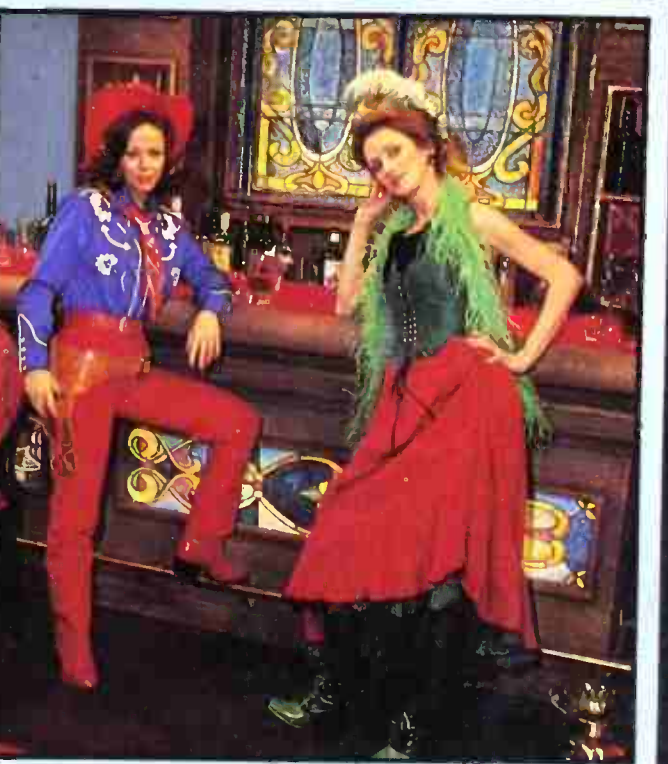
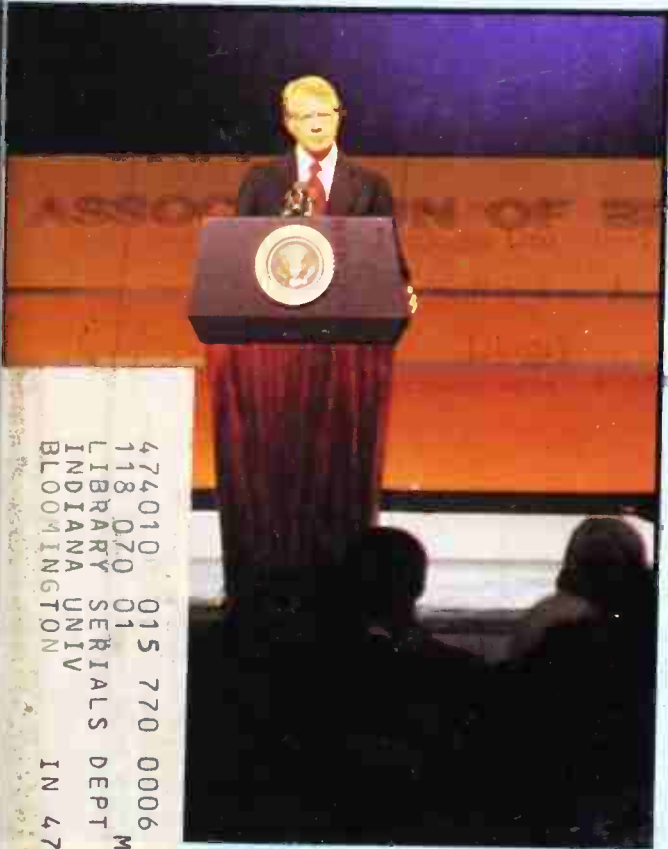


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NAB convention replay



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Each 2-wire controller is a micro-processor that confirms switching at all levels in the switcher via word exchanges to the four kinds of circuit boards. The TKA-105 was NBC's choice for the 1980 Olympics, NBC Burbank, NBC Chicago and the expansion of switching at NBC New York. If your routing requirements are for a matrix of 60 x 60 or larger, we invite you to explore the most advanced technology available.

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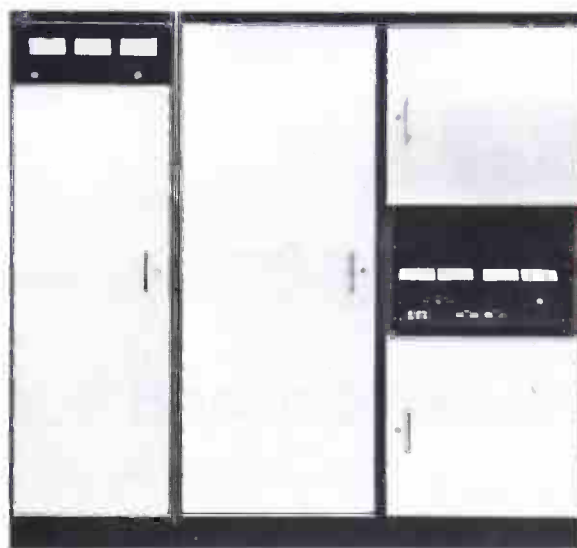
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The IF Diplexed TV Transmitter

FCC Type Accepts power levels through 5 kW



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Very recent FCC Type Acceptance actions on Acrodyne's IF Diplexed TV Transmitters open a new era for domestic broadcasters. The advantages of IF Diplexed TV Transmitters for primary U.S. broadcast service are available for the first time under normal FCC licensing procedures.

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Because of the rapid technological growth in this field you should contact your Acrodyne representative or the factory for the up to the minute status of higher power configurations.

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BROADCAST engineering

The journal of the broadcast-communications industry

June, 1979 □ Volume 21 □ No. 6

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BROADCAST engineering

NAB convention replay



THE COVER

NAB/Dallas '79, the industry's largest convention, is replayed in this issue and colorful scenes from the show are displayed on the cover.

In the upper left, President Carter addresses the convention and announces his program to bring about additional reform to the regulatory process. In the lower left photo, at the Thomson-CSF booth, a skateboarder performs to illustrate the ease of operation of the Microcam camera. In the upper right photo, Marconi demonstrates in their booth the flexibility in operation of their Mark 12 ENG/EFM camera with this newsroom set-up. In the lower right photo, models pose in this frontier saloon scene to demonstrate the color quality of Panasonic's studio and ENG/EFM cameras.

The cover photographs, along with most of the photos of the NAB/Dallas convention included in this issue, were shot exclusively for BE by Christopher Cave, One to One Photography, Dallas, TX.

JULY ISSUE

- Digital and broadcasting
- Pre-broadcast financial management conference notes
- Business and technical automation
- Designing equipment budgets

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Microprocessor Based Editing Control System

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Flexibility — the Z-6 utilizes the computer industry's standard IEEE S-100 buss electronics. The heart of your Z-6 is a tried and proven Z-micro computer. Moreover your Z-6 interconnects with your VTR. Your transports are factory reliable.

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However, if you are a novice, the Z-6 will operate like the simplest control track editing system you have ever used except it will be the most accurate. Forget the numbers, durations, roll times, events. Simply shuttle to the pictures and rehearse and/or perform the edit. The Z-6 can handle your novices and your pro.

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BROADCAST engineering

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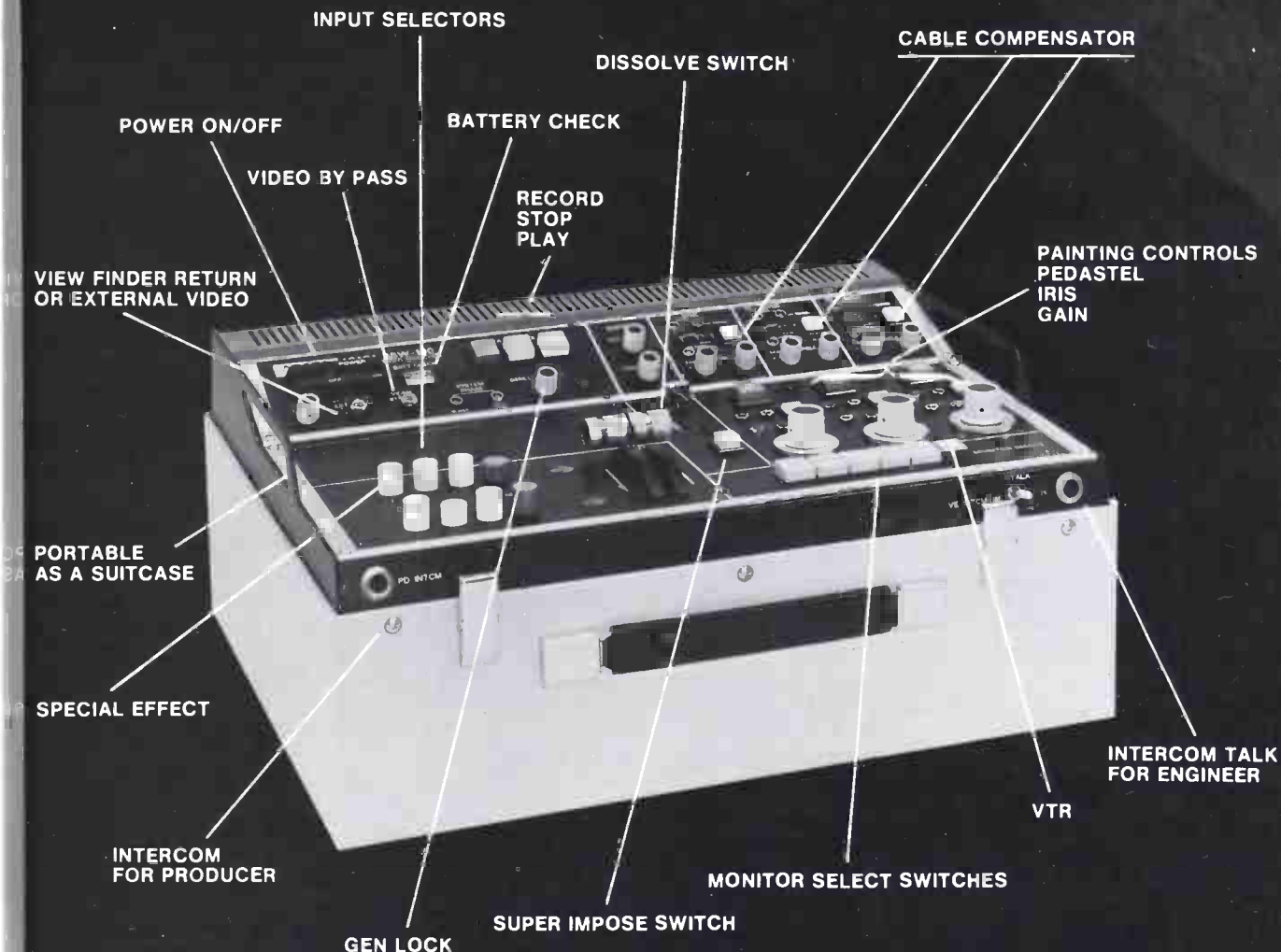
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At last! Portable Video Switcher-Battery Packed- or works on 12-Volt Car Battery or 120-Volt AC line!!

Customizes to your equipment. Compatible with any camera. Connects to VTR! The Asaca ASW-100. A portable switcher designed for the ENG and EFP cameras. Small and light. The hand-carry type with features ideal for "field production."

Powered by a battery pack, or 12-Volt vehicle battery or 120-Volt AC line; when from latter two, the switcher can also be powered along with multiple cameras and VTR.

The ASW-100 operates with up to three cameras. Designed for use with the Asaca-2000 camera. Compatible with any other camera. Full operations remote controls optional. Non-Asaca cameras containing internal gen-lock circuitry use black burst output, providing for each camera position.

The ASW-100 includes a "sync" generator. Internal gen-lock circuit permits VTR signals as a fourth input for editing or program modifications. Automatic phase control is within a plus or minus 15 degrees from all sources.

Switcher is vertical interval and processes composite video signal. Mixer-fader is included, capable of special effects.

Monitoring is optional with an AMB-100 unit. The instrument provides three mono-chrome source monitors and wave form monitor for use with external color line monitor. When the AMB-100 monitor is not used, a signal monitor can be connected to switching unit. Integral monitor switcher included in the ASW-100 will select the various sources for viewing on the monitor.

Combining with the Asaca ACC-2000 camera furnishes a full production system capable of expanding the mobile operation of any broadcaster or video producer while maintaining full broadcast signal quality.

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Groundbreaking for new KPLX-FM facilities



Groundbreaking ceremonies were held March 28 for the new office building and studio of the Arlington, TX, FM radio station KPLX. The 7000 sq ft structure will allow for another 4-track production studio and an expanded local news department. From left, participants included Art Carlson, senior vice president of Susquehanna Broadcasting which operates KPLX; Miles David, president of the Radio Advertising Bureau; S.J. Stovall, mayor of Arlington; Edward McLaughlin, president of ABC Radio; Vincent T. Wasilewski, president of the National Association of Broadcasters; and Wally Tucker, KPLX vice president and general manager.

Ferris urges diversity of children's programs

At the National Association of Television Program Executives annual convention held recently in Las Vegas, Charles D. Ferris, FCC chairman, urged television producers to seek new partnerships with technological advances and new markets outside the three networks to improve the diversity of children's programming.

According to Ferris, no subject concerning television generates more moral intensity than children's television. He stated that, "Preschool children at the time of the first White House report are now parents, and some, probably, are television programmers themselves. We have lost too much time to remain locked forever in fixed positions based on the same presumed clash between social values and financial self interest. For the children's program market to func-

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Our new modular audio consoles are the perfect match for today's video equipment. In fact, we believe our new 3200 and 1600 broadcast production consoles are the forerunners of the audio equipment of the 80's. You won't see anything else like them, at least not this side of late 1979.

Our totally new consoles employ the finest proven components and integrate them into a cohesive, versatile, reliable unit . . . one that will accommodate your most exacting requirements. Our total in-house design and manufacturing capability put so much quality into all of our consoles that ADM® offers an exclusive 5-year warranty, the most comprehensive in the industry.

Learn more about how ADM can increase your audio capabilities. Contact Audio Designs and Manufacturing, Inc., 16005 Sturgeon, Roseville, Michigan 48066. Phone: (313) 778-8400. TLX-23-1114.

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ADM

The Audio Company

Industry news

tion most adequately, changes in the marketplace are necessary and certainly preferable to continued government oversight."

TV audio channel

The American Telephone and Telegraph Company recently made

available a second television audio channel which allows for stereophonic or bilingual broadcasts. In addition, the channel makes it possible for stations to simulcast programs in which viewers receive the audio portion of a TV program in stereo through a local radio station.

The channel is a result of a trans-

mission method developed by Bell System which permits the simultaneous transmission of TV pictures and sound along the same transmission facility known as duplexing.

1978 employment report

A 1978 employment report by the FCC shows that of the 41,103 full-time women employees in the broadcasting industry, 21,366 (52%) were in the higher pay categories in capacities such as official and manager, professional, technician and sales.

The report showed that women held 21.6% of the official and manager positions, 22.3% of the professional jobs, 27.3% of those in sales, 7.2% of technicians and 90.3% of the office and clerical positions.

Penn State offers PTV programming

The Pennsylvania State University operated public television station is the first local public TV station to distribute its programming nationally to other PTV stations over the public broadcasting's satellite distribution system. The first feed occurred on March 30 when WPSX-TV showed *Timbromania*, a 30-minute special on stamp collecting. After only one week, 16 local stations and three state PTV networks had expressed their interest in the program. The station is planning to distribute additional locally produced programs directly to public stations through the satellite system.

NPPA awards

The National Press Photographers Association (NPPA) and the Department of Mass Communications at Arizona State University have named KING-TV, Seattle, the national television photography station of the year. The Ernie Crisp Award went to Ken Swartz, KPRC-TV, Houston, as the national television news photographer of the year.

Other winners were John Smith, CBS news, for spot news; Randy Fairbain, NBC news, for general news; Ed Matney, NBC's *Weekend news*, for documentaries; and Edwin Bragg, KTRK, Houston, for features.



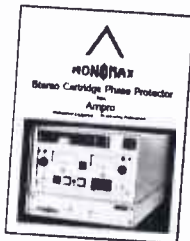
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AM Stereo is coming and FM Stereo is here. Your rich, clear stereophonic sound can lose a lot of its punch when heard on a monaural receiver. Phase cancellation, response holes and peaks can make it sound downright dull and lifeless. And that turns off listeners. That's bad business for you because the majority of your prime time audience consists of mono receivers.

To give your mono listeners the sound quality they demand, you need Monomax... the new stereo tape matrixing system from Ampro. Monomax helps your signal come across strong and clear because it totally *prevents* phase cancellation problems. Now your mono as well as stereo listeners can enjoy the full lively sound you transmit.

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Today, backed by MICROTIME'S proven tradition of performance, the new 2020 Video Signal Processor has become the concept in complete video correction. The 2020, an even better industry standard.

The 2020 VSP, combining our creative design capabilities with advanced technology provides the modular flexibility to offer the



options to precisely fit your applications—exactly the features you need, whenever you need them.

Just as with all MICROTIME products, the 2020 VSP is available and supported through our worldwide distribution network

with representatives and technical support teams to serve you everywhere. Only MICROTIME with its experience, people and technology could create the 2020 Video Signal Processor. Call today for the name of the distributor nearest you.



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Circle (10) on Reply Card

The competition drew 703 entries representing all three networks, 191 US stations and four in Canada.

AM stereo test

KTSA radio in San Antonio has been granted FCC test authorization for testing AM stereo transmission. The authorization allows the station to conduct on-air testing of the

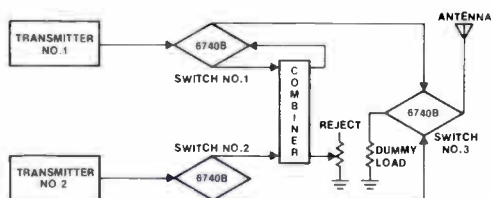
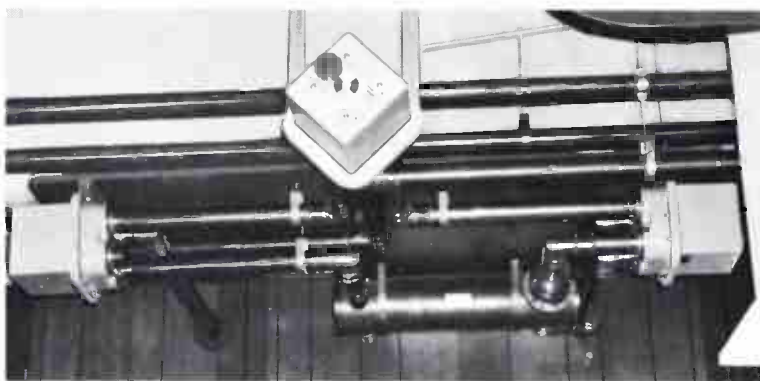
system which has been proposed by Kahn/Hazeltine but does not allow it to be used for promotional purposes. The station will submit test results to the commission for inclusion in the record of Docket 21313.

Polarized signal use

Four North Carolina television

stations are currently using a circularly polarized signal for transmission of their broadcasts. The stations, WRAL-TV, Raleigh; WTVD Durham; WFMT-TV, Greensboro and WITN-TV, Washington, have all purchased RCA transmitters and circularly polarized broadcast antennas. The systems are capable of 316 kW of power which is the maximum allowed.

WRVQ, Richmond MADE THE SWITCH . . . to Delta's 6730/6740 Series of Coaxial Transfer Switch



Three Delta Model 6740B 3-1/8-inch Coaxial Transfer Switches are used in Chief Engineer Harry Long's Parallel FM Transmitter Installation at WRVQ, Richmond, Virginia. The Delta Coaxial Transfer Switch is fully interlocked; and will switch between transmitters, antennas, or dummy loads in less than two seconds. The Transfer Switch can be operated manually, or remotely controlled using an SPDT switch or an optional control panel. Specifications for the 1-5/8- and 3-1/8-inch switches are available on request. Call or write Delta Electronics for further information.

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Christian Broadcasting satellite is channel 8

For the purpose of television listings the Christian Broadcasting Network Satellite Service is Channel 8. The number was adopted from the network's Transponder 8 on the RCA Satcom I satellite as a measure to avoid duplication, confusion and misunderstanding in the cable television industry.

Publication of articles by FCC employees

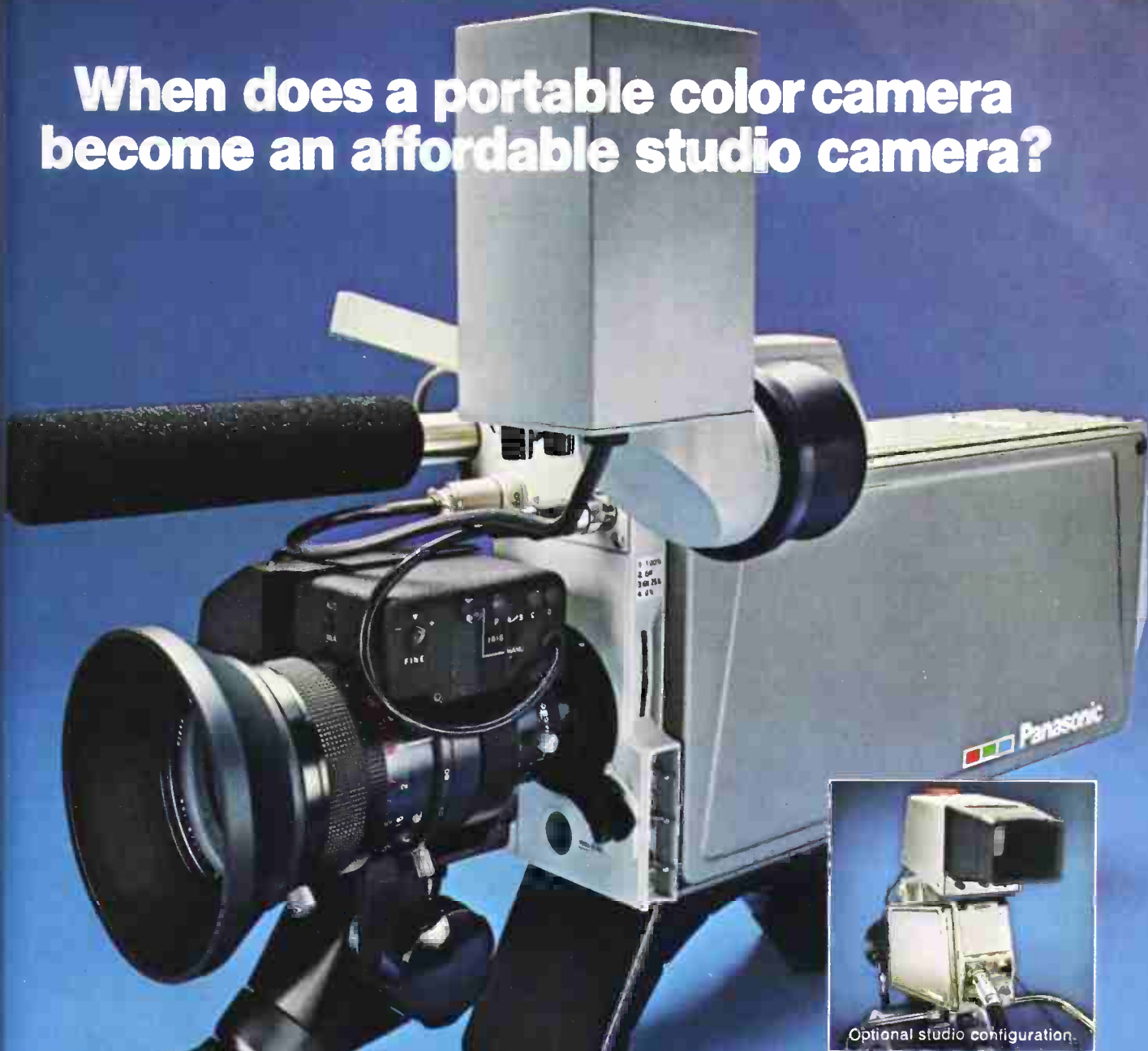
FCC employees may now publish articles as long as they are not incompatible with an employee's duties and responsibilities. The publication of articles was formerly regarded by the commission to be an activity that might be regarded as an official action or that might bring discredit on the commission. The general prohibition against outside activities which conflict, or are incompatible, with an employee's duties and responsibilities will be continued but the prohibition against outside activities which would cause unfavorable and reasonable criticism of the FCC would be deleted.

Dallas symphony uses Sony audio processor

The Dallas Symphony Orchestra used Sony's PCM-1600 digital audio processor recently to record three classical works intended for RCA Red Seal release. Eduardo Mata, the conductor, lead the symphony in Stravinsky's Firebird Suite and Symphony in Three Movements as well as Ravel's Daphnis and Chloe.

Circle (11) on Reply Card

When does a portable color camera become an affordable studio camera?



When it's a Panasonic ENG/EFP camera.

Now you can stop admiring ENG/EFP color cameras, and start owning one! The surprisingly affordable Panasonic AK-750. Thanks to its impressive list of options, our three-tube Plumbicon® portable camera troubles as a studio camera.

In the field it's a fully self-contained portable camera that weighs only 20 lbs. (with our optional 12:1 zoom lens shown), so it's easy to handle. It's just as easy on the power, using only 23 watts. You can interface the AK-750 with any EFP system, because it can be externally synchronized with a single cable. Timing and phase adjustments are built right into the camera head. Or connect it to any studio system, simply by adding the optional Remote Control Unit and studio viewfinder.

Indoors or out, you can look forward to impressive performance: With an S/N ratio of 49 dB, and horizontal resolution of 500 lines center at the recommended illumination of 200 footcandles at f/4. There's even a +6 dB gain for a minimum illumination of just 15 footcandles at f/1.8.

Some impressive circuitry was built into the camera: like a Y I/Q encoder, an RS-170A sync generator with genlock for studio or EFP use, and a color bar generator.

It also features an optical black, and automatic white balance. And there's electronic color conversion, as well as a filter wheel behind the lens.

Horizontal and vertical blanking are both adjustable to meet a variety of recording or playback requirements. And your picture is always crisp and clear thanks to horizontal aperture correction and 1-line vertical aperture correction built right into the camera head.

Not only do you get a long list of standard features with the AK-750, there's also a long list of camera options available. Such as 2-line vertical aperture correction, a chroma key unit, and more.

So if you're pricing both studio cameras and portable cameras, price one camera that can do both. The Panasonic AK-750.

Plumbicon is a registered trademark of N.V. Philips of Holland for TV camera tubes.

For more information, write: Panasonic Company, Video Systems Division, One Panasonic Way, Secaucus, N.J. 07094. In Canada, Panasonic Video Systems Department, Mississauga, Ontario.

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YES	No	No
YES	No	No
YES	YES	No
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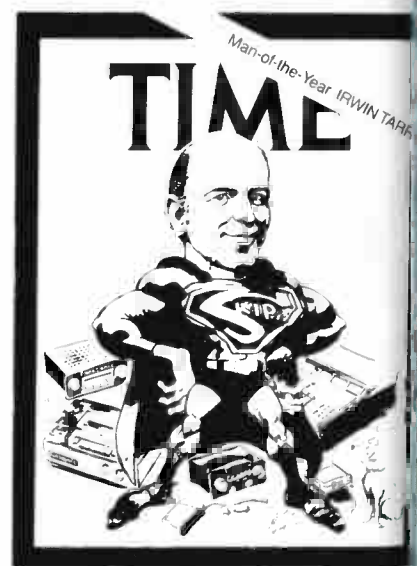
Industry news

The ¾-inch tapes will be edited with the prototype electronic editing unit which Sony will show at the Los Angeles Engineering Society convention this month.

