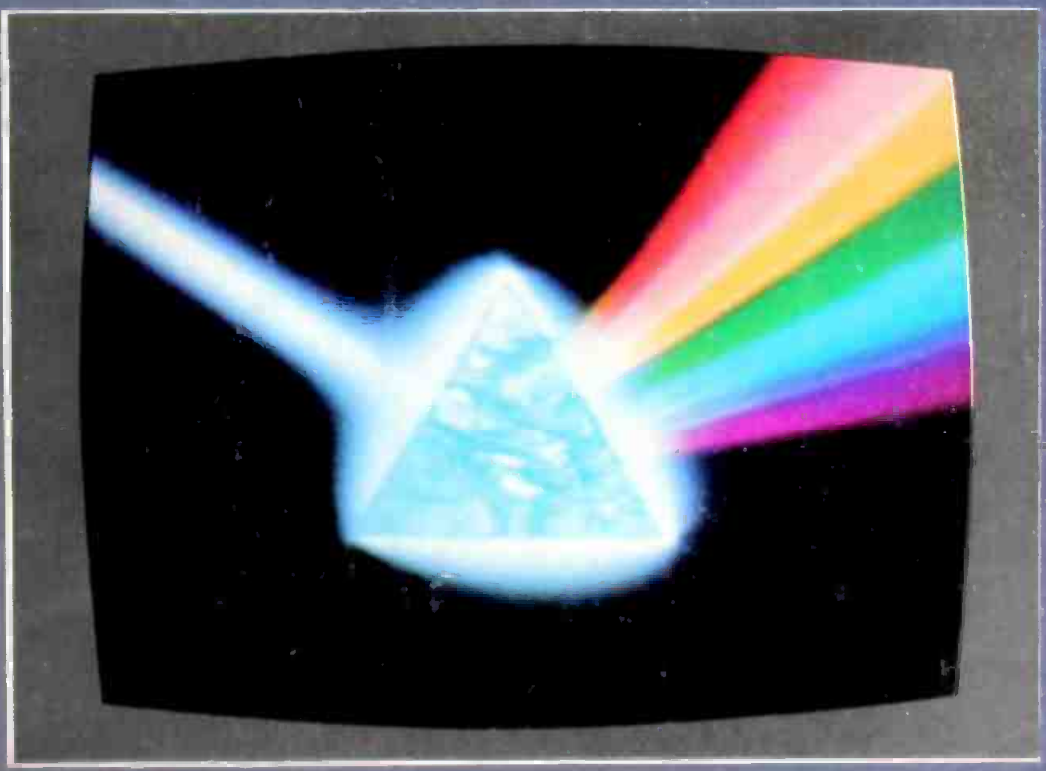
BROADCAST engineering

October, 1978/$2.00

CREATING COMPUTER IMAGES



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Ward-Beck introduces affordable quality!

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The standard model L3242 includes such outstanding features as full equalization, individual peak indicators on each input channel, HL line selectors, integral jackfield and redundant power supply changeover. In addition, expanded flexibility is achieved through an impressive selection of optional ancillary modules.

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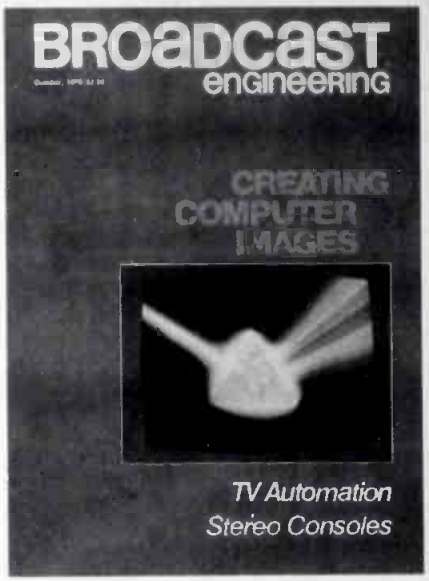
BROADCAST engineering

The journal of the broadcast-communications industry

October, 1978 ☐ Volume 20 ☐ No. 10



The cover picture for this issue was provided by Dolphin Productions in New York through the courtesy of its sponsor, Johnson & Johnson. It is excerpted from a 10-minute computer animated segment of videotape to be integrated into a film for J&J employees to be shown in many J&J facilities around the country.

The animation sequences were produced and directed for the J&J presentation by Daniel J. Coughlin, a free-lance producer, and written by Marston Meyers, consultant for J&J.

The cover story is continued on page 74 in an article on creating images, including animations, with the use of complex computers.

Next Month
Our major article will be devoted to advances in radio automation and will include materials gleaned at the NRBA convention in San Francisco last month.

In December
We will look into the crystal ball for what is ahead in various areas of broadcast technology, plus review AM stereo.

Special note
On page 10 we have introduced the staff that produces **Broadcast Engineering**. Please feel free to contact any of us regarding material being published in the magazine.

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BROADCAST engineering

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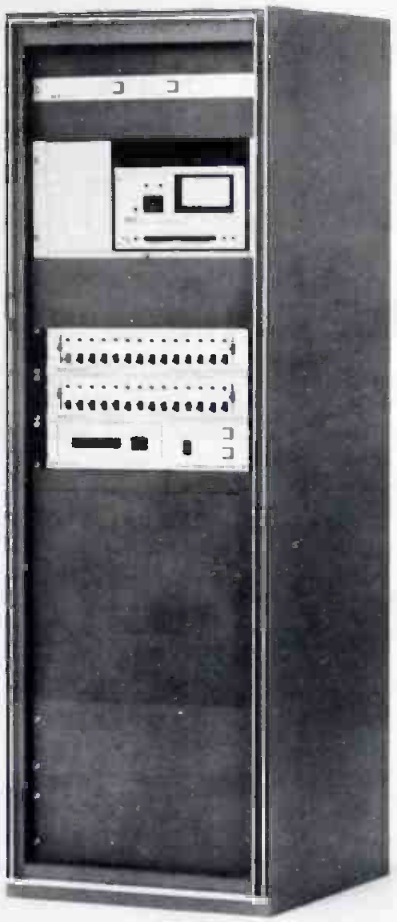

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THE MODEL 7614 SYSTEM is equipped with 14 front panel toggle switches for ON/OFF control functions, at both control and remote sites and displays command status at-a-glance via LEDs for each channel. Verification of command execution is almost instantaneous. A special digital technique of "double-scan/compare" logic virtually eliminates the possibility of error.

THE MODEL 714 MULTIPLEXER FILTER is a special option that allows operation of the 7614 over the same telephone line with many existing analog type remote control systems, saving on both telephone bills and extra installation costs.

PRODUCT ADAPTATIONS including the Model X-14A Antenna Controller make the TFT Model 7614 as diverse as the modern requirements of broadcast control.

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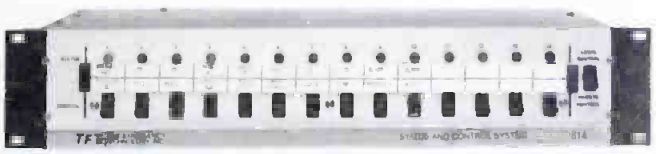

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October, 1978/By Howard T. Head and Harold L. Kassens

AM stereo - step by step

The commission has proposed the adoption of technical standards governing AM stereo broadcasting. In a Notice of Proposed Rule Making, the commission has invited comments on five proposed systems of AM stereo. Three of these systems were tested by NAMSRC (National AM Stereophonic Radio Committee) and two systems were proposed in addition to the committee activity.

The next step is the evaluation of the test data on the five systems. At issue are the quality of stereo broadcasts, channel separation and the costs involved in AM stereo transmitting and receiving equipment.

