in a jammed automation machine.

Circle (359) on Reply Card

### Feedline dehydrator

By Cablewave Systems



- **APD-70:** automatic pressurization dehydrator; operates from 117Vac; rating of 0.7 SCFM for use in systems to 1,700 feet of 6 1/8-inch diameter transmission line; provides close control over output pressure; accessory includes high-pressure alarm.

Circle (360) on Reply Card

### Digital signal processor

By Corporate Computer Systems



- **MICRO56:** digital audio terminal; bidirectional 7.5kHz channel using 56k to RAM; 64x oversampling on input, 8x oversampling on output avoids brickwall filtering; meets CCITT G.722 Mode 2 ADPCM standard for signal compression; XLR connectors for analog input, output connections at standard signal levels to dial-up telephone, earth-station facilities.

Circle (362) on Reply Card



## CRT maintenance

By Conway Manufacturing

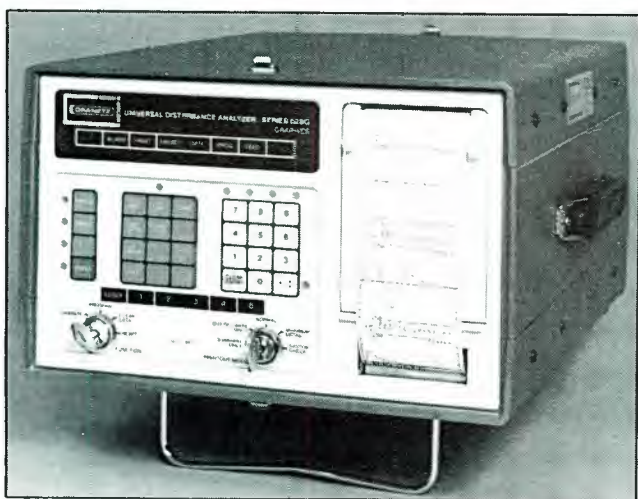


• **Beltron System:** restoration unit for picture tubes; available as manual or microprocessor controlled; usable with monochrome, color CRTs; isolation transformer, regulated filament circuit; current-limiting for positive protection of operator and CRT; range of adapters and accessories to match any tube type.

Circle (361) on Reply Card

## Power analyzer

By Dranetz Technologies



• **626G analyzer:** full-time power-line monitor analyzes disturbances of power source; integral recording capability, waveform graphics printing; array of plug-in modules available for monitoring of voltage current, temperature, humidity, harmonics, demand, impulse energy, alarm events; software package for retrieval of data and control from remote PC.

Circle (365) on Reply Card

# WE'VE MADE DEAD AIR A DEAD ISSUE.

There are worse things in radio than dead air. But not many.

And if your CD players aren't built to resist tracking errors, you could find yourself listening to some very embarrassing silence.

Not with the new CD-701 from Tascam. Its unique disc clamping system is a technological triumph that virtually eliminates disc vibration. So you never hear the awful hush that means a tracking error has occurred.

What you do hear is the finest sounding CD unit you can buy, with the same proprietary "ZD Circuitry" praised by two of Japan's top audio magazines\* for eliminating low-level digital distortion.

Then there's the optional RC-701 Remote Control with Auto Cue so you can cue to the music instead of the track (for even less dead air). Or you can add the Ram Buffer for true, instantaneous startup.

And with four times oversampling and 16-bit D/A converters in an extra-rugged chassis, the CD-701 is superbly designed for the broadcast environment.

Can a CD player really deliver this kind of performance, track after track, disc after disc? Only if it's a Tascam.

Contact us or visit your Tascam dealer for more information about the CD-701. And take the sounds of silence off your playlist.

## TASCAM



©1989 TEAC America, Inc., 7733 Telegraph Road, Montebello, CA 90640, 213/726-0303  
\*Radio Technology Component Grand Prix '88, CD Division, Stereo Sound Component of the Year (1988) & Best Buy (1988)

Circle (218) on Reply Card



# The Edit Code Master

## The ECM 4010



- Generates VITC and LTC
- Reads VITC (0 to 40x)
- Reads LTC (1/30th to 70x)
- Translates between formats
- High resolution Character Inserter
- Several Jam sync modes, including time→user bits
- RS-232/422 interface for command and data ctrl.

This top line Edit Code Master combines a generator and reader for both LTC and VITC with a built-in character inserter making it the most comprehensive answer to all of your time code needs.

We manufacture a complete range of VITC and LTC time

code equipment, machine synchronizers, ATR and VCR to editor interfaces, automatic edit listers and other editing equipment. We also have a modular system designed for custom and/or OEM applications. Call us today for details!

**evertz**

SEE US AT NAB BOOTH #6444  
FAX: (416) 335-3573

EVERTZ MICROSYSTEMS LTD.  
3465 Mainway, Burlington,  
Ontario, Canada. L7M1A9  
TEL: (416) 335-3700

Circle (219) on Reply Card

## IN A HURRY? AUTOMATE TIMING WITH FASTIME.



- Automatically adjusts delay for sync timing up to 1575 Nanoseconds.
- Burst timing automatically adjusted.
- Automatically times 16 channels in less than 60 seconds.
- Delay settings are stored during power failure or maintenance, even if cards are removed from rack.
- Manual fine trim is available on each channel.
- Allows manual selection and timing adjustment of each channel.

Call or write for Application Brochures  
from Allen Avionics and BAL.

**ALLEN AVIONICS, INC.**

224 East Second Street, Mineola, NY 11501  
Tel: 516-248-8080 Fax: 516-747-6724



Circle (234) on Reply Card

## Satellite signal simulation

By CTS Systems/Wavetek

• **Model 1470:** satellite receiver test set; 45MHz-95MHz IF sweep signal, 0 to -79dBm level, crystal-controlled markers; simulates signals from satellite to troubleshoot earth-station receivers; modulation available from external source or internally with color bars, dispersion and audio subcarrier signals.

Circle (363) on Reply Card

## Time-code source

By Denecke

• **Dcode SYNCBOX:** LTC generator works with TS-1 time-code slate; generates all common time-code formats; operates stand-alone or jam-synced from an external source; 60 hours of use from one 9V alkaline battery.

Circle (364) on Reply Card

## Maintenance software

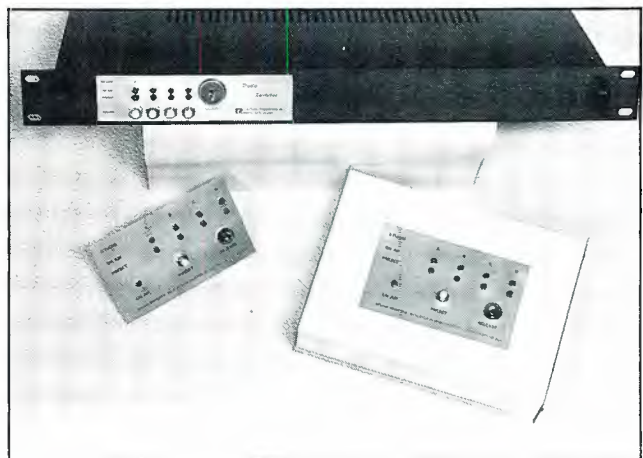
By Eagle Technology

• **EMM 3.0:** Expert Maintenance Management software; combines artificial intelligence and expert system concepts to maintain equipment history, preventive maintenance, spare parts inventory and other information for equipment maintenance department; interface for dBASE, LOTUS, DIF file formats, mainframe systems; bar code label module available.

Circle (366) on Reply Card

## Audio routing

By Electron Processing



• **Studio switcher:** controls signal routing of four stereo sources to one stereo output; preset button puts one studio ready to go on-air when the current studio release button is pressed; status indicator panels, override control panels; sealed reed-relay switching; 9-conductor control cable kept separately from audio signal lines to avoid crosstalk.

Circle (368) on Reply Card

## Mic mixer

By FSR

• **MPA-2 2-mic mixer:** for dynamic, phantom-powered microphones; independent gain, sensitivity adjustments; 600Ω transformer-coupled output; silent switching; uses EZ15, EZ-PHP-15 power supply.

Circle (372) on Reply Card



### **Patchbays, rack slides**

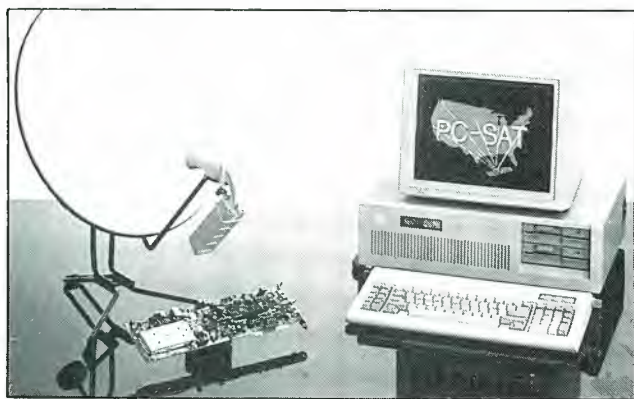
By ERGO Industries

- **Audio patchbay:** prewired audio patching products; various connectors, configurations available.
- **EIS-5000T:** VCR tilt-and-lock slide mount kits for VCRs; equipment remains in rack while maintenance is being performed.

Circle (369) on Reply Card

### **Microwave/satellite antenna**

By ISS Engineering

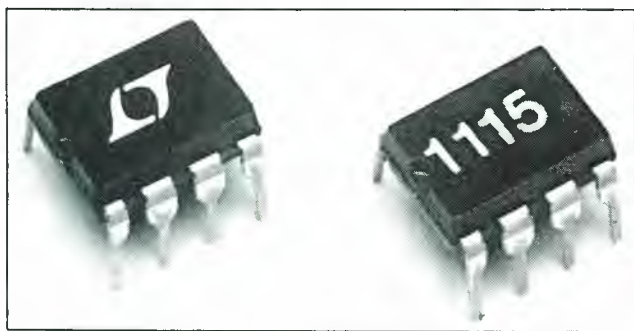


- **No. 4518 antenna system:** 18-inch dish antenna, high gain, directivity to 23GHz; fiberglass-based plastic construction; Ku-band feedhorn, LNB; use with PC-SAT satellite receiver card for single slot in PC.