ITA/Time man of the year

The 1979 ITA/Time magazine "Man of the Year" award was presented to Irwin "Skip" Tarr at the International Tape Association ninth annual seminar at Hilton Head Island, SC, on April 1. The award is presented each year to an individual who has made major contributions in the tape and communications industries since their inception.

Tarr has been instrumental in the development of the audio and video tape industries in business, education and the home. In 1964 he was vice president of recorded markets.



ing at RCA, Tarr played an important role in the development and consumer acceptance of 8-track stereo tapes. Tarr joined Panasonic in 1972 where he instituted the expansion of the video system division where he was serving as general manager.

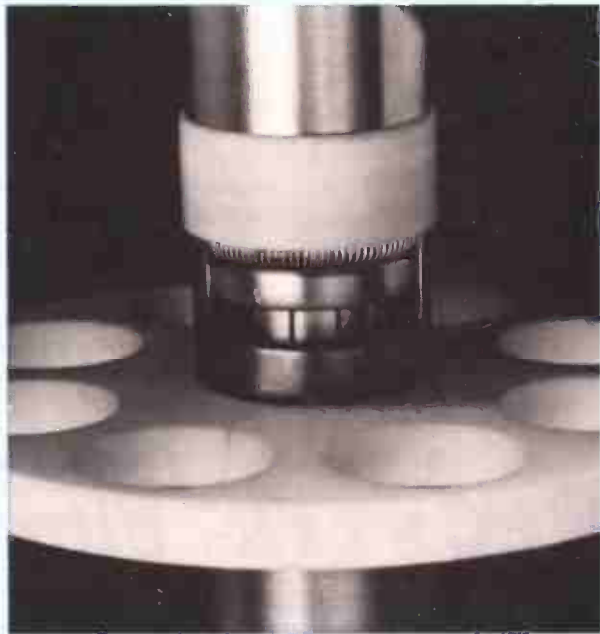
Tarr became actively involved in ITA in 1972 and in 1976 became a member of the board of directors. Early in 1977 he was appointed to the position of vice president and later that year to president, a position he still holds.

A new standard in coax transmission line

For the Broadcasters who missed seeing us at Dallas, we'd like to introduce you to the best rigid coax line in the industry. Our C - "K" thermo-coupler sets a new standard for transmission line reliability, outperforming our Competitors from 2 to 1 to over 5 to 1. To achieve this we incorporated a thermo-probe within our watchband connector. This allows the heat to transfer from one section of line (or component) to the other with accelerated ease, relieving the R.F. contact surface from this burden. Thus hot spot build-up experienced in the old silver plated connectors is almost eliminated giving a more equal distribution of calories throughout your system. This also allows the line to dissipate calories through the diplexer and antenna short circuits at an accelerated rate, decreasing temperature build-up of the inner conductor and increasing reliability against breakdown.



The above photo shows a cut-away view of the female connector with its built-in thermo-probe prior to its assembly with the watchband male bullet. (Note: Both the male and female connections are an integral part of the inner conductor allowing only one contact joint per section of transmission line.)



After assembly as cut-away shows the thermo-probe remains in contact internally with a male wrist-band bullet. This allows maximum heat transfer from one section of line to the other. All dust generated due to differential expansion by the watch-band spring and thermo-probe are captured within the inner conductor.

Broadcasting equipment has moved from vacuum tubes to solid state. S.W.R. provides the opportunity to bring your coax to the same state of the art. Remember you can pay more or less but you can't buy better. Whether you're planning a new system and wish to use our exciting new "K"-Line flange where the teflon and "O" ring cannot be damaged on assembly or wish to update your existing R.C.A., Andrews, Phelps Dodge, etc. rigid coax we have the answer. **S.W.R. is Systems With Reliability.**

Available in 3 1/8, 4 1/16, 6 1/8 and 9 3/16 sizes.

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Systems with Reliability

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(603) 497-3000

Broadcast company formed in NJ

Three veteran broadcasters have joined to form Sharepoint Systems, a company to design and manufacture products for the broadcast industry.

Ted Schober, president, has been in broadcasting for 15 years with such companies as CCA Electronics and Harris, in venture management, sales and transmitter design. Art Silver has 20 years of experience as a broadcast station engineer, equipment sales executive and consultant and will serve as a marketing and sales consultant. In the position of vice president of engineering is Eric Small, who has 15 years of experience as a chief engineer, technical consultant and entrepreneur.

The company's first new product, Upstart, a controller for audio cartridge production, was introduced at the 1979 National Association

of Broadcasters Convention in Dallas.

Sharepoint Systems is located at 402 Tenth Avenue, Haddon Heights, NJ 08035.

RCA demonstrates satellite system

As a feature of their exhibit at the National Association of Broadcasters convention in Dallas in March, RCA American Communications demonstrated a proposed satellite distribution system for supplying movies, sports, feature and syndicated programs to the nation's commercial television stations. The demonstration used programming supplied by Viacom International. A field test of the system to assess the economic and marketing aspects of the concept will be conducted later this year by RCA Americom, Viacom

International and Post-Newsweek Stations.

Andrew F. Inglis, RCA Americom president, stated that the service would provide program distributor and broadcasters with a fast and secure method of sending and receiving program material via satellite.

Dictaphone to transfer logger production

Dictaphone Corporation recently announced plans to end operation of its audio/electronics division in Mountain View, CA, this July. According to William R. Krehbiel, president, the production of voice communications logging systems will be moved to the company's main manufacturing facility in Melbourne, FL. The company also has agreed in principle to sell its line of Scully

From Cinema Products

NEC's TTR-7 Ultra-Lightweight 1" VTR



***Weights less than 33 lbs!
(Including tape and battery)***

Designed exclusively for portable over-the-shoulder operation and rugged reliability with utmost stability, the broadcast-quality 1" TTR-7 is ideally suited for the wear and tear of remote use.

For maximum operational and handling ease, the TTR-7 1" helical "D" format VTR utilizes NEC's advanced self-threading cartridge design, which eliminates the majority of field tape-handling problems.

Outstanding Features:

- Internal battery will drive a minimum of two 22-minute self-threading tape cartridges on a single charge (continuous run).
- Despite its lightweight design, the TTR-7 has a built-in video confidence head, edit system, full status indicating system, and will play back in color (with the use of an optional AC/color adapter).
- Virtually foolproof servo-control system.
- Modular construction permits easy in-the-field replacement of video head cartridges.
- Can be ordered with optional second audio channel!

Also available is NEC's matching-system 1" cartridge VTR, the TTR-5. Weighing 55 lbs., the TTR-5 was designed for mobile van or fixed-location remotes, and light studio use, if desired.

For further information, please contact:

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...the best value for your money.
...Because, in design and performance,
...MNC-71CP is the most advanced
...era of its class. With built-in linear
...x, 2-line image sharpener, comb filter
...ncoring, I/Q encoder and color bar
...erator, automatic iris, white balance,
...balance, flare compensation.
...bering *studio-quality* picture resolution
...outstanding colorimetry, with ENG/EFP
...bility and versatility.

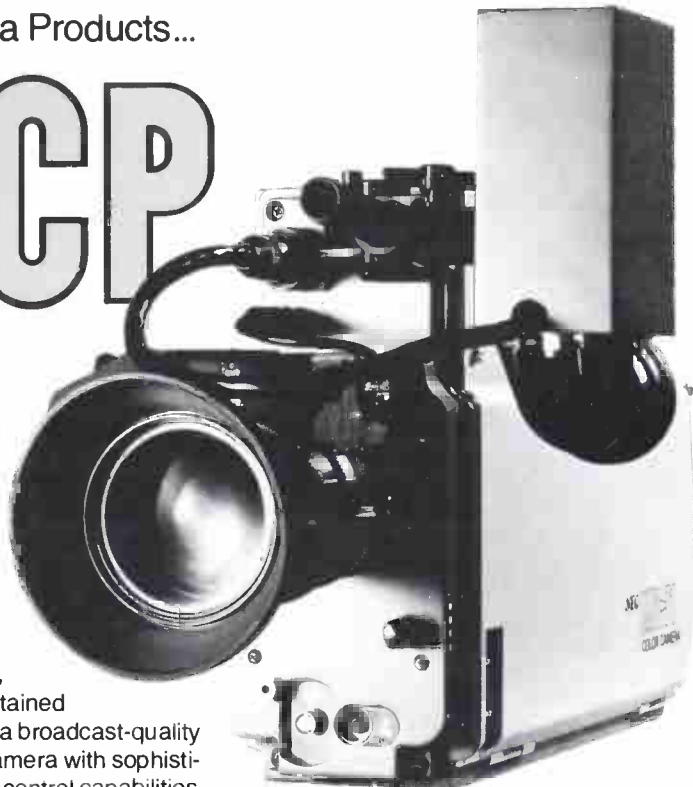
ENG/EFP Design Excellence

...Manufactured by Japan's largest
...ufacturer of broadcast equipment —
...on Electric Co., Ltd. (NEC) — the
...MNC-71CP incorporates design inputs
... Cinema Products, and features many
...pvements over all first-generation

backpackless cameras.
It is a totally new
video camera system,
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from its inception to be
used both as a compact,
lightweight, fully self-contained
ENG camera, as well as a broadcast-quality
studio/field production camera with sophisti-
cated remote production control capabilities.

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There's no need to repackage the
camera in a bulky outer shell for studio
operation. Just add the optional 5" viewfinder
and the portable production CCU (with cable
compensation up to 155 feet), or the rack-
mounted teleproduction CCU (with cable
compensation for more than 1000 feet)...
and your MNC-71CP readily converts into
an MNC-710CP studio/field configuration.
Ideal for multi-camera shoots on location
and in the studio.



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The MNC-71CP was designed for
utmost stability and reliability in performance
as well as ease of maintenance.

What's more, it is backed by Cinema
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With an unprecedented full one-year
warranty, and replacement parts available
anywhere in the United States within
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rental cameras...just in case.

And for around-the-clock seven-day
video service, you can call Cinema Products'
toll-free number: 800-421-7486.

Less Than \$1000 Per Month!

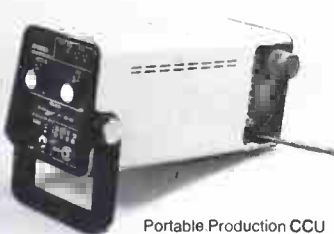
The MNC-71CP is probably the most
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and we will design a complete package
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production needs as well as your financial
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professional recorders for the broadcast and studio recording industries to Ram Manufacturing.

O'Brion sees bright future for video

Richard F. O'Brion, executive vice president of US JVC, sees 1979 as a year of industry maturity for the professional video market. According to O'Brion, an important aspect of this growth is reflected in "its impact on hardware and hardware usage patterns." The impact of maturity isn't likely to signal a slowdown in technology either. Yet as users' needs become more clearly defined, he sees less technology for the sake of technology and more emphasis on tailoring innovation to specific functional requirements.

Ampex restructures

The audio-video systems division of Ampex has restructured its organization into five separate profit

centers designed to place more emphasis on each of the division's product lines.

Each center will be responsible for its own engineering, product management and product planning and include audio products, responsible for professional audio products; camera products, responsible for professional camera products; materials and devices, responsible for ferrite, ceramic and plated products; video recorders, responsible for professional videotape recorders; and video systems, responsible for electronic still store devices, graphics and editing systems.

SALES/CONTRACTS

Harris

Harris Corporation has been awarded a contract to build a \$5.2 million radio broadcasting network in Egypt. Under the contract terms,

Harris will manufacture and supervise the installation of 80 transmitters at 20 sites from the Mediterranean to the upper Nile. Twenty local stations will rebroadcast programs originating in Cairo. The contract awarded by the Organization for Broadcasting and Television Federation, calls for delivery of all equipment by the summer of 1980.

McMartin

The Collins Transmissions Systems Division of the Commercial Telecommunications Group of Rockwell International has granted a subcontract to McMartin Industries for the design and manufacture of coordination channel modulators and demodulators for satellite communications.

Rockwell is developing the system for the Corporation of Public Broadcasting to provide a satellite interconnect system for National Public Radio. McMartin will market directly to users such units as the McMartin SMR-1, IF modulator and

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- Modular constructed for easy service.
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- 1 or 3 tone — mono or stereo.
- Replay reminder system.
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100% Modern Solid State Electronics; Replay Lock-Out Circuit—Prevents Double Airing; Front Access Controls—Removable Desk Covers; Heavy Duty Inverted Head Mountings; Rugged Mechanical Design—Cool and Quiet; Optional Digital Recording Timer; Internal Record Response Test System; Six Position Auto-Switched Meter; +18 dBm Audio Output—Wide Headroom; Desk or Rack Mount Optional; 24 Model Variations For Your Needs.

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 1974 HELICAL FRONT END RECEIVER
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 1978 PORTABLE DIVERSITY RECEIVER

1979

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In 1964 Vega developed the first wireless microphone system that offered full-fidelity sound, the first real innovation in microphones in over 50 years. Now we are proud to introduce our latest innovation ... Dynex!

Dynex adds dynamic input range expansion to wireless microphone operation thereby eliminating the need for continuous mic gain adjustments. Set it and forget it ... it's that simple. Two years of extensive field use with the Dynex option enables us to guarantee the same proven reliability, quality and performance that you have come to



Model 77 Transmitter

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We have continually improved our systems during the past 15 years, so you can be assured that

today's Vega systems are designed with the latest in high-technology electronics and sophisticated audio engineering. Besides offering you the finest systems available, Vega is constantly working with the industry to further the art of audio processing. One example is Vega's F.C.C. petition which resulted in obtaining clear wireless channels for broadcasters and filmmakers last year.

Vega offers a variety of systems that give you a new order of freedom and that foster new confidence in your performance. When new techniques are developed ... they're from Vega.



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But price alone isn't our only breakthrough.

The revolutionary XC-530 features remarkable reliability. Reliability that comes from our bias lighted three-tube bonded block design that eliminates mechanical registration adjustments. Which eliminates costly set-ups and down time—a problem common even to the most expensive cameras, especially after rough ENG/EFP assignments.

Sharp's new XC-530 can be externally driven or used with our gen lock option, allowing you to lock up to any existing system. The XC-530 accepts standard C-mount lenses, including our optional 10:1 auto iris power zoom lens.

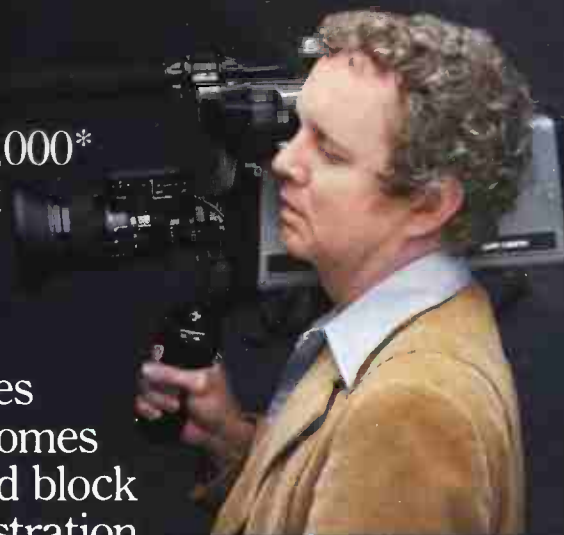
Why else would you want a \$35,000 camera for \$10,000?

For its sensitivity, high S/N ratio, excellent colorimetry and low power consumption.

The only way you could possibly tell the difference between this saticon camera and one costing three times its price would be on electronic test equipment. And our new saticon studio camera, complete with CCU (Sharp's XC-500) delivers the same high quality as our portable model.

So take the Sharp challenge and see if the difference is worth the \$25,000 difference. We're betting it isn't.

For the name of the authorized Sharp dealer nearest you, turn the page.



SHARP'S XC-530 LIGHTWEIGHT PORTABLE CAMERA.



SHARP'S UNIQUE 3-TUBE BONDED BLOCK DESIGN.



SHARP'S XC-530 STUDIO CAMERA IN REMOTE-CCU CONFIGURATION.

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Arizona

Zonar Corp.
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Phoenix, AZ 85017
(602) 264-2100

Arkansas

Fairview Audio Visual Co.
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(501) 568-7446

California

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Sunnyvale, CA 94086
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The Video Store
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San Diego, CA 92111
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Video Systems Network
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Los Angeles, CA 90066
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Bethesda, MD 20034
(301) 530-9580

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(305) 592-5355 (Domestic)
(305) 592-3938 (Foreign)

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Honolulu, HI 96813
(808) 533-3848

Illinois

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Highland Park, IL 60035
(312) 432-0725

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Louisville, KY 40299
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MP Video, Inc.
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(617) 965-5405

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East Lansing, MI 48823
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Minneapolis, MN 55435
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Radonics Electronics
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Central Missouri A/V
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(607) 748-3331

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Video Concepts
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Kettering, OH 45419
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Tulsa, OK 74145
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Portland, OR 97214
(503) 232-4632

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(713) 528-1662

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(214) 341-1771

Texas Video Systems, Inc.
433 Breesport
San Antonio, TX 78216
(512) 341-1317

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Salt Lake City, UT 84101
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Professional Products Department, Sharp Electronics Corporation, Headquarters Offices: 10 Keystone Place, Paramus, NJ 07652, (201) 265-5548; Western Regional Office: 1047 Carson Blvd., Torrance, CA 90502, (213) 830-4470.

McMartin SDR-1 IF demodula-

Cox

Cox Broadcasting and General Electric have reached agreements in principle with potential purchasers of three television stations and eight radio stations. The stations would be divested to meet the FCC's requirements related to proposed combination of the companies' radio and television broadcasting and cable television businesses.

The Cox stations to be divested are WSB and WSB-FM, Atlanta; WHIO-TV, Dayton; and WSOC AM-FM, Charlotte. General Electric's stations are WRGB-TV and WGFM, Shenectady; WNGE-TV and WSIX AM-FM, Nashville; and KFOG-FM, San Francisco.

General Electric's program approach is an effort to meet the FCC's objective of broadening broadcast media ownership by including new entrants and local minority participation.

Sony

Sony's broadcast division has received an order from Compact Video Systems for more than \$4 million worth of broadcast studio equipment. The order included 1-inch helical scan video recorders, broadcast-quality video cameras, lighting equipment and 3/4-inch videocassette units. The equipment will be delivered over a 2-year period.

Harris

Group W of the Westinghouse Broadcasting Company has announced the purchase of \$1 million of radio transmitters from Harris' broadcast products division. The order includes five MW-50A, 50 kW AM transmitters, three FM-20, 20 W FM transmitters and one MW-5A, five 5 kW AM transmitter and related accessories. All equipment will be installed by this fall.

ProTech Audio

Robins Industries has reached an agreement with ProTech Audio for the sale of its broadcast and sound equipment product line. The agreement includes the rights to manufac-

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Because at Camera Mart, we feature an entire line of video equipment including Ikegami, Hitachi, Panasonic, Sony, Microtime and many others. The Ikegami ENG package shown here is just one of many we offer. It's got everything you need to cover the story, indoors or out.

The camera: Ikegami's HL-79 high sensitivity Plumbicon®* color shoulder camera with the Canon f/1.6 wide angle 9mm-117mm zoom is light weight and easy to handle. Its low-profile, with eye-level CRT monitor (on both take and playback, by the way), gives it the convenience and maneuverability you'll appreciate during those hectic, on-the-spot coverage sessions.

The recorder: Sony's easy-to-operate BVU-100

gives you up to 20 minutes of NTSC color on a single U-Matic® cassette which can be edited on the 2860.

This custom package and whatever you need in video, are all available for sale, rent or through convenient lease-purchase options which can be arranged to suit nearly any budget. And we're flexible, too. If there's a special package or custom purchase option you'd like to work out, let us know.

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*Plumbicon is a registered trademark of N.V. Philips.

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Now, we have added the new 2000 Series to our product range. Developed to meet high standards of the broadcast industry, the 2000 Series color monitor is modular for easy adaptability to RGB/NTSC/PAL encoded signals. Available in 19" case and rack and 25" case, the 2000 Series maintains Electrohome's high standard of engineering.

In addition to an expanded line, Electrohome has a new west coast distributor network to provide fast delivery. For complete information on all our video equipment, contact Electrohome Limited at one of these offices:

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Business news

ture the professional audio products and provides for licensing of applicable patents, transfer of engineering and production drawings, procedures and product specifications. Special tooling, work in process plus equipment and inventory were also acquired in the agreement which became effective March 1.

FINANCIAL

Orrox

Orrox (CMX Systems, Videomax) ended its year on December 31, 1978 with revenues of \$6,348,666 and profits after tax benefits of \$734,178. In the prior year the company reported a loss of \$346,731 on revenues of \$4,805,453.

The 30% increase in revenues from 1977-78 resulted from increased demand for the company's videotape editing systems. Backlog for the computer-assisted editing systems was approximately \$2,200,000 at the end of 1978 compared to approximately \$1,300,000 a year earlier.

All of the company's divisions recorded an operating profit.

Cox

Cox Broadcasting recently declared a regular quarterly cash dividend of 18 3/4 cents per share on common stock. The dividend was payable on April 17 to shareholders of record April 2.

Scientific-Atlanta

Scientific-Atlanta announced that on January 31, 1979 its board of directors declared a quarterly cash dividend on its common stock of 5 cents per share. The dividend was payable February 23, 1979 to shareholders of record as of February 14, 1979.

Tracor

Tracor reported an increase of 26% in earnings per share and 22% in sales for 1978. The board of directors voted a five for four split of common stock in the form of 25% stock dividend distributed on March 9, 1979 to shareholders of record February 21, 1979.

Circle (19) on Reply Card

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small



D-4300 Series

Video & Audio Switchers

Available as 6x1 video, 6x1 audio, 16x1 audio-video, 20x1 video and 20x1 audio. Video only, audio only, or video-audio. May be stacked for multiple output bus applications. Uses digital control system with coax remote control cable. Each output bus has an independent control system.

medium

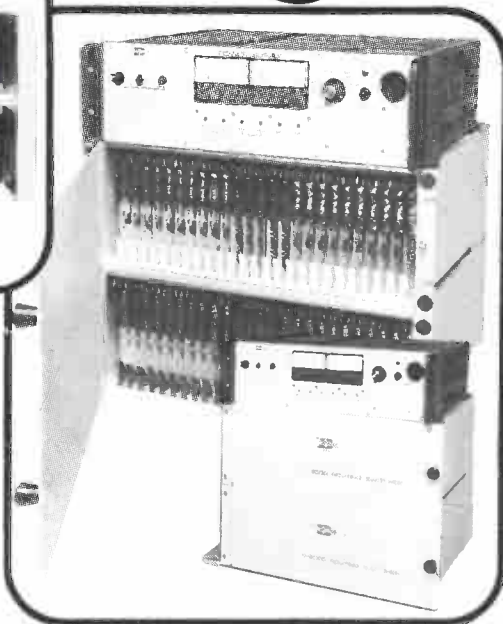


D-400 Series

Video & Audio Switchers

Available in 20x10, 20x15, 20x20, 30x10 and 30x15 video and audio basic matrix sizes which may be used as building blocks for larger systems for up to 100 inputs. Control system is BCD. Each output bus has an independent control system.

Large



D-2000 Series

Video & Audio Switchers

Available in 25x20, 25x25 and 50x25 video and audio basic matrix sizes. Digital control system is designed for 250 inputs and coax is used for remote control cable. Each output bus has an independent control system.

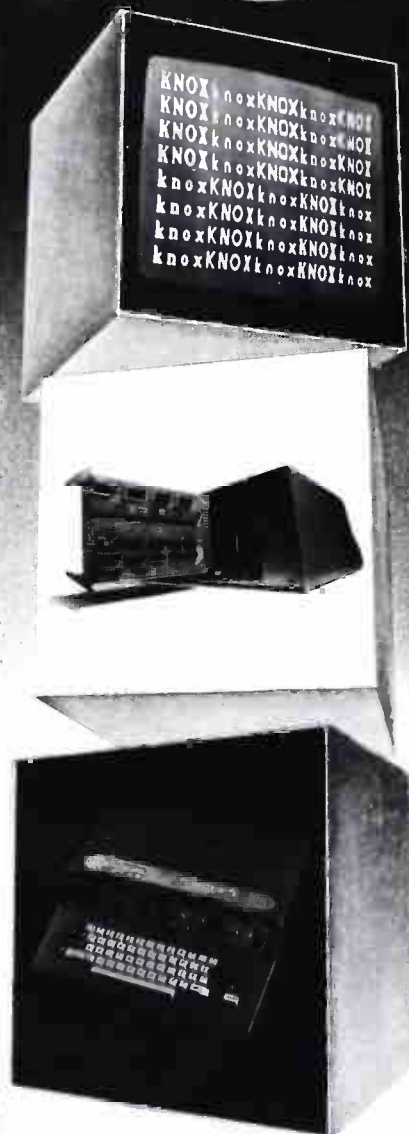
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association news

National Association of Broadcasters

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Cable copyrights

An industry position and action to be taken on distribution of royalties from cable TV systems for retransmission of distant broadcast signals was recommended by NAB's Ad Hoc committee on cable copyright royalties. The three recommendations included NAB initiating discussions with other copyright owners, seeking authorization from all stations to enter negotiations with other copyright owner claimants, and station receiving all royalties initially, but with proportionate shares of other copyright owners being determined by the marketplace.

TV devices rule

In a request to the FCC the National Association of Broadcasters (NAB), has asked that Texas Instruments be denied its petition to relax rules governing emission standards applicable to home computers. The association fears that granting the relief would result in increased television reception interference.

If the request is granted, Texas Instruments could market the model TI-900 modulator with the associated home computer. According to Texas Instruments, many manufacturers of home video devices do not comply with commission requirements. The company has requested a waiver pending a decision by the commission.

NAB objects to waiver provision

The FCC's refund form requires the approval of the General Accounting Office before it can be printed and mailed to broadcast licensees. The NAB opposes this provision as in order to receive a

refund it is necessary to sign a waiver accepting the amount as full satisfaction of any claim against the government for a refund. NAB emphasized that it does not wish to slow up long overdue fees refunds broadcasters have paid to the government under the unlawful fee schedule.

Radio Moscow

According to the US Justice Department, radio licensees are not subject to the Foreign Agents Registration Act when broadcasting programs by Radio Moscow if they meet the following requirements:

- the station must retain absolute discretion on programs broadcast;
- the station must advise Radio Moscow of the scheduled use of tapes and return used tapes to Radio Moscow;
- the station must not make, or receive payment from Radio Moscow; and
- commercial time must be sold to any interested party if station approves the text of the announcement.

Rules simplification requested

A suggestion was made to the FCC by NAB that regulations for receive-only satellite earth stations be different for common carriers and private users. According to NAB, the present regulations should be maintained for common carriers and others who desire long-term protection. In order that the carrier not be concerned with damaging future interference and resultant complaints from its customers, the regulations would require site coordination. NAB feels site coordination should be optional for private



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NAB news

users, but provisions should be made for conversion of a non-coordinated station to a coordinated one at a later date if subsequent engineering data would qualify the site.

Combination of cable proceedings requested

The NAB requested that the FCC consolidate five proceedings involving cable television. The association feels the consolidation will afford better commission consideration of cable policy.

The five proceedings are

- inquiry into cable television syndicated program exclusivity rules;
- inquiry into the economic relationship between television broadcasting and cable television;
- petition to eliminate cable television distant signal carriage and program duplication rules;
- petition to require retransmission consent and 2-tier structure for cable television carriage of non-network programs; and
- petition to require the formulation of rules or policies designed to attenuate the harmful effects of superstations on the provision of quality broadcast program service to the public.