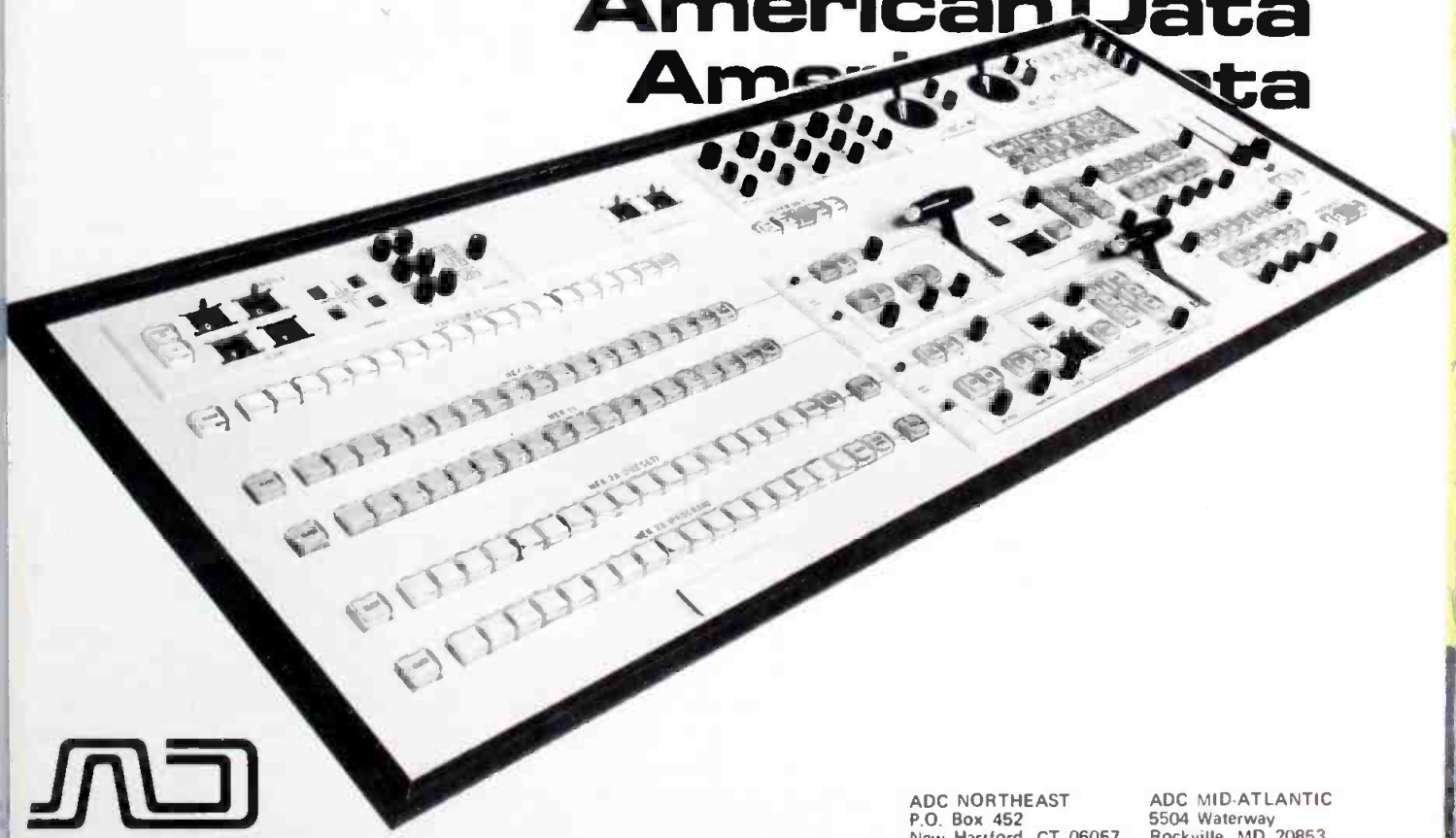
And in the FM band...

In the meantime, the commission continues to ponder the factors involved in the adoption of Standards for quadraphonic FM broadcasting. Without proposing the adoption of a specific FM quadraphonic system, the commission has asked for comments concerning the mutual impact of the various systems which have been proposed for FM quadraphonic broadcasting and a proposal under consideration for the reduction of FM broadcast channel separation from the present 200 kHz to 150 kHz.

This latter proposal has been studied by the commission's staff and appears to have considerable promise for permitting a significant expansion of FM broadcast channel assignments. The commission wishes to be sure, however, that adopting a reduced FM channel separation won't preclude FM quadraphonic or vice versa.

continued on page 8

American Data



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continued from page 6

"Low-Power" television stations proposed

The commission has instituted a study looking toward the eventual authorization of a class of "low-power" television broadcast stations. These would range somewhere between the present full-power television broadcast stations (which might employ as much as 5000 kW with a 2000-foot antenna height), and a simple VHF television translator, many of which still operate with only 1 Watt r.f. power into the transmitting antenna.

The commission believes that the availability of simpler, lower-cost studio origination equipment might make possible a highly localized program delivery to audiences in smaller towns and cities. There is no doubt that reducing video quality would permit the use of cheaper equipment but one of the principal unresolved problems is that of what can be put on these channels that very many people would want to watch.

Short circuits

The Rural Electrification Administration (REA) has authorized a "broadband" cable loan in the Midwest which may be the forerunner of rural CATV service...Land mobile operations in the southern California area are having trouble with the "ducting" propagation phenomena in that area...The commission is beginning the translation of its Rules and Regulations in the Spanish language...The commission has ordered Class D (10 Watt) non-commerical, educational FM stations either to increase power or to move out of the educational FM band (Channels 201-220) into the commerical band; or to newly-created Channel 200, actually 87.9 MHz inside television Channel 6...Ascertainment - next time you do it don't overlook deaf people or the Gays - Uncle Charlie says so.

Editor's Note:

At the National Radio Broadcasters Association convention in San Francisco last month the buzz of many conversations in the halls, in hospitality suites, on the exhibit floor, and in a Tuesday afternoon technical session, evolved around AM Stereo and the FCC's pending decisions. Harold Kassens, as Chairman of the National AM Stereophonic Radio Committee, moderated a session on the latesttin AM stereo developments. Continued coverage on AM stereo is tentatively scheduled for the December issue of Broadcast Engineering.

From now on your store or plant needs these three switches

Changes in distortion standards

Expect some new types of questions from your customers soon about distortion measurements.

Because you will find that the Institute of High Fidelity recently introduced a change in the type of measuring circuit to be used in distortion measurements on amplifiers.

For example, current IHF standards require an **rms-responding** meter circuit for measuring amplifier distortion, but an **average responding** meter for measuring receiver distortion.

What's more, when making total harmonic distortion measurements with either type of circuit, it can be important to know what the distortion **peaks** measure. Because peaks can be large even though rms or average values are small.

Your choice of three responses

So in the new Sound Tech 1701A Distortion Measurement System, we now give you **three metering circuit responses.**

You can measure with an **average, rms** or **peak** circuit. Just push the desired button.

Measure lower distortion, too

Sound Tech distortion analyzers have become the industry standards. When they were introduced four years ago, they gave nearly a 10-times improvement in distortion range and a 100-times increase in ease of use.

Now our new 1701A improves the distortion range even more — to .001% from 10 Hz to 10 kHz. Overall distortion measuring capability continues superior over the full 10 Hz to 110 kHz range.

There's lots more features, too, including our automatic set level and intermodulation distortion options, balanced input circuit for measuring bridged amplifiers, and lower distortion tracked signal source.

Demos and clinics

The 1701A is just what's needed to demo receivers, amplifiers, and other audio equipment to your customers.

For clinics, too.

It will give your store the prestige of technical leadership in your area.

And in receiver/tuner production, it's the only such instrument that will give the various types of distortion information you need.

Call for data

Be prepared for customer questions. Get the details now on the 1701A by calling Mike Hogue or Larry Maguire. Or send in the coupon. Now.