Circle (374) on Reply Card

### **Audio op-amp**

By Linear Technology



- **LT1115:** low-noise audio operational amplifier; less than 120nV rms noise over dc-20kHz frequency range; configured to drive a 60Ω load, THD is less than 0.002% at 10kHz; CCIF IMD less than 0.0002%; gain is 2 million, gain-bandwidth product is 40MHz; minimum slew rate of 10V/μsecond.

Circle (377) on Reply Card

### **Still-frame audio**

By Fast-Trax Digital Technologies

- **SES-300/PCAT-300:** still-frame audio encoder, decoder; converts audio signal to analog video for storage as still frames on videodiscs; 300:1 compression of data permits one frame to contain 10 seconds of voice-over narration or other au-

# WHEN IT'S TIME TO WORK, WE PLAY.

## ON AIR

Few things can make you look worse than equipment that doesn't work on cue. What you need is a CD deck that's at home in the studio, not at home in the home.

Tascam's CD-401 and CD-501 were especially designed for the broadcast environment. Their extra-rugged chassis design insures consistent, reliable performance even through demanding non-stop use.

Disc after disc, day after day, year after year.

Of course, they include all the features you'd expect. Independent DA converters for the left and right channels, balanced +4 outputs and sub code out for system automation.

Plus a 3-beam laser pick-up that provides perfect alignment and instantaneous error correction.

Don't let a consumer deck turn your programming into the original amateur hour. Contact us or visit your Tascam dealer for more information about the CD-401 & CD-501. No matter how hard you play them, they're guaranteed to work.

## TASCAM



©1989 TEAC America, Inc., 7733 Telegraph Road,  
Vortecello, CA 90643, 213/726-0303.

Circle (221) on Reply Card



dio; 54,000 still capacity of disk enables 150 hours audio storage; can be intermixed with video or data on the disc.

Circle (370) on Reply Card

### Satellite-receiving equipment

By R. L. Drake Company



• **ESR1250 receiver:** PLL-synthesized tuning satellite receiver; dual video outputs, fixed audio channel; optional subcarrier demod boards; decoder outputs for VideoCipher II, MAC compatibility; C-/Ku-band H/V polarization switching; 30MHz-16MHz IF SAW filters.

• **No. 2864 LNB:** low-noise block converter; converts 11.7GHz-12.2GHz Ku-band signals to 0.950GHz-1.450GHz range; 50dB gain.

Circle (380) on Reply Card

### Audio power amp

By FM Acoustics Ltd.

• **FM 1000-1 amp:** monophonic, peak power capability to 7kW, 2.5kW rms; can drive loads below 1Ω; parameters normally causing various distortions through compression, limit-

ing is individually sensed, shutting the system down if values fall beyond set limits; returns to full operation as soon as errors are corrected; protects amplifier and speaker.

Circle (371) on Reply Card

### Spot cleaning system

By Hub Material Company

• **Micro Care system:** series of packaged solvents for cleaning of electronic circuit boards; trigger grip approach avoids dip-and-brush or aerosol spray applications; solvents include formulas to remove solder flux, rosins, pastes and various oils; 16 oz. containers have twist-lock nozzle to connect heat-resistant hose that attaches to the hand applicator unit.

Circle (373) on Reply Card

### Digital audio equipment

By Waveframe

• **DSP-X:** digital signal processing expander for AudioFrame disk recording module; for 12 digital inputs and outputs in PD or SDIF-1 formats, and one pair of inputs, outputs in SDIF-2 or AES/EBU format.

• **Magneto-optical drive:** removable, erasable MO drive for archiving, backup for AudioFrame system.

• **Storage expansion:** rack unit for four SCSI devices to increase convenient disk storage capacity to eight hours per rack; racks can be linked for greater capacity.

Circle (409) on Reply Card

# HOW TO MAINTAIN PRECISE SIGNAL QUALITY?

*For Routing, Distribution, Transmission, and Timing*

## Video

Differential Phase and Gain ..... 0.05°, 0.05%  
Frequency Response ..... to 80MHz  
Slew Rate ..... 150V/μsec  
Group Delay ..... 4 nsec to 80 MHz

## Audio

Bandwidth ..... 150 KHz  
Gain Range ..... - 8 to + 23.5 dB  
Distortion (THD) ..... 0.1% @ + 10 dBm  
Hum and Noise ..... - 75 dBm

*For Precision Distribution, Switching and Timing*



## SPECIFY SIGMA SERIES 2100

FROM SIGMA ELECTRONICS INC.

1184 Enterprise Road, P.O. Box 448, East Petersburg, PA 17520-0448 (717) 569-2631

See us at NAB Booth #6300

Circle (222) on Reply Card



## Lab measurement package

By Rohde & Schwarz



- **rms voltmeters:** high-accuracy units with IEEE-bus remote control; covers LF/audio to HF/HDTV signal ranges; URE-2, 10Hz-25MHz, 50 $\mu$ V-300Vac, digital display of 30 measurements; URE-3 rms/PEAK, 0.1Hz-30MHz, peak-value rectifier for positive, negative, peak-to-peak readings of non-sinusoidal signals.

Circle (382) on Reply Card

## CAD design software

By L. J. Engineering

- **VideoCAD:** software adjunct for AutoCAD on IBM/compatible PCs; facilitates signal-flow diagrams; generates wiring list including wire number, point-to-point designations, notes; no link to database or spreadsheet program required.

Circle (375) on Reply Card

## Soldering system

By Leads Metal Products

- **Power vacuum:** desoldering system pulls molten solder from insertion holes on a circuit board, ejects solder into a receptacle; no filters to clog; reduces time heat is applied to the circuitry; available with/without temperature control and ESD conductive handle.

Circle (376) on Reply Card

## Satellite-receiving equipment

By Standard Communications

- **MT-830:** frequency agile omni satellite receiver; RS-250B spec; PLL tuning for center of RF channel and audio subcarriers; panel indication of channel, format, subcarrier frequency, antenna polarity; EPROM handles automatic operation after given the desired transponder number and satellite format; remote control via telco line or satellite link.

Circle (388) on Reply Card

# HOW TO ACHIEVE MAXIMUM FLEXIBILITY?

*For Routing, Distribution, Transmission, and Timing*

## 3 Useful Packages:



## Unlimited Combinations:

- Audio, Video and Pulse in the same frame
- Distribution, Switching and Timing in the same frame



# SPECIFY SIGMA SERIES 2100

FROM SIGMA ELECTRONICS INC.

1184 Enterprise Road, P.O. Box 448, East Petersburg, PA 17520-0448 (717) 569-2681  
See us at NAB Booth #6300

Circle (223) on Reply Card



**When it Comes  
to PiRod Quality,  
Service and Support,  
the Sky's the Limit.**



Avoid the  
pitfalls of tower  
purchase. Let us  
send you a copy of  
Tower Specification.  
Write or call today.

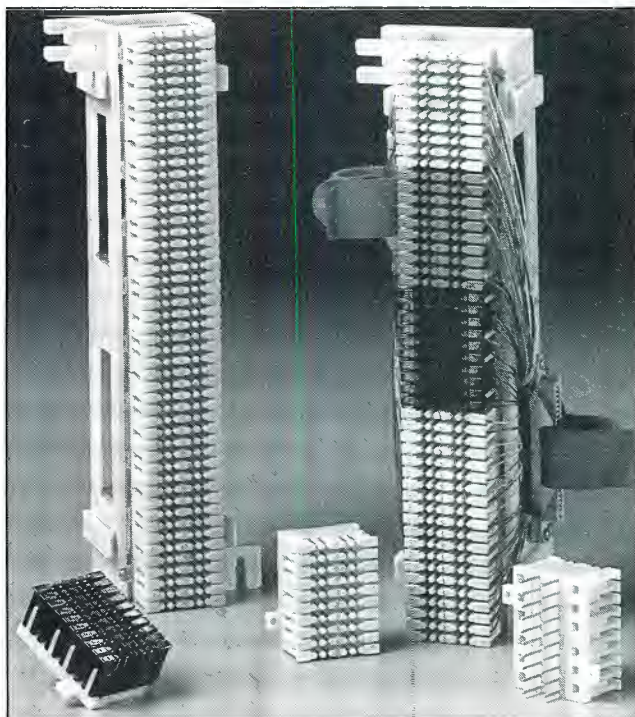
**PIROD INC.**

P.O. Box 128  
Plymouth, IN 46563-0128  
Telephone (219) 936-4221

Circle (224) on Reply Card

### **Wiring accessories**

*By Siemon Company*



• **Multiflex blocks:** wiring connecting blocks for various signal types beyond 20MHz; for stranded, solid conductors; two termination slots per quick clip; clips reset for protection from accidental changes; various sizes, configurations; color-coding available for easier wiring, troubleshooting.

Circle (385) on Reply Card

### **Power stabilizers**

*By Superior Electric Company*

• **UPSY Stabiline series:** uninterruptible power supplies; maintains proper power level with internal battery if input drops below a set level; RS-232 interface for interactive computer-operating systems; 400Va, 800Va, 1,250Va load models for 110Vac and 220Vac requirements; PWM inverter system produces spike-free power.

Circle (391) on Reply Card

### **Post-production console**

*By Trident Audio*

• **Vector 432:** audio mixer with four stereo buses, 32 group outputs; programmable muting system operates from SMPTE, MIDI code; in-line system includes additional mix busing for post-production needs; integral machine control can be used in audio, A-V fixed and mobile installations; compressor/limiter on main output.

Circle (404) on Reply Card

### **Cable ties**

*By Toleeto Fasteners International*

• **Cord-Lox:** fabric strips to tie and bundle cables; highly visible colors with nylon hook-loop closures; allow color coding, identification of cable bundles with sizes from 5/8" x 3" to 1 1/2" x 24".

Circle (402) on Reply Card



## Power conditioners

By Superior Electric



• **Stabiline CR series:** power conditioners: protect voltage-sensitive equipment from brownouts, overloads, surges, spikes; output voltage maintained at 120Vac  $\pm 3\%$  from 95V-130V input range; 120dB common-mode noise rejection; 60dB transverse-mode noise attenuation; 500VA, 1kVA, 2kVA models.