FCC urged to regulate superstations

The NAB is urging the FCC to begin rule-making to curb the impact of superstations on broadcast program service. NAB fears that superstations will lose sight of their local community to the detriment of local program diversity and the commission's goal of locally oriented broadcast service.

Hoberman named to board

NAB has elected Ben Hoberman to their radio board of directors. Hoberman, president of ABC radio, succeeds Harold L. Neal, Jr., who resigned from ABC in March. He brings 38 years of broadcasting experience to the position. ☐

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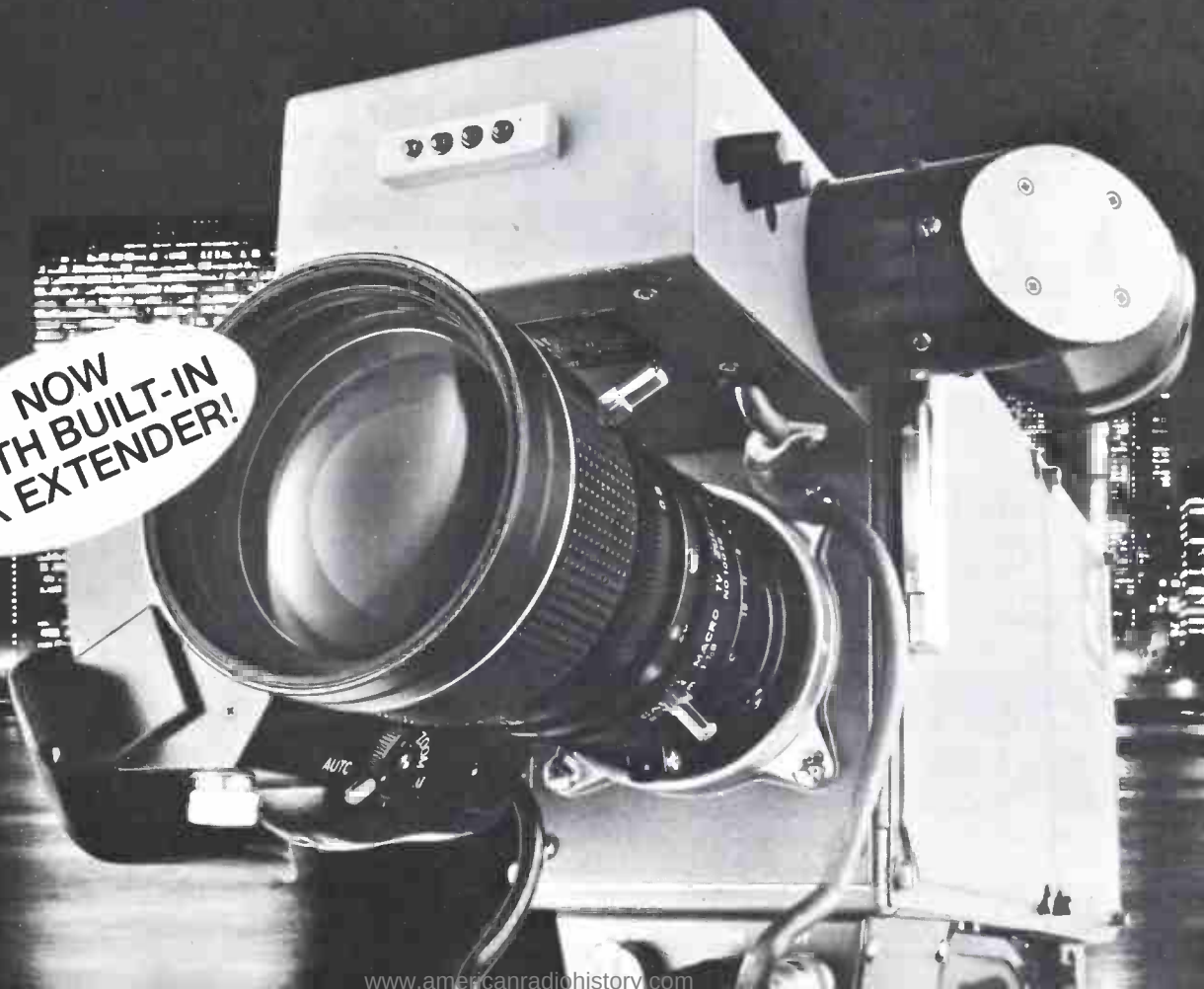
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NRBA

National Radio Broadcasters' Association

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Rewrite II

A statement released by the NRBA executive and legal committees concerning Rewrite II said the association wholeheartedly supports the basic philosophy that gave rise to the rewrite: "the public interest is best served when marketplace forces, rather than government regulation,...." control the operations of broadcast facilities. The NRBA however, reiterated its opposition to the portion that requires broadcasters to pay a spectrum fee.

The association is against any legislation that would create a mechanism that could be utilized by the government to further its efforts to intimidate a free broadcast press. They further feel the spectrum fee is nothing more than a tax with a different name, subject to increases throughout the years.

More is better?

NRBA president Jim Gabbert criticized the "more is better" concept when applied to increasing the number of stations on AM and FM bands. Gabbert feels increased fragmentation will increase amounts of advertising dollars going to TV due to the complexity hundreds of new radio stations would cause.

Listener loyalty

According to researchers at Frank M. Magid Associates, fewer and fewer radio listeners claim any one station as their favorite. Sixteen percent said they could not name a favorite station, this is more than triple the figure a few years ago. Bruce Fohr, director of radio research at Magid, said today's radio listeners are more aware of the variety of stations and tend to tune in to whatever station suits their mood at the moment. Increased fragmentation and a lack of variety

in programming were also cited as causing the lack of listener loyalty.

Notice of inquiry

A Notice of Inquiry has been issued by the FCC to examine amending its rules to permit radio and television stations to rebroadcast CB radio transmissions. A proposal allowing the rebroadcast of amateur radio transmissions was rejected. Present rules prohibit live or recorded rebroadcast of either CB or amateur radio communications. The FCC is considering allowing direct rebroadcast of CB transmissions involving emergency information; traffic, road and weather conditions; and similar material.

Deregulation rally

On February 28 about 400 broadcasters gathered in Washington, DC, to lobby for deregulation. Senator William Proxmire of Wisconsin addressed the broadcasters at the kick-off breakfast. He pledged to continue supporting the cause. His efforts toward deregulation include the repeal of the Fairness Doctrine and equal time requirements on the grounds that they violate First Amendment freedoms of the press.

Richard Neustadt, assistant director of the Domestic Policy staff, reported to the broadcaster's rally steering committee that the Carter administration supports the basic concepts of radio deregulation and agrees with the NRBA that the marketplace serves as the most effective regulator.

Lionel Van Deerlin, House Communications Subcommittee chairman, noted that the FCC cannot escape regulating licensees as long as the present Communications Act remains intact.

After the afternoon meeting, members of the Communications

Subcommittee staff were present to discuss rewrite with broadcasters.

Position on time brokerage

The National Radio Broadcasters Association (NRBA) is urging the FCC to deregulate time brokerage arrangements to encourage part-time specialized audience programming and to increase minority involvement in broadcasting.

NRBA recommended that the FCC issue a policy statement that openly encourages part-time brokerage arrangements. Also, the NRBA wants the FCC to consider brokered specialized programming as part of a licensee's non-entertainment/community programming. Through time brokering, minority and female employees should be credited to the licensee's EEO program.

Armstrong awards

The Armstrong Awards for excellence and originality in radio broadcasting have been expanded to include AM as well as FM radio stations. The program will be co-sponsored and jointly administered by the Armstrong Foundation and the NRBA. Wesley J. Hennessy, president of the Armstrong Foundation, and Abe Voron, executive vice-president of NRBA, announced the changes.

AM and FM stations will compete equally in news, news documentary, music, education, community service and creative use of the media. Three new categories that have been added are technical achievement in broadcasting, innovative station programming, and outstanding contributions to radio industry.

Awards will be presented October 7-10 at the annual NRBA convention. □

Another Harris First.... FM-25K—25,000 Watt, One-Tube—High Power FM Transmitter.

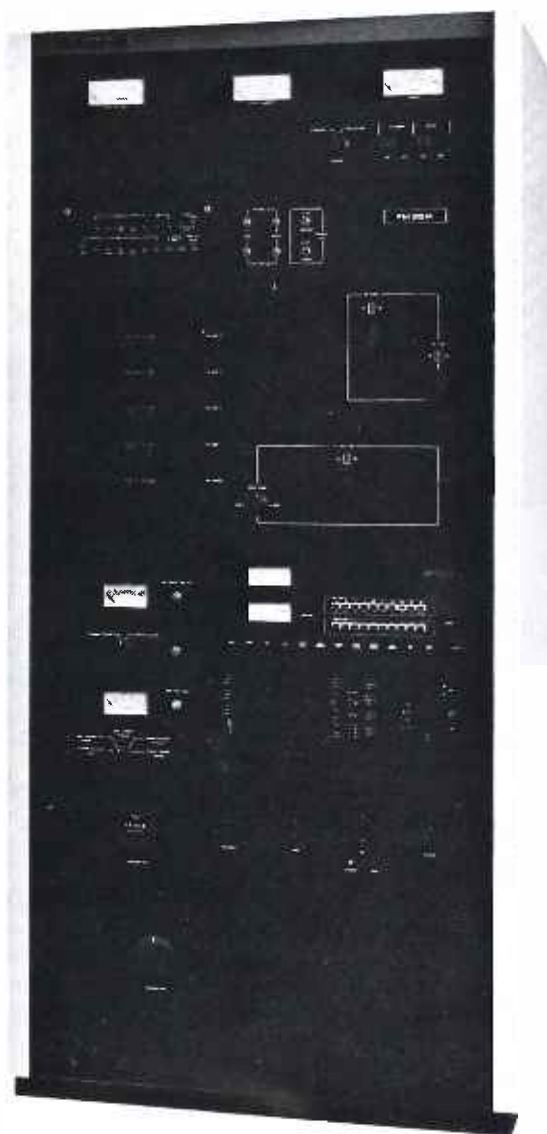
Introduced at the 1979 NAB show, Harris technology has combined advances in both tube and solid-state designs, bringing to the broadcaster the new FM-25K, 25 kilowatt transmitter, a major step forward in high-powered FM transmitters.

The FM-25K reflects the Harris design philosophy of delivering RF power efficiently, without degrading exciter performance. Dependable solid-state control logic, broadband solid-state IPA, single tube design, and the world's most advanced FM exciter, the MS-15, combine to provide the highest performance available.

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Take 1: Feedback

Karl Kaessler's letter in the March issue covered subject matter that is important to all those interested in the overall subject of jobs in the industry and the sources of properly trained personnel to fill those positions.

As a recap, we stated in that issue that the ASTVC would initiate a series of articles in **BE** designed to make it easier for all concerned to learn from the experiences of those who have made it and from those who have not. We are not assuming the role of an employment service or a career-counseling service, but we will comment on what we believe to be the most practical and/or expeditious means of interview preparation. We will point out the problems, as we see them, that exist now and those that might conceivably arise due to changes in technology and mandates under which the industry operates (licensing, equal opportunity and other relevant stipulations).

For those who have gone beyond

the entry-level situation, comments will be made on job switching from smaller markets to larger ones and the effects it has on the switcher and the switcher. Because of the interest that this subject has been raising, more letters from employers, vocational and college counselors and, of course, those employed in the industry are anticipated. These comments, questions and experiences will make this series more meaningful and productive for everyone.

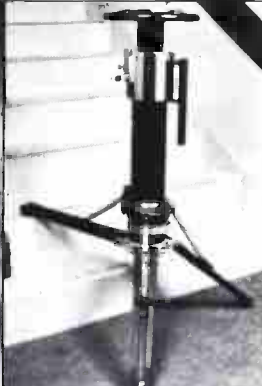
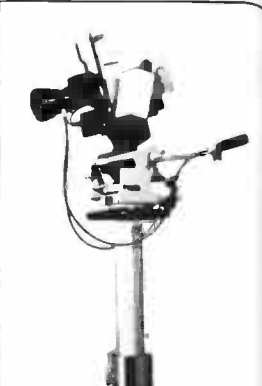
Take 2: US Department of Labor selects ASTVC

A recent caller representing the US Department of Labor (International Visitor Section) stated that they were interested in knowing whether the American Society of TV Cameramen would be willing to act as a coordinating agency for the training of some foreign representa-

tives. Since these visitors would be technically-trained staff members of the Yemen Broadcasting Service, could we assist by setting up a training program?

Upon receiving verification of the request we find we have embarked on a training project. We are currently in the process of outlining what we believe will be an effective and well-rounded program of instruction for our foreign guests. We have contacted, and are contacting, representatives of networks, independents, production houses, CCTV facilities and unions to arrange for cooperation in compliance with the Labor Department request. We are additionally contacting vocational and academic schools to learn whether some classroom instruction might be feasible. We envision a program including much over-the-shoulder observation of American methods and technology. What we observe and learn during this training program may prove most beneficial in equipping us in our continuous program of aiding those in our own industry.



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State broadcasting organizations and other associations

State associations

South Carolina Association of Broadcasters

The 14th annual SCBA congressional luncheon was held on April 5, with 42 individuals in attendance, including 18 representatives from SCBA. In a recent mail ballot sent to the membership, Virgil "Buddy" Evans, WCBD-TV, Charleston was elected vice president for TV to fill the unexpired term vacated through the resignation of Tom Chandler.

Florida Association of Broadcasters

Nominations are being accepted for 1979-80 officers and directors.

The Fall Conference under the leadership of Gary Adler, WJKS-TV Jacksonville, will be held in Jacksonville the weekend of October 6. The midwinter conference will be held in late January.

Arkansas Broadcasters Association

The ABA spring meeting gave members an opportunity to visit with legislators and discuss many

broadcast-related bills before state legislature. Following the meeting state representative "Bunk" Allison of Morrilton withdrew his bill that would have placed a 3% tax on Arkansas advertising.

Kansas Association of Broadcasters

Comments by Bob Russell, president-elect of KAB, before the Senate Committee on Transportation and Utilities stated that the Kansas Association of Broadcasters objected to the provision of Senate bill 228 that would not allow the cost of advertising as a reasonable expense of doing business in computing rate of return. The thrust of the objection was to the concept that the type of advertising being presented by utilities is to the benefit of the consumer and should be allowable as a proper expense in the rates charged the consumer.

Missouri Broadcasters Association

MBA's awards dinner was held

April 19 at the Ramada Inn during Journalism Week at the University of Missouri, Columbia. Guests included graduating broadcast majors and broadcast faculty.

Nebraska Broadcasters Association

Orval Koch has accepted chairmanship of an ad hoc committee to review the NBA roster of associate members. He hopes to increase numbers while maintaining quality. Names and addresses of nominees should be sent to Orval Koch, Dept. BE, Stuart Stations, Stuart Building, Lincoln, NE 68508. The NBA convention will be held in the Old Mill Holiday Inn, Omaha, September 16-18.

National/International groups

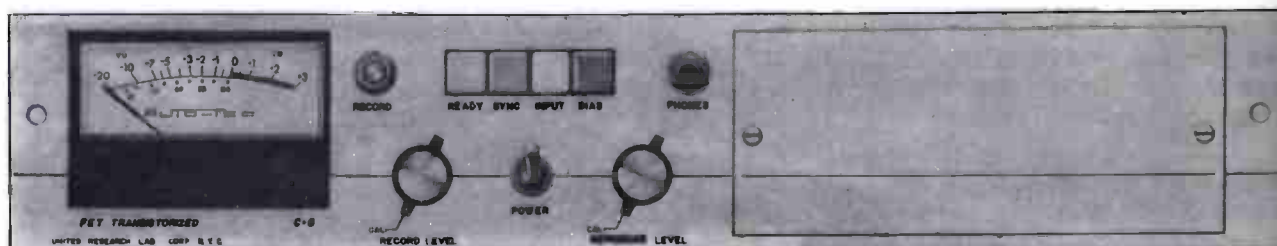
US Department of Commerce

The National Telecommunications and Information Administration (NTIA) has asked the FCC to eliminate its licensing requirement for domestic receive-only satellite earth stations. In formal comments NTIA pointed out that the licensing requirement procedure is costly, time consuming and is not necessary as a protective device against interference where receive-only earth stations are in the path of terrestrial microwave radio transmission.

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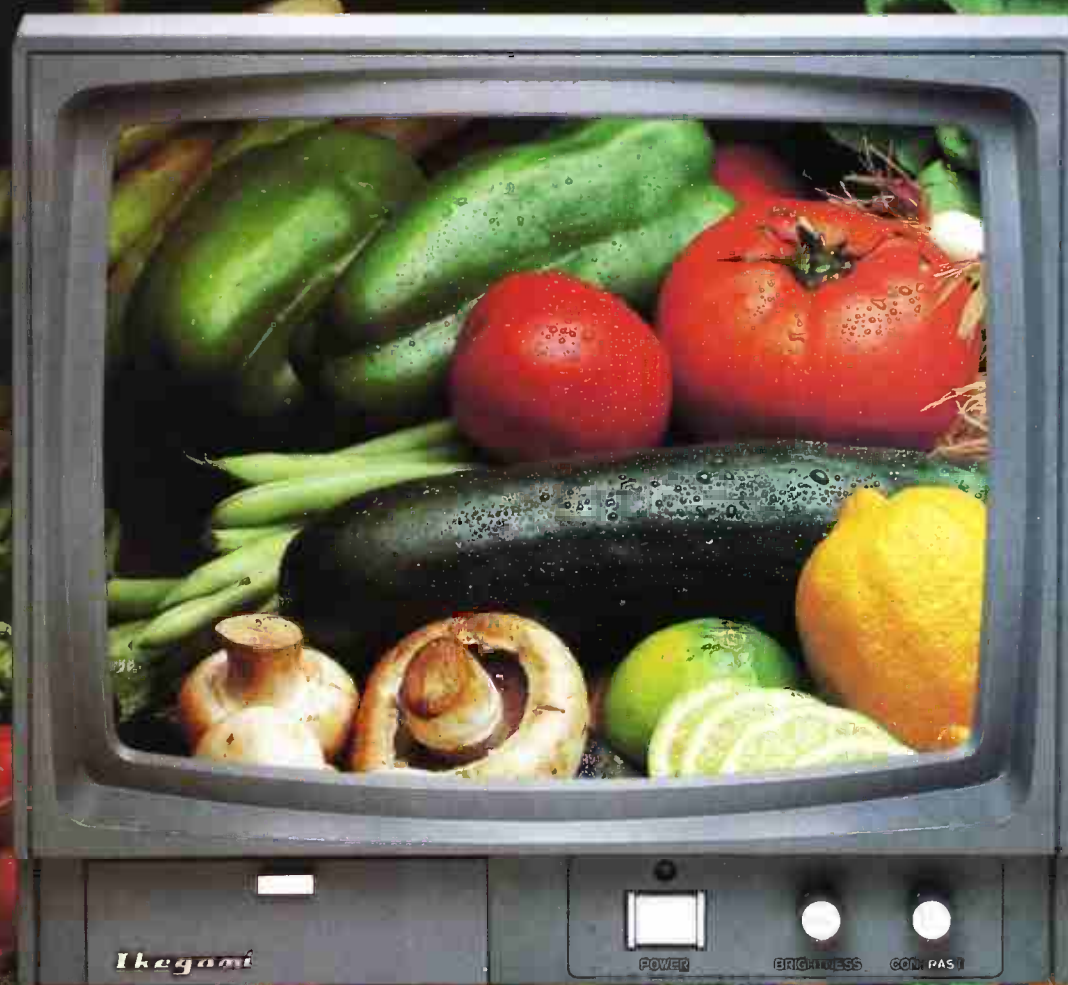
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Other associations

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Society of Broadcast Engineers

The SBE second semi-annual chapter chairperson's meeting was held March 28 at the Dallas Convention Center, as part of the 57th Annual NAB Convention. In addition to the new officers, Robert A. Jones, president and Eugene Hill, vice-president were secretary-treasurer James Grinnell and representatives from 16 of the 46 SBE chapters.

Comments were made by each chapter chairperson on past meetings, problems and successes in their chapter area. Bob Wehrman presented the new Chapter Guide voted upon by the board of directors at their annual meeting the previous Saturday. Certification chairman Jim Wulliman's report of some of the questions and problems encountered in the certification program to date, was also presented.

Prior to the meeting Robert A. Jones, new president, gave his acceptance speech.

Chapter 28—Milwaukee, WI

The March 20 meeting was held at WISN-TV Studio in Milwaukee. Guest speaker, Ralph Evans Jr., of Evans Associates, consulting communications engineers, spoke on The Evolution of the Superstations. Featured was a look at some of the latest technological tricks to ensure maximum coverage for AM, FM and TV outlets. A tour of the WISN facilities followed.

At the April 17 meeting Bob Ott, sales engineer, Shure Brothers, presented demonstrations on the complete line of Shure Brothers microphones, along with the "ProMaster" audio equipment and the new Shure V15 IV phone cartridge.

Chapter 47—Los Angeles, CA

The meeting on April 17 at KFAC radio station in Los Angeles was an attempt to revitalize the local SBE chapter. Ed Gordon, engineering manager of KCOP-TV, was appointed chapter chairman; John Huntley, chief engineer at KCRW radio, secretary treasurer; Lou Schneider, chief engineer of KFAC radio, agreed to remain vice chairman with Dick Burden and Bob Palitz accepting the responsibilities of co-program chairmen. Lyle Henry will continue as the chapter certification chairman. ☐

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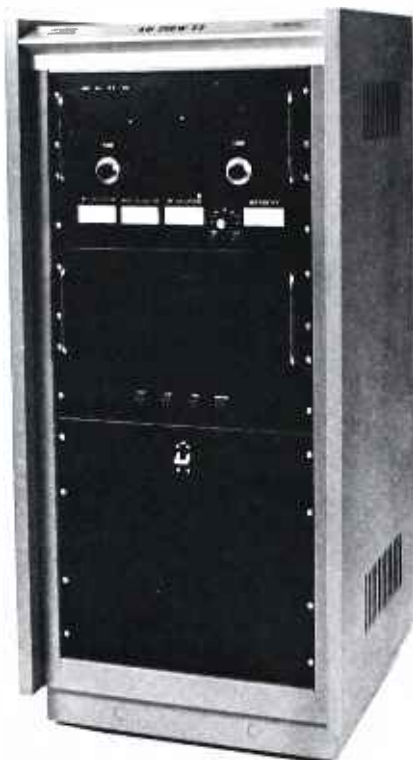
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AM-250SS SOLID STATE 250 WATT AM TRANSMITTER



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The Wilkinson Electronics AM-250SS is an all solid state 250 watt Am transmitter housed in an attractive 24 inch cabinet, 52 inches in height. All components are mounted in two drawers for maximum accessibility and ease of maintenance. Space is available in the cabinet for a second transmitter making it possible to combine two 250 watt units to obtain 500 watts. It is also available at any power below 250 watts at a reduced price.

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meetings, events & seminars

August 22-24—The Satellite Communications Users conference will be held in Denver. The state of the industry will be presented by the editorial staff of *Satellite Communications* and others, and a panel of manufacturers and frequency coordinators will discuss how to choose an earth station. For more information, contact Pat Wiesner, publisher, or Steve Shaw, associate publisher at *Satellite Communications* magazine, Dept. BE, 3900 So. Wadsworth Blvd., Denver, CO 80235.

September 9-12—The NAB will sponsor a radio programming conference to be held at Stouffer's Riverfront Tower, St. Louis.

For more information, contact: NAB, Dept. BE, 1771 N Street NW, Washington, DC 20036.

September 10-11—An international meeting on Magnetic Recording on Particulate Media will be held at Centro Congressi del Garda, Villa Alba, Gardone Riviera. The meeting is a satellite activity of the Triennial Conference on magnetism to be held at Munich on September 3-7.

The program will consist of invited and contributed papers which will be presented and discussed at the meeting in a workshop. Papers received by March 27 will be considered.

For more information, contact: Dr. A. R. Corradi, Sonorex Tape S.P.A., Via Bonfadina 14, Dept. BE, I-25046 Cazzago S.M. (BS).

September 16-19—The 19th Annual Broadcast Financial Management Association conference is scheduled for The Waldorf-Astoria in New York City. For information contact Broadcast Financial Journal, Dept. BE, Suite 910, 360 N. Michigan Avenue, Chicago, IL 60601.

October 21-26—The 121st Technical Conference and Equipment Exhibit of the Society of Motion Picture and Television Engineers (SMPTE) will be at the Century Plaza Hotel in Los Angeles, CA. The conference will feature five days of technical sessions on motion pictures and television. The SMPTE equipment exhibit, beginning Monday, is expected to have more than 250 booths of equipment with many of the major film and video equipment manufacturers participating. For additional information write SMPTE Conference, Dept. BE, 862 Scarsdale Ave., Scarsdale, NY 10583.

November 11-15—The National Association of Educational Broadcasters will hold their 55th Annual Convention at the Conrad Hilton in Chicago. Highlights include the 2nd Annual Video Fair, a preview of programs being distributed to public broadcasting.

For more information, contact: National Association of Educational Broadcasters, Dept. BE, 1346 Connecticut Avenue NW, Washington, DC 20036.

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June 1979 *Broadcast Engineering* 39

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40 Broadcast Engineering June 1979



Sintronic Model SI-A-IS
1kW AM Transmitter

**people
in the news**



President Carter arrives at NAB convention headquarters with his staff.



George Bartlett, NAB vice president of engineering (left), displays the plaque given to Robert Booth in recognition of his contributions to allied fields of amateur radio and broadcasting.



Gerald Vander Sloot, NAB broadcast engineering conference committee chairman (left), discusses a point with Robert Flanders, McGraw-Hill Broadcasting, who was presented with the 1979 NAB Engineering Achievement Award.



Jack Cannon, president of the National Academy of Television Arts and Sciences (left), addressed the engineering luncheon with Edward Herlihy, Golden West Broadcasters, who presided over the luncheon.

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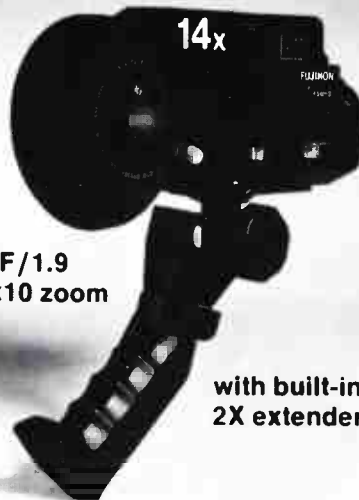
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People in the news

.....



Vincent Wasilewski, NAB president (left), the Honorable Charles Ferris, FCC Chairman (center), and Donald Thurston, chairman of the NAB board of directors (right).



Cam Bishop, Broadcast Engineering (left), and George Boardman, Ampex, pause briefly in their conversation to pose for BE's photographer. (C. Cave)



Al Conte (center), SMPTE television engineering, and his wife share refreshments with Cam Bishop, at the Sony hospitality suite in Dallas. (C. Cave)



J.D. Strand, Nortronics (left), discusses the Dallas show with Eunice Adams, HM Electronics, and George Laughead, BE publisher, at the BE hospitality suite in Dallas. (C. Cave)



Cindy Nelson, BE's managing editor, and Bob Peterson of Dolby Laboratories enjoy refreshments at Broadcast Engineering's hospitality suite in Dallas. (C. Cave)

Superb synchronizers... and more.



The CVS 630 Series

CVS 630 Series synchronizers are digital framestores... broadcast quality time base correctors... versatile effects generators... interfaces to new developments in digital video... and much more, for all T.V. standards. Yet, their prices compare favorably with those for synchronizer-only units and their performance is superior.