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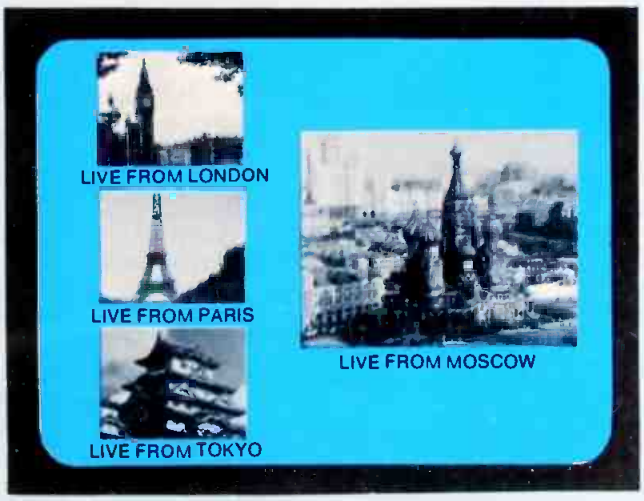

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FRAME SYNCHRONIZER
Locks all remote signals to house sync. Network, ENG, Remote pick-ups, and satellite signals will mix with local signals with no disturbance.

Sampling video at 4 times subcarrier for superior technical standard and picture quality.

TIME BASE CORRECTOR
Will "NTSC" COLOR and sync of low cost VTR's.

FRAME FREEZER
Will act like having another camera in the studio for still shots. Will freeze any full frame picture. Will retain last frame of interrupted incoming signal automatically until picture is restored.

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No matter how a slide or scene comes in, you can compress and/or change its aspect ratio as you wish, down to one picture element, and position it anywhere on the screen.

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See or read information not possible without zoom.

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industry news

Computer system monitors and evaluates remote transmitter signals

A computer-controlled system for the remote monitoring of transmitters was developed by the Belgian broadcasting corporation, BRT, with assistance from the Munich electronics company Rohde & Schwarz.

The signals from the four FM radio broadcasting and eight television transmitting stations of the Flemish part of the country are to be constantly checked for the quality of the picture and sound. They will be received over antennas at a center in Brussels and measured with R&S instruments. The measured signals will then be evaluated by a computer system of the Belgian electronics company M.B.L.E.

SMPTE/PMPEA study lighting standardization

SMPTE and PMPEA are now forming a special committee to investigate the standardization of motion picture and television lighting equipment accessories.

The committee will consist of manufacturers and users for this type of equipment.

The committee will examine the compatability of lighting fixtures with respect to mounting hardware as well as lighting diffusion densities and diameters.

Awarded TV Emmy

The National Academy of Television Arts and Sciences has awarded a TV Emmy to CBS and Thomson-CSF for the development of an electronic device that reduces noise in television pictures.

The electronic device, known as a digital noise reducer (DNR), makes it possible to eliminate picture noise during the transmission of television images to home TV sets.

Communications act

Three members of the National Association of Broadcasters' board of directors attacked the spectrum use fee proposal of the Communications Act of 1978 in testimony before the House communications subcommittee.

Donald A. Thurston, president of Berkshire Broadcasting, termed the use fee a tax and said he opposes it. Thomas E. Bolger and Walter E. May also expressed opposition to the spectrum use fee and said they too are concerned about future increases.

FCC chairman Charles E. Ferris supports the deregulatory thrust of the subcommittee's current re-evaluation of broadcasting and cable regulation under the Communications Act of 1934. He suggested that Congress express the ultimate goal

continued on page 14

So much for so little

Model 9048 Video Graphics System

THE PANIC BUTTON: The Panic Button is an instruction file for system operation which will take the place of a conventional operator's manual. The program contains a complete set of operating instructions.

ZOOM FEATURE: The Zoom Feature permits a continuous increase or decrease in character size at a rate selected by the operator. Character size (17 lines lower case, 28 lines upper case) can be varied ±50% without loss of character resolution.

DIAGNOSTIC PROGRAM: This program is provided on a separate disc and is capable of detecting and isolating system faults to a particular memory address level.

FONT SELECTION: Three upper and lower case fonts are provided as standard. Styles are News Gothic Bold, Times Roman Bold and Helvetica Bold. Fonts can be intermixed on a page-by-page basis.

PREVIEW MONITOR: The Model 9048 is a two-piece unit consisting of a rack-mountable electronics package and a keyboord enclosure containing a 9-inch, black-and-white preview monitor.

EDIT FORMAT: The Model 9048 reminds you in plain English what font, edge style, character and background color you were using for your program or any preview pages.

HIGHLIGHTS: Try automatic centering, roll, crowl, flash, and pause.

MEMORY: State-of-the-art floppy disc storage gives you a 128-page memory with the capability of expansion to over 500 pages if the zoom option is not selected. All this allows all memory to be retained after system shutdown – or power failure.

Meet the Model 9048 along with Dynasciences' other video products in October at Video Expo in New York.

DYNASCIENCES

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A Unit of Whittaker Corporation
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Blue Bell, Pennsylvania 19422
215/643-0250 Telex 846358

Whittaker

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continued from page 12

of deregulation and then set certain specific preconditions for achieving that goal.

FCC releases UHF report

The FCC office of plans and policy has released a report by the UHF task force reviewing several techniques for reducing television bandwidth. The report states that there may be large advantages in reducing television bandwidth and thereby saving spectrum, but that there also would be large costs, due to the need to replace the millions of existing television receivers with new receivers which would probably be higher priced.

Several digital techniques are also evaluated, but analog techniques were found to be more efficient than digital in reducing bandwidth while maintaining picture quality.

New American Satellite earth stations approved

The FCC has granted the American Satellite Corporation approval for the installation and operation of transmit-receive earth stations with 5-meter diameter antennas.

In approving American Satellite's application for the installation of the two small earth stations the FCC observed that similar American Satellite antennas on the U.S. continent will be routinely processed.

FCC adopts a primer on political broadcasting

The FCC has adopted an updated and simplified primer on political broadcasting and cablecasting.

The new primer differs from previous editions in the following ways:

The 1978 primer combines in one document interpretations of the law on rates that may be charged candidates for broadcast time, the Fairness Doctrine as applied to political campaigns, the political editorializing and personal attack rules, and rules on sponsorship in identification, maintaining a public "political file" and logging political broadcasts. In addition, it provides references to the Federal Election Campaign Act to distinguish its requirements from those of the Communications Act.

Information is given on how to file a complaint and where to send and telephone complaints and inquiries on broadcast and cablecast issues.

A simplified, general explanation of the political broadcasting law in layman's language is provided for those seeking only an overall explanation without citation of statutes, rules or cases.

Rather than including case citations in the text, they now are noted in the margins of the part of the primer which gives a detailed explanation of the laws, rules and policies regarding political broadcasts and cablecasts. □

Meet an editor who gets the most out of our new 1" equipment.

Who is he?

Any editor seated in front of a Sony Broadcast BVE-500A Automatic Editing Control Unit.

It's true that our BVH-1000 1" Video Recorder has a handful of very remarkable editing capabilities. That's the big creative advantage of the 1" format. Video editing with a true "film" feeling.

But an editor may have his hands full putting those capabilities to work. Unless, of course, he works with an editing console built to fulfill the creative potential built into our BVH-1000.

And that's the Sony Broadcast BVE-500A.

Now wait a minute, you say. Isn't the BVE-500A primarily intended for U-matic editing?

Not at all.

When we designed the BVE-500A, we gave it specific features to make both 1" and U-matic editing faster, easier, and far more accurate. Then we created a unique Editing Interface Adaptor. The IF-1000. Which opens our BVH-1000 to all our BVE-500A advantages.

So the BVE-500A allows automatic control track editing between two BVH-1000 1" recorders. Between two BVU-200A U-matic recorders. Even between a BVH-1000 and a BVU-200A, side by side. It's like having two editing systems for the price of one.