Circle (390) on Reply Card

## Battery pack

By Paco Electronics

• **BP-11 NiCad:** increased life battery pack; replacement for NP-1/-1A; 13.2V, 1.9Ah rated with 02C discharge rate; integral thermal sensor protects against short circuits; for ENG camera, VTR combinations; use with Dememorizer KD-120A II charger.

Circle (379) on Reply Card

## Satellite transceiver

By SSE Technologies

• **ASAT-1124:** solid-state Ku-band transceiver; 16W output; system includes power supply, LNB amplifier; broadband operation between 14GHz-14.5GHz; compatible with INTELSAT, EUTELSAT, AUSSAT standards; use individually or in redundant systems; for teleconferencing, in high-fade margin areas, transportable terminals.

Circle (387) on Reply Card

## Videotape editing equipment

By Time Logic

• **TLI-4400:** editing controller; operates dual-standard NTSC/PAL, complete list management; 15 ports with 32 GPI relays; EDL protected by battery; keyboard layout and color display screen similar to other editing systems; 4-channel audio, variable speed motion with trackball job panel; VTR, switcher interfaces.

Circle (398) on Reply Card

# HOW TO PROVIDE SYSTEM SOLUTIONS?

*For a wide variety of Routing, Distribution and Timing Applications*

### Desk-Top



2 Modules

(1) Audio D.A.'s  
(1) Video D.A.'s

or

(1) Audio Switcher  
(1) Video Switcher

or

(1) Black Burst Generator  
(1) 1 x 6 Video D.A.

### 1 Rack Unit



6 Modules

(3) Video D.A.'s  
(3) Audio D.A.'s

or

(2) Component (CAV)  
or (2) R.G.B. D.A.'s

or

(2) Component (CAV)  
or (2) R.G.B. Switchers

### 3 Rack Unit



16 Modules

(8) Audio D.A.'s  
(8) Video D.A.'s

or

A 6 x 6 Audio or Video  
Switcher with Remote  
and Computer Control

or

(5) R.G.B. or C.A.V.  
D.A.'s

*For these and many more possible applications*

## SPECIFY SIGMA SERIES 2100



FROM SIGMA ELECTRONICS INC.

1184 Enterprise Road, P.O. Box 448, East Petersburg, PA 17520-0448 (717) 569-2681

See us at NAB Booth #6300

Circle (225) on Reply Card



NEW

## TECH CASE



TC-1

TC-T

► This newly designed carrying case is an over-the-shoulder bag designed for engineers, technicians, reporters and other video professionals.

It will carry an array of personal gear as well as a variety of tools and meters. This case can be used as a combination personal bag and service equipment bag.

As a companion to the Tech Case (TC-1), a small optional Engineer's Tool Kit case (TC-T) is available.

The TECH CASE (model TC-1) measures 4" x 11" x 15". The TOOL KIT CASE (model TC-T) is 2½" x 6½" x 9".



K & H Products, Ltd.

Box 246

North Bennington

Vermont 05257, USA

PHONE 802-442-8171

FAX 802-442-9118

Circle (226) on Reply Card

## NEMAL ELECTRONICS

### Precision Broadcast Cables — NEC CL2

#### VIDEO

P/N 1570

- Same size as RG 59
- Low Loss .7 db at 10 MHZ
- Double Shielded

#### AUDIO

P/N 2201A

- One Pair 22 ga reduced diameter
- Available in 7 colors
- Foil-bonded to jacket for one-step stripping

Call for your copy of our new, 44-page  
Cable and Connector Selection Guide

**1-800-327-5999**

FAX 1-305-895-8178

INT'L 1-305-899-0900

**AVAILABLE FROM STOCK** together  
with 1,500 different types of Broadcast Cables,  
Connectors, Patching Equipment and Crimping Tools.

**NEMAL ELECTRONICS INTERNATIONAL, INC.**

12240 NE 14 Ave.

North Miami, FL 33161 • TELEX 6975377

Offices in New York and Florida

Circle (227) on Reply Card

SEE US AT NAB BOOTH #7203

272 *Broadcast Engineering* March 1990

### Power conditioning

By Sola



• **CPC series:** computer power conditioner; 3-phase unit corrects load imbalance conditions, offers electrical line-to-load isolation and protected pass; protects against transients, over-voltage and undervoltage events; 97% efficient ac-to-ac; models from 10kVA to 30kVA.

Circle (386) on Reply Card

### Noise-reduction cards

By THAT Corporation

• **dbx 321-series noise-reduction circuits:** for audio transmission by satellite, microwave and other applications; 35dB of noise reduction, maintains a response flat from 50Hz to 15kHz; series includes 321CS compressor, 321ES expander; compatibility between these cards and previous dbx equipment.

Circle (395) on Reply Card

### Work station console

By Console Masters

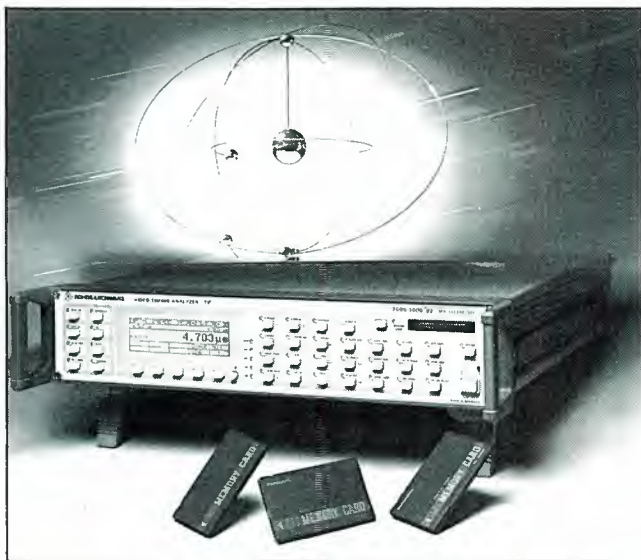
• **The TV Work Station:** provides unprecedented human design and flexibility, in sizes from 1-10 bays; 1-piece construction, with tapped equipment mounting rails and sloped mounting adaptors; extension bridges are used to mount equipment with controls closer to the operator; tube steel frames are finished in matte black; a designer's kit is available.

Circle (412) on Reply Card



## Timing measurement

By Rohde & Schwarz



• **TIF analyzer:** video signal timing verification system; auto measurement system requires one second to sense, measures 20 timing parameters of video signals in 525-, 625-line standards and component signals; measures color subcarriers of NTSC, SECAM, PAL; usable with noisy, substandard signals.

Circle (383) on Reply Card

## Editing/synchronizing unit

By Time Logic

• **TLC Time Logic controller:** field-accurate film-to-tape transfer, editing system; specific scenes of material can be redone by insert edits direct from telecine through color corrector or other processing equipment; to tape without complete retransfer of the reel of film; supports all current analog and digital VTRs.

Circle (397) on Reply Card

## Satellite weather data

By WeatherTrac Industries

• **WeatherTrac:** PC-based weather imaging system; uses NOAA, GOES/WEFAX, HF-FM NAFAX data as well as European and Russian satellite data; information received via satellite, displayed through menu-driven image analysis tools; 64-level gray scale, 256 colors on VGA system.

Circle (410) on Reply Card

## Tuning tools

By Voltronics

• **TT-100, 200, 500, 600:** series of tuning tools including plastic with hardened steel blades or high-strength ceramic tips; TT-100 and TT-200 are high-temperature plastic with pocket clip and reduced-diameter end holding blades; TT-500 and TT-600 have rotatable tops fitting into the palm and ceramic tips for uses where metal would affect tuning accuracy.

Circle (407) on Reply Card

# HOW TO CONTROL EQUIPMENT COST?

*For Routing, Distribution, Transmission, and Timing*

With 3 versatile packages:

Desk-Top



@ \$250

1 Rack Unit



@ \$450

3 Rack Unit



@ \$650

With many useful modules:

Audio, Video and Pulse  
D.A.'s @ \$200

Audio, Video and Pulse  
Switching @ \$250

Black Burst For  
Timing @ \$250

*Compare Price, Performance, and Versatility*

## SPECIFY SIGMA SERIES 2100



FROM SIGMA ELECTRONICS INC.

1184 Enterprise Road, P.O. Box 448, East Petersburg, PA 17520-0448 (717) 569-2681

See us at NAB Booth #6300

Circle (228) on Reply Card



# CAN'T KEY? ONLY 1 M/E? USE ME!!!!



## THE AMAZING CKM-4 MULTI-LAYER KEYER

**Add NEW POWER to your current switcher  
& REAL DEPTH to your productions!**

- Four keyers and four clips in one!
- Up to 5 layers. . . One Pass.
- Exchange layers/sources instantly.
- Cuts holes vs. non-add mix.
- Plugs into any switcher like any single key source.
- Upstream, downstream or self-contained.
- Like adding another M/E or more.
- Optional dissolve state to state with preview.
- Optional fade to/from black or ext video.
- Includes GPI for editor. Plus! Plus! Plus!
- Combined video and key outputs!
- External or internal keying of any source.
- Simple to operate. Remote controllable.
- Transparent video performance guaranteed.

**A videocassette demonstration tape  
available at nominal charge.**



**P. O. Box 90  
Bryn Mawr, PA 19010  
Tel: (215) 489-1820  
Automation Associates, Inc. Fax: (215) 489-1834**

**See us at NAB Booth #3434**

Circle (229) on Reply Card

## Cleaning solvents

By Tech-Sa-Port



- **DisClene, SafeClene:** for use in preventive maintenance programs with computer peripherals, electronic equipment; DisClene, 99.7% isopropyl alcohol; SafeClene, a non-flammable liquid; apply with any approved cleaning wipe or lint-free cloth.

Circle (394) on Reply Card

## Delay, editing system

By Time Logic



- **APDU-200:** automatic program delay unit; full range of editing features; accommodates delays from minutes to days, simultaneous multiple feed playback with independent delays per channel; perpetual schedule concept avoids re-entry of repeated events into program log; capable of driving 15 devices (VTRs, switchers); VTR activity schedule determines equipment requirements for specific projects; for network multiple time zone delays.

Circle (399) on Reply Card

1:~:~)!!!



# MORE POWER FOR THE LONG RUN!



The new Anton/Bauer Logic Series® Magnum® and Compac/Magnum® batteries utilize a new high energy cell technology that delivers 25% greater capacity and runtime.