For example, they actually out-perform stand-alone TBCs. And, even under noisy, less than ideal conditions, they maintain multi-field color sequence (NTSC, PAL or SECAM) without H-position shift or "cycle jump." Odd field edits and "hot" switches are also easily handled.

CVS 630 Series synchronizers owe their versatility, in large part, to an exclusive "universal" memory that is compatible with all T.V. standards. This is made possible by processing the video signal in component, rather than composite, form—a technique already proven in over 1000 CVS digital TBCs.

Furthermore, for effects generation, picture freeze

(field or frame) is a standard feature of the CVS 630 Series.

Fixed picture compression, horizontal and vertical positioning and joystick control are available as economical options.

Digital noise reduction (DNR) is also a low cost option. These plug-in cards allow you to achieve up to 15dB of noise reduction without the motion artifacts and resolution loss common to other noise-reducing devices.

Along with all of this, every model in the CVS 630 Series has a direct memory access (DMA) digital I/O interface. This opens up an almost unlimited range of potential applications: digital still store... digital graphics... real time picture analysis... multiple picture effects... and much more.

So, if you're thinking about buying a framestore synchronizer, get one that does more than just synchronize—from the CVS 630 Series. For a demonstration, contact your authorized CVS distributor or the CVS office nearest you.



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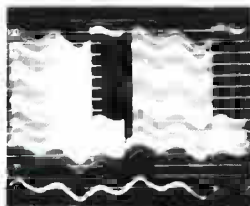
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People in the news



Dave Edmonds, IVC, described his firm's impressive sales growth in recent months at a press conference in Dallas. (C. Cave)



At NAB Dennis Fraser, NEC America (right), discusses their spectacular new equipment lines with a customer. (C. Cave)



Masahiko Morizono, managing director and general manager of Sony video products, Tokyo, discusses VTRs with the BE staff. Morizono received the SMPTE David Sarnoff Gold Medal award last year for his role in developing portable helical scan VTR systems. (C. Cave)



Bill Nichols (left), and Vince Kasprzak of Arvin/Echo, share a pre-show toast to NAB at their hospitality suite in Dallas. (C. Cave)



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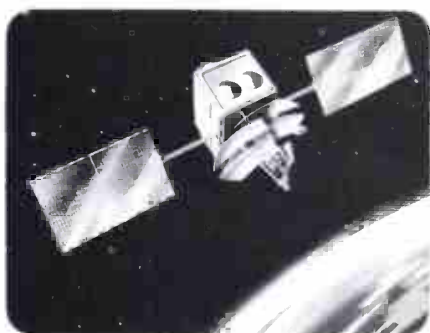
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People in the news



Lyle Keys (right), Utah Scientific, discusses the status of the industry with Bill Rhodes, BE editorial director, at a social meeting in Dallas. (C. Cave)



Clint Bradt, BE staff, and Eric Somers, McMartin Industries, discuss radio workshops at NAB. (C. Cave)



This group was seen socializing at the Sony hospitality suite as a warm-up to NAB. Shown (left to right) Cindy Nelson, BE managing editor; Jason Farrow, Sony Audio; and K. Tsunoda, president, Sony Video Products Co. (C. Cave)



Vincent Wasilewski, an Commander Ed Davis, US Navy Recruiting Command discuss the Navy booth at NAB. The booth was one of many public service exhibits.

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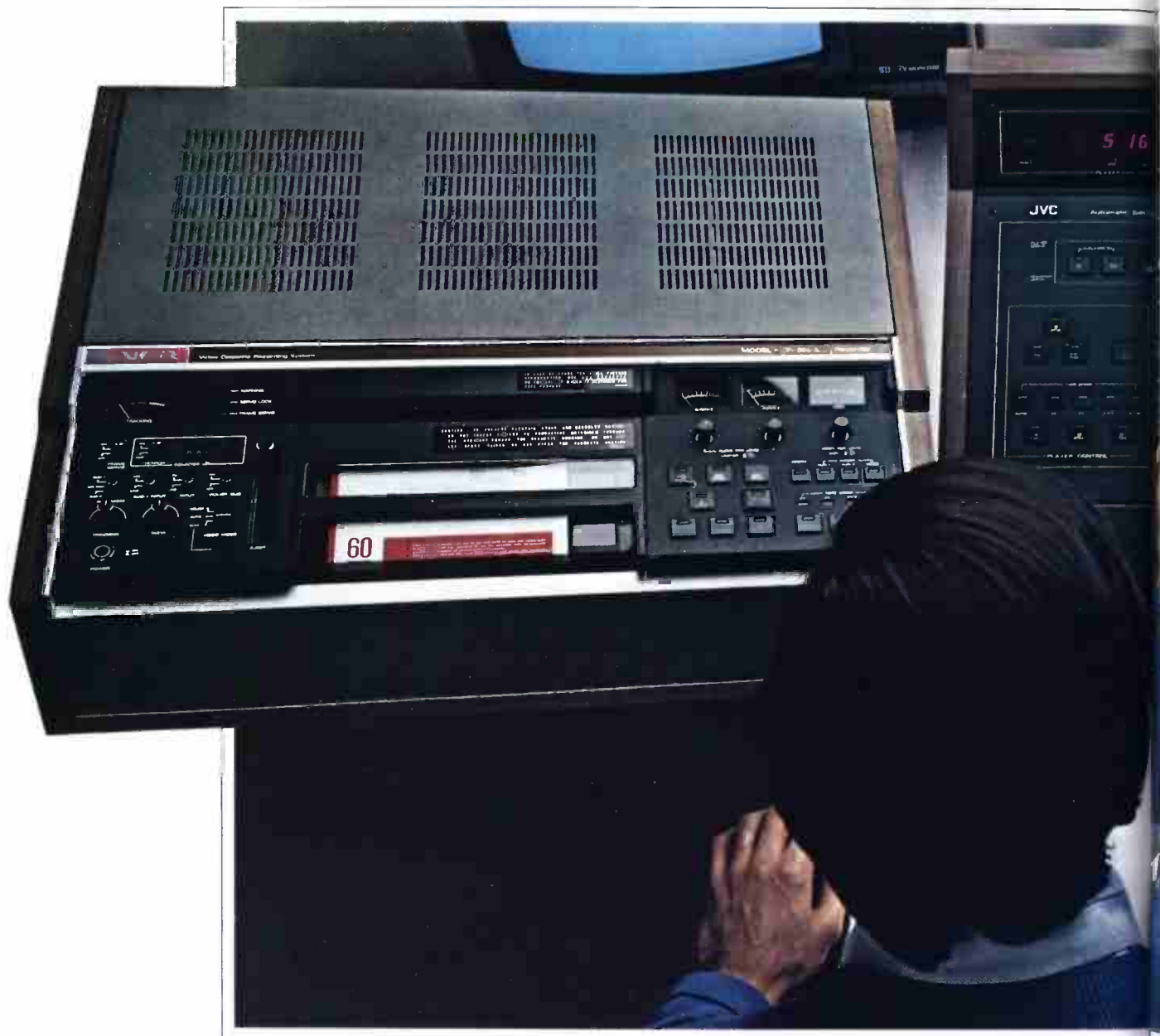
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June 1979 *Broadcast Engineering* 49

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But if you'd like to save \$6000 compared to the nearest performing competition...yet perform advanced editing functions at tape speeds up to 10 times normal (a JVC exclusive)...and produce broadcast quality tapes even if you're not an expert...then the CR-8500LU system including RM-85U Editing Control Unit is for you. It has many features you won't find elsewhere

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The RM-85U Editing Control Unit has independent LED displays for player and recorder. Each gives elapsed tape time

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NAB/Dallas '79 replay:

OVERVIEW OF AN EXCITING SHOW

By Bill Rhodes, editorial director

When all is said and done, the NAB/Dallas '79 convention stands out as the most successful show in history for broadcasters. And rightly so, for the industry is in the throes of a dynamic period of growth and excitement. The NAB provided a focal point for this excitement and a vehicle for manufacturers to communicate their latest developments.

The last three issues of **BE** have captured the momentum of NAB and conveyed elements of the convention to its readers. This issue of **BE** provides a thorough replay of facets of this major industry event—a final

"In the final analysis, our government is responsive to its citizens. But not if they stand silent. Only if broadcasters articulate their concerns and convince those in and out of government of their validity, can the on-going deliberations be shaped to preserve and strengthen this industry."

Everett H. Erlick, senior vice president and general counsel, ABC, before the ABC Radio Network Affiliates in Dallas.

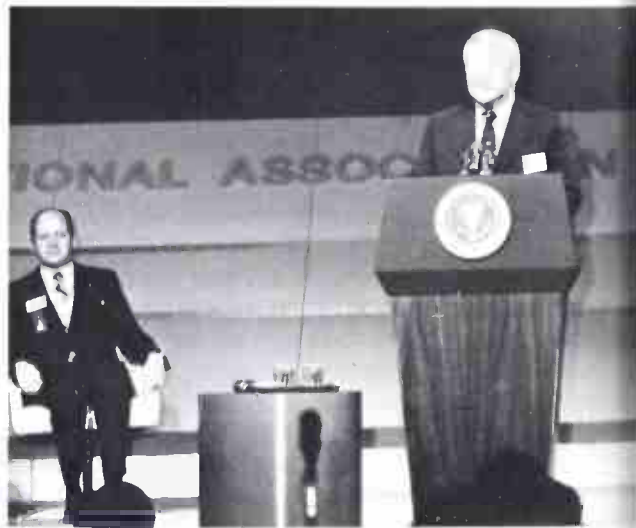
salute before getting on to other broadcasting topics that have been pushed aside to make room for NAB.

To make the Dallas show information easily accessible to the many readers who were not able to attend the Dallas show, **BE** has arranged this issue in sections covering selected topics. Within those sections workshops are reviewed, various classes of instruments are presented and manufacturers listed with reader service numbers by which readers may obtain detailed literature.

In the concluding section, **BE** lists



Vincent Wasilewski, NAB president (left), presents Jack Harris, KPRC-TV, with NAB's Distinguished Service Award. In accepting the award, Harris said, "Just as any of you, I value this award above any which have come my way in some 45 years in our industry, because it comes from the people who share with me the privilege of the broadcasting profession. And I know from my own observations over 45 years of working for a living that few men are privileged to spend their lives doing what they want to do..."



In the opening ceremonies at NAB/Dallas '79, Vincent Wasilewski, NAB president, addressed the general assembly and presented Jack Harris of KPRC/KPRC-TV with the NAB's prestigious Distinguished Service Award. Don Thurston, chairman of NAB's Board of Directors (left), hosted this session and Robert Folsom, Dallas' mayor (not shown), delivered a "Welcome to Dallas" speech to launch NAB/79, the broadcasting industry's largest show (C. Cave)

Sales activities at NAB/Dallas'79

Class of equipment	Quotations	Sales
Earth station eq.	\$3M	\$1.5M
Video recorders		1.3M
Frame store synchronizers	4.2M	820K
TV cameras	1.2M	770K
Routing switchers	1M	313K
Video monitors	813K	237K
Automation systems		200K
Transmitters AM & FM	2.24M	153K
Audio consoles	488K	70K

manufacturers that displayed equipment not listed in the previous articles. Thus, by generic class, every type of broadcast equipment in Dallas is mentioned in this issue and has a "bingo" number for acquiring complete data.

This issue of **BE** is a gold mine of information available from equipment manufacturers and service sources with booths at the NAB convention. To readers who did not attend, or who missed something, copy digging!

Throughout this issue in the news and technical sections **BE** has included exclusive photos to add a little spice to the action in Dallas. Readers who were at the show may find themselves captured in a photograph somewhere in this issue.

Sales at NAB

One of the exciting aspects of the NAB annual convention is the level of sales that occurs on the floor. Some general observations for NAB/Dallas '79 are as follows:

Many firms reported record sales, some well ahead of previous years. One firm reported that they sold every piece of equipment that they had on the floor, and this amounted to \$1.9 million in sales.

One firm reported that their sales had been so unexpectedly high that they were going to completely reamp their marketing/manufacturing plans.

Because of the exceptional business activity at NAB, **BE** conducted a poll of exhibitors and requested sales and quotations made in Dallas. Over 11% of the exhibitors responded. They listed equipment quotations and sales in 41 categories, with \$17 million in quotes and \$5.3 million in sales. Ranked in order of sales, the reported figures for the top nine classes of equipment are in the accompanying table. These figures represent but a fraction of the actual sales at NAB because most firms were reluctant to release proprietary information. However, the data indicates the remarkable sales activity that occurs at an NAB convention. And it makes for a great show, with NAB/Dallas '79 being the biggest yet. **BE** is already looking forward to NAB/'80, as are many broadcasters and manufacturers. □



President Carter's address on Sunday was delivered before a packed assembly hall.

Carter supports deregulation

President Carter, in his speech at NAB/Dallas '79, announced his submission to Congress of a proposal to "Reduce, rationalize and streamline" the regulatory burden throughout American life. Speaking before 4000 broadcasters at the opening assembly, he said his call for regulatory reform "is not a demand that all regulation be abolished, but is a call for common sense."

He noted that when he went to Washington, 90 separate regulatory agencies were issuing 7000 new rules every year and that the FCC now requires 18 million man-hours a year from broadcasters to fill out the paperwork imposed by its rules and regulations. He stated that FCC Chairman Charles Ferris is working to reduce that load and has his full support. He also said "it is time that we take control of federal

regulations in America instead of regulation controlling us."

The President also said he will continue to support opportunities for minority ownership, and a strong public broadcasting system free from political control. He said he applauds the "hard work and leadership" of NAB Chairman Donald A. Thurston, president, Berkshire Broadcasting, on behalf of NAB's minority ownership fund.

Replying to questions from broadcasters in the audience, the President said:

- First Amendment protection doesn't apply equally to newspapers and broadcasters because the electronic media is licensed. The federal government should not interfere with news programs, however; and
- He has no immediate position on the spectrum tax that is being proposed in the Communications Act rewrite.

NAB/Dallas '79 replay:

RADIO WORKSHOPS

By Brad Dick, KANU/KFKU, University of Kansas, Lawrence

Audio processing: Test measurement and monitoring

This was one of the most highly attended radio sessions at the 1979 NAB convention. Moderator Emil Torick of CBS Technology led a lively discussion about the use of modern test equipment in measurement of broadcast audio equipment.

Tom Rosback from Harris explained that his company did not specify the dynamic measurement techniques used in their equipment. He felt that any measurements for the FCC should not involve the source equipment, (tape machines, cart machines and turntables).

Bob Orban, Orban Associates, said he felt that few engineers were capable of performing the necessary tests to measure dynamic response of equipment; while he specifies some dynamic adjustments for the FM Optimod, it requires a spectrum analyzer and other sophisticated equipment. However, he does not specify any type of dynamic measurements for the AM version of the Optimod because he felt that it is inherently more stable than the FM, and any adjustments should be made at the factory where they rely on differential measurement techniques. In other words, the piece of equipment under test is compared with a "standard card or unit." Any differences are noted and determined to either be in or out of tolerance by comparing signals. He noted that few stations would even be able to generate the complex

signals necessary to properly test the dynamic characteristics of a modern piece of equipment.

Several engineers were concerned about the lack of understanding from the management and programming department. It was the consensus of the engineers present that their hands were tied in terms of adjustment of the audio processing. It was felt that unless engineers could make the other departments more aware of "quality," then little could be done to clean up the airwaves.

At one point Sid Feldman, a recording engineer, explained how in recording and pressing records, producers often cut for specific purposes. One side of a 45 might have heavy EQ and processing for the AM market, while the other side might have less limiting and other processing for an FM audience. As it turned out, this very point of severe processing for AM created a furor in a later session. Torick explained that the record industry is set up for symmetrical processing. This is naturally quite different from the type of processing presently utilized for AM; therefore, difficulties were bound to be created by this anomaly.

In discussing the processing necessary for AM radios, Orban pointed out that the average noise within an automobile is between 65 and 75 dBA. This being the case, it is necessary that AM be limited to only 10 to -15 dB dynamic range. Orban pointed out that with proper processing techniques an AM radio cannot detect up to 12 dB clipping where FM can only tolerate 4 to 5 dB of clipping. One engineer said the loss of AM's audience is caused by severe processing resulting in listener fatigue.

Many questions were directed to Dennis Williams from the FCC Broadcast Facilities branch. Engineers were very concerned about two primary areas: making the rules applicable and realistic, and equal enforcement of those rules. One

engineer pointed out that the modern spectrum analyzer is now within reach of many stations and yet the FCC does not accept such analyzer tests. Engineers feared that the FCC might, be rewriting the rules, limit the introduction of new technology by over-regulation, as is the case today. Williams pointed out that today's aura of deregulation it might be "impossible to rewrite the regulations."

The obvious question then becomes "if there were no rules regarding the technical performance of the stations, would they be responsible enough to police themselves?" It was a debated point during the meeting and there was no consensus. Some engineers argued that they would be responsible because of competition; others felt that idea might only work in large markets. The small town station would have little reason to spend money on modern technology if the rules did not require it. Williams stated that these were exactly the kind of problems the FCC was presently dealing with, and that would be impossible to please everyone.

This session had outstanding response from the audience, indicating that the engineering community is concerned with audio quality. However, two things must happen before the present static situation will change:

- Management and programming departments must stop being so concerned with loud and more concerned with quality. (That is not to say that loud is not acceptable but that distortion and misadjustment of limiters and other processing is not being accepted by the audience.)

- The FCC must wake up and come into the modern age of equipment and the rules must be applicable and equally enforced.

Engineers at NAB appeared ready to work on these factors, but everyone must accept the notion that times are changing.



The panel for the audiotope workshop included (from left) Richard P. Schumeyer, Capital Cities Communications; Karl Lahm, KPOL Radio; John McKnight, Magnetic Reference Labs; Alistair Heaslett, Ampex; and Al Moris, 3M Company.

A new generation of cartridge machine, the Series 99 from ITC

One of the highlights of the radio session had to be the new ITC Series 99 cartridge machine. There had been rumors about a new cartridge machine from ITC, but many were not prepared for what was previewed. Kerry Meyer, manager of engineering for ITC, gave a short but tantalizing show on the new Series 99. This new machine appears to be the wave of the future. The specifications make it look more like a reel-to-reel unit. The frequency response is claimed to be within ± 1 dB, from 31.5 Hz to 16

kHz record to playback at -10 VU (160 nWb/m). The wow and flutter is said to be within 0.12%, S/N 54 dB, crosstalk 50 dB and distortion of 0.5% or less. Needless to say, this kind of performance would excite any engineer. But, the best is yet to come. This machine obviously has been designed by engineers familiar with the problems experienced by engineers in the field. The most intriguing feature of this equipment is that it is microprocessor controlled using the INTEL 8048. This chip is not only a full-blown 8 bit

CPU, but also has 1k of on-board ROM (Read Only Memory). The CPU controls all transport logic and motion sensing and generates/detects the extensive range of cue and test tones.

According to Meyer, the Series 99 performance involves four main areas of improvement:

- The tape transport now utilizes a brushless dc, crystal reference servo motor and a positive, mechanically latching solenoid to hold tape stability to within 0.1%;
- Modular construction throughout with plug-in sub-assemblies and a playback amplifier which operates with levels up to +18 dBm (+26 dBm without clipping).
- The front panel controls have been redesigned with improved switches and the most revolutionary feature in terms of operator convenience is the optional ELSA (Erase-Locate Splice-Azimuth) capability.
- An internal oscillator for alignment is included.

The radio workshop Next Time We Will Build One of These..., a mini-course in station construction and remodeling, was moderated by Peter Burk (speaking) of WKBW. Panel members included (from left) Jack Homesley, January Sound; Ben Friedland, Lightening Electric; Eric Small, Sharepoint Systems; Justin Henshell of Justin Henshell Architects; and Joe Meier, WJAM/KAFM.



Engineering principles of communications satellite systems

This session drew 300 interested people. The discussions centered around two areas: cost and availability of receive systems. Harold Rice from RCA said that coordination and protection was becoming a real problem in the industry. He felt that the FCC was being much too restrictive in approving applications and suggested a "modified approach" whereby the FCC would adopt the attitude that the industry

would be mature enough to be allowed to install its own systems, provide its own investigation as to possible interference, and finally apply for licenses. He felt that if the industry had money invested in a particular site, it would do sufficient investigation to ensure adequate operation. In other words, "let us install the sites and if they work, then apply for a license."

Dan Yost of Compucom explained how stations could use sites once

thought to be unusable. He showed several examples of how the use of proper shielding materials—such as fencing, shields, buildings and even holes in the ground—would result in adequate reception. Ray Stuart of Scientific Atlanta drew a laugh from the audience when he explained how the satellites are located 15° west of the area served in order to allow for coverage through prime time even when an eclipse takes place.

Adapting AM transmitters for stereo transmission

Cliff Leach from Harris presented a paper on adapting AM transmitters for stereo transmission. He explained that the adaptation should be straightforward and involve little in the way of modification of transmitters. He explained that all of the proponents were similar and that, no matter what system was adopted, manufacturers would be able to provide the necessary equipment.

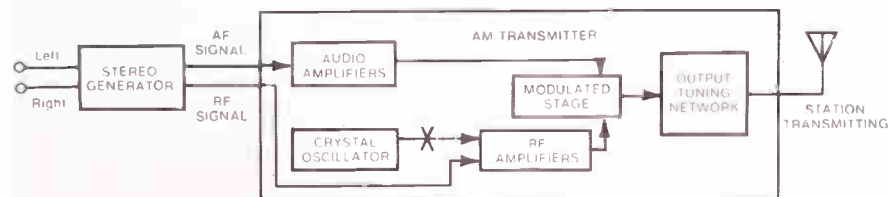
Leach showed the basic technique for converting an AM transmitter to stereo. The stereo generator takes the left and right channel audio signals and produces an AF signal and an RF signal which carries the AM part of the stereo signal. The AF signal is applied to the transmitter's audio input and the PM signal is applied to a low level RF stage in place of the carrier signal usually

generated by the crystal oscillator. The two signals are amplified and then mixed to produce the stereo signal which is then passed through the transmitter's output tuning network and the station's antenna system.

Leach stated that there were three real concerns when consider-

ing the adaptation of a transmitter to stereo:

- the phase vs. frequency characteristics of the transmitter's RF chain must be linear, i.e., phase shift must be directly proportional to frequency over the bandwidth of the PM signal;
- the AF chain must have a linear



Cliff Leach of Harris used a block diagram to describe the conversion of an AM transmitter for stereo transmission.

Radio workshops

phase characteristic, as well as flat frequency response over the bandwidth of the AF signal;

- the transmitter's output network and the station's antenna system must be able to pass all of the significant frequency components in the stereo signal.

Of the five proposed stereo systems, one could be classified as additive and the other four could be classified as multiplicative. Leach showed the difference in the necessary bandwidth of the two classes and concluded that the bandwidth of the multiplicative systems will be more critical in terms of bandpass of the station's transmission chain.

To illustrate how critical the adjustments of the transmitter and antenna might be, the following average figures would be necessary to achieve 20 dB of channel separation and 2% harmonic distortion for modulating frequencies from 30 to 10 kHz.

RF channel phase linearity:
 $\pm 2^\circ$ over a 40 kHz bandwidth;
 $\pm 4^\circ$ over a 60 kHz bandwidth.

AF channel frequency response and phase linearity:

a) Additive system: ± 0.5 dB, $\pm 2^\circ$ 30 to 10 kHz

b) Multiplicative system: ± 2 dB, $\pm 10^\circ$, 30 to 10 kHz

Output network and antenna system, response and phase:

a) Additive system: symmetric response ± 0.6 dB, $\pm 4^\circ$ over a 20 kHz bandwidth

b) Multiplicative system:
 ± 0.5 dB, $\pm 2^\circ$ over a 40 kHz bandwidth; ± 1 dB, $\pm 4^\circ$ over a 60 kHz bandwidth

Of the problems that a station might encounter, the engineers seemed most concerned about the output network and antenna system. Leach pointed out that stations still would be able to achieve stereo without major difficulties. He pointed out that the manufacturers would provide the necessary adjustments for delay within the stereo generators which also will incorporate some method of amplitude and phase correction for the AF signal. Some additional filtering of the power supply may be necessary in order to minimize the Extraneous Phase Modulation. Furthermore,

careful adjustment of the transmitter neutralization and tuning will reduce the Incidental Phase Modulation noise.

Leach was quick to point out the simply adding a stereo generator would not be sufficient to achieve a good quality signal; the other side of the coin is that AM stereo is not possible. Neither view is correct according to Leach. "The difficulty and cost of the conversion will depend on the type and condition of the transmitter and antenna system which of the five competing systems is adopted and what performance standards the FCC requires," he said.

In a survey of engineers at the NAB, there was almost unanimous agreement that they do not want to see AM stereo while the management does. Of those engineers interviewed at length, the reasoning seems to center around the problems with directional antenna systems, old transmitters and antennas and the general lack of knowledge of AM stereo. Most engineers felt that the present AM receiver problem needed to be solved before AM stereo would even have a chance of succeeding.

AM-FM receivers: The manufacturers' viewpoint

A near riot would be the best way to describe this session. There were over 450 people in a room designed for less than 400 Monday afternoon. It was obvious from the start that the engineers were very concerned about the quality of receivers, specifically AM receivers.

Norm Parker of Motorola, the session moderator, said that the present state of receiver-transmitter problems lies in a form of tailchasing.



Moderator Norm Parker of Motorola (left) fields comments from irate engineers at the AM/FM receiver workshop, while the panelists (from left) Bart Locanthi, Pioneer; Jon Grossjon, consultant; Oliver Richards, Sprague Electric; and Bud Votava, Delco (General Motors) look on.

The broadcaster is trying for more high frequency and the manufacturer is trying for lower cost in order to be competitive.

When Bud Votava from Delco stated that the worldwide standard for AM car receiver frequency response was -3 dB at 2.7 kHz one would have thought the lions had been let loose. The engineers were obviously amazed that this was a worldwide standard. Votava continued that this standard had been developed over many years and it was not a new trend. Several engineers attempted to challenge him but were not successful. Bud suggested that future hi-fi sets will have dual bandwidth switches that will provide maximum frequency response out to 10 kHz. The use of 20 kHz is not possible because of the heterodyning problems.

At one point, an engineer stepped to the mic to suggest that the FCC should adopt standards for receiver performance. He said the manufacturers were responsible for the present poor state of receiver per-

formance. That statement drew an immediate applause from the crowd. Parker then replied that the manufacturers should not be required to produce receivers according to some standard and that the marketplace should be the place to determine the quality of the units. His response brought forth an immediate deluge of boos, hisses and other negative responses. The engineers felt that the manufacturers would never change unless forced by some type of regulation. The panel, however, remained steadfast with the position that the marketplace was the answer to the problem.

This session was by far the most lively. Engineers felt trapped by the receivers available, and the manufacturers saw little reason to improve the product for the market. The addition of AM stereo certainly will bring forth a number of high quality AM receivers. Whether the public will pay the price for them remains to be seen. If they don't AM stereo will die a slow death from lack of listeners.