(And a very attractive price it is.)

The BVE-500A performs assemble edits. Edit inserts. Edit preview. And edit review, all automatically.

Each edit point can be shifted by adding or subtracting individual frames.

But here's the best part.

Like our BVH-1000, our BVE-500A has BIDIREX: two self-return search dials that take the place of ordinary pushbutton search controls. With BIDIREX, an editor can search quickly or slowly, in both forward and reverse, without taking his eyes off the monitors. That's the moviola-type editing video editors have been waiting for.

And the BVE-500A also incorporates a new decision-prompting system, with indicator lamps that flash until edit commands are made. Even in a busy newsroom, with many interruptions, an editor can still tell at a glance the status of his last instruction.

One last instruction. Write Sony Broadcast, 9 West 57th Street, New York, N.Y. 10019. Or call us direct. In New York, at (212) 371-5800. In Chicago, at (312) 792-3600. Or in Los Angeles, at (213) 537-4300.

And introduce yourself to more information about the BVE-500A.

It's one professional editor your professional editors will all be very anxious to meet.

SONY BROADCAST

Sony, U-matic, and BIDIREX are registered trademarks of Sony Corp.

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WLAC fined $10,000

The FCC has notified the Billboard Broadcasting Corporation, licensee of WLAC, Nashville, TN, that it was liable for a $10,000 forfeiture for repeated failure to log commercial broadcast matter and to identify the sponsors.

In September 1977, the FCC was informed that Billboard had written to record companies and talent agents stating that WLAC was planning a series of free promotional concerts and asking the addressees to provide free talent in return for WLAC's airing of the artist's records.

The various record companies provided free talent for the concerts, and in return, the records of these artists were played on WLAC prior to and during Music Week '77.

Adjacent to the broadcast of the records, WLAC announced only that the appropriate record companies had provided concert talent free of charge. The actual time of each record played was not logged as commercial and no sponsorship identification announcements were made to inform the listening public that WLAC had broadcast these records in return for the free concert appearances.

E-Systems sells antenna

Elektrisk Bureau, NERA division, a telecommunications company in Norway, has ordered a 13-meter earth station satellite antenna from E-Systems for installation on Spitsbergen Island.

The contract, for about $600,000, includes shipment to Bergen, Norway, and installation of the antenna in summer 1979. The antenna is scheduled to link Svalbard with the Norwegian mainland via the Norwegian domestic satellite system by December 15, 1979.

Emergency service

International Microwave's communications systems division now has a 24-hour emergency service phone to provide prompt assistance to customers utilizing the IMC microwave links. The phone number is (203) 869-8772.

Unitel business up

Unitel Production Services announced its largest gross volume business this past August. Contributing factors include the acquisition of the new Thomson minicam, a 100% increase in the tape-to-film area and an increase in retail shoots.

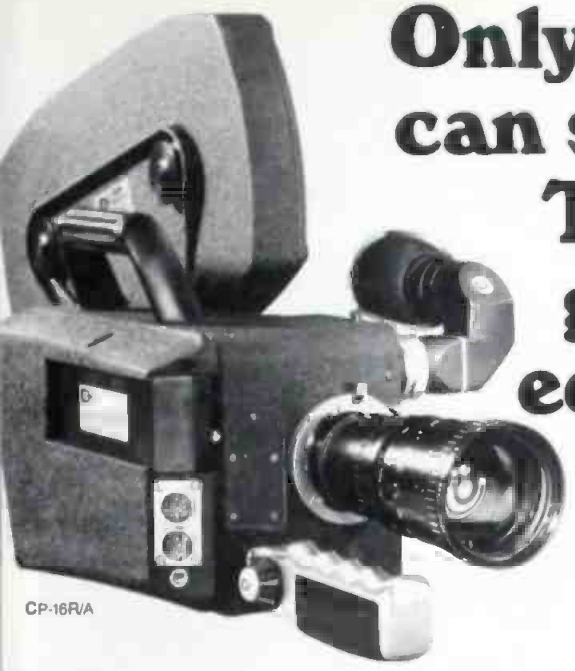
New product sales

Over one million dollars in orders have been booked for Dynair System 21 switching equipment during the six month's period following its introduction at the National Association of Broadcasters convention last March.

The System 21 has been in development for 18 months and utilizes proprietary, integrated, solid-state components.

continued on page 20

Only Cinema Products can satisfy all your TV-news gathering equipment needs.



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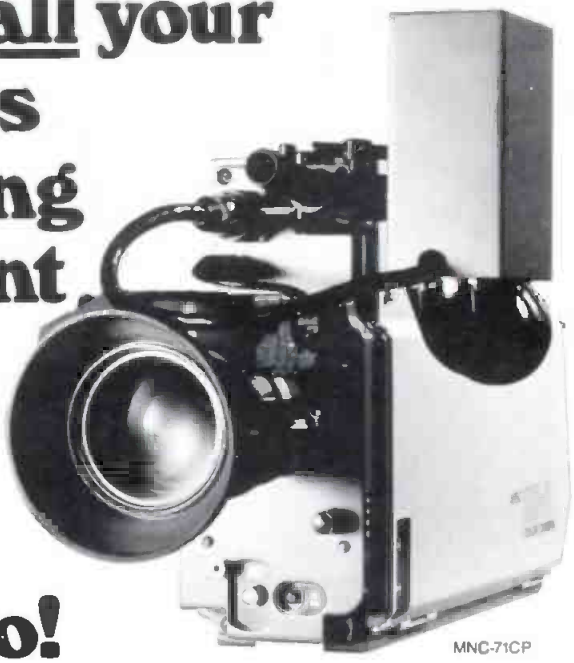

MNC-71CP

Film as well as video!

Nobody knows TV-news gathering equipment requirements like we do.

Our extraordinary responsiveness to the needs of the working TV-newscameraman in the field has made "CP-16" practically a generic term for newsfilm/documentary cameras... and the standard of the industry!

And we have a track record for reliability and service that is unmatched by any other camera manufacturer/distributor in the TV-news gathering industry.

On a recent visit to the U.S., Sadayuki Ikeda (right), Supervisor of NEC's Video Development Dept., Broadcast Equipment Division, and Cinema Products' Chief Engineer Robert Auguste exchange views on ENG/EFP practices and equipment requirements.

Ideally suited for American television industry needs, the MNC-71CP incorporates many design features based on CP inputs gathered from our extensive experience in the TV-news/documentary field. The MNC-71CP is so rugged and reliable, it is covered by the standard Cinema Products full one-year warranty (unprecedented in the broadcast industry!).

We also offer accessory equipment such as lenses, VTR's, portable video set-up units, including a unique portable 16mm film-to-tape transfer system (the new KM-16).

Film and video "under one roof"

What's more, we are the only ones who have available for you, *under one roof,* the finest film *and* video newsgathering equipment and accessories: our own CP-16 line of newsfilm/documentary cameras... as well as the most advanced ENG/EFP camera of its class — the all-new MNC-71CP, manufactured exclusively for us by NEC (Japan's largest manufacturer of broadcast equipment).

Complete package deals

Be sure to call on us as you analyze your equipment needs. We can help you upgrade your news gathering operation with a complete video and/or newsfilm package deal — including special lease/purchase plans and a trade-in allowance for your obsolescent 16mm cameras — a package deal specifically tailored to meet your particular requirements and give you the competitive edge you need in your market.

At the recent NAB Conference, Ed DiGiulio (right), President of Cinema Products Corp., and R. Dennis Fraser, Vice President and General Manager, Broadcast Equipment Division, NEC America, Inc., display the Oscar and Emmy awards won by their companies for their respective "state of the art" contributions to the motion picture and television industries.