The Magnum battery is *the* perfect choice when using the on-camera UltraLight® system, and its maximum power makes it the perfect match for use with the latest digital format cameras.

Compac/Magnums can *more than double* camera runtimes, when compared with NP-1 style batteries—with as much as 3 times the useful life.

See this high energy system at **NAB**  
March 31 through April 3 in Atlanta, Georgia—Booth #5013



*The quality standard  
of the video industry.*

ONE CONTROLS DRIVE, SHELTON, CT, U.S.A. 06484 203-929-1100 FAX 203-929-9935

Circle (230) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)









# Take a closer look . . .

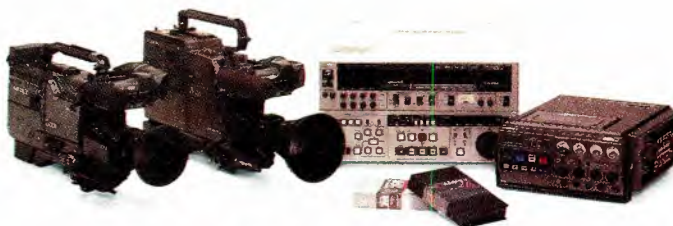
## Betacam built by Ampex!

You already know that Betacam SP is the world's most popular acquisition video format. But did you know that Ampex has been in the Betacam business for over three years? What's more, we build and test Betacam SP portable and studio video recorders, cameras, camcorders and accessories in our own factory.

Ampex Betacam SP products meet the demands of broadcast professionals everywhere. The CVR-300 integrated camcorder shown here performs under the most demanding conditions, with 670 line resolution and an electronic shutter.

Better yet, Ampex offers not only Betacam SP products, but also a full line of production and post-production equipment for both component and composite systems. And if you ever need help, highly qualified Ampex service people will respond, fast!

Call us at 1-800-25AMPEX for information about Betacam SP products from Ampex.



# AMPEX



## Talk To The People Who Use It



Smooth productions depend on your intercom not letting you down. From master control to on-site remotes, Clear-Com has a reliable intercom system to meet your exact needs. With belt packs that work in the rain and interfaces that connect to just about anything, Clear-Com has a proven commitment to reliability and innovative design. But don't just take our word for it, call us for a comprehensive list of satisfied customers and talk directly to the people who use it.

**USA/Canada:**

945 Camelia St., Berkeley, CA 94710, TEL 415-527-6666 FAX 415-527-6699

**International:**

FAX 415-932-2171

**See us at Booth #1407 at NAB '90**

Continued from page 92

ment is turned off when the system is not being used. In addition, extended HPA warming and cooling procedures are used to further extend the tube life.

Another key to maximum filament life is careful use of the in-line attenuators. (See Figure 1.) The attenuators, located after the modulators, allow a gradual power increase to reach proper carrier level. This procedure is followed with NPR's assistance 15 to 30 minutes before each transmission.

Some uplinks operate by remote control and are not able to adjust the HPA output power. In these cases, NPR allows  $\pm 2$  dB level variance from ideal carrier level. If the affiliate uplink is unable to achieve this requirement, someone must travel to the uplink and adjust the power level manually before transmission.

Other equipment could be added to this system. Without a waveguide switch and dummy load, it's difficult to perform any troubleshooting. In addition, the HPA lacks a wattmeter to measure RF output. Because the HPA beam current reading is not sufficiently linear, determining actual power output is difficult. Additional equipment and other refinements are likely to follow as the system grows.

## Greater appreciation

The BSU uplink/downlink project was exhausting as well as exhilarating. It was particularly time-consuming and demanding, having to be completed on time in spite of other pressing duties. The usual problems of deadlines, budget concerns and general impatience were compounded by the close observation of the project, which was located in the center of campus, by university administrators.

After fully experiencing the many complexities of this project, those involved will never again see an uplink in quite the same way. It's not likely that they'll ever take the earth station for granted, and you can bet they'll remember the importance of careful planning and system operation.

## Bibliography

Limpman, Andrew D. and Emilia L. Govan. "New Rules for Earth Station Licensing," *Satellite Communications*, August 1987.

Shattuck, Blan. "Interference to Your Satellite Earth Terminal and What to Do About It" *NPR Engineering Update*.

Smalling, Elmer III. "Satellite Technology," **Broadcast Engineering**, monthly column, November 1985 and December 1989.





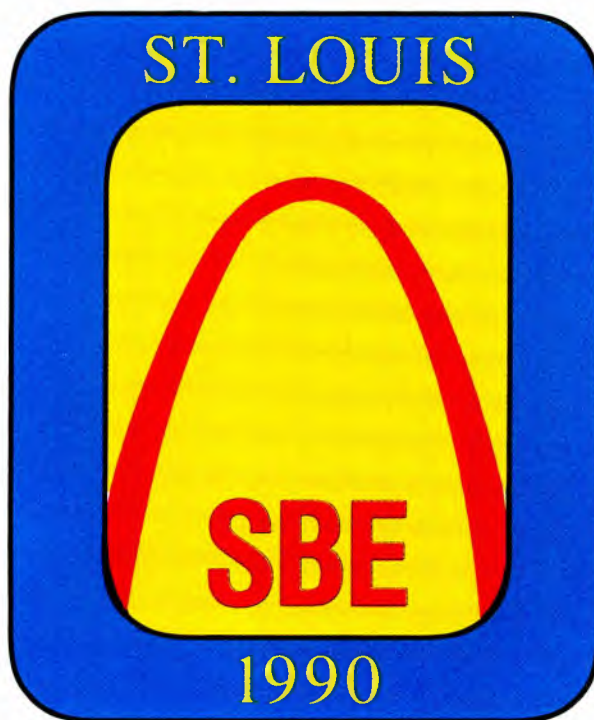
## Your future begins in St. Louis.

The 1990 SBE convention and **Broadcast Engineering** conference will be held in St. Louis, MO, October 4-7, 1990. Join more than 3,000 engineers from across the nation as they gather to study broadcast technology and learn how to survive the rapid changes taking place in our industry.

To stay ahead, you need new skills and one of the best places to learn those skills is at the SBE convention and **BE** conference. Among this year's conference topics are: HDTV, broadcast engineering licensing, new technology for radio/TV and preparing for disasters.

In addition, 10 hands-on half-day and full-day Ennes Workshops will be held on Wednesday, October 3. Receive **FREE** factory training on the equipment you use. Register early because seating is limited.

Join the crowd, receive the industry's best training and see more than 200 exhibits as you improve your future. Plan now to attend by calling 317-842-0394 for registration materials and information.



**Be There--  
Your Future  
depends on it.**

Looking for information, ideas or software to help solve a problem at your station?

» Several data libraries are at your disposal including the "**Broadcast Engineering Technical Library**" (DL4) Would you just like to communicate with upward of 3,000 other people much like you in the radio/television broadcast technical/production community?

» A message requesting assistance to a technical problem at your station is sure to draw response from your colleagues. Want the latest information from **SBE**, the **FCC** or **AES**?

» Special areas for **SBE**, the **FCC** or **AES** are updated periodically.

All these become possible when you enter  
**GO BPFORUM, GO SBENET, GO AESNET**  
at any prompt on CompuServe.

A membership to CompuServe is required and on-line charges are assessed.

[www.americanradiohistory.com](http://www.americanradiohistory.com)



# 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

## B.E.A.M.S. on

Broadcast Engineering and Maintenance Services

Complete Service on all UHF & VHF Transmitters

P.O. Box 2731  
Springfield, MA 01101  
Office: 413-737-0306  
24 hr. Beeper 1-800-759-7243  
PIN # 52330

STEVEN M. HASTINGS  
Consulting Engineer

## 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



- TERRAIN SHADOWING
- POPULATION DENSITY
- CONTOUR COVERAGE
- SPECIALS

(301) 652-8822

(800) 368-5754

## D. L. MARKLEY

& Associates, Inc.  
CONSULTING ENGINEERS

2401 West Moss Ave.  
Peoria, Illinois 61604

(309) 673-7511  
Member AFCCE

## K. BLAIR BENSON

Consultant

Television Technology

23 Park Lane  
Norwalk, CT 06854  
203-838-9049

## TEKNIMAX

TELECOMMUNICATIONS

DENNIS R. CIAPURA  
PRESIDENT

11385 FORESTVIEW LN.  
SAN DIEGO, CA 92131

(619) 695-2429

## SMITH and POWSTENKO

Broadcasting and Telecommunications  
Consultants

2033 M Street N.W., Suite 600  
Washington, D. C. 20036  
(202) 293-7742

Robert J. Nissen

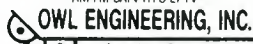
## THE NISSEN GROUP, INC.

Communications Technology Consultants

32 Ridge Drive • Port Washington, New York 11050  
(516) 944-5477

Consulting Communications Engineers

- FCC Data Bases
- FCC Applications and Field Engineering
- Frequency Searches and Coordination
- AM-FM-CATV-ITFS-LPTV



Consulting Communications Engineers  
1306 W. County Road F, St. Paul, MN 55112  
(612) 631-1338 "Member AFCCE"



CHUCK JONES

ANTENNA SYSTEMS SPECIALIST  
618-564-2481

## SOUTHERN ILLINOIS ANTENNAS

ROUTE 3, BOX 114  
METROPOLIS, IL 62960

## ERIC NEIL ANGEVINE, P.E.

consultant in acoustics

specializing in broadcast studio acoustics

910 Lakeridge Drive  
405-744-6444

Stillwater, OK 74075  
405-372-3949

Why not run your business  
card here?

Only \$125 per insertion.

Frequency discounts available.

Call 913/888-4664

## UNUSED CALL LETTERS

MAILING LABELS

AM • FM • TV

**dataworld®**

301-652-8822

800-368-5754

## PATCHPRINTS®

VIDEO TIE LINES  
In 1 2 3 4 Aux

Custom Patch Bay Labeling  
By

PATCH BAY DESIGNATION COMPANY  
Div. of Glendale Rubber Stamp & Printing Co., Inc.

P.O. Box 6278, Glendale, CA 91205  
4742 San Fernando Road  
Glendale, CA 91204

Telephone  
(818) 241-5585  
FAX (818) 507-5050

## East Coast Video Systems

ON LINE IN TIME

A full service  
company providing...