AM stereo broadcasting

This session was well attended, indicating a high interest in the process. John Taff from the FCC

outlined the history of the AM stereo question up to this date and talked briefly about the problem

with the introduction of the 9 kHz spacing on the decision of stereo. One of the interesting points made

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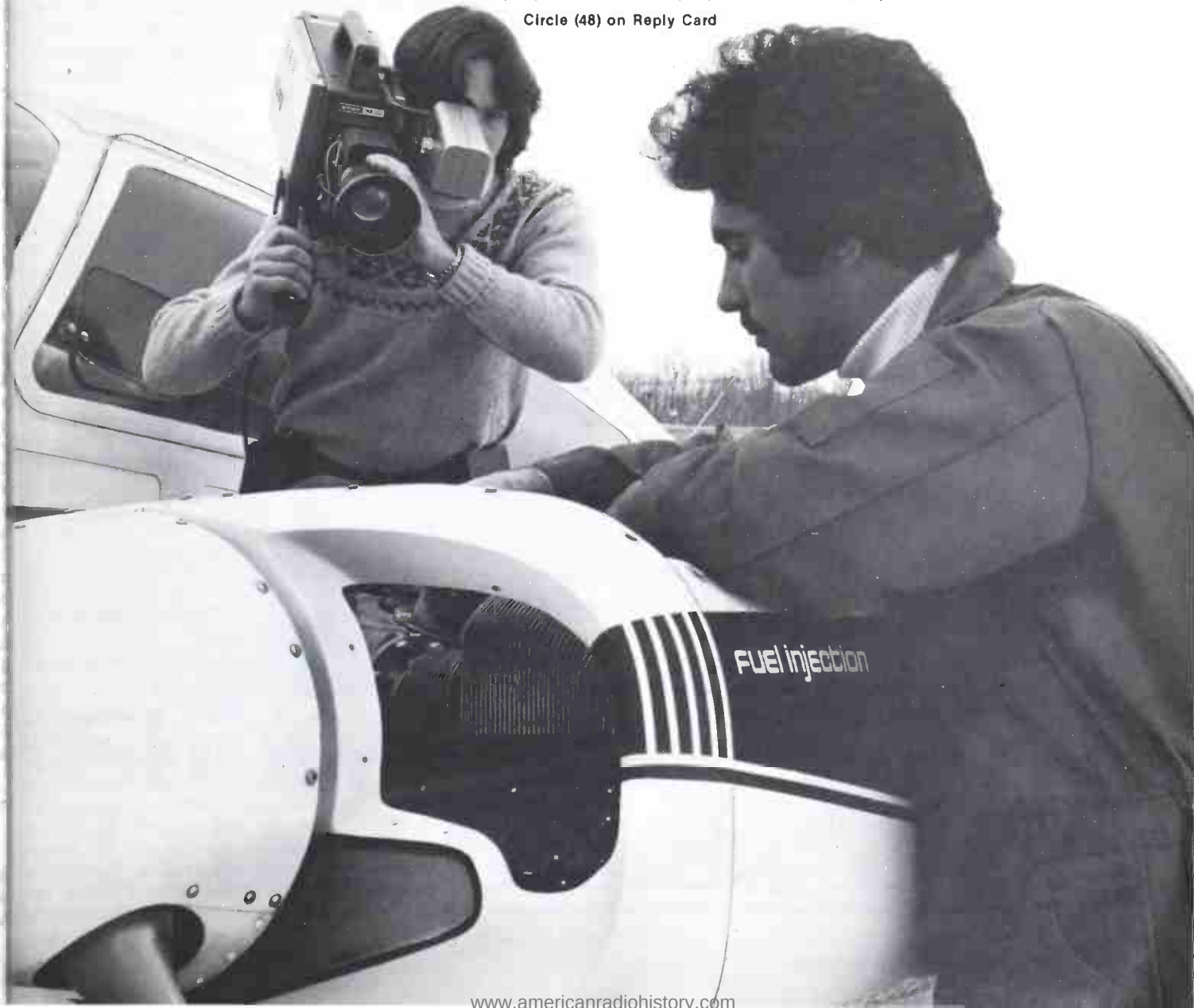
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Circle (48) on Reply Card



Radio workshops

by Taff was the question on whether AM stereo is legal within the present treaty agreements with Mexico and Canada. Apparently, the answer to that question has not been found. If AM stereo is A3 no change in the treaties is required; if not, the two treaties will have to be renegotiated.

Harold Kassens of A. D. Ring & Associates brought up the problem with aural STL space. In most large cities there is simply no space for a microwave STL. The Moseley company has proposed that other spectrum space be used to provide that space, but the FCC has not yet acted on that proposal.

John Heath from AT&T discussed

the types of STLs they could provide and the characteristics. He outlined a questionnaire that was sent to many stations to see if they would need stereo service in the event of AM stereo. Of those questioned, 90% stated that they would want stereo service and would require the service to be of 15 kHz quality. Of that 90%, Bell would be able to provide 80% of the facilities immediately. Of the remaining number, 75% could receive service with some construction and of the remaining few, 65% might have to wait as much as one year for service.

Chris Payne from the NAB stated that there was no way that AM stereo could be transmitted to the transmitter as a composite signal; therefore, the dual link would be required. When many engineers

expressed difficulty in obtaining the necessary service from Bell Telephone, it was suggested that the NAB could be of some help.

There always have been some problems when broadcasters deal with the telephone companies. Some of that trouble stems from the different language spoken by the two groups. As John Heath, AT&T Longlines, pointed out, sometimes the local telephone company has only a few people who understand loops and broadcasters, and these must be searched out. He offered to help any station that had trouble in obtaining the necessary service and one should contact him if help is desired. Heath said stations expecting to need service should order now. Waiting until everyone needs service could delay fulfillment as much as a year.

Audiotape: Performance, measurements & standards

This session, one of the more technical sessions at the convention, was also less well attended. The discussions centered around two areas: present practices in the use of cartridge tapes, and the inconsistencies in alignment tapes.

Karl Lahm from KPOL radio gave a description of some of the tricks he had found useful in the area of cartridge machines. He pointed out that even a few thousandths of an inch in terms of cartridge positioning could drastically affect the quality of the audio on that cart. He told of how he found four cartridge recorders in a production room all aligned differently. The reason given was each was aligned for different types of carts. After some investigation, he was able to standardize on one type of cart and align all the machines in the same manner.

Al Moris from the 3M Company spoke about the company's new Centra Cart machine. This machine represents a drastic departure from what is presently acknowledged as the "standard" in cartridge machines. The Centra Cart system utilizes a new cartridge design of the same size as NAB carts, but here the similarity ends. In the

Centra Cart, the tape is not exposed at the front of the cart. Instead, the tape passes in a circle within the cart and then comes out of the pack and passes through the center of the circle made by the tape pack. The bottom of the cart is open to allow for the insertion of the tape heads. Naturally, this cartridge and machine will not be compatible with any equipment presently on the market. However, Moris stated that the quality of the unit is the same as a studio recorder operating at 15 ips using 206 tape.

Alstair Heaslett from Ampex and John McKnight from Magnetic Reference Labs spent a good portion of the session outlining the reasons for the difficulties with test tapes. The real reason for the incompatibility between reference test tapes is historical. Companies use different standards, especially with regards to track width.

Many engineers were concerned about the fringing effect seen on test tapes. As McKnight explained, that comes from different track widths being used on the record machines than used on the machine under test. If the machines have identical track widths and are properly positioned, the fringing

effect will not be noticed. If some form of standardization is wanted, "complain to the test tape manufacturers," said Heaslett. Historically, few people have been aware of the problems with test tapes and manufacturers simply have adopted different approaches in producing their tapes.

When questioned about the wisdom of delaying the purchase of recorders until digital techniques are available, Heaslett said the advent of digital recording is supposed to make the process of recording much easier, when in fact, that is not the case. For every parameter that becomes easier to solve with digital recording, there is at least another one more difficult to handle than with analog. One of the primary difficulties, according to Heaslett, is that of tape and machine cleanliness. Since the wavelengths of digital recording are one magnitude smaller than those used today, dust and fingerprints on the tape or recorder will become critical in the proper performance of digital recorders. "Only if you can justify the extra cost in equipment and additional precautions necessary should you consider digital," said Heaslett.

Building new radio studio facilities: Planning, contracting and purchasing

Moderator Peter Burk led a lively discussion about the pitfalls and rewards of building new facilities. It seemed that most everyone was concerned about how to go about not only the major construction, but also the fine points of installation.

Gordon Sibeck, Sibeck & Associates, led off the discussion with a fine presentation of how and why to

employ an architect. As he pointed out, not only is the architect important in terms of design, but also in selecting the contractors and ensuring that the work is completed properly. It is important to spend some time selecting the architect. A good working relationship is imperative to successful completion of the project, as Sibeck pointed out.

One of the points often overlooked is that of construction time. Using Sibeck's timetable, one should allow 2-3 months to select the proper architect and have him prepare the schematic and preliminary drawings. Another four months is necessary to complete the production drawings. Given that it takes one month to obtain and select bids,

there is still one more year necessary to actually bring the project to fruition. It should be obvious that there is more time involved than one might think.

One often overlooked point according to Paul Stewart, WOR Radio, is that a station's format can change after a couple of years' time. If a building is constructed around a particular format with no possibility of later change, real problems can occur. The new operation is probably the most critical area in this regard. The requirements of a news facility are quite

different from music or talk studios, so be sure and allow for sufficient news area in the construction of a new building. Another problem to consider in building a facility is the advances of modern technology. A few years ago, one would not have thought of using microprocessors, computers, and TV monitors to control parts of an operation, but today they are commonplace. If the operation is to be effective, one should allow for these kinds of advances in the new areas.

One of the critical control areas to be concerned with is that of noise: environmental noise, mechanical noise, architectural noise and room acoustics. The first is primarily a factor of location of the building. Obviously, building under an airport approach would be unwise. The remaining three considerations usually can be solved with proper engineering on the part of the architect. In all of these areas, a good architect is the best ally. Here again, the architect is the answer to these problems. One warning from the panel: Do not select an architect based only on aesthetics alone. To do so could jeopardize the whole operation and performance of a new facility.

Edward Edison of Hammett & Edison presented a paper on the

design of directional antenna phasors. His initial premise was that phasors could be built with a systems approach with improved results. In his presentation, he pointed out that with today's interest in AM stereo, bandwidth seems to be the critical concern of all engineers. While it may be possible to improve bandwidth by modifying or retuning present systems, Edison takes a more direct approach. He feels that if a system is properly designed from the beginning, then these after-the-fact methods will not be necessary. One of the results of this kind of approach is the reduction in components required for a workable directional antenna phasor. If AM stereo is adopted, all stations will have to become concerned about the transparency of the antenna system. Also, the better the sideband match of the complete system, the more transparent the entire system will be.

The real help factor in this approach is the use of a computer to project the results of any system change. With this method, designs can be checked in a matter of minutes with real benefits in terms of design, performance and cost. One should keep this method in mind when selecting a consulting engineer for AM directional work. □



Christopher Payne, NAB (left), moderated the workshop on AM stereo broadcasting. The panelists (from left) were Jim Loupas, James Loupas & Associates; John Heath, AT&T Longlines; Harold Kassens, A. D. Ring & Associates; and John Taff, FCC Policy & Rules division. (Photograph by Brad Dick)



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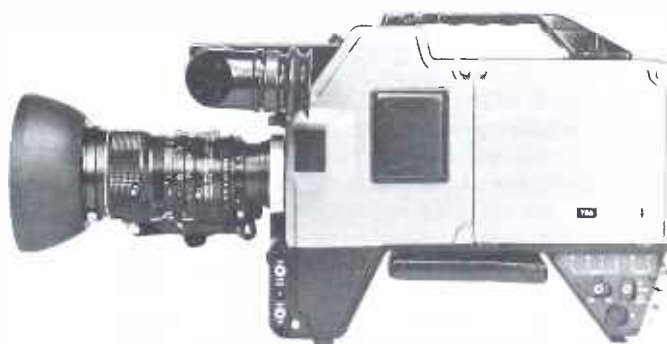
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AUDIO PRODUCTION CONSOLES

For more information on audio production consoles exhibited, turn to the listing at the end of this article. There, locate the appropriate number to circle on the reader service card.

As expected, with the imminent arrival of AM stereo quite a few new stereo consoles were shown (the majority were on-air/radio production boards). Most of these included mono mix-down capabilities, easing the transition to stereo when it is finally approved. Design trends introduced in recent years by the various manufacturers are now included as standard items in practically all of these consoles, except a few of the smallest portables. DC switching, modular plug-in and flip-top construction, linear tracking conductive plastic faders and full flexibility equalization are some examples. A complete overview of all the new stereo on-air/radio production boards shown in Dallas appears throughout this section.

Ampro introduced their Microtouch on-air console series, offered in several configurations: 5- or 8-mixer, linear or rotary faders and dual mono or dual stereo program channels. Microtouch dc logic buss switching eliminates lever key and electrostatic switching. Ampro rates the switch's life at 10 million operations. Other features include balanced transformer input pre-amps; two selectable mic, line or mixed inputs per mixer; a 10 W monitor amp and built-in cue amplifier and speakers. All console circuits are on plug-in boards and the entire input selector panel is removable with all user connections intact for easy servicing.

Audio Designs and Manufacturing introduced their ST 160 stereo on-air console with three independent stereo outputs and mono output capability. The desk-top unit (with a rack-mount power supply) has 16 totally modular inputs with two inputs per channel. Ten and 20

input mainframes are available. Other features include two monitoring busses, talkback, and a timer that sequences to machine stop/start capabilities. Also available are equalizations and preselect modules which plug into any input module position.

Auditronics introduced the 110B on-air console. The console comes in two frame sizes, previewed for up to 18 or 26 input channels. Mic levels with gain controls are included on the input channels. The 110B has two stereo pairs and mono sum outputs with the ability to pan between the two stereo pairs. Options included are speakers, digital timer and clock, a test oscillator and stereo headphone functions.

Autogram introduced their AC-8 self-contained stereo/mono consoles. The console is a scaled down version of their IC-10 model, with up to 26 stereo inputs into eight mixers. Depending on modules used, the AC-8 offers a variety of output configurations including one stereo program, one stereo audition, two monitor amps, two headphone amps and a cue amplifier. Program/audition channels have +8 dB in nominal outputs and +24 dB in maximum output.

Automated Processes showed a number of new items for audio, highlighted by their System 8000 Communicator, a microcomputer controlled, programmable communications system. The 8000 functions simultaneously as an intercom, monitor and audio distributor using only four wire telco cable installation. The system can instantly recall the intercom network and signal routing used on previous productions. Some other features include CMOS crosspoint switching, confer-

ence call capability, status readout and hands-off or press-to-talk operation. AP's new Automix console is capable of programming all input functions including echo, pan and three band equalization positions. The program is read from the front panel. The 32 inputs can be mixed down to 4x2x1. AP also showed a programmable equalizer. The equalizer has 10 bands, and is programmed and labelled for a specific announcer. The announcer simply plugs it into the top of the board's front panel and sets up his personal equalization instantly.

Avab, a new exhibitor, showed two portable mixers weighing 16 lbs each. The model ME-802 has eight mic/line input channels featuring a prefade listening switch, foldback, echo send and pan controls. There are master level controls for stereo output, echo send, echo return, foldback and monitor. Also included are LED level meters switchable to PPM or VU modes and switchable to any input or output channel. A 10-octave stereo graphic equalizer is included and all inputs are



The popular ADM booth featured audio consoles for radio and TV (plus routing switchers), and stressed advanced technology design for the 1980s. (C. Cave)

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Circle (52) on Reply Card

June 1979 *Broadcast Engineering* 63

Audio consoles

equipped with a switchable 48 V phantom supply.

Broadcast Electronics showed their updated 150 series of 5, 8 and 10 mixer consoles. The electronics as well as the front panels have been upgraded. The consoles come in single or dual, mono or stereo configurations.

Though Cetec showed no new consoles, the Centurion II stereo model was highlighted.

Compact Video, a new NAB exhibitor, introduced their Compact Audio Mixer console, offering much flexibility in a very compact unit. Especially designed for installation in production vans, it includes 12 inputs, 12 direct outs with differential outputs, four buss outputs with panning between odd and even busses and a mono mixer. It also included four buss meters, one mono buss meter and three solid-state logic programmable mute functions with independent enable/clear and master clear functions. The

input side features Penny and Giles faders, two sends and pre/post fader switching, solo, mute buttons for overriding the programmable mute and a 7-position gain switch. Three band equalization modules also were included in the expandable console.

Howe Audio, another new NAB exhibitor, showed their model 7000 stereo on-air console in the Accurate Sound booth. The 7000's rotary fader circuit design controls volume levels indirectly through optically coupled integrated circuits. Consequently, no audio passes through the faders or program/audition keys. Features include stereo speakers, 12 input channels and a switchable LED level display. Channels 1 and 12 have six selectable inputs accepting -20 dBm to +20 dBm nominal levels while the other 10 channels accept -60 dBm levels to +20 dBm levels.

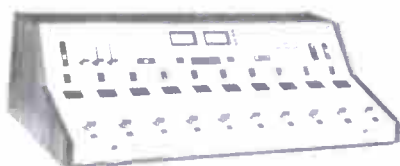
ISI showed their model 1002, a 10x2 rackmount audio console. The

balanced input channels feature equalization, foldback, echo send, cue and muting capabilities. Long travel slide faders and switchable input attenuators to the paralleling switch allows cross fades. Three frequency boost/cut filters plus high and low cut filters and a 4-position microphone sensitivity preselect switch are provided on the inputs. The balanced output channels are equipped with illuminated VU meters and an LED peak indicator.

LPB introduced their new Monogram series of five mixer consoles,



McMartin's booth featured the Maxi processor and transmitting equipment. (C. Cave)



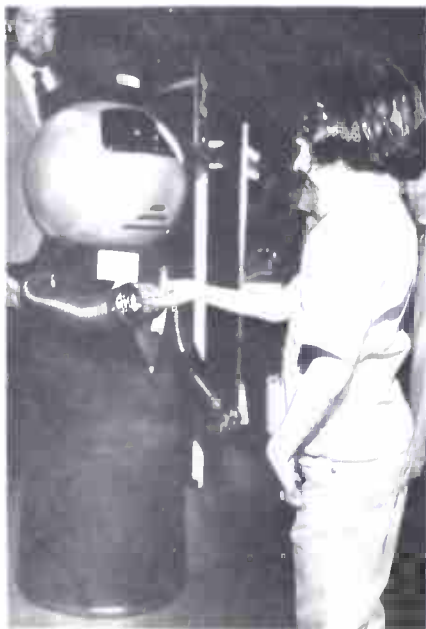
QRK Omega



MCI JH600



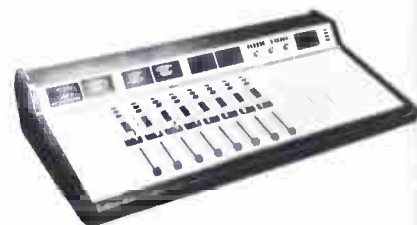
Studer ReVox 269



The talking robot at the Ward-Beck booth drew large crowds. With the robot is Jared Ravich, son of Richard Ravich of Philips/AKG Microphones. (C. Cave)

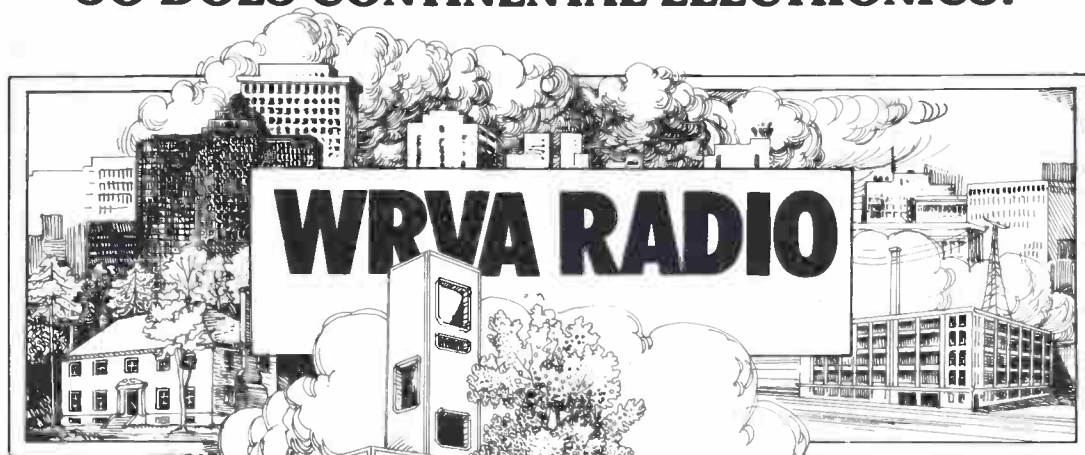


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UMC Beaucart

WRVA KNOWS EXACTLY WHAT THEY WANT IN A 50 KW TRANSMITTER. SO DOES CONTINENTAL ELECTRONICS!

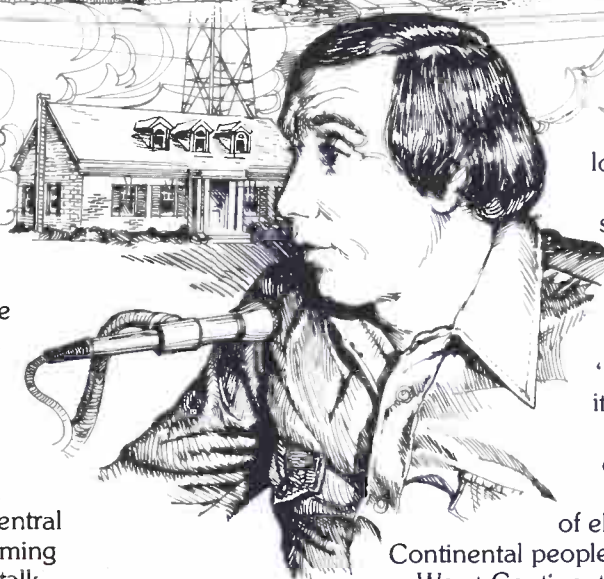


The late Fall of 1925 brought a new signal to the headphones in and around Richmond, Virginia. The crystal sets began to detect an exciting new sound on the broadcast spectrum. The sounds of WRVA radio.

For the next half century WRVA initiated a number of broadcasting "firsts" including the first transmission of a Presidential address. Many of these achievements were technical in nature, from transmitted power to self-supporting towers.

Today WRVA continues as a leader by meeting the needs of central Virginia with responsive programming offering news, music, sports and talk. Late night finds its signal dialed-up by most 18 wheelers from Canada to the Carolinas, Wisconsin to the Atlantic Ocean.

Mr. Jim Hoke, Vice President Engineering, Southern Broadcasting Company, explains how WRVA chose a new 50 kW AM transmitter: "I suggested to our engineering staff at WRVA that they go down to Dallas and take a close look



at Continental's 317C transmitter. I've always been impressed with Continental's experience in high power.

After looking at the other transmitters on the market, the WRVA team selected Continental's Type 317C, and I supported their decision."

Ray Vogler, Chief Engineer at WRVA, talks about Continental's Type 317C-1, now in operation: "I'm very impressed with the quality of workmanship in the transmitter . . . uses very conservative components . . . a straight forward design . . . easy to tune . . . plenty of elbow room in the cabinets . . . and Continental people are just excellent to work with."

We at Continental compliment WRVA on their fine operation. They knew what they wanted in a 50 kW AM transmitter. So did we.

For information on the 317C, write Continental Electronics Mfg. Co., Box 270879, Dallas, Texas 75227.



Continental Electronics



Circle (55) on Reply Card

June 1979 *Broadcast Engineering* 65

Audio consoles

in stereo and mono packages. The Monogram consoles will accept 12 inputs, two to each of the first four mixers and four inputs to mixer 5. Due to its plug-in circuit construction, any or all channels can be fitted easily with optional mic preamps, although the consoles come standard with mixer 1 already fitted with the preamp. Some other features included monitor speaker muting, torque controlled Cermet attenuators, visible indication input selector and a bi-polar regulated power supply. The model S-22 also has a mono sum output.

Logitek displayed their Custom Audio Series of mono and stereo consoles in 5, 6, 8 and 12 input module configurations. Some of the more unique features of Logitek's consoles include a "monitor mono" pushbutton for verifying stereo phasing without affecting program material, wire clamping terminal blocks for all input and output connections and a choice of a single linear stereo fader or individual left and right faders on the stereo board's input modules. Also standard on the consoles are interchangeable balanced output program and audition amps, built in hi-fi cue amp and speaker, modular construction and electronic switching.

McCurdy's new SS8650 stereo console is a free standing, modular audio system especially suitable as an on-air and master control radio center. The front panel, made of heavy gauge steel for maximum RF shielding, hinges upwards to allow easy access to internal wiring. A maximum of 16 stereo inputs with A/B switching are available. Microphone inputs are balanced and floating while line inputs are balanced and bridging. Slide attenuators have more than 80 dB before cutoff for optimum stereo tracking and separation. Complete monitoring, cue/talkback system and a provision for a mono output with metering are all standard. McCurdy also showed a peak program meter, available in the B, C & E scales.

MCI had an array of new equipment at their booth, but the new JH-600 console was sidetracked in New York and arrived in Dallas after the show. The JH-600 series are low-cost automated consoles available in 18 and 36 input frame sizes. The JH-50 automation used in the JH-600 series provides discrete

grouping, solo in place and solo reverse. Modes are read, write and update. Up to 36 busses with panning, differential line out, hi and lo pass filters and six sends are standard. The JH-1618 and JH-1636 are available with optional parametric equalization of the non inter-active type, allowing three separate controls for frequency, amount of boost and sharpness.

The new Micro-Trak 6618 6-mixer rotary fader console has three inputs per channel selected by noiseless latch logic switches. In the



Automated Processes proclaimed their readiness for AM stereo with this audio production console. (C. Cave)



Ampro's Microtouch consoles and cartridge machines were popular exhibits at NAB. (C. Cave)



At the Ramko booth, information on equipment for audio mixing, distribution and processing was in hot demand. (C. Cave)

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This is the all-pro Centurion II deluxe studio console, big and dependable, noiseless and very flexible. And of course when AM stereo arrives, you're ready.

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The construction is heavy-duty, the electronics are solid-state and modular. No cross-talk in any operational mode.

Newly designed power supply is rugged, solid-state, and highly reliable. All five meters are lighted for easier reading. You can choose

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Centurion II is at the top of the line among stereo consoles, but not close to the top in pricing. And thanks to our new and much larger manufacturing center and expanded production team, we can offer very prompt delivery—and many years of outstanding performance.

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Circle (56) on Reply Card



Audio consoles

standard configuration one mic and five high-level preamps are included. Stereo and mono outputs, a built-in 10 W monitor amp and cue speaker, switch selectable muting, voltage controlled attenuators and plug-in PC cards are all standard in the console.

Rupert Neve displayed a representative sample of their line of audio consoles, including a full-

scale console equipped with NECAM computer-assist and just about every possible feature and function presently available in an audio console. The new NECAM "D" system (not at the show) is intended for post-production. One of the "D" system's additional features is its program preroll offsets to allow SMPTE synchronized machines to achieve solid sync. Also new was

Neve's model 5422, a suitcase 2-group console incorporating eight modular channels, each switchable to mic or line and with switchable attenuation. The inputs are balanced and floating. Each channel can be panned to either a stereo output or to a stereo audition buss bar. Talkback, a 5-frequency oscillator, monitoring and 2 VU meters are standard while PPMs are optional.

Pacific Recorders & Engineering introduced a larger version of the BMX-14 stereo broadcast console, the BMX-22, which has all the features and performance of the smaller model. Totally modular and expandable in design, the BMX-22 utilizes CMOS switching logic for input channel on/off and for all remote functions, such as turntable start/stop. Five plug-in modules are available. There are separate mic and line input modules, both featuring a 30 dB adjustable gain, two selectable balanced and floating inputs, and a program and audition buss selector. A stereo pan pot is provided on the mic module and a

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Debbie Gronke (center) demonstrates a Logitek custom audio console to interested visitors at NAB on a system which has the workings exposed to show modern circuitry. At the far left Scott Hochberg demonstrates another system to a potential customer. (C. Cave)



Bruce Ballantyne (left) and Tom Perryman, chief engineer of KRGV/FM-TV, discusses audio consoles at NAB. (C. Cave)

When you need microphones with "reach," reach for these!