For further information, please contact:

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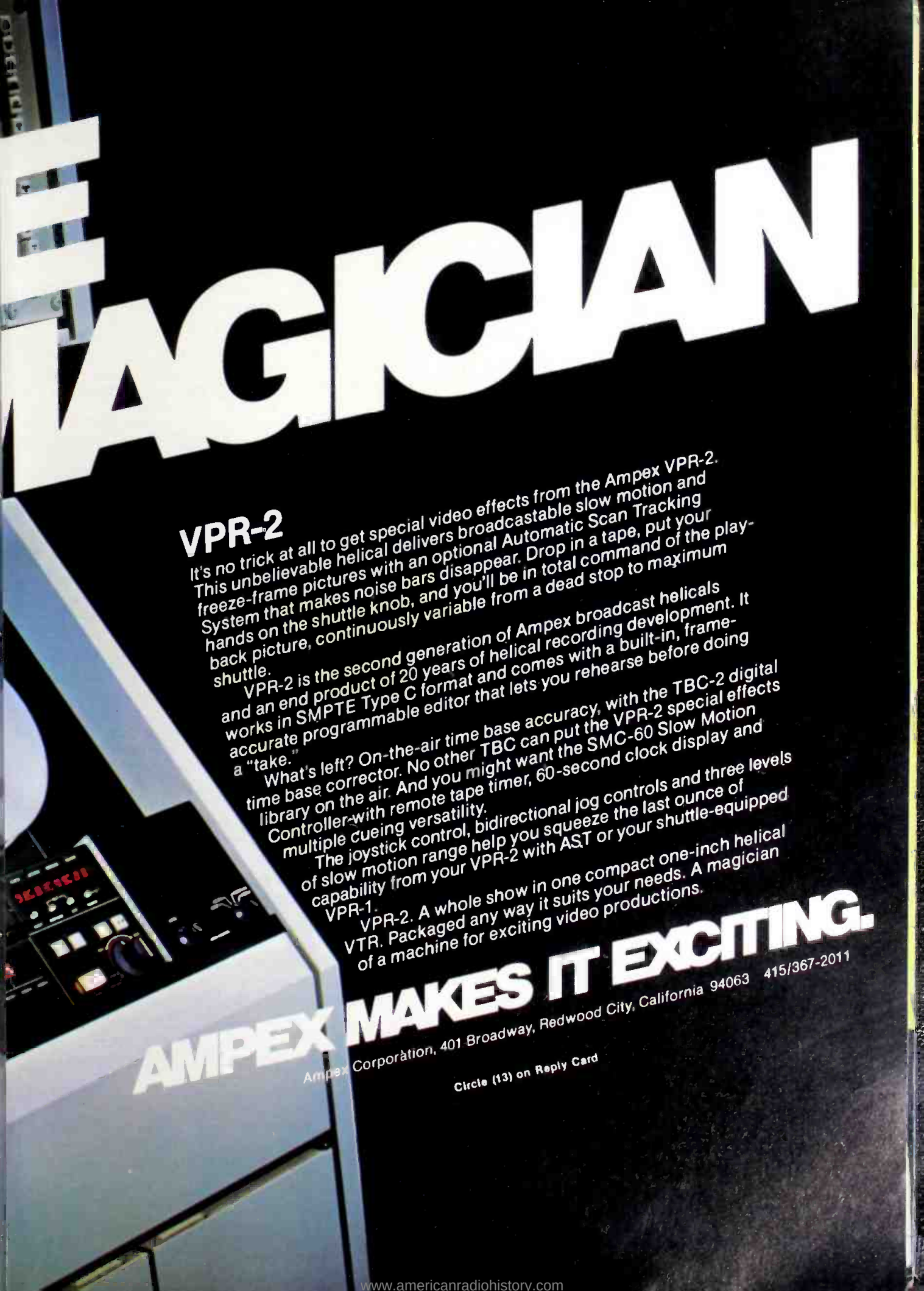


business news

continued from page 16

TRW LSI reduces prices

TRW LSI Products has announced price reductions up to 50% on six major products. The new prices became effective September 15, 1978.

In OEM quantities of 100, the MPY-16AJ multiplier chip is reduced to $157 from $175; the MPY-12AJ to $103 from $115 and the MPY-8AJ to $59 from $65.

Cost of the TDC-1001J analog to digital converter was reduced to $87 from $175, and the TDC-1002J's price was cut to $56 from $65.

The division's TDC-1004J digital correlator has been cut to $75 from $150.

Reeves acquires company

Reeves Teletape Corporation acquired Alan Landsburg Productions of Beverly Hills, CA.

Landsburg Productions will operate as an autonomous unit of RTC and will continue in production on a number of properties which include: *Triangle Factory Fire*, NBC; *Revenge of the Savage Bees*, CBS; *The Chisolms*, CBS; *Torn Between Two Lovers*, CBS; and *In Search Of*.

ESE moves

ESE, supplier of digital clocks and timers, has a new address. It is 142 Sierra St., El Segundo, CA 90245.

Cetec to build antenna

Cetec Broadcast Group has been selected to design and manufacture an omni-directional spiral circularly polarized transmitting antenna for KWTX, Waco, Texas.

The spiral antenna will be tested at Cetec's Jampro antenna manufacturing and testing center in Sacramento. It is to be installed atop a 1600-foot tower.

KOLO-TV buys gear

KOLO-TV, Reno, Nevada, has ordered almost $500,000 worth of videotape production equipment from Ampex to equip their new studio, completed earlier this month.

The order calls for delivery of three VPR-1 helical scan VTRs, two AVR-2 quadruplex VTRs, and an ACR-25B automatic videocassette recorder/reproducer.

According to Jim Herzig, vice president and general manager of the station, this purchase makes KOLO-TV one of the first 1-inch facilities in northern Nevada.

The equipment will be housed in the station's new 15,500 square foot studio, valued in excess of $2 million. □

SCOTCH IS FIRST IN BROADCAST. GIVE OR TAKE AN INCH.

Scotch® has been state of the art in broadcast videotape for more than twenty years. It's an industry-wide fact that nobody knows tape like 3M.

So when the industry looks at a new format, the industry looks to Scotch.

3M COMPANY

In broadcast quality one-inch, it's Scotch Master Broadcast 479. 479 has all of the qualities you've come to expect from a tape named Scotch.

Like superior color noise and signal-to-noise. And nobody gives you better RF output.

Scotch Master Broadcast 479.

When you come to that new format, you'll have an old friend.

meetings, events&seminars

October 20-21—The *1978 Film and Video Tape Seminar* will be held at the Marriott O'Hare in Chicago.

Topics to be discussed range from animation and special effects to multi-image presentations. Two keynote speakers will be featured, one to mark the opening of the seminar on Friday evening, and one to close the event on Saturday afternoon.

For more information, contact: Bennett Grossman, Dept. BE, c/o Edit/Chicago, Prudential Plaza Suite 3010, Chicago, IL 60601, (312) 787-9100.

October 23-24—*The 54th Annual EIA Conference* will be held in Los Angeles, CA at the Century Plaza Hotel. A consumer electronics show and press reception will be on Tuesday. Hugh Downs will be the guest speaker at a banquet on October 25. His topic will be the possibilities of new technology. A 3-day seminar in conjunction with the conference will be held at the Hyatt House. The seminar will cover the future of government electronics.

For more information, contact: Helen Bohensky, Dept. BE, 2001 Eye Street, N.W., Washington, D.C. 20006.

October 24-27—A four-day course, entitled Data Communications: Digital Techniques and System Design, will be offered by *Integrated Computer Systems* in New York.

It will be offered also in Boston, November 14-17; Los Angeles, December 12-15; Dallas, January 23-26; Chicago, February 6-9 and Washington, D.C., March 13-16.

For more information, contact: Kim D. Sanson, program manager, Integrated Computer Systems, Dept. BE, 3304 Pico Boulevard, P.O. Box 5339, Santa Monica, CA 90405.