- Consultation
- Engineering & Design
- Installations
- Training

Serving...

- Cable Systems
- Corporate Facilities
- Broadcast Facilities
- Teleproduction Facilities

178 Casterline Road • Denville, NJ 07834 • (201) 751-5655

**CALL US** For New and Rebuilt  
Radio Broadcast Equipment

**HE HALL**  
Electronics  
(804) 974-6466

1305-F Seminole Trail • Charlottesville, Va. 22901

## Franklyn R. Beemish & Co.

Engineering for the Video, Motion Picture & Recording Industries

VIDEO POST, BROADCASTING, CONFERENCE CTRS, THEATERS, RECORDING

FACILITIES AND SYSTEMS DESIGN & IMPLEMENTATION  
ANALOG & DIGITAL VIDEO, AUDIO, HDTV

ARCHITECTURAL ENGINEERING  
ELECTRICAL, HVAC, ACOUSTICAL

574 Sunrise Highway, Baldwin, NY 11510 516/867-8510

**JOHN H. BATTISON PE.**  
CONSULTING BROADCAST ENGINEER,  
FCC APPLICATIONS AM, FM, TV, LPTV

Antenna Design, Proofs, Fieldwork  
2684 State Route 60 RD#1  
Londonville, OH 44842  
419-994-3849

## NETCOM (201)837-8424

NETWORK COMMUNICATIONS CONSULTANTS  
931 TEANECK RD TEANECK, N.J. 07666

STATE-OF-THE-ART ENGINEERING FOR AUDIO & VIDEO

• FACILITY PLANNING

JAMES TRONOLONE  
ENGINEER

• SYSTEM DESIGN

• CAD SERVICES

BROADCAST DATABASE

**dataworld®**  
MAPS

Coverage/Terrain Shadowing

Allocation Studies • Directories

P.O. Box 30730 301-652-8822  
Bethesda, MD 20814 800-368-5754



MAILING LISTS  
AM FM TV  
Labels or Diskette

**StationBase**  
(800) 359-2818

For Classified Advertising  
or Professional Services information  
Call Renée Hambleton at (913) 888-4664



# Classified

Classified advertising now available as Classified Display or By-the-word.

**Classified Display:** \$100 per column inch, per insertion, with frequency discounts available. 1 inch minimum, 10 inches maximum per ad. Blind ads \$40 additional. Reader Service number \$50 additional. Spot color available for 150 (color determined by publisher).

**By-The-Word:** \$1.75 per word, per insertion. Initials and abbreviations count as full words. Blind ads \$40 additional. Minimum charge \$40 per insertion.

Contact Renée Hambleton, at (913) 888-4664, for information on frequency and pre-payment discounts. To place our classified ad send your order and materials to Broadcast Engineering, Classified Ad Mgr., P.O. Box 12901, Overland Park, KS 66212.

## HELP WANTED

**CHALLENGE IN INTERNATIONAL ENGINEERING** with the Voice of America. Voice of America is the international broadcast service of the United States Government. A part of the U.S. Information Agency, the VOA broadcasts news, commentaries and features in over 40 languages to more than 130 million people worldwide daily. As we operate and expand our radio broadcast facilities worldwide, we have immediate openings for electronics engineers and technicians. **ANTENNAS AND BROADCAST SYSTEMS**—radio and broadcast engineers with experience radio broadcast facilities including antennas and antenna array, high power shortwave and medium wave transmitters, transmission lines, switch bays, baluns, dummy loads and related instrumentation and devices. Incumbent will participate in design, integration and testing of new broadcasting equipment and operation and maintenance of broadcast systems. Salary range: \$29,891 to \$55,381 per annum. Most positions are based in our Washington, D.C., headquarters and require an appropriate technical degree or equivalent radio suitable experience, other positions may be available at VOA's broadcast relay stations in the United States as well as abroad. The VOA offers competitive compensation, excellent benefits, and the opportunity for foreign travel. If you would like an opportunity to be a part of American public diplomacy while advancing your professional career, we invite you to send your resume or SF-171 indicating your area of interest to: Voice of America, Officer of Personnel, Room 543, ATTN: TN, 330 Independence Avenue, S.W., Washington, D.C. 20547. U.S. citizenship is required.

03-90-11

**VIDEO MAINTENANCE ENGINEER** for large post-production facility with min. 3-5 years experience in high-end video maintenance including analog and digital VTRs, Jantel Harry, ADO, Kaleidoscope, GVG switchers and terminal equipment. High level of workmanship, motivation and flexibility expected. Salary commensurate with experience. Resume and salary requirement to: P.O. Box 7352, San Francisco, CA 94107.

03-90-11

**MAINTENANCE ENGINEER** with five years experience in the installation and maintenance of broadcast video equipment. Experience with Betacam desired. Current FCC license or S.B.E. certification required. Reply to John Doe, WAGA-TV, P.O. Box 4207, Atlanta, GA 30302. EOE.

03-90-11

**AMPRO ANTENNAS, INC.**, currently seeks a qualified, energetic professional to manage ongoing antenna projects. Qualification includes, but not limited to, production management, antenna manufacturing, and some antenna design. Send resume and salary history to P.O. Box 28425, Sacramento, CA 95828.

03-90-11

**MAINTENANCE ENGINEER:** NBC affiliate in N.W. Arkansas needs a self starter skilled in ¾ tape, microwave and all studio equipment. FCC General class, SBE Engineer certification, minimum 2 years strong hands on experience. Apply to: Engineering Manager, KPOM/KFAA-TV, P.O. Box 610, Fort Smith, AR 72914 EOE M/F

03-90-11

## SALESMAN/MANAGER

TBC Manufacturer seeks aggressive SALESMAN/MANAGER. Technical knowledge is preferred, will travel nationwide, salary commission and benefits. Send RESUME to P.O. Box 26446, San Jose, CA 95159.

## ASSISTANT CHIEF ENGINEER UHF TV STATION

Looking for hands-on type with transmitter experience. 3-5 years in general television maintenance, satellite and computer systems, STL, and studio operations required. Also to perform repairs and preventive maintenance. Send resume to Glen Dingley, Chief Engineer, KHSH-TV 67, 2522 Highland Square Mall, Alvin, TX 77511. EOE.

**ASST. CHIEF ENGINEER** - Strong knowledge of UHF transmitters and microwave systems. Maintenance of transmitter, microwave, studio, and overseeing remotes. Valid FCC general or SBE certification required. Salary DOE. Fringe benefits. Resume to Steven Ellis D.E. R&R Media, P.O. Box 991, New London, CT 06320

03-90-11

**MEDIA SYSTEMS ENGINEERING SUPERVISOR.** Dynamic, growing community college district with advanced video operations, seeks highly experienced, skilled, imaginative, and cooperative individual with strong video, audio, and media engineering and supervisory skills. Responsible for development, supervision, and performance of technical systems design, maintenance, repair, installation, and production engineering related to composite, component, and digital video production; satellite up/downlink; teleconferencing; cable, fiber optic, microwave, and broadband video distribution; audio and broadcast radio; videodisc, and media production; and classroom and interactive media equipment. Supervises television engineers and media repair specialists. Extensive systems design, production engineering, troubleshooting, and hands-on bench skills essential. Broadcast radio experience desirable. Starting salary \$45,972 to 60,321. Very generous benefits. Classified management position. Send resume to NOCCCD, Personnel Office, 1000 N. Lemon, Fullerton, CA 92634 by 4/12/90.

03-90-11

**MAINTENANCE ENGINEER** needed for intermountain region network affiliate. FCC general or SBE certified. Studio and ENG experience necessary. RF desirable. Send resume to Andrew Suk, KIVI-TV, 1866 E. Chisolm Dr., Nampa, Idaho 83687. EOE.

02-90-21

**MAINTENANCE TECHNICIAN/ENGINEER** Post audio facility. New York City. Responsibilities include session set up, coverage and repair work. Formats include 35mm MAG., ¼-2" Audio, ¾-1" Video Tape. Call Chris (212) 867-0730.

03-90-11

## TECHNICAL SUPPORT ENGINEER BROADCAST EQUIPMENT

Orban, maker of OPTIMOD broadcast audio processors, seeks an experienced troubleshooter to assist customers with application and maintenance issues via telephone and FAX. Must be familiar with broadcast transmission plant practices, understand analog circuits and possess good interpersonal skills. No beeper. SBE Cert. helpful.

Please forward resume to:

B.E. Smith, Dept. CSA,  
ORBAN a division of AKG Acoustics,  
645 Bryant St.,  
San Francisco, CA 94107.

**orban**

Experienced, well qualified **ENGINEERING TECHNICIANS** sought to operate broadcast video tape recorders (Ampex VPR-6's, Sony BVH-1100's, 500's, Betacam SP's), network routing switchers and satellite uplink facilities. Salary range \$15,389 to \$32,517 based on qualifications. Benefits include health, dental, disability, retirement and life insurance plans, sick, annual leave and holiday leave. Contact:

SC Educational TV, Personnel Department  
P.O. Drawer L., Columbia, S.C. 29250  
Telephone 803-737-3457.

## TV MAINTENANCE ENGINEER

needed for a national Christian studio post production satellite uplink facility. Three years component level maintenance experience. Ampex, AVC, ADO, VPR-3, Beta, Scientific Atlanta Uplink. Positions available in San Diego and Dallas. Competitive salary and benefits (Paid vacations, holidays, incentive programs, medical & dental insurance) with an exciting organization. Send resume to: Personnel Dept., Word of Faith, P.O. Box 819099, Dallas, TX 75381-9099

## SERVICE TECHNICIAN

CATV system with video production studios in central New York seeks qualified person to repair and maintain CATV and video production equipment. Must have experience in the repair of ½" and ¾" VTRs, 3 pickup tube and solid state cameras, TBC's, production switchers and associated support equipment. References required. Please phone 607-272-3456 or send resume and salary requirements to: Joseph Powers, American Community Cablevision, 519 State Street West, Ithaca, New York 14850. EOE/M/F/V/H

## MCN Can Help You Find A Better Job. Even If You Are Not Looking.

As much as you may like your job, MCN may be able to help you find one you'll like even better. Send us your resume, and we will incorporate you into our referral service. It's free, it's easy, and it's confidential.