CL42S Shotgun System

The CL42S reaches farther and rejects more ambient noise than any other shotgun of its size ever made. Our exclusive line bypass port makes it more directional at low frequencies so you won't have to sacrifice frequency response when you use it on a boom. Diffraction vanes maintain high-frequency directivity to preserve uniform frequency response if the "talent" gets a little off-mike.

Phantom or AB powered, the CL42S comes complete with windscreen, shock mount, carrying case and handle for hand-held applications. And it's rugged.

CH15S Hypercardioid System

The CH15S is actually more directional than a mini shotgun mike – in a package that's only 4 inches long that weighs less than 6 oz. Specially designed for boom and fishpole use in TV and motion picture studios, but equally at home wherever working space is small and you have need for a compact, highly directional microphone.

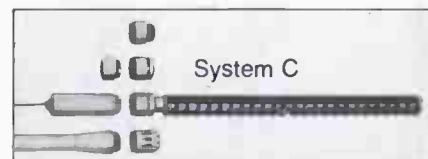
Compatible with phantom or AB power, the CH15S comes complete with windscreen, shock mount and carrying case. And, this microphone is rugged.

The Electro-Voice Warranty

Electro-Voice backs up these two microphones with the only unconditional warranty in the business: for two years we will replace or repair your CL42S or CH15S microphone, when returned to Electro-Voice for service,

at no charge – no matter what caused the damage!

We can do this because we build these microphones to meet our standards for performance, ruggedness and durability. We accept nothing less, and if you're a professional, buying a professional quality microphone, you shouldn't either.



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a gulton company

600 Cecil Street, Buchanan, Michigan 49107

Circle (58) on Reply Card

Audio consoles

mode selector switch on the line module. The outputs are stereo program and audition busses, with an optional mono output module. PPMs are optional.

QRK introduced the newest Omega broadcast consoles with a number of programmable functions such as input gain selection, muting and remote starting. Available in 6- and 10-channel models, the QRK console's electronic slide attenuators utilize an IC to control both

left and right channels to ensure zero tracking error between channels. Other features include dual cueing methods, a digital clock, remote start switches and four inputs per fader. All amps are plug-in and there is a provision for four remote lines on two sets of front panel mounted switches.

RCA's new BC-300 series of audio consoles are available in 6, 8 and 10 mixer dual channel mono or stereo configurations. Each mixer channel

is equipped with 2 dB stepped rotary attenuators and remote start circuits. An input switch allows each input channel to accept one of four inputs. Each of the first four mixing channels are supplied with mic preamps with three selectable gains and they are strappable for high level inputs. The BC-300 consoles are equipped with illuminated VU meters and programmable LED peak indicators. S/N is better than 74 dB below +18 dBm, 20-20 kHz with a -50 dBm input. The clipping level is above +22 dB. Options include a mono mixdown bus and a digital timer.

Ramko showed their new P5M miniature remote mixer with 5 mixers and 8 inputs. A built-in limiter/compressor, tone generator, cueing and balanced inputs and outputs are standard. Also new from Ramko was their ESP-38 turntable preamp with a -90 dB distortion figure. Pushbutton activated scratch, brilliance and rumble filters, along with pushbutton mono/stereo select are included. Ramko's new SSM-2C table top stereo meter and the SSM-3R 3-meter rackmount for both stereo and phase feature a fast response and VU decay for an easy-to-read indication of audio peaks. The phase meter gives an instant phase check on stereo signals.

Listec Television Equipment showed the updated Richmond Sound Design M82BX portable broadcast consoles featuring eight inputs with three selectable mic/line inputs per channel. The inputs are op-amp-, floating-, balanced- and transformer-coupled for maximum sensitivity and S/N. Hi, mid and lo equalization, echo send and foldback, as well as monitoring and cueing facilities are found on the input channels. Output features include two program and two monitor channels, two echo return levels, VU meters and separate echo send and foldback busses. The compact console weighs 24 lbs and is expandable to 24 channels. Listec also showed RSD's new S64B com-

Football Special

Shure M-67 Mixer
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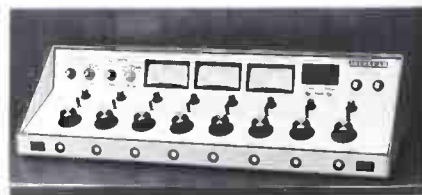
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For transmissions as far away as 300 miles, the FV2CR can operate with a minimum system fade margin of 20 dB. And with the ENG crew as close as 1/8 of a mile, the receiver's front end won't overload and cause distortion like other receivers.

The FV2CR provides 21 synthesized channels in the 2-GHz band. By instantaneous phase-lock loop, the channel you select (manually or remotely) is the channel you get. And the receiver's unique, extremely sharp IF SAW filter provides excellent selectivity of at least -45 dB with maximum half-channel rejection. Also its noise figure of only 3 dB is tops in the industry.

Now you'll have a new degree of freedom in news coverage. So you can send your ENG crew wher-



ever the action is. And Farinon's new FV2CR Central Receiver couldn't care less where they go.

Farinon Video also offers portable and mini-portable video transmission systems, STL microwave radios, FM transmission channel systems, as well as video baseband treatment units and ancillary equipment.

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Circle (60) on Reply Card

June 1979 *Broadcast Engineering* 71

PEDESTAL OF THE 80's



TVP's P-20 offers the latest in a modern camera pedestal, with objectives of reliable operation, versatile height range (30-5/8" to 50-5/8", measured from the pan head mount), and the greatest weight-to-load capacity of any other pedestal of this type (weight: 160 lbs., load capacity: 300 lbs.). The P-20 handles the new smaller broadcast cameras with absolute stability, whether in the studio or out on location, with a minimum doorway clearance of 30".

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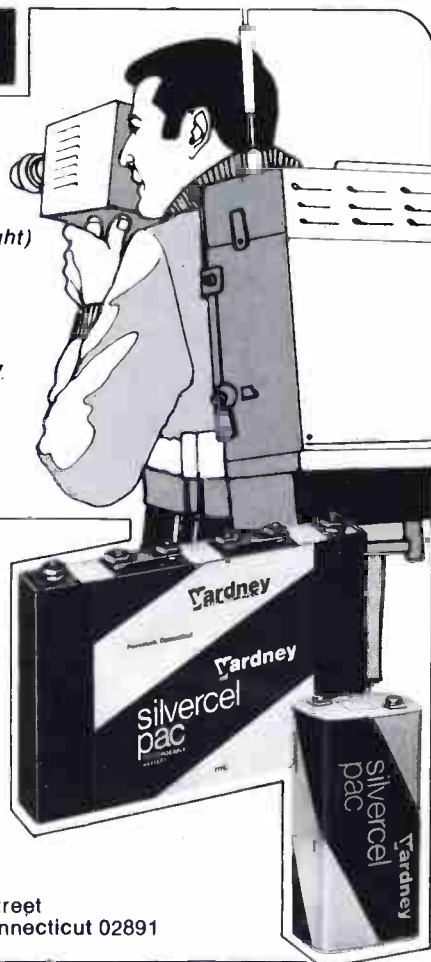
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Or, If Your Present Battery Is As Powerful As You Want It . . . How Would You Like To Have It At 1/3rd Its Present Weight?

Silvercel rechargeable batteries pack the most useable power into the smallest and the lightest modular package. Used by all major manufacturers of TV Back Pack Cameras as original equipment, they offer the added advantage of a QUICK CHARGE without battery damage by the use of a quick pulse charge.

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Circle (62) on Reply Card

Audio consoles

munications module for the M82BX console series. Included in the S64B are two additional meters reading foldback and echo send, an assignable tone oscillator and talkback facilities which can slate voice to any of the echo send, foldback or program busses.

Rockwell-Collins displayed their new rotary fader stereo console, the Audio Rack 10. Of modular construction, the model 10 is a 10-mixer dual channel console with mono mix down. It is capable of accepting 30 inputs and up to eight microphones. A notable feature of the board is its automated machine sequencing capabilities which allow audio switching to be remotely controlled. A mini-automation sequence, such as starting and cycling a 3-deck cart and rolling through to a next event is possible.

The new model 825 8-channel stereo console from Russco utilizes rotary faders and plug-in preamps on channels 1 through 6 with 20 dB gain presets. They may be set for flat high level, two different flat low levels or for an RIAA phono input. Channels 7 and 8 are 600Ω and balanced with five pushbutton selectable inputs. Silent FET switching with LED indication is included. Outputs include line, HP, a 20 W monitor and a 2 W internal cue with speaker. A built-in digital clock, headphone monitoring of cue and monitoring of an off-air signal are standard features.

Studer ReVox showed the new model 269 with a maximum of 16 input channels which are switchable for mic/line. Stereo input channels are available with pan pots. There is a foldback and reverb send out of each input channel as well as high and low equalizations and a continuously adjustable mid equalization control. Also included is a built-in 48 V phantom supply. Monitoring capabilities allow selection of any busses and can select returns from two tape machines. The outputs have built-in limiters and PPMs are optional.

Tangent, a first time NAB exhibitor, showed a number of production and on-air consoles. Their "A" series of stereo mixing consoles featured very quiet, low distortion (.075% min) performance and flexibility, including sub-master grouping and three independent monitor/reverb/effect busses. The "A" series is available in 8-, 12-, 16- and 24-channel models. Input modules with +20 dB head room, low cut Butter-

"We evaluated all carts and have standardized on the Audiopak® AA-3"

—Bob Kanner
Chief Engineer
KRTH, FM 101
KHJ, AM 93
Los Angeles

"Our test results show that the Audiopak® AA-3 holds stereo phasing better than any other cart on the market."

"The excellent phase stability of the AA-3 will be of major importance as AM stations convert to stereo."

"The High Output, Low Noise (HOLN) tape on the AA-3 gives us excellent frequency response combined with 6db more headroom."

"The AA-3 maintains excellent tape motion with low wow and flutter."

"We had had previous cart pressure pad problems with our multiple playback machines — these have been resolved by the durability of the AA-3 pressure pads."

"The AA-3 is the 'state of the art' in cartridges — it meets or exceeds the specifications of the current NAB standards."

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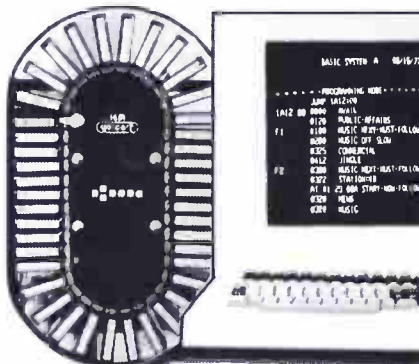
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Audio consoles

worth filters and LED metering are included. Tangent's 3216 series consoles are 16, 24 or 32 by 16 or 24 production consoles. Metering is via a color coded, 12 segment array switchable to PPM or VU characteristics. Tangent's BC-160 series modular on-air consoles have a unique simulcast feature allowing assignment of program output to AM and FM transmission equipment. A digital timer, EQ on all inputs and recessed mount semi-parametric output equalizations are provided. The consoles are totally RF shielded.

Track Audio showed their new RTW peak meters. These "bar graph" type displays are available in vertical and horizontal 101-, 201- and 301-element versions. Overload range is colored red. Measurement error is ± 5 dB, 30-20 kHz.

Tweed Audio, another of the new NAB exhibitors, introduced several new consoles at the show including the M124 broadcast production board and the suitcase BC8L console. The BC8L input channels are plug-in modules as is most of the console's construction. They also feature switchable mic/line input with stepped and fine gain controls. Phantom power is available to all channels. A high-pass filter, low and high EQ, solo, echo, send and cue outputs are included on the input channels as well as pan controls. A balanced stereo output along with echo send, cue send and a stereo monitor complement the output capabilities. Two echo returns and two playback inputs also are provided. The stabilized power supply is built in the suitcase lid along with a battery box. Tweed's model M124 is a 12-channel 4-group stereo console. Modular construction, CMOS switching, a complete output section with full metering and monitoring are included. Tweed also showed the RP1203/S, a 12-channel on-air/production console with three stereo outputs and mono mix down. Rounding out the Tweed booth was the B245 broadcast production console with 24 input channels including mic/line inputs, flexible equalization, four submaster groups with pan facilities, two echo sends and two foldback sends. Cue solo output and several stop/start facilities are included.

The new UMC/Beaucart stereo console, shown this year as a production model, is an 8 to 10 input unit with plug-in channels

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Audio consoles

modules, each having three selectable inputs. Module cards include a high/low switch for impedance matching with a ± 10 dB trimming switch. The console includes three fully metered matching stereo busses plus a metered mono feed buss. Waters conductive plastic linear faders are used throughout. Channel on/off buttons provide DC switching and remote machine start/stop.

Although Ward Beck Systems had no new consoles, they showed their popular "L" and radio series of broadcast and full production consoles. Some other new items shown included the M605A self-powered distribution amplifiers with LED level indicators. The series of LEDs gives nominal and overload levels as well as power supply level indication. The M605A combines features found in the 605 and 612 models in a smaller, 3½-inch rackmount package. However, the obvious big hit at Ward Beck was Orion, which, according to a Ward Beck spokesman, is able to fully automate any console chosen. ☐

NAB/Dallas '79 replay:

AUDIO PRODUCTION CONSOLES

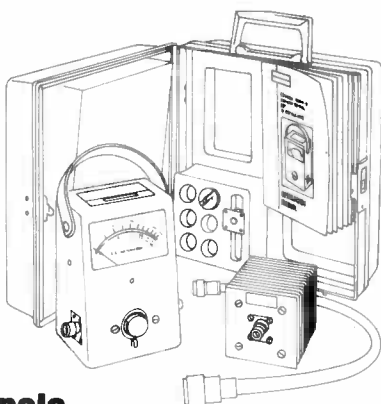
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AUTOMATED PROCESSES, (235)	RAMKO, (249)
AVAB, (236)	RCA, (250)
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June 1979 *Broadcast Engineering* 77

NAB/Dallas '79 replay:

TRANSMITTING EQUIPMENT

By Don Markley, BE facilities editor & consulting engineer

For more information on the transmitting equipment exhibited and described here, turn to the listing at the end of this article. There, locate the appropriate number to circle on the reader service card in this issue.



Bosch-Fernseh displayed its fiber optics laser link for video and audio transmission. (C. Cave)



CCA displayed an impressive array of AM/FM transmitters and related accessories to NAB visitors. (C. Cave)



Circularly polarized and UHF antennas were hot topics at Bogner's booth. (C. Cave)

The 1979 NAB Convention in Dallas was huge, interesting and alive with fascinating gadgetry created with the magic of microprocessors. Many would agree that the most exotic gadgets were in the area of video switchgear and processing. While transmitters shown at NAB did not contain any equipment so radical as to establish a new level in the state-of-the-art, significant improvements were shown in some phases of the transmitting system.

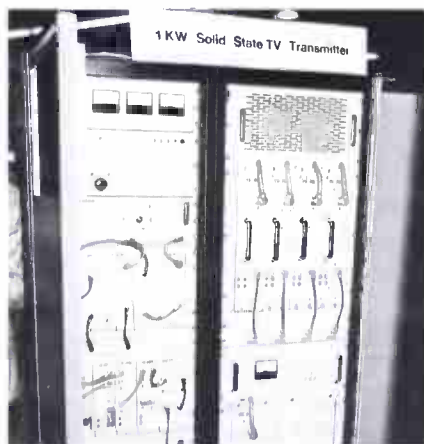
Television

Perhaps the most significant new television transmitter to be displayed was the RCA TTG line of VHF low- and high-band equipment designed for world-wide use. This long-anticipated system utilized some of the most modern electronics in a style which seemed almost European in that front panel key-type switches were utilized to prevent exposure of hazardous voltages. This feature is common in the international market but unusual in American equipment. The TTG line used Surface Acoustic Wave (SAW) filter technology for sideband shaping with the now widely accepted

intermediate frequency modulation scheme. The most unusual and interesting part of the transmitter was a completely solid-state drive section which is broad-banded with no tuning adjustments.

Harris also had a large VHF television transmitter on display, a did Philips and CCA. The Harris and Philips units were basically the same as those previously shown. Philips did have a UHF transmitter on display as well as the current PYE VHF models. The UHF system is unique in that it is available with a variety of Klystrons to suit the preferences of the buyer. All of these transmitters utilize IF modulation.

At the lower power levels, EMCEE and Acrodyne displayed transmitters of several different models. The 1 kW units are very similar to the translators available from these companies with the obvious addition of a modulator. The higher power units have left the translator class of equipment and are obviously sophisticated transmitters which make full use of state-of-the-art technology. The wide range of power capabilities from these manufacturers will appeal to the small



NEC's 1 kW solid-state TV transmitter made a big hit in Dallas. (C. Cave)



O. B. Fubara, Rivers State Broadcasting of Nigeria (left), looks over the Harris 2.5 kW FM transmitter. (C. Cave)

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Transmitters

market operators and to large operators desiring the capability to serve outlying areas.

AM broadcast

One of the more significant new transmitters was the Harris 10 kW unit using pulse-duration modulation (PDM). This transmitter could be considered a higher power version of their very successful MW-5 series. The high efficiency possible with this type of transmitter, together with the few tubes needed, probably will make this unit very popular in the international market where 10 kW is in demand.

Also using a pulse-type modulation system was the 5 kW Rockwell transmitter. The RCA 5 kW solid-state transmitter was absent this year, although representatives of that company state that problems with that unit have been largely solved and that it will be shown in the near future.

FM broadcast

The most significant new items in this area would be the new 25 kW transmitters shown by Harris and

CCA. The Harris transmitter uses a single RCA final amplifier tube driven by four solid-state amplifiers which in turn are driven by a fifth solid-state amplifier. All five of these units are interchangeable and only a minor power reduction results from the removal of one of the four drivers.

The CCA transmitter used an Eimac final amplifier tube with a pair of solid-state drivers. Failure of one combiner limits the transmitter power output only slightly. This transmitter will be offered in several modes depending upon the extent to which the buyer wishes to use ATS. In the full-blown version, a microprocessor ATS system will be built into the transmitter along with dual exciters with automatic changeover. The ATS system will provide all of the FCC required functions as well as a number of additional desirable services.

ATS systems

Two highly visible ATS systems were shown by Potomac and Harris. While the Harris system would monitor the standby power plant parameters, building status, and everything else desired, the Potomac system had the ability to tell more about a directional array than most

people really would want to know (It should be pointed out that directional antenna systems may not be operated by ATS at this time although it would appear that such operation will be permitted in the near future.)

General

Continental: As is usually the case, this firm displayed a series of well built units, the bottom size being 5.0 kW AM. This firm's transmitters have always been noted for rugged construction, and this tradition seems to be in no danger of being changed.

CSI: This company demonstrated a complete cosmetic change in their product line. While the interior workings of their transmitters were essentially unchanged this year they have changed some component mountings, meters and controls which resulted in a neater looking line of equipment.

McMartin: The high point of the display was the new series of FM exciter/audio processor equipment. The new models contained such features as overshoot protection and audio processing built into the exciter itself.

Sintronics: A new series of trans-

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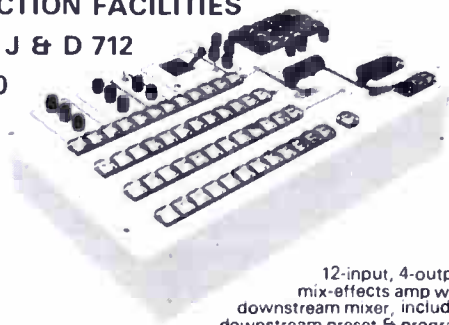
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mitters was shown for both AM and FM. The new designs appeared neat and clean, and the units seemed to be exceptionally well metered. The bottom end of the AM line was a 1.0 kW solid-state unit, but continued up to a 3-tube, high-level modulated 10 kW transmitter. The FM transmitters use a newly designed exciter and grounded grid amplifiers.

Rockwell International: In addition to the 5.0 kW AM system, the 25 kW FM transmitter was displayed. This unit had been dressed up a little with new status indications which provide the operator a great deal of helpful information when trouble occurs. A phase loss/rotation detector also was included which provides additional protection against problems on the power line.

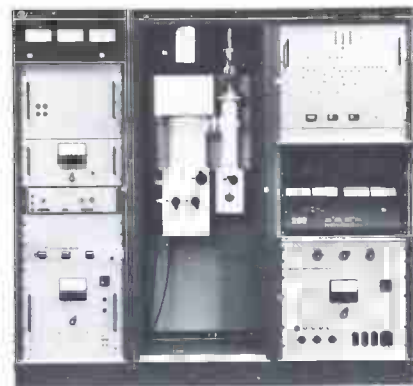
Wilkinson: As last year, this

company displayed their solid-state AM and FM transmitters. Their newest item was a series of self-contained dummy loads of the calorimeter type. Using a closed-loop system of ethylene glycol coolant and a film type resistor, these units permit accurate power measurement up to 80 kW.

Introduced, but not shown, at NAB was a new generation of compact, lower priced VHF and UHF TV transmitters by NEC. □



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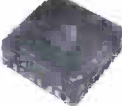


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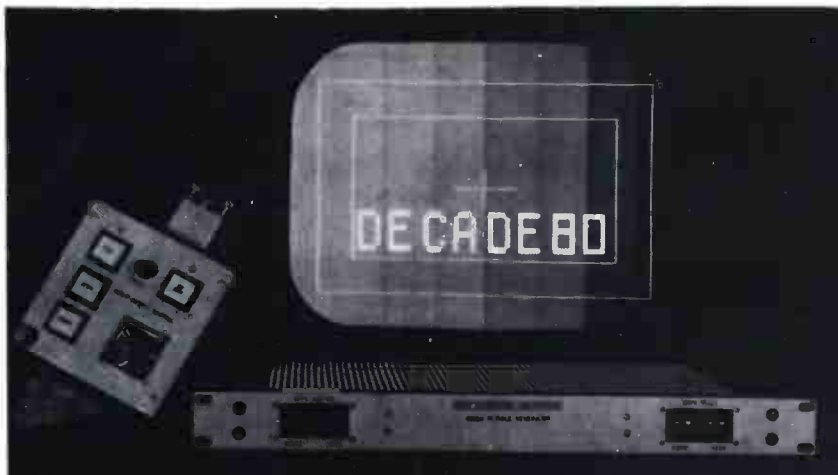


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Transmitters

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CCA ELECTRONICS
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ATS/remote control/meters, (187)
TV, (188)

CSI ELECTRONICS
AM & FM, (189)

COMARK INDUSTRIES
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CONTINENTAL ELECTRONICS
AM & FM, (191)

DELTA ELECTRONICS
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NAB/Dallas '79 replay:

AUTOMATION

By Cindy Nelson, managing editor

For more information on automation systems exhibited, turn to the listing at the end of this article. There, locate the appropriate number to circle on the reader service card.

Manufacturers of radio and television programming automation and station business automation equipment introduced many updated systems and modules and a few new systems. There was such a variety of services and options available that station managers and engineers could choose any degree of automation desired. The following are descriptions of new and updated models, but several companies exhibited older models as well; these can be found in the table following the article.

Station business automation

The Radio Broadcast Management System exhibited by Automated Business Concepts has added a new feature, the Audience Data System. Other features and functions of the system include availabilities, order entry, copy assignment, billing and a variety of custom reports.

The Autotron Systems division of Automation Electronics introduced two optional modules for their Autotron Star System. A totally in-house minicomputer system, it is designed for sales, traffic, management controls and receivables for radio broadcasters. One new module, the Music Library System (MLS) allows music to be catalogued by title, artist, record number, label, library record location, and library cartridge and tape location. MLS also provides for structuring single or recurrent music logs. These printed logs provide selection, number, artist, titles and length in stop-sets, as well as giving total stop-set timing. The other new module, the Demographic Analysis and Reporting System (DARS) is a complete cross-analysis system

available for in-house use. DARS allows use of ARB data for reporting functions and provides for in-house listener research.

Bonneville Data Systems' new BTA-101A is a smaller version of their BTA-101 computerized traffic and accounting system for radio and TV. The system provides detailed logs, avails, billing information, reports, journals and file listings.

CMS introduced the Broadcast Management Information System (BMIS) at the NAB. The service is a sales, traffic and accounting system for both radio and TV. A monthly fee provides the use of large, centrally located computers in communication with in-station computer equipment. Basic functions include order confirmation, sales projection, availabilities, facility management, program logs, revenue analysis, invoices, statements, account management, operating statements and balance sheets.

Jefferson Data Systems introduced three broadcast business automation packages. The first, a complete broadcast business package, uses an IBM System 34 computer for sales, traffic, logging and accounts. The second, a Media Management System, is a complete tape cartridge inventory for videotape featuring a purge list. Also offered was an In-House General Accounting package for stations and group broadcasters featuring general ledgers, P&L and a consolidation package.

A music inventory system, a newsroom system and an updated TV business automation system were among Station Business Systems' new products. The Music Playlist and Inventory (MPI) is an instantly accessible music data file

for music entry, selection and review. It can select titles automatically to fit formats and can analyze data rapidly.

The concept of NEWSKOM, an interactive computer system for TV newsrooms, also was introduced. The company says the system will provide electronic editing of stories, prioritizing, timing, high-speed script printing, storage, full archiving and story retrieval, direct hookup to prompter system (eliminating printed scripts), personnel management and much more. The company also exhibited the new BAT 2700 billing, accounting and traffic system for TV.

Radio programming automation

Taking a modular approach to low-cost program automation, Automated Broadcast Controls introduced two units at NAB/Dallas'79: the 1600S sequential controller and the 2800MI microprocessor interface. The standard model 1600S contains 16 events and nine audio sources with one special event. The controller also features a VU meter and internal speaker for monitoring PGM, CUE or external audio; 600 Ω balanced stereo output strapable for mono out; provision for external off-air monitoring; and remote control for STOP, START and SE. The 2800MI was developed for loading, dumping, examining, and editing of the company's 2800M audio controller's stored information. Features include RS 232 interface for CRT; 20 MA current loop for printer and a self-contained modem for interface to cassette record/play unit or other storage medium.

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Automation

system has been upgraded with enhanced software for the computer traffic system. The system includes a Nova 3 central processor with 128 K bytes of main memory; video display terminal; a printer and software.

Broadcast Electronics Incorporated (BEI) expanded its program automation line with the Econo Control 16, a microprocessor-based system which is field expandable to full Control 16 capabilities (by installation of a video monitor and main processor chassis). Standard features include 2000 program events and 11 event functions capacity, data error sensing and interchangeable universal source cards. Another addition to BEI's automation product line is Intelog, a high-speed program logger. The encoder electronics are said to make Intelog the first encoding system to provide electronic tabbing, full message editing capability, 32-line memory and error detection between the message encoded on tape and the message stored in the encoder's memory.

Cetec Broadcast Group exhibited their updated System 7000 Radio Automation. This included the new Level II Software which adds user flexibility to the system. User-definable program codes provide selective access to the memory. Also new was a debug card which, when inserted, displays the circuit schematic on the CRT. Another addition to the line is the Audiofile IIA, a modification of the Audiofile II. It is a microprocessor controlled, 48-tray random access multi-cart playback machine with closed-loop control, 150 Hz sensing and all logic controls. This unit, featuring a new solenoid and extra platform drive motor, is being retrofitted on existing System 7000s.