October 25—Dr. Bill Christians will address a combined meeting of *EIA's* distributor products division, parts division, and tube division in the Pacific Palisades Room in the Century Plaza Hotel in Los Angeles, CA.

In his address he will describe his "pitchfork theory of leadership development."

For more information, contact: Electronic Industries Association, Dept. BE, 2001 Eye Street N.W., Washington, D.C. 20006.

October 29-November 2—The 120th Technical Conference and Equipment Exhibit of the *Society of Motion Picture and Television Engineers (SMPTE)* will be held at the Americana Hotel in New York City.

The conference will feature four days of presentations of different aspects of motion-picture and television technology. The television subjects include satellites, video processing, video production, video transfers and video special effects and editing.

The exhibit will feature leading manufacturers and suppliers of television equipment. More than 6000 film and television professionals are expected to attend.

For more information, contact: Irwin Young, Dept. BE, SMPTE, 862 Scarsdale Avenue, Scarsdale, NY 10583, (914) 472-6606.

continued on page 24

You know what Technics quartz-locked direct drive does for records. Now listen to what it does for cassettes.

Accuracy good enough for even the most demanding professional, that's what Technics quartz-locked direct-drive turntables are all about. And that's why radio stations use them and discos abuse them.

Now you can record your records as accurately as a Technics turntable plays them. With the RS-M85, our new quartz-locked direct-drive cassette deck. Not only does it have the kind of transport accuracy that's hard to beat, it has that kind of price, too. The reason for all this accuracy: The performance of Technics direct drive combined with the precision of our quartz oscillator.

The RS-M85's servo-controlled system compares the motor rotation with the unwavering frequency of the quartz oscillator and instantly applies corrective torque if any speed deviations are detected.

To complement that accuracy, Technics RS-M85 has a Sendust head with a high-end frequency response of 18,000 Hz, low distortion and excellent dynamic range.

Since there's nothing ordinary about the RS-M85's performance, there's nothing ordinary about its meters. The RS-M85 features Fluorescent Bar-Graph meters. They're completely electronic and therefore highly accurate. Response time is a mere 5μS. There's also a peak-check mode plus two selectable brightness levels.

To all this sophistication, the RS-M85 adds all this: A separate, coreless DC motor for reel drive. Dolby NR.* Full IC logic control in all modes. A low-noise, high-linearity amplifier section. And a 3-position bias/EQ selector with bias fine adjustment.

Also available is Technics RP-070. An optional full function infrared wireless remote control.

Technics RS-M85. Compare specifications. Compare prices.

FREQ. RESP. (CrO_2): 20-18,000 Hz. WOW AND FLUTTER: 0.035% WRMS. S/N RATIO (DOLBY): 69 dB. SPEED DEVIATION: No more than 0.3%.

Technics RS-M85. A rare combination of audio technology. A new standard of audio excellence.

*Dolby is a trademark of Dolby Laboratories, Inc.

Technics
Professional Series

Circle (16) on Reply Card

meetings, events&seminars

continued from page 22

October 30—*The Professional Motion Picture Equipment Association* seminar, in conjunction with the annual SMPTE conference, will be held in the Ziegfield theatre, New York City.

The guest artist for this year's PMPEA and co-sponsor Eastman Kodak program, is special effects wizard Doug Trumbull. Trumbull's presentation will include examples of his most recent visual creation, as well as some behind-the-scenes demonstrations of his technique.

For more information, contact: PMPEA, Dept. BE, University Tower, Suite 809, 6440 Central Expressway, Dallas, TX 75206.

November 3-6—*The 61st Audio Engineering Society Convention* will be held at the Waldorf-Astoria in New York City.

The annual business meeting will open the events of the convention. Throughout the four days various exhibits will be on display along with seminars being held.

The convention will have social/cultural outings. A tour of the city's neighborhoods, a trek to New York Botanical Garden, a tour of Manhattan's "Toe" and Saturday in Brooklyn are included in the convention.

For more information, contact: Audio Engineering Society, Dept. BE, 60 East 42nd Street, New York City, NY 10017.

November 7-10—*Integrated Computer Systems* is offering a four-day course in structured programming in Los Angeles. This course is designed for programmers, software engineers, systems analysts and their managers who have the responsibility of creating and maintaining reliable, complex program structures.

The seminar will also be offered January 16-19 in Washington, D.C., January 30-February 2 in Boston, MA, and February 20-23 in New York City.

For more information, contact: Kim D. Sanson, program manager, Integrated Computer Systems, Dept. BE, 3304 Pico Boulevard, P.O. Box 5339, Santa Monica, CA 90405.

November 8-10—The *1978 Scientific-Atlanta Satellite Communications Symposium* will be held in Atlanta, GA. Major emphasis will be given to earth stations and video programming.

For more information, contact: Ken Leddick, Scientific-Atlanta, Dept. BE, 3845 Pleasantdale Road, Atlanta, GA 30340.

November 14-16—*The Military Electronics Expo '78* will be held at the Anaheim Convention Center in Anaheim, CA.

The exposition will feature technical sessions such as electro-optics, ship electronic warfare systems and military space-based navigation and communications systems.

Two-day tutorial courses will be presented by Intergrated Computer Systems, and will focus on a specific topic of concern to individuals involved with developing defense equipment, systems and components. □

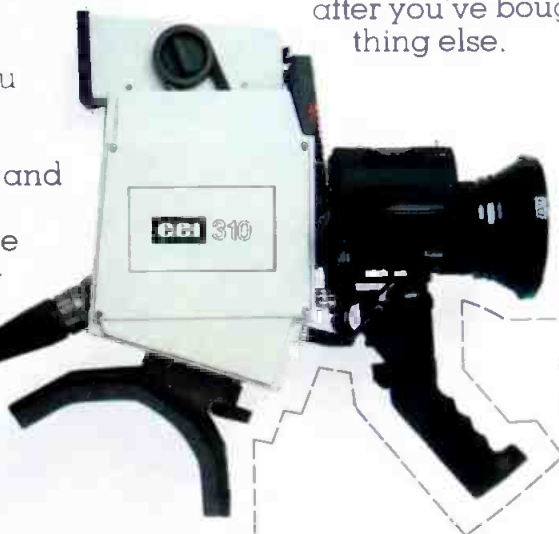
IF YOU BUY ANY OTHER CAMERA BEFORE EVALUATING THE CEI 310, YOU COULD END UP WITH A RED FACE.

The most important thing about any television camera is the quality of the picture it produces. You already know that. But maybe you don't know this: you can't judge quality by the price tag any more.

There have been a lot of advances in electronics lately. And we've built most of them into the new CEI 310. The result is an American made instrument that will give you, at less than half the price, just as good a picture as the most expensive camera you can buy. This isn't just talk. We'll gladly give you our list of owners and you can call them all.

Now there may be factors other than picture quality which might make you want to spend well over a hundred thousand dollars for a camera. But if what you have is around forty thousand, we can't think of a single reason why you'd want to settle for any less than the best.

Call us collect for a demonstration. We or one of our distributors will show you the 310 in both its hand-held and studio configurations. But do it now. You may not be very happy if you see the 310 after you've bought something else.



Shown: The CEI 310 in field configuration.

GENTLEMEN:
I DON'T NEED ANY EMBARRASSMENT.
SHOW ME YOUR CAMERA.

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people in the news

Radio/Television

A. Paul Townsend has been promoted to technical maintenance supervisor of WBTV, Charlotte, NC. In this position, Townsend will be in charge of the upkeep and maintenance of all technical equipment, including videotape, live cameras, film cameras, switchers and associated equipment.

The Electronic Industries Association recently announced, that **Hugh Downs** has accepted an invitation to address participants at a luncheon on October 25 during the association's fall conference. His speech will focus on "The Technological Imperative: Separating the Possible From the Permissible."