**MEDIA  
CAREERS  
NETWORK**

**Media Careers Network (MCN)**  
PO Box 15174 • Charlotte, NC 28211  
(704) 362-2739



## FOR SALE

### AZONIC SOUND UPGRADE

For high-performance, upgrade your studio with Azonic acoustical foam. For a "permanent sound solution" which can eliminate slap echo and harsh resonances and put the lid on noisy equipment: *Azonic... for superior performance at a fair price.*

**CALL TODAY! 1-800-842-9790**  
For a FREE brochure and pricing.



Noise Reduction From A to Z

1600 E. CLIFF ROAD BURNSVILLE, MN 55337  
FAX: 612 • 894 • 2748 © 1990 AZONIC, Inc.

**CAPACITORS OVERNIGHT:** CAPACITORS for transmitters. CAPICATORS for power supplies. CAPACITORS overnight from stock. Sprague Mallory Cornell-Dubilier and others. The CAPICATOR PEOPLE: KELLNER ELECTRONICS, INC. FAX 1-800-425-3664. Charlotte, Vermont. Call 1-800-323-0460 for CAPACITORS. 03-90-tfn

**ANTON/BAUER LIFESAVER** eight hour quad battery charger, never used, mint condition, list \$900. Must sacrifice, \$350. Call Richard 504-464-7651. 03-90-1t

**HIGHEST PRICES** for 112 Phase Monitors, vacuum capacitors and 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. 6-89-tfn

**LIVE VIDEO FROM ANYWHERE!!!** Remotes, aeriols, sports, more with 2 1/4" x 4", 2 Watt UHF transmitter. Broadcast quality color/audio...2 mile range! Build easily under \$100. Complete plans, plus kit information, \$9.95 + \$3.00 s/h. SUPERCIRCUITS, 1403-B Bayview, Hermosa Beach, CA 90254. 03-90-1t



**VIDEO/AUDIO/RF**  
Buy • Sell  
Consign • Service  
Over 3000 items  
in inventory  
Burbank, CA 818.845-7000  
New York, N.Y. 212.268-8800

## FOR SALE

### DEMO & USED VIDEO EQUIPMENT BROKER

Mobile Production trucks—45', 43', 40', 38', 22'  
1" A/B Roll complete systems from \$80,000.  
Betacam A/B Roll systems from \$48,000.  
Sony VO-5850PAC edit system—\$6,000.  
Sony VO-5600 recorders—\$1,695.  
Chyron RCU-2 character generator—\$10,000.  
Ampex VPR-2B/TBC-2B 1" VTR's w/AST—\$16,000.  
GVG 1600-3H, 16 input, 3ME switcher—\$16,500  
New!! Video 2x24 normal-thru patch panels—\$699

HUNDREDS OF ITEMS LISTED—  
LET US SHOP FOR YOU!!!

**PROVID SUPPLY CORP.**  
**ANDY TURNER— (708) 215-9010**

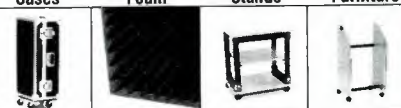
**NO. CA POST PRODUCTION TV EQUIP. FOR SALE** including G.V. 300-2BN Switch, Sony BVH - 2000/02 Recorders, Ikegami HL-79 Camera and more. Contact T. Kramer 415-955-3223. 03-90-1t

**RCA TTV-60A TRANSMITTER** - Ch. 33 - approximately 105,000 operating hours - extremely well maintained - selling all associated equipment including antenna and transmission line - For more information contact Larry Pentecost C.E., WVLA 5220 Essen Lane, Baton Rouge, LA 70809. Ph. (504) 766-3233 03-90-1t

**FOR SALE:** Tubes 3CX1500A7, 4CX250B, 4CX5000A, 4CX3000A, and more. We carry lg. inventory, all major brands (EIMAC, AMPEREX, RCA) Call Stew 1-800-842-1489. 01-90-12t

### FACTORY DIRECT

Custom Cases Acoustic Foam Custom Stands Studio Furniture



Request Catalogue 800-343-1433, 516-563-0633  
Island Cases, 1121-20 Lincoln Ave., Holbrook NY 11741

## SERVICES

### Lighting Eliminators and Consultants completes more than Eighteen Years Protecting Radio and TV Broadcasters from lightning and its effects

Lightning Eliminators and Consultants, Inc., of Boulder, Colorado, now has more than eighteen years experience protecting radio and TV broadcasters from direct strikes by lightning and the transient effects of nearby lightning strokes. Broadcasters sustained many outages before installation of the Dissipation Array System®; after installation of the DAS® all outages were completely eliminated.

### LIGHTNING ELIMINATORS AND CONSULTANTS, INC.

6687 Arapahoe Road, Boulder, CO 80303  
**(303) 447-2828.**

**TRANSMITTER TUBE REBUILDING SINCE 1941:** 3CX2500, 4CX5000, 4CX15000 and many others. Write for details. FREELAND PRODUCTS INC., 75412 Hwy. 25, Covington, LA 70433. (504) 893-1243 or (800) 624-7626. 6-79-tfn

**BROADCAST TRAINED MAINTENANCE ENGINEERS** will repair your ENG/EPF cameras, VTR & related audio/video equipment. Quality work. Quick turnaround. For information call MNP Technical Services, Inc. 617-932-9545. 03-90-3t

## Advertising sales offices

### NEW YORK, NEW YORK

Diane Gottlieb-Klusner  
Telephone: (212) 702-3404  
Telefax: (212) 702-7802  
Mike Trerotoli  
Telephone: (212) 702-3405  
Telefax: (212) 702-7802  
866 Third Ave.  
New York, NY 10022

### CHICAGO, ILLINOIS

Vytas Urbanas  
Telephone: (312) 435-2361  
Telefax: (312) 922-1408  
55 East Jackson  
Suite 1100  
Chicago, IL 60604

### SANTA MONICA, CALIFORNIA

Herbert A. Schiff  
Telephone: (213) 393-9285  
Telefax: (213) 393-2381  
Jason Perlman  
Telephone: (213) 458-9987  
Telefax: (213) 393-2381  
Schiff & Associates  
501 Santa Monica Blvd. Ste. 504.  
Santa Monica, CA 90401

### OXFORD, ENGLAND

Nicholas McGeachin  
Interlec Publishing Corp.  
Roseleigh House  
New Street  
Deddington  
Oxford OX5 4SP  
England  
Telephone: (0869) 38794  
Telefax: (0869) 38040  
Telex: 837469 BES G

### TOKYO, JAPAN

Masayoshi Yoshikawa  
Orient Echo, Inc.  
1101 Grand Maison  
Shimomiyabi-Cho 2-18  
Shinjuku-ku, Tokyo 162, Japan  
Telephone: (03) 235-5961  
Telex: J-33376 MYORIENT

### FREWVILLE, SOUTH AUSTRALIA

John Williamson  
Hastwell, Williamson, Rep. Pty. Ltd.  
109 Conyngham Street  
Frewville 5063  
South Australia  
Phone: 799-522  
FAX: 08 79 9522  
Telex: AA87113 HANDM