Consolidated Electronic Industries has changed the appearance of Cuerac, its automatic air-program storage and reproducer unit for radio. With a lower profile and more flexibility, the system also can be interrogated. The system features a random access library of 500 cartridges; expansion to control up to five Cuerac libraries and up to 40 single source display units.

Groton Computer introduced three interfaces to automation equipment: Enhancement 1979A, 1979B and 1979C. 1979A provides for all billing and affidavits to be printed on special "Mini-Logs" for stations that



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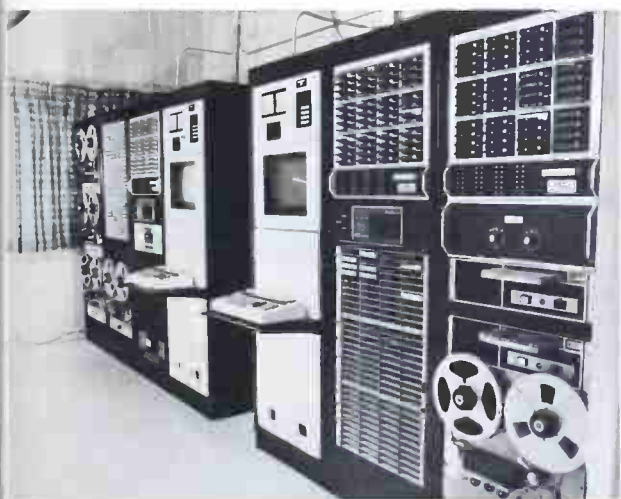
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Dow Jones, Broadcast Electronics (right), describes their Control 16 radio program automation equipment to a potential customer. The sign on the CRT facing Jones indicates that the Broadcast Electronics system at NAB was tied into the business automation facilities of Station Business Systems for logging of business functions. (C. Cave)

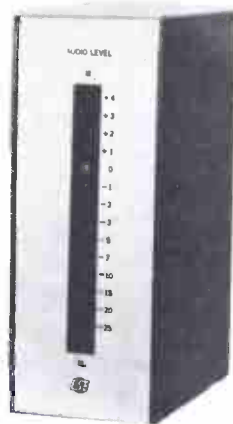


Cetec Broadcast Group displayed its full line of automation equipment, consoles, antennas and studio equipment. (C. Cave)



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June 1979 *Broadcast Engineering* 91

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Automation

are simulcast but sometimes depart for special programming. 1979C provides load sheets of carts and step numbers for any automated equipment (IGM, Harras, SMC, Cetec) showing both new cart insertions and old removals.

The Harris 9000 program control automation system features the Multi-File program memory which provides independent files for commercial schedules, music rotation, etc. The system provides multiple overlaps, voice-track synchronizations and many live-assist features.

IGM/NTI introduced a new version of Instacart designed as an additional source of station revenues called the Information Retrieval Instacart. A station may use several cartridges to provide off-air information to telephone callers as well as use other cartridge positions for news or IDs. The company also showed a production model of its BASIC A automation control system which has been updated with a Techtran microfloppy disc memory storage device. The device makes it simple to dump programming onto the disc during maintenance, automatically reloading from the disc thereafter.

The model 377 stereo automation reproduce preamp was introduced by Inovonics. Designed to upgrade radio automation systems, the low-noise unit is fully RFI-proofed. It is pin-compatible with older Schafer systems, as well as being able to interface with a variety of tape heads and transports.

The International Tapetronics ITC 1K audio library system is an automatic cartridge system which receives, stores, moves and plays 1024 cartridges back-to-back with reel-to-reel sound. The unit is accessed through a controller of the user's choice and will accept four program lists, each 32 events long. Events may be added, deleted or re-sequenced.

MEI exhibited its new 100B Programmer designed as the heart of its Log 2 and Log 4 radio automation systems. In either manually-assisted or fully-automatic mode, it controls eight sources: tape decks, carousels, single- or triple-play machines, a mic, or any combination. A "Hold

& Continue" feature allows the operator to maintain whatever degree of manual control is desired.

SMC added three automation products to their line at NAB. The DP-2-T video operating display for the company's DP-2 programmers is being offered as a retro-fit accessory and as a complete operating system. With three distinct and safe operating modes the terminal permits the operator to display, edit and label each operation of the system from the programming location. SMC also exhibited the ESP-1 Programmer with tape loader and the new LL-1 Live Logging package which provides printout logging to live stations.



Harris 9000 Program Control



Cetec Autocue



Automated Broadcast Controls 1600S Sequential Controller

NAB/Dallas '79 replay:

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June 1979 *Broadcast Engineering* 93

NAB/Dallas '79 replay:

TV WORKSHOPS

Blanking, the hottest TV subject at NAB, was addressed at Monday's workshop on *Television Blanking Progress Report: Measurement and Control*. Presiding at this session was R. La Verne Pointer, ABC's vice president, broadcast engineering, and a member of NAB's Broadcast Engineering Conference Committee. Moderator for the session was Thomas Keller, director of engineering, WGBH-TV, Boston.

Panelists included Wallace Johnson, FCC Broadcast Bureau; Samuel Stelk, FCC Regional Director from Kansas City; K. Blair Benson, Video Corporation of America and SMPTE officer; Frank Davidoff, CBS Television Network; Charles Magee, Westinghouse Broadcasting; Robert McCormick, Public Broadcasting Service; and John Serafin, American Broadcasting Companies.

This NAB subcommittee to study blanking was formed just nine months ago, and grew out of communications among Pointer, Joseph Flaherty of CBS, George Bartlett of NAB, and other leaders in the industry. A paper by Davidoff was delivered by Keller at the 120th SMPTE Technical Conference in New York, describing measurement techniques, parameters being studied and some committee progress. The workshop in Dallas was scheduled as a final preview of the committee's work before the submission of its formal report to George Bartlett, NAB's vice president of engineering.



Gerald Vander Sloot, WOOD Radio (left), meets with Walter Johnson of the FCC.

This final report from the blanking committee will be a monumental document concluding the efforts of an industry-dedicated group and may well be one of the most significant documents to be delivered to the FCC in 1979.

In Dallas, Davidoff gave a condensed version of his SMPTE paper and explained why, technically, the industry has a blanking problem. Serafin's task force undertook a thorough study of pulse measurement methods and established the shortest practical pulse width possible at the end of the system that can be guaranteed (practically) today. McCormick's task force compiled the data. These elements (the problem definition, the measurement methods, and the data compilation) along with conclusions and recommendation comprise the subcommittee's final report.

As **BE** goes to press, this final report is nearing completion. It will be submitted to Bartlett of NAB for review by his staff and NAB counsel and, when approved, delivered to the FCC for review and action. While the report will be available soon, and even though NAB approval is anticipated to be rapid, there can still be delays.

The progress of this subcommittee's work on blanking has been impressive. Curves for over 100,000 video samples of commercials, tape shows, and film shows (nearly equally divided between commercial and public television) have been compiled and analyzed from over 100 stations. "We would like to thank everyone in the industry," Keller said, "who spent a lot of time making these measurements for us to provide the extensive data base possible for our report."

A 5-year breather

In essence, the committee's final report calls for a 5-year moratorium on blanking width enforcements. This may seem long to some, but quite short for others. Standardization throughout the system will be required if blanking is to be gotten down to the 1-3% range eventually

possible, from camera pulse widths to receivers.

In terms of foreseeable values, the committee sees 12.2 μ s horizontal and 23 lines vertical (at 20 IRE divisions) as potentially practical blanking criteria for the near future, but 11.44/21 is not. Their report recommends 13/24 for the off-air radiated signal.

While Keller indicated that the subcommittee's report was nearing completion, its work will go on. It will continue to compile data annually on what's being broadcast, continue industry efforts to establish practical blanking criterion, and communicate its findings to NAB/FCC and the industry.

"Our work," Keller said, "shows that, as electronically-generated programs tend to lengthen blanking, it will take five years to correct the problem. Our committee will keep pressuring the industry—the producers, manufacturers, and broadcasters—to clean up their act." By providing a reliable information base, this group hopes that users will design their plants better, manufacturers will have reliable numbers by which to design the hardware needed, and that operators will learn to use new instruments to solve the problem.

The committee's 5-year plan has a clearly defined basis and recommended plan of achievement, but its recommendations amount to a 5-year moratorium on enforcement on blanking by the FCC. Keller and the committee say that this is the best interest of the public and the manufacturers; everything can be put into proper perspective and advances made judiciously and economically.

While the FCC already has relaxed in vigilance on blanking enforcement, its attitude on a 5-year moratorium must await a formal announcement. **BE** will keep its readers informed on the progress of the committee's report on blanking as it passes through the machinery of NAB and FCC and will publish the FCC's decision on this important subject when it becomes available.

TV workshops

Television broadcasters attending the NAB's 57th annual convention were challenged not to be dazzled by tomorrow's technology by remembering that communicating meaningful information is the business they are in. Robert King, Capital Cities Communications, opened NAB's television general session by introducing the panel—*Information Age Odyssey: Television 1979*. King is NAB Television Board vice chairman and convention co-chairman.

Panel moderator Paul Bortz, National Telecommunications and Information Administration, noted that broadcasters must now contend with cable growth, multipoint distribution systems, satellites and videodiscs as means of distributing programming. How broadcasters adapt to these changes and competition for viewers "will determine your fortunes," Bortz said.

Members of the panel were Mark Foster, Microband National Systems; Portia Isaacson, Electronic Data Systems; and Arch Madsen, Bonneville International Corporation.

Foster opened the panel by reminding broadcasters that until now "entertainment has been the principle program content to flow through the airwaves and onto the cathode-ray tube display." However, the age of computer generated information (from massive information data banks and from interactive data program providers) has arrived, Foster said. "These new distribution information systems will transform the home television set and telephone into an operational computer terminal."

Isaacson told the audience that "now is the time of personal computing." She said low-cost, abundant computers are bringing a new era of computers for people. "Home computers will be the next household appliance." Home computers (some of which will be connected to the television set) also will make use of public information utilities to offer extensive news, listings of yellow pages, employment availabilities and real estate.

Broadcaster Arch Madsen presented a taped demonstration of teletext printing via television with its capability of 100,000 words every two minutes. Madsen also explained how Bonneville station KSL which received Federal Communications Commission permission to experiment uses teletext.

For example, he said that an anchor person is able to refer to a "teletext page number" for viewers who wish to read extensive information on a particular news item. In addition, during a news bulletin teletext reference numbers can be included on the screen so that interested viewers can call up full details.

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TV workshops



Darryl Dillingham, NAB, addresses the TV session *Is There Room at the Top? A Second Look at NAB/Dallas '79*. The panelists for the session (from left) were Eleanor Brown, Westinghouse Broadcasting; B. Celia Shaw, WCIV; and Roberta Romberg, NBC.



At a television session on Tuesday, Wilma Kriner, American Women in Radio & Television, introduced the topic of *Managing the Management Woman*, while Alleen Hernandez (left) of Hernandez & Associates led the group discussion on this subject.



The Tuesday morning TV workshop featured *Update: FCC Rules and Policies*. Appearing were (from left) Nancy Carey, FCC; moderator Erwin Krasnow, NAB senior vice president and general counsel; Werner Hartenberger of Dow Lohnes & Albertson; and Michael Senkowski of McKenna, Wilkinson & Kittner. □

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June 1979 *Broadcast Engineering* 97

NAB/Dallas '79 replay:

CAMERAS

By John Wiliszowski, BE video editor

For more information on the new and updated cameras described here or on other cameras exhibited, turn to the listing at the end of this article. There, locate the appropriate number to circle on the reader service card.

Camera manufacturers have again demonstrated at NAB their ability to design new cameras and improve existing models to meet the stringent requirements of commercial broadcasters. Highlighting this year's exhibits was a variety of new cameras plus camera updates, including cameras with the new diode-gun tubes and the capability of triax operation.

New cameras

Newly designed cameras were revealed at NAB by Bosch Fernseh, Commercial Electronics Incorporated (CEI), International Video Corporation (IVC), Ikegami, JVC and Thomson-CSF.

The new Bosch Fernseh KCP 60 is a studio and remote broadcast camera utilizing three 3/4-inch pick-up tubes and dynamic beam control circuitry. It can handle up to 16 times overload when used with diode-gun tubes. The lightweight, weatherproof head with its shock resistant optics, excellent service access and adjustable viewfinder is designed for a wide range of applications. A signal processing unit combining all of the monitoring and control functions can be located up to 500 m (1650 ft) from the camera head and connected to a main and remote control panel. According to a Bosch source, delivery of the KCP-60 will begin in the last quarter of 1979.

CEI highlighted the CEI-330 at this year's show. The CEI-330 is reported to extend the cable range between the camera head and electronics unit to 2400 ft without compromising color control or signal-to-noise. Carrying RGB video from the head, the model 330 suffers no RF problems associated with triaxial systems on long cable runs or loss in signal-to-noise. Fewer circuits and lower power requirements at the camera head promise to reduce total system cost and promise more reliability.

The CEI-330 may be used with various cable types including TV 81, mini TV 81 and CEI's new micro-cable. The new micro-cable carries three (RGB) video signals, viewfinder video and camera head control, including timing pulses; vertical and horizontal centering and sizing; iris control; on-off switches for beam, tally and test; IC and program sound (for headset); two spare analog channels; and one spare on-off control.

While the CEI micro-cable offers RGB and more complete camera control, total system cost is reported far less than for triax. Cable cost and diameter is comparable to triax, but CEI interfaces at the camera head and electronics units are less expensive.

IVC had two entries in the arena of new color cameras for 1979: the 7005 studio camera and the 7005P. The 7005P is the EFP (electronic

field production) version of the 7005. According to IVC spokesmen, the 7005 and 7005P will complement the already existing cameras (7000 and 7000P) of the IVC product line.

The 7005 and 7005P are both equipped with automatic beam control (to help eliminate comet tailing) and the newly developed 25mm diode-gun Plumbicon. The 7005 series of cameras will be delivered to accommodate either multicore or triax cable. (This feature was only available in the studio version of the 7000 series.) Both the 7005 series and the 7000 series come with the standard complement of features, including automatic white and black balance and RGB beams, RGB focus, and RGB x and y alignment from the camera's setup panel.

Ikegami unveiled two new ENG/EFP cameras to add to their already extensive line at the 1979 NAB show. One of the new ENG color-TV cameras was the model HL-78B. This is a lower-priced companion of the HL-79A all-in-the-head ENG camera. Ikegami spokesmen stressed that the new HL-78B delivers sensitivity and resolution at least comparable to anything now available in the prism optics 3-tube class, despite its budget price tag.

The HL-78B meets the criteria of low price by eliminating some of the more sophisticated automatic features of the HL-79A. However, it retains all the functions for ENG in a simplified modular design: auto-

Cameras

iris, auto white balance, auto black stabilization, I/Q color encoding, IC color sync generator, genlock, horizontal and vertical detail correction, filter wheel, and monitoring of video output. Furthermore, such features as status indicators of battery condition, video level, white balance, and tally have been retained within the viewfinder.

The second new camera for Ikegami was the portable HL-53 electronic field production (EFP) television camera. Its striking feature is its compatibility with the well-known auto-setup computer that Ikegami originally introduced for its HK-312 studio cameras. The computer, which uses a microprocessor, sets up the HK-312 (and now the new HL-53) in less than a minute. Both cameras can be used interchangeably within one camera control unit (CCU) system for unusually great versatility. With triax cable operation, the HL-53 can be situated nearly a mile from the CCU.

The HL-53 can use three 1-inch conventional or ACT Plumbicon pickup tubes and is equipped with a prism optics beamsplitter. Resolution is more than 600 TV lines at center, geometric distortion is less than 1.5% and signal-to-noise is more than 55 dB at 4.5 MHz bandwidth. Automatic features for the HL-53 include phase control, white balance, and auto-iris. Use of the HK-312 CCU computer permits automatic cycling through flare and gamma correction, pedestal and video gain, and the eight registration functions in less than a minute.

JVC's addition to the camera line for 1979 was the KY-2000. According to a JVC spokesman, the camera was being introduced in a prototype version at NAB with a production model to become available in the latter part of 1979. The KY-2000 is a 1-piece camera that is adaptable for both ENG or EFP use. It features three Saticon tubes and a built-in battery pack. Options for the KY-2000 include a 5-inch viewfinder for converting the camera to a studio configuration.

Thomson-CSF displayed a multiple Microcam exhibit featuring the 1- and 2-piece configurations of the Microcam with the new 4½-inch viewfinders and remote control package for EFP applications. New

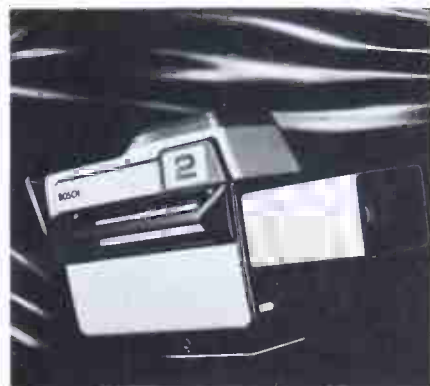
this year was the production version of the 1-piece Microcam, the model MC-601. It is a self-contained, 1-piece, 3-tube color camera featuring prism optics, digital automatic white and black balance and 2-line enhancement. The MC-601 delivers 100 IRE units at 0 dB gain, f/4 aperture, 200 fc with 60% reflectance chart. Setting the gain switch to +9 dB or +18 dB and employing



Hitachi displayed their GP series cameras (C. Cave)

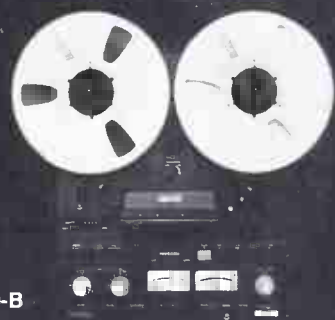


Ikegami HL-78B



Bosch Fernseh KCP-60

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Cameras

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Toshiba International, a newcomer into the North American broadcast market, made its entry with an impressive array of equipment for the American broadcaster. Although the company has been manufacturing broadcast equipment for many years, the company made its formal appearance on the American market in January of this year. As a result, each product shown at NAB this year was introduced for the first time in this country. Already established products include the PK-39 ENG camera, and the PK-31A

automatic studio camera. The new item on Toshiba's product line both here and abroad is the PK-40, their computerized automatic studio camera.

The PK-39 is a self-contained, portable design for ENG use. It is offered with both $\frac{3}{4}$ -inch lead oxide and diode gun tubes.

The PK-31A is a fully automatic, digitally-controlled camera designed for both studio and remote applications and already is used in a number of countries around the world. The PK-31A uses 30mm lead-oxide tubes and employs a self-contained microcomputer to accomplish automatic centering, size and linearity controls, automatic white

level, black level, gamma and flare controls. Automatic set-up and registration can be performed within 50 s. It uses a highly sensitive prism optical system incorporating an integral bias light for minimizing lag in low light level situations. Preheating functions permit the camera to be operated as soon as it is turned on.

The PK-40 employs 1-inch diode-gun tubes and provides for computerized diagnosis and correction of faults and for routine quality evaluation and maintenance. It consists of camera head and modular type CCU, CCP and power supply. The camera head and CCU interconnecting cable is available either



Listec exhibited its full line of Vinten camera support equipment. (C. Cave)



As part of their push into the broadcast market, Panasonic exhibited many cameras and video systems. (C. Cave)



Hitachi also showed the SK70, adapted for underwater action by Aquavision. (C. Cave)



Bob Garbutt (left) adjusts a camera for a potential customer at the Sharp booth (C. Cave)



Rick Boyland, RCA (right), demonstrates an ENG camera to a customer who seems ready to take it with him. (C. Cave)

Cameras

triaxial or conventional multicore cable according to operating conditions. The triax camera cable makes easy cable installation between camera head and CCU, especially in field productions. And, if the studio is equipped with multicore cable, the PK-40 can be quickly converted to a studio camera by replacing the camera cable interface module.

Both automatic cameras introduced by Toshiba are unique in design in that all control operations are performed by a built-in micro-

computer. This differs from other cameras currently distributed in the US which utilize outboard computers for controlling automatic functions.

Camera improvements

Although new products are the highlight of any show, much of the excitement at the 1979 NAB was generated by updates of currently existing camera lines. The trend demonstrated by the 1979 show was towards triax and diode-gun adapt-



ENG cameras were popular at the CEI booth. (C. Cave)

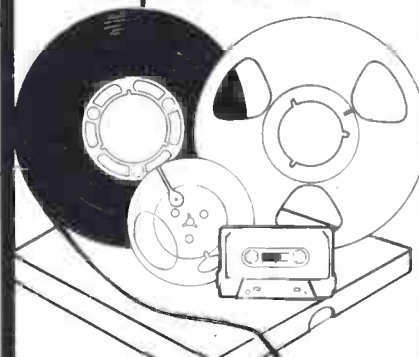


Don Dunbar, director of national marketing for Cinema Products Corporation, discusses some of the features of the MNC-71CP video camera at the company's NAB booth.



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ability in the studio cameras. The ENG/EPF cameras at the show featured reduced weight and lowered power consumption in addition to triax and diode-gun tube adaptability.

For RCA, updates were revealed in the form of improvements for the TK-76, now the TK-76C, and the TK-760, the EPF version of the popular TK-76 series. This year, both cameras were exhibited in versions that required 20% less power than previous models, reducing the power requirements of both to 34 W. Other updates on both cameras included

new CCUs with joystick iris, paint controls and automatic timing for cable lengths of up to 3000 ft (2000 ft more than previous models). Models TK-76C and the TK-760 are now available in a triax version and have an optional hip pack.

Harris Corporation camera line improvements came in the form of a redesigned pre-amp for their TC-80A. The new pre-amp can be incorporated in earlier versions of the TC-80 and specs in at an impressive -52 dB S/N. Other new features included a more efficient power supply and a redesigned en-

coder, making the camera more versatile and easier to set up.

Philips featured the production model of the LDK-14 camera which was introduced at the 1978 NAB as a prototype. The LDK-14 was shown this year with the prototype versions of the 2/3-inch versions of the diode-gun tubes, although a delivery date for the camera with diode-gun tubes has not yet been set. Other cameras used in the presentations at the exhibit included the LDK-25 (equipped with the new 73XQ 1-inch diode-gun tubes), the LDK-5 and the LDK-15. □

NAB/Dallas '79 replay: CAMERAS

For more information, circle the boldfaced number on the reader service card.

AMPEX

BCC-10, Studio, (99)
BCC-14, EPF/ENG, (100)

ASACA

ACC-2000, EPF/ENG, (101)

BOSCH-FERNSEH

KCP-60, Studio/EPF, (102)
KCKR, EPF, (103)
KCA, EPF/ENG, (104)
TCX, Industry, (105)
TXK, Studio, (106)

CAMERA MART

showing Hitachi, (107)
showing Ikegami, (108)
showing Sharp, (109)
showing Sony, (110)

CINEMA PRODUCTS

MNC-71CP, ENG/EPF*
MNC-710CP, Studio/EPF*

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CEI-310, Studio/ENG/EPF, (112)

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HARRIS

TC-80A, Studio, (113)
TC-50, Studio, (114)

HITACHI

Full line, (98)

IKEGAMI

HL-53, EPF, (115)
HL-78B, ENG, (116)
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showing NEC MNC-71P, (149)

NAB/Dallas '79 replay:

VIDEO PRODUCTION SWITCHERS

By John Williszowski, BE video editor

For more information on the video production switchers exhibited and described here, turn to the listing at the end of this article. There, locate the appropriate number to circle on the reader service card in this issue.



The MCI/Quantel DPE-5000 digital production effects system provided a dazzling display of video effects. (C. Cave)



The Central Dynamics' CD-408 video production switcher with Quantel digital effects was a star attraction at NAB. A dancer performed live inside the CDL studio while the operator performed his magic with the CDL system and displayed different outputs on overhead monitors. (C. Cave)



The O'Connor Engineering Laboratories booth was a popular place to pick up information on camera support equipment. (C. Cave)

American Data

American Data introduced three production switchers at NAB/Dallas: 558-6, 558-5 and 2114.

The 558-6 is designed for a variety of studio and remote production applications. The 558-6 and the 558-5 are the newest in their line of switchers featuring 4-channel video processing. The 558-6 is the 6-bus version which features 16 clamped inputs and quad entry (composite bridging, synchronous or non-synchronous) and two 4-channel video processors. Each of the video processors includes a 100-pattern wipe generator, variable softness and borders, pattern preset, positioner, modulator color matte generator, key blink and key invert.

The model 558-5 is the 4-bus

version of the 558-6. It also features two 4-channel processors and includes a 3 x 1 program output switcher and a 5 x 1 preview output switcher.

The model 2114 is designed for compact studio, remote and post-production facilities. Eight composite bridging inputs are provided on four buses. The effects and mix outputs also appear as reentries on the program bus. The 2114 special effects generator provides 12 wipe patterns with full range softness control. The effects system also incorporates a luminance keyer with horizontal/vertical wipe key control.

Duca-Richardson

Duca-Richardson, now a subsidiary of Ampex, showed their 4000 Series of production switchers. Included in their product line are 10 standard systems with expansion potential to meet future needs.

The largest of the line, the 4000 Series model H-1, features 24 inputs with eight output buses and three function modules (the rough equivalent of a mix/effects amplifier). The smallest standard switcher, the model E-2, features 12 inputs, four output buses and a single function module.

Updates on the line included interface capabilities for digital effects units manufactured by MCI/Quantel and Vital in addition to facilities for utilizing the switchers with computer controlled editing systems.

Asaca

Asaca, a company best known for its camera line, revealed the first of a line of production switchers, the model ASW-100. The unit is a 4-input switching console with built-in downstream keyer and an internal sync generator that can be



The ASW-100 portable video switcher was demonstrated in the Asaca booth. (C. Cave)



Crosspoint Latch video production switchers were a high point for many at NAB. (C. Cave)

Production switchers

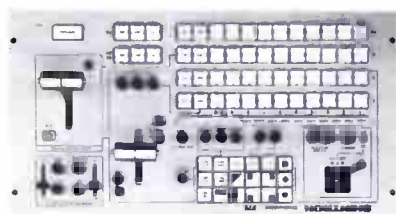
genlocked to an external timing source such as house sync or sync provided by any one of the four inputs. Two unique features are the inclusion of the electronics permitting automatic phase control and



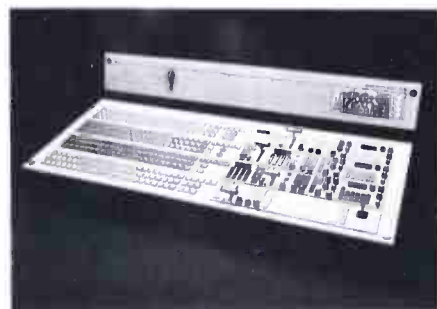
Bill Rhodes, BE editorial director (right), gets a rundown on important features of Vital switchers and video special effects systems. (C. Cave)



Steve Asposto (right) demonstrates the 3M Mincom 3300 production switcher. (C. Cave)



Shintron 375



Grass Valley 300 series

the addition of camera control units on the switching console.

Central Dynamics

Continuing with the philosophy of modularity and building—block design, Central Dynamics introduced its newest switcher, the model 6, based on the design of the model 5. It offers the identical features of the model 5 with the addition of a second primary bus (bus A) feeding the master mix/cue system. This second primary bus allows a greater number of sequences to be performed. The model 6, according to a company spokesman, is designed for a small post-production or station studio. It can be equipped with the entire line of CDL options, including quad, extended effects and dual key border.