Jimmie Fidler, best known for his nationally syndicated radio program and newspaper column on the entertainment industry, recently marked his 20th year as a distributor of Ampex professional audio systems. Fidler was presented with a commemorative plaque at a luncheon two days after his 80th birthday.

Robert R. Robinson recently joined the Maine Public Broadcasting Network as radio program/production manager. Formerly radio program operations manager for WVPB-FM, a public radio station in Beckley, West Virginia, Robinson has eight years of experience in radio broadcasting.

Alex Keddie has been promoted to the position of chief engineer at WIRE/WXTZ radio in Indianapolis, Indiana. Before coming to the station, Keddie spent four years in the U.S. Navy as a communications supervisor.

Agencies/Associations

CBS has designated **William J. Small**, the corporation's Washington vice president, as its representative on the National Association of Broadcasters' Television Board of Directors. Before being named to his present post earlier this month, Small was CBS news senior vice president, and was director of news since February, 1974.

Jeffrey Neal Goldberg has been named associate membership coordinator for the National Association of Broadcasters. Goldberg will serve as the contact for associate members which include equipment manufacturers, record and film syndication companies, engineers, lawyers, stations reps and brokers.

continued on page 28

Lost Air Time Problem Solved

IMAGINE! Going from one back-up Transmitter or Antenna to another without blowing a spot.

For the Broadcaster who would rather switch than fight.

Announcing "The Patchless Panel" the 2 second change, from stop to start. The surprise, is it's less than ONE HALF THE COST of a MOTORIZED SWITCH. Just as fast as some easier to maintain than most and probably more reliable. (Since we don't use Finger Stock that will bend or break.) The secret, we use our patented Connector with its Wristband Spring that has years of proven reliability.

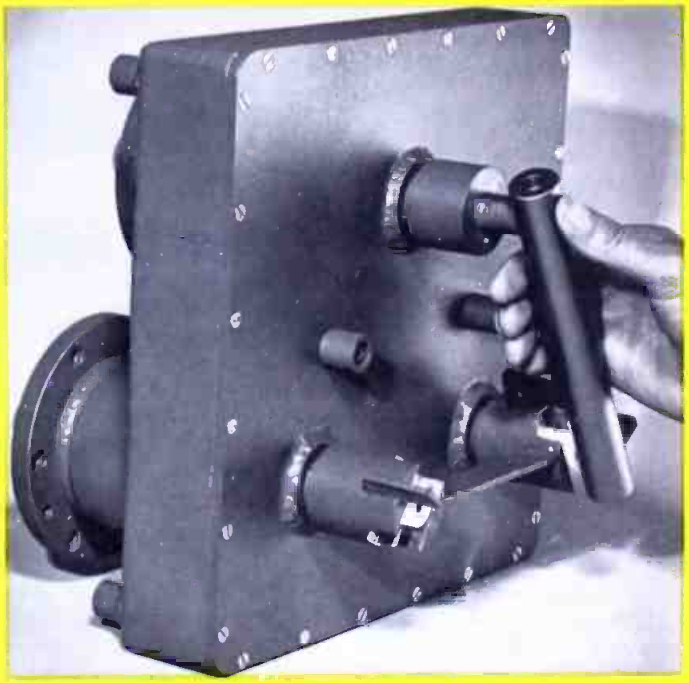
Most TV - FM and AM stations have used a three port 3⅛ patch panel to perform this function. It's sometimes very cumbersome and much slower (at the cost of air time.) Others have over-corrected by buying unnecessary, EXPENSIVE MOTORIZED SWITCHES that are used in a maintenance function or by a manned transmitter.

The features of our switch are:

1) Can be operated by 1 man with 1 hand from latch-lock to latch lock in 2 seconds.
2) Has positive lock-in-place latch action.
3) Any maintenance to switch does not necessitate removal of coax or mounting brackets. Can be done by removal of front panel.
4) When switch wrist-band contact needs replacing (about every 10 years depending on switch use) the total maintenance time to change these is 30 minutes with time for a coffee break.
5) Most electric switches come equipped with E.I.A. flanges, but adaptors must be purchased at additional cost to adapt to your present system (at the cost of approximately $75.00 each x 3.) Our switch flange ports, all male out-puts, are available at no additional cost, in Unflanged Straight Couplings, E.I.A., or Universal Marmon.
6) Weight — 25 lbs. or less depending on flanges ordered. Size — less than 1 cubic ft. Power handling capability — same as 3⅛ unpressurized line.

Price $825.00 — FOB Goffstown, N. H.

For data sheet, circle reply card No. given below.



The three port 3⅛ 50 Ω Patchless Panel photo above shows the selector bar before being pressed into switch lock position. Note: Fingers placed behind bar release lock lever and when bar is pressed into position lock automatically closes. Bar visually shows path selected. The Patchless Panel may be used overhead or in a vertical position. (Patent Pending)

In making this unit available we are maintaining the same engineering standards built into our transmission line. Just like our first 10 years, if we don't make it better, we don't make it at all. Remember SWR Inc. is Systems with Reliability.

Coming Soon:

A 4 port 3⅛ 50 Ω Transfer Patchless Panel.
A 3 port 4 1/16 50 Ω Patchless Panel.
A 3 port 6⅛ 50 Ω Patchless Panel.
Other sizes may be available soon.
For more information, call or write SWR Inc.

SWR INC.
Systems with Reliability
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603-497-3000
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people in the news

continued from page 26

Manufacturers/Distributors

George F. Benton has been named manager of BroadCom for Jerrold Electronics Corporation, a wholly owned subsidiary of General Instrument Corporation. Prior to this appointment, Benton was Jerrold's eastern regional sales manager.

As manager, antenna product management, for RCA Broadcast Systems, **David S. Newborg** is responsible for product management of RCA's complete line of radio and television broadcast antenna and equipment. Previously Newborg was manager, radio station equipment product management.

Michael J. Mackin has been promoted to manager of marketing services at Philips Broadcast Equipment Corporation. With the company since 1965, Mackin's most recent position was as field engineering supervisor.

Harold W. Bailey is the new marketing director for television transmitting antennas at Cetec Broadcast Group. He was vice president for international development of Applied Magnetics Corporation.

Richard Quinlan has taken the post of national video training manager for JVC's Vidstar VHS ½-inch video line. Quinlan, most recently east coast regional sales manager, will be in charge of the training back-up for JVC's dealers, sales reps, and regional managers.

The Cetec Broadcast Group announced the appointment of **T. Arthur Kvaas** as operations manager. He has many years of technical and business management experience with such companies as Douglas Aircraft, RAND Corporation, and General Electric.

William C. Mercurio was promoted from senior sales engineer to sales manager of Mura Corporation's OEM division. He will have direct sales responsibility over all key accounts and will supervise the operation of the national sales force.

LeRoy C. Cochran was recently named general manager of audio products for Ampex Corporation's audio-video systems division. Cochran was also named president of Duca-Richardson, a new subsidiary of Ampex.

Teletronics' new manager of technical operations is **Gary Bradley**. With the firm since 1970, Bradley's most recent position was as an editor.

New product manager for Memorex's professional products division is **Jeff Higgins**, who will be responsible for planning and coordinating all sales promotion programs in support of domestic and international objectives.

David H. Garcia has been appointed export product manager for ITT Cannon Electric. Garcia has been with the division since 1955, most recently as import-export specialist. □

New! For heterodyne VTRs

a broadcast quality, digital TBC

It's the CVS 516, first digital TBC made and priced to give users of non-segmented, heterodyne VTRs all the proven advantages of modern digital video processing.

The CVS 516 is ideal for ENG, teleproduction, studio VTR backup and much more because it comes with features that, before, you'd find only in TBCs costing up to twice as much.