### CLASSIFIED ADVERTISING OVERLAND PARK, KANSAS

Renée Hambleton  
P.O. Box 12901  
Overland Park, KS 66212  
913-888-4664



# Ad index

|                                      | Page<br>Number | Reader<br>Service<br>Number | Advertiser<br>Hotline |                                            | Page<br>Number | Reader<br>Service<br>Number | Advertiser<br>Hotline |
|--------------------------------------|----------------|-----------------------------|-----------------------|--------------------------------------------|----------------|-----------------------------|-----------------------|
| A.F. Associates, Inc.                | 157            | 103                         | 201/767-1201          | Concept W System                           | 174            | 58                          | 316/342-7743          |
| Abekas Video Systems                 | 41, 66A-D      | 19, 47                      | 415/369-5111          | Conex Electro Systems                      | 252            | 206                         | 206/734-4323          |
| Acrodyne Industries                  | 91             | 62                          | 800/523-0596          | Continental Electronics, Div.<br>of Varian | 100            | 68                          | 214/381-7161          |
| ADX Systems—USA                      | 212            | 162                         | 800/444-4239          | Control Concepts Corp.                     | 154            | 100                         | 607/724-2484          |
| AEG Olympia AG                       | 259            | 215                         |                       | Cortana Corporation                        | 252            | 200                         | 505/325-5336          |
| AEQ S.A.                             | 149            | 127                         |                       | Cycle Sat                                  | 203            | 151                         | 612/921-8488          |
| AKG Acoustics, Inc.                  | 155            | 101                         | 203/348-2121          | Datatek, Inc.                              | 31             | 52                          | 800/882-9100          |
| Allen Avionics                       | 266            | 234                         | 516/248-8080          | Delta Electronics                          | 249            | 186-198                     | 703/354-3350          |
| Alta Group Inc.                      | 88             | 41                          | 408/297-2582          | Denon                                      | 205            | 152                         | 201/575-7810          |
| Amco Engineering                     | 160            | 106                         | 800/833-3156          | Di-Tech Inc.                               | IBC            | 2                           | 516/667-6300          |
| Amek Systems and Controls,<br>Ltd.   | 79             | 49                          | 818/508-9788          | Digital Microwave                          | 74-75          | 43                          | 408/943-0777          |
| Ampex Corp (AVSD)                    | 276-277        |                             | 800/25AMPEX           | Dolby Labs Inc.                            | 45             | 20                          | 415/558-0200          |
| Ampex Recording Media                | 263            | 217                         | 415/367-2911          | Dorrough Electronics                       | 46             | 21                          | 818/999-1132          |
| AMS Industries, Inc.                 | 87             | 57                          | 206/633-1956          | Drake Electronics                          | 32             |                             | 615/254-7400          |
| Anton/Bauer, Inc.                    | 275            | 230                         | 203/929-1100          | Dynair Electronics, Inc.                   | 216            | 165                         | 619/263-7711          |
| Anvil Cases, Inc.                    | 212            | 161                         | 818/575-8614          | East Coast Video Systems                   | 76             | 45                          | 201/751-5655          |
| Aphex Systems, Ltd.                  | 116            | 79                          | 818/765-2212          | EEV, Inc.                                  | 189            | 135                         | 914/592-6050          |
| Arrakis Systems, Inc.                | 21             | 13                          | 303/224-2248          | Electro-Voice, Inc.                        | 161            | 107                         | 616/695-6831          |
| ASACA/Shibasoku Corp.,<br>Japan      | 68-69          | 38                          | 213/827-7144          | Electrohome                                | 136-137        | 84                          | 579/744-7111          |
| Audio Accessories, Inc.              | 202            | 150                         | 603/446-3335          | Emcor Products                             | 211            | 160                         | 507/289-3371          |
| Audio Precision                      | 109            | 64                          | 800/231-7350          | Ergo 90                                    | 210            | 158                         | 714/632-7045          |
| Audio-Video Engineering Co.          | 196            | 141                         | 516/546-4239          | ESE                                        | 261            | 65                          | 914/592-6050          |
| AudioLab Electronics                 | 60             | 31                          | 916/485-0500          | Evertz Microsystems Ltd.                   | 266            | 219                         | 416/335-3700          |
| Auditronics, Inc.                    | 153            | 99                          | 901/362-1350          | Faroudja Laboratories, Inc.                | 94             | 74                          | 408/245-1492          |
| Automation Associates, Inc.          | 274            | 229                         | 215/489-1820          | Fast Forward Video                         | 146            | 94                          | 714/852-8404          |
| Avitel Electronics Corp.             | 140            | 88                          | 801/977-9553          | FGV Panther                                | 166            | 112                         | 818/761-5414          |
| AVS                                  | 93             | 63                          | 201/767-1200          | Frezzi/Pag                                 | 145            | 93                          | 201/427-1160          |
| Barco Industries, Inc.               | 151            | 98                          | 408/370-3721          | Fujinon, Inc.                              | 243            | 179                         | 201/633-5600          |
| Belar Electronics Laboratory<br>Inc. | 210            | 157                         | 215/687-5550          | Full Compass Systems                       | 62             | 33                          | 800/356-5844          |
| Belden Wire and Cable                | 33             | 16                          | 800/BEL-DEN4          | Garner Industries                          | 110            | 75                          | 800/228-0275          |
| Benchmark Media Systems              | 138            | 86                          | 315/452-0400          | GE Support Services/RCA<br>Broadcast       | 138            | 85                          | 609/866-3147          |
| Berc                                 | 247            | 181                         | 818/841-3000          | Gentner Electronics Corp.                  | 65             | 36-37                       | 801/268-1117          |
| Bext, Inc.                           | 252            | 205                         | 619/239-8462          | Gentner Electronics Corp.                  | 225            | 170-171                     | 801/268-1117          |
| Broadcast Electronics, Inc.          | 11             | 7                           | 217/224-9600          | Graham-Patten Systems, Inc.                | 195            | 140                         | 800/547-2489          |
| Broadcast Supply West                | 164            | 110                         | 800/426-8434          | Grass Valley Group, Inc.                   | 9,229          | 6,173                       | 916/478-3000          |
| Broadcast Video Systems,<br>Ltd.     | 248,254        | 220,209                     | 416/764-1584          | Gray Engineering Laboratories              | 186            | 130                         | 912/883-2121          |
| Bryston Vermont                      | 218            | 134                         | 416/746-0300          | Harris Corp.                               | 27,239         | 51,177                      | 800/4HA-RRIS          |
| BTC Test & Measurement               | 99             | 67                          | 704/547-TEST          | Hipotronics, Inc.                          | 226            | 119                         | 518/789-6464          |
| BTS Broadcast Television<br>Systems  | 81, 97         | 66                          | 801/972-8000          | Hitachi Denshi America Ltd.                | 3              |                             | 516/921-7200          |
| Burle Electron Tubes                 | 245            | 180                         | 800/827-TUBE          | Hitachi Denshi, Ltd.                       | 197            | 143                         | 516/921-7200          |
| Cablewave Systems                    | 49             | 24                          | 203/239-3311          | Hotronic, Inc.                             | 186            | 131                         | 408/378-3883          |
| Calculated Industries                | 199            | 145                         | 800/854-8075          | Ifema                                      | 255            | 212                         |                       |
| California Tube Laboratory, Inc.     | 248            | 202                         | 800/824-3197          | Ikegami Electronics, Inc.                  | 84-85          | 55                          | 201/368-9171          |
| Camera Mart, Inc.                    | 72             | 97                          | 212/757-6977          | Illbruck                                   | 60             | 30                          | 804/358-3852          |
| Canare Cable, Inc.                   | 76             | 44                          | 818/840-0993          | Inovonics, Inc.                            | 200            | 146                         | 800/733-0552          |
| Canon USA, BCTV Lenses               | 241            | 178                         | 516/488-7700          | International Tapetronics,<br>Corp.        | 29,MAP         | 14                          | 800/328-1684          |
| Cel Electronics, Ltd.                | 107            | 73                          | 913/831-0188          | Intraplex, Inc.                            | 170            | 115                         | 617/486-4072          |
| Clear-Com Intercom Systems           | 278            | 231                         | 415/527-6666          | ITT Canon/Canada                           | 142            | 89                          | 416/668-8881          |
| Comark                               | 173,256        | 118,233                     | 215/822-0777          | Jampro Antennas, Inc.                      | 30             | 15                          | 916/383-1177          |
| Comark                               | 156,234        | 102,183                     | 215/822-0777          | JBL Professional                           | 55             | 27                          | 818/893-8411          |
| Computer Assisted Technology         | 170            | 116                         | 212/360-2591          | Jem-Fab Group                              | 252            | 204                         | 516/867-8510          |
|                                      |                |                             |                       | Jensen Transformers, Inc.                  | 210            | 159                         | 213/876-0059          |