Crosspoint Latch

Crosspoint Latch revealed two additions to its product line: the model 6020 video dissolve unit and the model 6112 video switcher. The model 6020 is a switcher-type unit which will permit dissolves between two video sources. It is equipped with auto dissolve and a built-in sync generator with two complete sets of drives. The model 6112 is a full-fledged 4-bus production switcher featuring two independent mix effects systems (complete with pattern selectors) downstream keyer, modulator, colorizer and intercom.

Grass Valley

The all-new 300 series production switcher was Grass Valley's entry at the convention. The 300 is designed for a no bar production service. According to a company spokesman, Grass Valley will continue to manufacture the 1600 Series, but the 300 Series will replace it as the top of the Grass Valley line. Central to the design concept are no-compromise video performance, ease of operation, fully integrated digital video effects and interface flexibility.

Four input buses are provided to each mix/effects system, with two

separate input buses for video and title key sources. Each M/E can be entered into any other, in any order. Each contains a built-in Effects Memory (E-MEM) system as standard equipment. An optional expanded E-MEM also is available for communication with peripheral and to provide positional transition and effects dissolves.

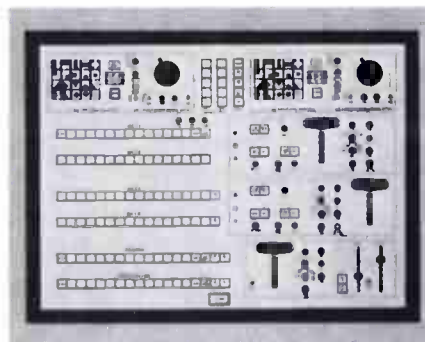
Shintron

Released for the first time was Shintron's model 375. Under development since 1974, the model 375 utilizes "SuperBus," a departure from conventional switcher design. While other switchers pass video signals through a series of cascading effects amplifiers to obtain desired effects, SuperBus achieves it all at once according to a company spokesman.

The switcher is a combination of a super group of cross points and effects amplifiers totally controlled by digital signal processing commands. Since this new method has practically no signal path length, there is no significant deterioration. Its differential gain and phase are near zero and delay is almost non-existent. The new switcher utilizing the SuperBus works and operates like a conventional switcher for studio personnel. The 12-input switcher includes all of the features found on conventional switchers: encoded chroma keyer, downstream keying, two sets of color background generators and numerous other effects.

Toshiba

Entering the American market for the first time in January, 1979, Toshiba brought with it a new contribution to the switcher line, the FPC-10. The FPC-10 is a portable audio-video production console offering all the necessary features for complete broadcast field production. The console includes a 3-input video switcher, a 4-input audio mixer, three monochrome monitors, a program color monitor and a waveform monitor. □



American Data 558-6



Toshiba FPC-10

NAB/Dallas '79 replay:

VIDEO PRODUCTION SWITCHERS

For more information, circle
the boldfaced number on the
reader service card.

AMERICAN DATA

558-5, (150)
558-6, (151)
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AMPEX

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VIX-114-4A, (179)
VIX-114-10, (180)
VIX-114-16, (181)
VIX-115-4/PSAS, (182)

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NAB/Dallas '79 replay:

VIDEOTAPE EDITING

By Tom Werner, director of R&D, One Pass Video

For more information on the videotape editing equipment exhibited, turn to the listing at the end of this article. There, locate the appropriate number to circle on the reader service card in this issue.

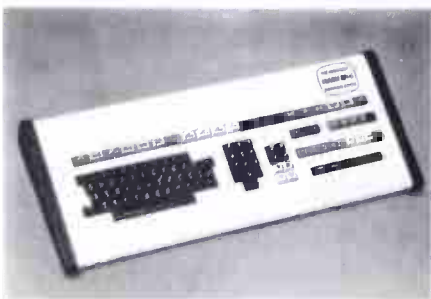
Videotape editing has gone through three revolutions. The first was the cue tone editor that allowed rehearsals and repeatability in terms of the edit point on the record VTR. The second revolution was address code; subsequently stan-



RCA's TR8600 videotape editing system is set up by two RCA employees. (C. Cave)



At the CMX booth, Bill Rhodes, BE editorial director (left), discusses features of the CMX videotape editors with John Peterson.



Mach One editing system.

dardized by the SMPTE, this allowed total repeatability and absolute frame accuracy. The final revolution, made possible in 1972 by the second, is off-line editing which permits artistic freedom without the enormous cost traditionally connected with videotape editing. Since then there have been refinements and cost reductions, but no breakthroughs comparable to the first three.

Presently-available videotape editors can be categorized by a number of common parameters. Table I shows a listing of such systems displayed at NAB/'79; these are generally considered as ENG systems. Table II categorizes larger, complex systems displayed at the convention; here some universal features (such as SMPTE time code, computer control, use of three or more VTRs) are not listed.

What was new?

What was new at the NAB? Very small improvements compared to other years. CMX showed its GISMO which offers tactile control primarily for the new 1-inch continuous field formats. They also showed PALETTE which removes many of the computer-to-operator dialogues

by providing a separate key for each function.

Mach One showed a user changeable arithmetic conversion program. This allows editing in foreign standards and in the film/video 24 frame/s standard. This option probably will be of use only in the major market video service.

An entirely new system was shown by appointment only via a white limousine. This was a Sonn-Roy SRS-1. They claimed extreme simplicity of operation, and all of the usual features.

Datatron showed their new 2000 series editor in production form, whereas at NAB/'78 it was a prototype. It has a striking color CRT display and impressive features, particularly in switcher handling. It will be interesting to see what industry acceptance it will generate.

CVS Epic also had a production system operating (last year static electricity had wiped out a huge number of ICs). The Epic has made strides in NTSC color frame problems and does interesting SMPTE code processing. Reel numbers, for instance, can come directly from the user words imbedded in the SMPTE code.

Convergence also had their system in production form this year. The ECS 103 is a full blown computer editor based around their tactile controller (super stick).

In the small system area, a new arrival is the Z-6B. Built by Videomedia, it looks much like a full-blown computer editor; in fact, they say that within a year it will have all the attributes of one. The unique element is micro-lock or non-SMPTE indexing of the tape. It is a modification of the 3/4-inch control track and was described as "like a picket fence with every one hundredth picket painted red." It certainly did have excellent repeatability and frame accuracy. The Videomedia representative did say

**A detailed paper by Werner on features and parameters of videotape editors will appear in BE's August issue.*



Videomedia featured its Z-6B videotape editor that drew exceptional interest at NAB. (C. Cave)

that a 1-inch version of the system would use SMPTE code.

What's ahead?

Where is the future? There are some as yet unaddressed problems in the post-production area which editing controllers could solve, including color correction or control of one or more color corrector devices. Changeable corrections should be stored in the edit list and linked to edits. Color framing is another unsolved problem. Actually, any frame cannot be edited to any other frame; the NTSC color frame sequence must be preserved. Although a one frame adjustment is usually workable with video, audio needs finer control. Thus, the VTR audio editor should have field rate (60 Hz) resolution and be independently controlled from the color frame rate (15 Hz) video editor.

Finally, switcher control is still poor. With post-production frame repositioning and fully controllable switchers, graphics should now be fully replicated in automatic assemblies from off-line edits. Split screens and mixes should also be off-lined and auto-assembled. Experience has indicated that producers and directors still don't trust automatic assemblies in video, and the temptation to re-edit a production again during auto assembly is great.

NAB/Dallas '79 replay:

VIDEOTAPE EDITING

For more information, circle the boldfaced number on the reader service card.

AMPEX (219)

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SERVO (228)

SONN-ROY (229)

VIDEOMEDIA (230)

TABLE I. Features of videotape editors at NAB / Dallas '79

Feature System	Type VTR	Changeable software	Tape indexing methods	Max. number of VTRs	Tactile control
DATATRON TEMPO-76	3/4" 1" 2"	no	SMPTE / pulse count	3	slider (Varascan)
DYNASCIENCES	3/4" 1"	no	pulse count	4	knob
VIDEOMEDIA Z-6	3/4"	yes	modified pulse count	3	lever
AMPEX RES-1	quad 1"	no	SMPTE code	4	key
CONVERGENCE	3/4"	no	pulse count	2	joystick
BOSCH EES-9	SMPTE B 1"	no	tape timer / SMPTE	2	key
JVC	3/4"	no	pulse count	2	key
PANASONIC	3/4"	no	pulse count	2	key
SERVO 712	3/4"	no	SMPTE code	2	lever
SONY BVE-500	3/4"	no	pulse count	2	knob

TABLE II. Features of videotape editors at NAB / Dallas '79

Feature System	3/4-inch VTR	1-inch VTR	2-inch Quad	Audio recorder	Switcher	Type of CPU	Auto assembly	Active list	Tactile control
CMX 340X	yes	yes	yes	yes	yes	distributed PDP-11 pace	yes 2 modes	no	yes
CVS EPIC	yes	yes	yes	yes	yes	NOVA	yes	yes	yes
MACH ONE	yes	yes	yes	yes	yes	LSI-II	yes 2 modes	yes	yes
AMPEX EDM-1	no	yes	yes	yes	yes	distributed PSP-11/ 6800	yes	no	no
SONN-ROY SRS-1	no	yes	yes	no	yes	280	yes	no	no
DATATRON 2000	yes	yes	yes	yes	yes	distributed NOVA 6800	yes	no	yes
DATATRON TEMPO-7650	yes	yes	yes	yes	yes	distributed NOVA 6800	no	no	yes
CONVERGENCE ECS-103	yes	no	no	no	yes	6800	no	no	yes
RCA AE-600	no	no	yes	no	no	na	no	no	no

NAB/Dallas '79 replay:

EXHIBITOR EQUIPMENT & SERVICES

The exhibitor information here is for products and services not covered in the special articles appearing elsewhere in this issue. Use the reader service card to obtain detailed data on the products that interest you.

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1/4" duplicating system (290)

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Digital still store processor (291)
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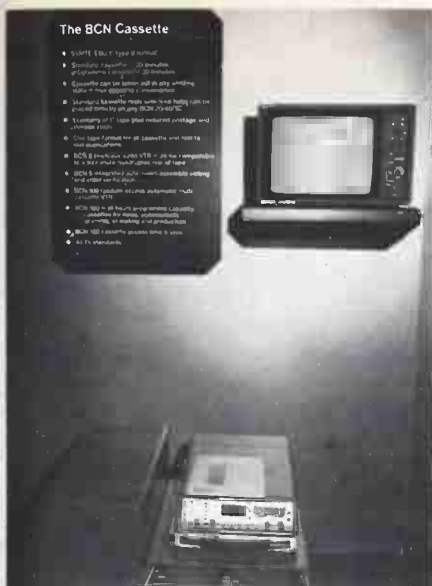
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Bosch-Fernseh displayed its BCN (Type B) 1-inch videocassette recorders at NAB. (C. Cave)



Lenco modular monitors were a popular attraction at NAB/Dallas '79. (C. Cave)



At the Microtime booth, time base correctors, synchronizers and video signal processors were items of top interest to NAB visitors. (C. Cave)



The model 9048 videographics display system gave a welcome to all NAB attendees visiting the Dynasciences booth. (C. Cave)



Wayne Graham, Tentel, demonstrates their unique tape tension gauge for in-line measurements on audio and video recorders. (C. Cave)



Oktel displayed its BDR 400 broadcast videodisc recorder series for slow motion and slide file presentations that meet NTSC, PAL and SECAM color standards. (C. Cave)



John Starosky, Chyron Telesystems (left), shows the new Chyron IV character generator to a packed booth. (C. Cave)



The UltiMatte video compositing system is reported to solve all problems inherent to other blue screen compositing systems. Its inventor, Petros Vlahos, received the Class I Oscar in 1964 for the Conception and Perfection of Techniques for Color Traveling Matte Composite Cinematography. The system received an Emmy award in 1978 for outstanding achievement in engineering development.

The UltiMatte is expected to have extensive applications in TV production and post production. Some of its features include no loss of fine detail; exceptional blue control; no blue flare; tint; or edging on foreground subjects and no matte lines when camera fields are aligned.

Because of its reception at NAB among broadcasters, Paul Vlahos, vice president of Vlahos-Gottschalk Research Corporation, indicates that they have reassessed their marketing program for UltiMatte and the industry should see a lot of this product in the future.

For further details, circle (1001).



NEC put on a spectacular demonstration of video strobe action effects with its digital strobe action system. (C. Cave)

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EEO

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EEV

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ESE

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OKTEL

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McMartin displayed its model SDR-1 demodulator and SMR-1 modulator along with receivers, amplifiers and signal distribution systems for avid NAB visitors. (C. Cave)



Nurad displayed an array of antenna systems for microwave communications. (C. Cave)



Knox Video Products introduced their 600 full color character generator. (C. Cave)



Bird Electronics, with its line of quality instruments for RF power measurements was very much in evidence at NAB. (C. Cave)



Robert Blair, Automated Processes (left), shows their new Intercom system and audio amplifier to an interested customer. (C. Cave)



Backstage at the Sony booth, five BVH-1000 VTRs, completely in sync, fed five video projectors as part of their spectacular stage show. (C. Cave)



Robert Davis, Broadcast Electronics, demonstrates their studio cart machines, audio consoles and automation controls in their NAB booth. (C. Cave)

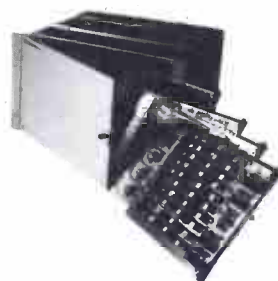


John Lowry, Digital Video Systems (left), explains his DPS-1 modular digital processor with time base corrector and frame store to a customer deep in thought. (C. Cave)



Michael Dyer, Video Associates Labs (right), discusses features of the Pro-Pak 1 modification equipment for 3/4-inch VCRs with a potential customer. (C. Cave)

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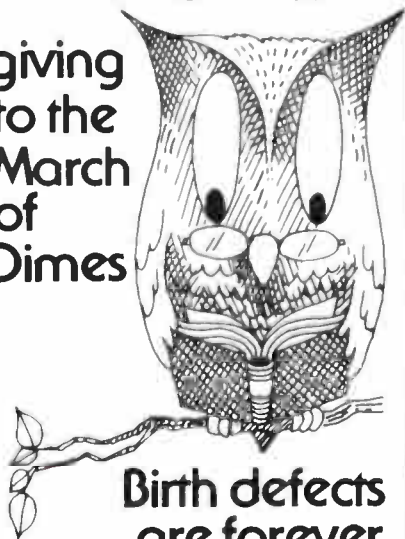
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Equipment & services



The ENG Corporation van at the highly attended Farinon Video booth was a combination display by both firms. (C. Cave)



In a special hospitality suite, Bosch Fernseh introduced some of its new products. One of these was the BCN 100 automatic multicassette VTR, which is an extension to the BCN VTR system. Rapid random access to 32 cassettes with up to 30 minutes playing time each and a choice of up to three tape decks is possible. The BCN 100 records, edits and plays its own cassettes or processes those previously recorded on the briefcase-sized BCN 5 cassette VTR.

For details, circle (1000) on the reader service card.



A. F. Associates is bringing back the well known 3M Mincom division dropout compensator and will be the exclusive distributor. (C. Cave)



At the BTX booth, the model 4600 SMPTE tape controller designed to control all manual recorder functions was demonstrated. (C. Cave)



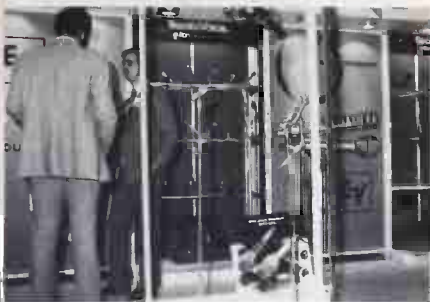
Asaca demonstrated the ShibaSoku model 1130 digital color camera registration meter. (C. Cave)



Video Aids of Colorado featured its model 4000 multi-phase meter and VIRS inserter, and model 5000 NTSC color gen-lock sync generator. (C. Cave)



Sound Technology featured its distortion measurement system plus audio generator and recorder testers in their booth at Dallas. (C. Cave)



Microphones were a hot topic with NAB visitors and this Electro-Voice booth was a popular shopping spot. (C. Cave)



Carl Cathcart (right) explains design features of JBL monitor speakers to a prospect at NAB. (C. Cave)



Before the show got underway, BE got this shot of the Datatek display of its routing switchers, transmitter color phase equalizers and distribution amplifiers. (C. Cave)



Philips' display of its PVR series broadcast video recorders and its tape synchronizers was popular with many visitors. (C. Cave)

SONY DIGITAL VTR

The Sony prototype digital VTR used a standard BVH tape transport system and a large rack of electronics processing circuitry. The waveform monitor and vectorscope patterns indicated an excellent signal quality.

Sony introduced its prototype

By Masahiko Morizono, managing director & chief of the video products group, Sony Corporation, Tokyo

For several years, Sony has been researching methods for recording video in a digital format and finds that a digital VTR could be developed in a size smaller than the 1-inch format.

We would like to emphasize, however, that this is a working process and our intent is to obtain users' opinions. We consider the

digital VTR at the NAB with little fanfare and publicity. At the Sony suite the night before the system was set up, there was no hint that this development would be unveiled. Sony's position on the digital VTR is expressed in the following.

format for digital VTR to be in the preliminary stages of development.

The final production of a digital VTR can only be justified when it has been developed with convenience and economy that is superior to current products. We consider the development of a digital VTR to be an effort of vital importance in the future. In order to fulfill the enormous potential of digital video, Sony will continue to produce prototype formats in close consultation with the broadcast community.

The recording format of the video signal for Sony's experimental digital VTR is as follows:

Sampling frequency	3 fsc (10.74 MHz)
Quantization	8 bit/sample
Track segmentation	2 parallel tracks, non-segmented
Channel coding	Block coding
Error protection	Correction & concealment
Writing speed	25.6 m/s
Rotational speed of head drum	60 rps
Tape speed	244 mm/s
Recording data rate	115 Mbit/s
S/N ratio	58 dB

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Equipment & services

OLESEN

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WANTED: TV studio engineer. First class license. Familiar with Quad-VTR and studio camera set-up. Call Chief Engineer (713) 985-5557.

5-79-21

AUDIO VISUAL TECHNICIAN: Audio Visual Technician with responsibilities for small format television operation (production and hard wire distribution), closed circuit radio, and general classroom audio visual equipment. F.C.C. First Class License and 2 year technical degree preferred but not required. Eleven month position, available immediately. Contact Personnel Department, Highland Community College, Pearl City Road, Freeport, IL 61302. An EEO/AA Employer.

6-79-11

MAINTENANCE ENGINEER—Videotape post production company in beautiful Pacific Northwest has immediate opening. Good pay and benefits. Contact Sterling at (206) 623-5934.

6-79-21

EDITOR for post production facility in beautiful Pacific Northwest. CMX experience on commercial productions required. Good pay. Contact Sterling Davis, (206) 623-5934.

6-79-21

HELP WANTED (CONT.)

Sales Engineer for Latin America

Aggressive, International firm seeks Spanish speaking Sales Engineer with knowledge of AM/FM Transmitters and Studio Equipment. 25% travel. Long Island based. Send resume and salary history. Dept. 456, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212.

6-79-11

TELEVISION HELP WANTED—IMMEDIATE OPENINGS. Experienced in maintenance of professional closed circuit systems for N.Y. company. Looking for persons with supervisory potential. Many benefits including paid medical and pension plan. Send resume to Technical Operations, P.O. Box 268, New Hyde Park, N.Y. 11040, or call Personnel Mgr., (516) 352-2238.

5-79-11n

VOICE OF AMERICA HAS OPPORTUNITIES FOR U.S. CITIZENS qualified as Civil, Electronic, Mechanical and Electrical Engineers. Supervisory openings available in Liberia and Philippines for broadcast station construction projects. BS in Engineering or equivalent experience in construction and contract supervision required. Must be available on a world-wide basis. Starting salary commensurate with skills and experience plus housing and overseas allowances. Civil Service Application (Form SF-171) available at Office of Personnel Management (formerly the Civil Service Commission) Job Information Centers and most federal buildings should be sent to International Communication Agency, Code 15-79, Washington, D.C. 20547. An Equal Opportunity Employer.

4-79-31

RADIO COMMUNICATIONS ENGINEER—To act as assistant to the Chief Engineer or 24kw FM. Technical maintenance of both studio and transmitter equipment is essential. First class license and willingness to accept 24-hour call is also required. Construction and remote broadcast experiences are also desirable. Send resume to General Manager, WHUR-FM, 2600 4th Street, N.W., Washington, D.C. 20059.

6-79-21

EL PASO'S FASTEST GROWING RADIO STATION needs a young or not so young aggressive broadcaster to be Chief Engineer. Are you looking for a group of professional broadcasters to work with? Do you know FM, STL, digital logic and high quality audio? Do you love sun and fun? Then drop me a line at KPAS/FM-94, Engineer, 3901 North Mesa, El Paso, Texas 79902, or call (915) 533-8211.

6-79-11

BROADCAST ENGINEER (CHIEF) for dynamic University Communications Dept. Perform maintenance, repairs, design & installation of video & film production facility. 1st Class FCC license, 3 yrs. experience, professional training. Send resumes only to Leonard Price, Communications Dept., Adelphi University, Garden City, NY 11530/Affirmative Action/Equal Opportunity Employer.

6-79-11

NORTHERN VIRGINIA PUBLIC TV has opening for 1st licensed TV engineer with solid electronics background to perform maintenance duties on studio gear. Experience preferred, but not essential. Also opening for Production Engineer. Resume and salary requirements specified first letter. Chief Engineer, WNVN, 8325 Little River Tpke, Annandale, VA 22003.

5-79-21

ELECTRONICS ENGINEER: National Public Radio seeks an individual with experience in servicing audio equipment, tape recorders, receivers, turntables, amplifiers, etc. Excellent company benefits and salary. Interested persons should submit resume including salary history/requirements to: DeNise Johnson, NPR, 2025 M St., NW, Washington, D.C. 20036. AA/EOE.

6-79-11

HELP WANTED (CONT.)

LICENSED TV MAINTENANCE ENGINEER: Must have broadcast experience, solid digital and analog background, and the ability to work and get along well with others in a production environment. RF experience helpful; must have solid knowledge of electronics theory. Degree helpful. Write Dept. 455, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212. 6-79-11

TRANSMITTER OPERATORS: Arkansas ETV Network, 350 S. Donaghey, Conway, AR 72032. Starting Salary Range, \$8,710-10,192.

5-79-21

ENGINEERING TECHNICIAN for major market production facility. Ultimately responsible for maintenance and operation of all TV studio equipment. Graduation from technical school and some work experience in electronics required. TV experience helpful, but will train the right person. Send resume to: Craig E. Blohm, Production Supervisor, CRC-TV, 6555 West College Drive, Palos Heights, IL 60463.

5-79-31

MOBILE UNIT ENGINEER. Expanding commercial TV production house needs videotape truck engineer for single-camera remote truck who is production and client oriented with can-do attitude. Prior operational and component-level repair experience with TR-600-A and TKP-45 desirable. Must have valid drivers license. Resume and salary history to Oliver Peters, Manager of Production Services, Ted Johnson Productions, Inc., 150 Riverside Avenue, Jacksonville, Florida 32202. No phone calls please.

6-79-11

2 POSITIONS. Technical sales for branch of large video systems organization. Positions located in D.C. area. Persons applying should have strong hands-on technical experience in cable or television and be sales oriented. Draw plus commission. Excellent earning opportunity. An Equal Opportunity Employer. Reply to: Dept. 458, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212.

6-79-11

ENGINEERING SUPERVISOR for PTV-UHF station. New facilities. Minimum 5 years engineering and 1 year supervisory experience required. First Class License required with expertise in all phases of TV engineering equipment. Salary commensurate with experience. Attractive benefits package. Send resume to Personnel Dept., WXXI-TV, P.O. Box 21, Rochester, New York 14601. EOE.

6-79-11

PORTLAND, OREGON—IMMEDIATE OPENING: Broadcast Maintenance Engineer, four years or associated degree in electronics technology or equivalent experience or military training. Knowledge digital/solid state logic. Television background/long-term interest electronics helpful. Require 1st phone. Contact Personnel, KPTV, Box 3401, Portland 97208. (503) 222-9921. EOE. Women/Minorities encouraged.

6-79-11

TELEVISION BROADCAST TECHNICIAN: Baltimore television station has an opening for a technician. Must have FCC 1st class license and technical school education. Send resume to: Chief Engineer, WMAR-TV, 6400 York Road, Baltimore, Maryland 21212. E.O.E. M/F.

5-79-21

TELEVISION ENGINEERS: CHIEF ENGINEER position now available for Southern Calif. Network Affiliate Station. Good hands-on knowledge of studio equipment operations, maintenance capabilities, and FCC First Class License are necessary. Supervisory capabilities plus desire to "get involved" with entire operation is a real "plus". Excellent opportunity for a qualified engineer/technician on the way up. Also opening for Transmitter Engineer at remote location. FCC First Class License required. Will train. Call for appointment, Mon.-Fri., Mr. Campbell (714) 352-9670. Equal Opportunity Employer. M/F.

6-79-11

TV MAINTENANCE ENGINEER: We have several openings in our growing organization. If you have a good technical background but are short experience, or are experienced in television maintenance...VTR's, (Quad, 3/4"), transmitters, ENG equipment, and general studio work, we would like to talk to you! Salary open and a good benefit package available to the right people. Send resume in complete confidence to Dept. 457, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212.

6-79-11

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fact: this condenser microphone sets a new standard of technical excellence. & it sounds superb!

The Shure SM81 cardioid condenser is a new breed of microphone. It is a truly high-performance studio instrument exceptionally well-suited to the critical requirements of professional recording, broadcast, motion picture recording, and highest quality sound reinforcement — and, in addition, is highly reliable for field use.

Shure engineers sought — and found — ingenious new solutions to common

problems which, up to now, have restricted the use of condenser microphones. Years of operational tests were conducted in an exceptionally broad range of studio applications and under a wide variety of field conditions.

As the following specifications indicate, the new SM81 offers unprecedented performance capability — making it a new standard in high quality professional condenser microphones.



SM81 puts it all together!

- WIDE RANGE, 20 Hz to 20 kHz FLAT FREQUENCY RESPONSE.
- PRECISE CARDIOID polar pattern, uniform with frequency and symmetrical about axis, to provide maximum rejection and minimum coloration of off-axis sounds.
- EXCEPTIONALLY LOW (16 dBA) NOISE LEVEL.
- 120 dB DYNAMIC RANGE.
- ULTRA-LOW DISTORTION (right up to the clipping point!) over the entire audio spectrum for a wide range of load impedances. MAXIMUM SPL BEFORE CLIPPING: 135 dB; 145 dB with attenuator.
- WIDE RANGE SIMPLEX POWERING includes DIN 45 596 voltages of 12 and 48 Vdc.
- EXTREMELY LOW RF SUSCEPTIBILITY.
- SELECTABLE LOW FREQUENCY RESPONSE: Flat, 6 or 18 dB/octave rolloff.
- 10 dB CAPACITIVE ATTENUATOR accessible without disassembly and lockable.

Outstanding Ruggedness

Conventional condenser microphones have gained the reputation of being high quality, but often at the expense of mechanical and environmental ruggedness. This no longer need be the case. The SM81 transducer and electronics housing is of heavy-wall steel construction, and all internal components are rigidly supported. (Production line SM81's must be capable of withstanding at least six random drops from six feet onto a hardwood floor without significant performance degradation or structural damage.) It is reliable over a temperature range of -20° F to 165° F at relative humidities of 0 to 95%!

Send for a complete brochure on this remarkable new condenser microphone! (AL577)

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