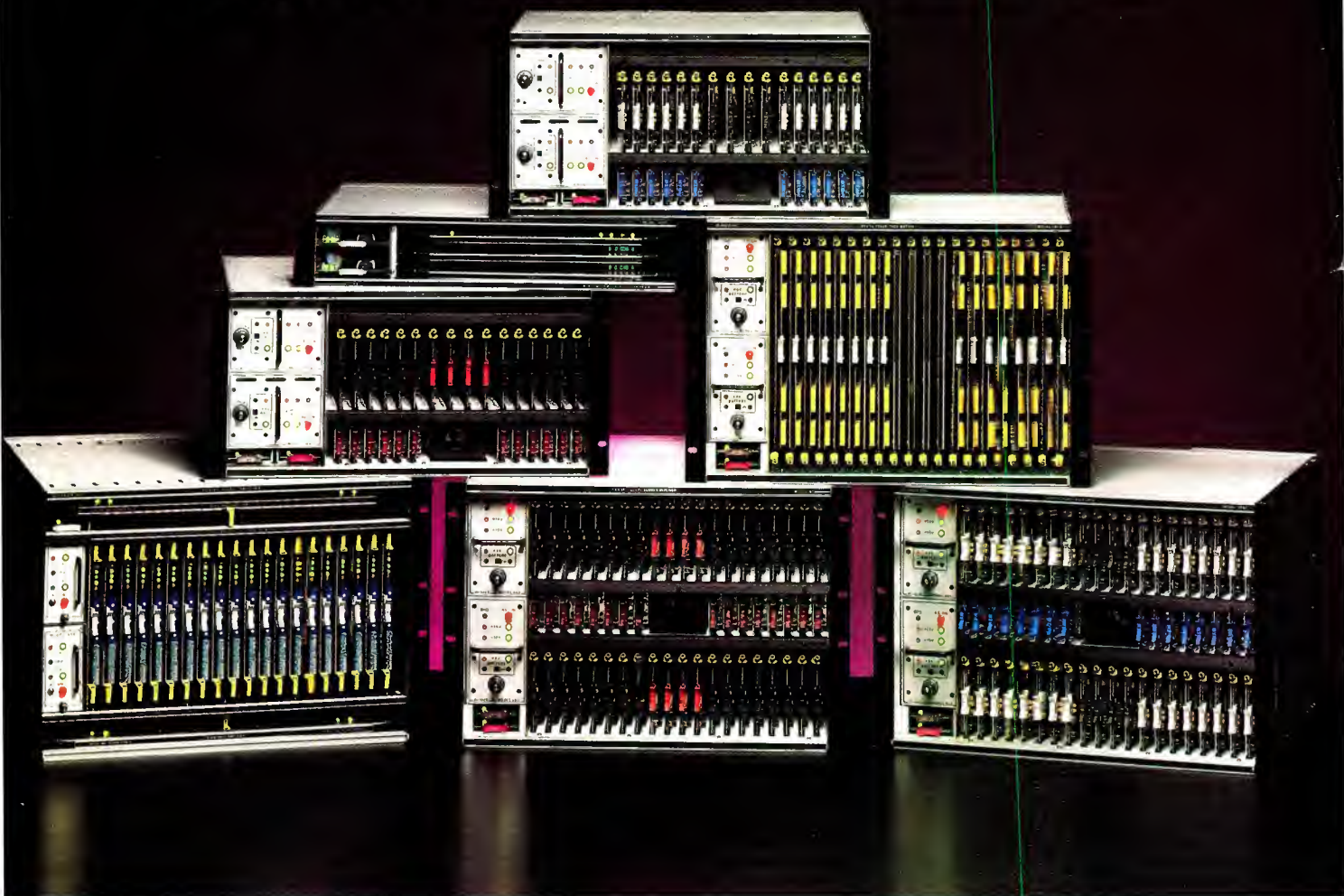


# *Ad index*

|                                          |                   |           |              |                                         |                     |         |              |
|------------------------------------------|-------------------|-----------|--------------|-----------------------------------------|---------------------|---------|--------------|
| JNS Electronics                          | 78                | 48        | 408/729-3838 | Quanta Editing Systems                  | 201                 | 148     | 801/974-0992 |
| JVC Professional Product Co.             | 19                | 11        | 800/582-5825 | Quantel Ltd.                            | 34                  | 17      | 203/348-4104 |
| K&H Products Ltd.                        | 272               | 226       | 802/442-8171 | Ramsa/Panasonic                         | 209                 | 156     | 714/895-7277 |
| LDL Communications                       | 23                | 12        | 301/498-2200 | Rank Cintel, Inc.                       | 179                 | 123     |              |
| Leader Instruments Corp.                 | 135               | 82,83     | 800/645-5104 | Rohde & Schwartz                        | 73                  | 216     |              |
| Lectrosonics, Inc.                       | 141               | 90        | 800/821-1121 | Roscor                                  | 111,232A-D          | 76      | 708/539-7700 |
| Leitch Video Of America, Inc.            | 105               | 71        | 804/424-7290 | RTS Systems, Inc.                       | 198                 | 144     | 818/843-7022 |
| LNR Communications, Inc.                 | 221               | 168       | 516/273-7111 | Rupert Neve, Inc.                       | 115                 | 78      | 803/744-6230 |
| 3M Magnetic Media Div.                   | 82A-B,83          | 54        | 800/328-1684 | Sachtler Corp. of America               | 71                  | 40      | 516/867-4900 |
| Magna-Tech Electronics Co., Inc.         | 139               | 87        | 212/586-7240 | SCA Data Systems, Inc.                  | 260                 | 121     | 213/452-2506 |
| Magni Systems, Inc.                      | 193               | 138       | 503/626-8400 | Schmid Telecommunications               | 213                 | 163     | 201/530-8555 |
| Mark Antennas, Div. of Radiation Systems | 62                | 34        | 708/298-9420 | Shure Brothers Inc.                     | IFC                 | 1       | 708/866-2553 |
| Markertek Video Supply                   | 248               | 199       | 800/522-2025 | Sierra Video Systems                    | 254                 | 201     | 916/273-9331 |
| Matco                                    | 200               | 147       | 408/998-1655 | Sigma Electronics, Inc.                 | 268,269             | 222,223 | 717/569-2681 |
| McCurdy Radio Industries                 | 215               | 164       | 416/751-6262 | Sigma Electronics, Inc.                 | 271,273             | 225,228 | 717/569-2681 |
| MCL, Inc.                                | 190               | 136       | 708/759-9500 | Snell & Wilcox, Inc.                    | 101                 | 69      | 415/856-0900 |
| Microtime, Inc.                          | 113               | 77        | 203/242-4242 | Solid State Logic, Ltd.                 | 182                 | 125     | 800/343-0101 |
| Midwest Corp.                            | 1                 | 3         | 606/331-8990 | Sony Communications Prod/Broadcast Div. | 24-25, 102-103, MAP |         | 800/635-SONY |
| Miller Fluid Heads                       | 207               | 155       | 201/473-9592 | Sony Communications Prod/Pro Audio Div. | 42-43               |         | 800/635-SONY |
| Minolta Corporation                      | 98                |           | 201/825-4000 | Sony Corporation/Pro Mavica             | 169,171             | 114,117 | 800/222-0878 |
| Mohawk Wire & Cable                      | 188               | 133       | 800/422-9961 | Sony Pro Video Tape Div.                | 257                 | 213     | 201/930-7669 |
| Moseley Associates, Inc.                 | 223               | 169       | 805/968-9621 | Standard Communications                 | 253                 | 208     | 800/243-1357 |
| Myat                                     | 70                | 39        | 201/767-5380 | Standard Tape Laboratory, Inc.          | 254                 | 210     | 415/786-3546 |
| Nautel                                   | 158               | 104       | 902/823-2233 | Stanton Magnetics                       | 48                  | 23      | 516/349-0235 |
| NCA                                      | 240               | 235       | 716/852-4521 | Stantron/Unit of Zero Corp.             | 106                 | 80,81   | 800/821-0019 |
| NEC Corp.                                | 185               | 129       | 214/907-4710 | STS, Skaggs Telecommunications Service  | 251                 | 203     | 800/654-4870 |
| NEC, Professional Systems Div.           | 58-59             | 29        | 708/860-0335 | Tascam, Div. TEAC Corp. of America      | 265,267             | 218,221 | 213/726-0303 |
| Nemal Electronics                        | 272               | 227       | 914/359-3333 | TC Electronic A/S                       | 258                 | 214     | 818/503-0404 |
| Nesbit Systems, Inc.                     | 104               | 70        | 609/799-1482 | Teac Corp. of America                   | 144                 | 92      | 213/726-0303 |
| Neutrik USA, Inc.                        | 178               | 184       | 609/327-3113 | Technics                                | 175                 | 120     |              |
| Nikon Corporation                        | 5                 | 4         | 516/222-0200 | Tektronix, Inc.                         | 52-53,181           | 26,124  | 800/452-1877 |
| Nova Systems, Inc.                       | 162               | 108       | 803/693-0238 | Telemetrics, Inc.                       | 220                 | 122     | 201/427-0347 |
| Odetics, Inc.                            | 187               | 132       | 800/243-2001 | Telex Communications, Inc.              | 63                  | 35      | 612/887-5550 |
| OKI Electric Industry, Co., Ltd.         | 147               | 96        | 213/245-7708 | Telmak                                  | 202                 | 149     | 800/637-4540 |
| Omicron Video                            | 146               | 95        | 818/700-0742 | Tennaplex Systems, Ltd.                 | 196                 | 142     | 613/226-5870 |
| Opamp Labs, Inc.                         | 86,254            | 56,211    | 213/934-3566 | Thermodyne International, Ltd.          | 219                 | 166,167 | 213/603-1976 |
| Optical Disc Corp.                       | 194               | 139       | 714/522-2370 | Thomson Tubes Electroniques             | 90                  | 61      | 201/812-9000 |
| Orban, Div. of AKG Acoustics, Inc.       | 7,17,MAP          | 5,10      | 800/227-4498 | Thomson Video Equipment                 | 61                  | 32      | 203/348-1995 |
| Otari Corp.                              | 15                | 9         | 415/592-8311 | Thomson-CSF/LGT                         | 235                 | 175     |              |
| Paltex, Inc.                             | 89                | 59,60     | 714/838-8833 | Time Logic                              | MAP                 |         | 805/527-0711 |
| Panasonic Broadcast Systems Co.          | 36-37,176-177,143 | 18,126,91 | 201/348-7336 | Total Spectrum Manufacturing, Inc.      | 227                 | 172     | 914/268-0100 |
| Panasonic Pro Industrial Video           | Polybag,50A-H,51  | 53,25     | 800/553-7222 | United Ropeworks (U.S.A.), Inc.         | 250                 | 182     | 215/368-6611 |
| Pesa America                             | 159               | 105       | 305/556-9368 | Utah Scientific, Inc.                   | 47                  | 22      | 800/453-8782 |
| Philips Components                       | 163               | 109       | 800/447-3762 | Varian MPTD                             | 165                 | 111     | 415/493-4000 |
| Pirod                                    | 270               | 224       | 219/936-4221 | Varian Eimac                            | 13                  | 8       | 415/592-1221 |
| Plastic Capacitors                       | 206               | 154       | 312/489-2229 | Varian Med                              | 237                 | 176     | 408/496-6273 |
| Prime Image, Inc.                        | MAP               |           | 408/374-6809 | Vicon Industries                        | 191                 | 137     | 516/293-2200 |
| Pro Audio Asia                           | 206               | 153       |              | Videotek, Inc.                          | 57                  | 28      | 602/997-7523 |
|                                          |                   |           |              | Vinten Equipment, Inc.                  | 231                 | 174     | 516/273-9750 |
|                                          |                   |           |              | Ward-Beck Systems, Ltd.                 | BC                  |         | 416/438-6550 |
|                                          |                   |           |              | Winsted Corp.                           | 77                  | 46      | 800/447-2257 |
|                                          |                   |           |              | 360 Systems                             | 167                 | 113     | 818/342-3127 |



# SWITCHING TO A HIGHER LEVEL



## Where will it end?

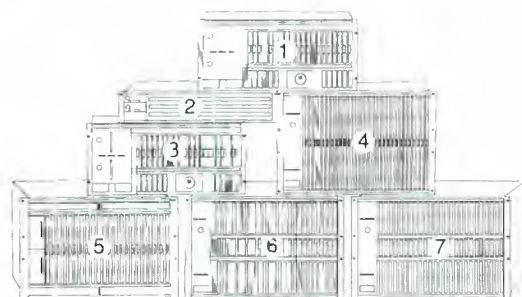
*You know the problem.* A master grid with video and 3 audio levels is no longer enough. Today's facilities already require HDTV-ready matrices, RS232/422, RGB, Key switching and more! You might say new requirements seem to be piling up all the time.

Di-Tech's growing family of routing switchers now includes a wide range of products to suit your application and budget. Naturally, these switchers are all compatible with industry standard, **Model 9002** Eight Level Virtual Matrix Control System.

With 30 MHz products, and field expansion to 256x256, uncertainty about the future ends with your call to our factory.

### Models Illustrated

|     |             |       |              |
|-----|-------------|-------|--------------|
| (1) | <b>5065</b> | 32x24 | stereo audio |
| (2) | <b>5515</b> | 16x16 | stereo audio |
| (3) | <b>5333</b> | 32x24 | video        |
| (4) | <b>5333</b> | 32x32 | 4 wire data  |
| (5) | <b>5335</b> | 20x20 | RGB, HDTV    |
| (6) | <b>5252</b> | 64x32 | stereo audio |
| (7) | <b>5254</b> | 64x32 | video        |



See us at NAB Booth #2954

Circle (2) on Reply Card

**di-tech inc.**

48 Jefryn Boulevard, Deer Park, New York 11729

(516) 667-6300 • FAX (516) 595-1012





## MiniCOM® brings a totally new dimension to professional communications!

Until now setting up a production communications system required bulky hardware and plenty of space.

MiniCOM® changes all that! It delivers mainframe performance in a "desktop" sized package. A 24 x 36 matrix in just 8<sup>3</sup>/<sub>4</sub>" of rack space (5 rack units).

And, because we've been able to put all that traditional Ward-Beck quality and performance into such a compact frame, the price has come down to "desktop" proportions too!

No need to dream any more about having a MicroCOM System sometime in the future .. You really can afford one today!



**WARD-BECK SYSTEMS**

Ward-Beck Systems Ltd., 841 Progress Avenue, Scarborough, Ontario, Canada M1H 2X4.  
Tel: (416) 433-6550. Fax: (416) 438-3865.