For example, correction of chroma/luminance delay problems, a 3 dB chroma noise reduction, velocity compensation and color dropout compensation are standard.

So is "Gyrocomp," an exclusive, use-proven CVS memory design that easily handles severe gyroscopic distortions—without breakup.

There's also a broadcast stable, gen-lock sync generator, automatic VTR advanced sync and a built-in completely adjustable processing amplifier.

If all that's not enough, add our optional, moderately priced Image Enhancer/Noise Reducer. This plug-in card substantially reduces luminance and chroma noise and significantly improves subjective resolution. And, to tame even the wildest instability, you can add our optional 16 line window.

Simple operation is another plus for the CVS 516. Front panel controls give you total mastery of your video signal. Each control also has a preset unity position to give you a consistent starting point for all your tapes.

All this, and more, is contained in a package that weighs only 25 pounds, is only 3½ inches high and uses only 175 watts—major advantages with today's increasing emphasis on ENG and field production.

So, to give your heterodyne productions the quality they deserve, get the one digital TBC made and priced to do the job—the CVS 516. For full details and/or a demonstration, contact your authorized CVS Distributor or CVS. And ask for our new booklet about the basics of digital time base correction. It's free.

CVS Consolidated Video Systems, inc.

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The 120th SMPTE Conference features largest equipment exhibit

The 120th Society of Motion Picture and Television Engineers (SMPTE) technical conference and equipment exhibit will be held at the American Hotel in New York City, October 29—November 3, 1978. The conference will feature four full days of technical sessions, a 211-booth equipment exhibition, social events, activities for spouses and a coffee club.

General Overview

The opening session of the conference is designed to close the gap between the hardware and software elements of the industry. A panel discussion featuring a film producer, a tape producer, a researcher in the field and a statistical analyst will bring new insights into the imagery of today and tomorrow.

Technical Sessions

Monday evening's session is the PMPEA program at the Ziegfeld Theatre featuring Doug Trumbull who will present special effects in 70mm and 6-track sound. The event is co-sponsored by PMPEA and Eastman Kodak.

Tuesday morning's session is *The PBS Sotellite System* featuring W. Gordon Douglas, of the Public Broadcasting Service, Washington, DC, discussing satellite technical operations and maintenance.

The afternoon session, *Sotellite Equipment ond Delivery Systems* includes "Transmission of Four Simultaneous Television Programs Via a Single Satellite Channel" by Liston Abbott, RCA Laboratories, David Sarnoff Research Center, Princeton, NJ; and "Future Developments in Satellite Communications" by James W. Cuddihy, RCA American Communications, Piscataway, NJ.

Wednesday's sessions begin with *Digital Television* which features the following presentations: "The Antiope Broadcast Teletext System" by Yves Guinet, CCETT (TV & Telecommunication Research Center), Rennes, France; "Optical TV Link Employing a Digitally Modulated Laser" by A. A. Goldberg, S. Juchnowycz and J. Rossi, CBS Technology Center, Stamford, CT; "Digital Video Recording" by Joachim Diermann, Ampex Corporation, Redwood City, CA; "A Monolithic Video A/D Converter" by Willard K. Bucklen, TRW LSI Products, Redondo Beach, CA.

Two sessions run concurrently in the afternoon. *Film Production* includes several presentations by experts in the field. *The Film-to-Tape and Tape-to-Film Transfers* session features the following: "A Continuous-Motion Color Film Telecine Using CCD Line Sensors" by Dieter Poetsch, Robert Bosch GmbH, Darmstadt, W. Germany; "First-Generation 16mm Film-to-Tape Transfers With Concurrent Special

continued on page 32

PROGRAM

Sunday, October 29

Registration, afternoon

Entertainment, evening

Monday, October 30

General Overview, morning

Get-Together Luncheon, noon

Equipment Exhibit Opening, afternoon

PMPEA Program, evening

Tuesday, October 31

Laboratory Practices, morning

Satellite System, morning

Fellows Luncheon, noon

Laboratory Practices, afternoon

Satellite Equipment & Delivery Systems, afternoon

Wednesday, November 1

Laboratory Practices, morning

Digital Television, morning

Film Production, afternoon

Film-to-Tape & Tape-to-Film Transfers, afternoon

Cocktails, Banquet and Entertainment, evening

Thursday, November 2

Sound Technology, morning

Video Production, morning

Special Effects Editing and Applications for Videodisc, afternoon

Sound Technology, afternoon

Friday, November 3

Administrative and Engineering Committee Meetings

This professional, broadcast quality switcher uses only 5¼" (13.34 cm) of rack space.

Eliminate patching complications!

DYNAIR's new Series 10

It's a ten input, ten output solid-state patchcord replacement that simplifies video, audio, and time code routing.

$3,200 buys a locally controlled video switcher which includes power-fail memory protection and tally as standard features.

Ask DYNAIR dealers for details. They will plug our products.

And these remote controllers can be connected to any version of the Series 10 Switcher by coax cable.

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5275 Market Street, San Diego, CA 92114
Tel.: (714) 263-7711 TWX: (910) 335-2040

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SMPTE Conference

continued from page 30

Effect and Editing" by David M. Stern, L-W International, Woodland Hills, CA; "Cinema Products' New KM-16: A High-Quality, Low-Cost Film-toTape Transfer System" by Edmund M. DiGiulio, Cinema Products Corporation, Los Angeles, CA; "Flying Spot Telecine With a New Framestore 'Digiscan'" by Neil Kempt, Rank Organization, London, England; "The Videodisc as a Means of Transferring a Video Picture on Motion-Picture Film" by Georges J. Broussaund and Claude M. Tinet, Thomson-CSF, Paris, France.

Running both Tuesday and Wednesday are the *Laboratory Practices* which feature a variety of practical and informative sessions such as: "A Sprocket Designed to Limit Film Damage," "The Print Corrector" and "Color Titles for Color Negative Films."

Thursday morning's session, *Sound Technology*, features "A Versatile Synchronizing System for Television Production and Post Production Audio/Video" by George R. Swetland, EECO, Santa Ana, CA.

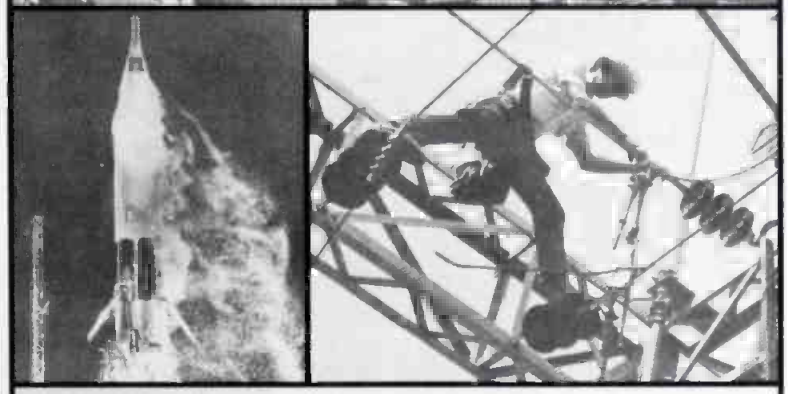
Video Production, the other morning session, includes the following presentations: "BCN 5, Portable Videocassette Recorder for ENG" by Dieter Gause, Robert Bosch GmbH, Darmstadt, W. Germany; "Automatic Videotaped Program Storage" by Komei Kazama and Hirofumi Itoh, NHK, Tokyo, Japan; "Design Criteria of Video Post-Production Systems with Optimum Operation Convenience" by H. Fix, W. Habermann and K.-H. Trissl, Institut fuer Rundfunktechnik GmbH, Munich, Germany; "Production Switching Automation System" by John Davis, Vital Industries, Gainesville, FL; "A Fully Automatic Television Camera" by John C. Adison, RCA, Camden, NJ; "The Application of the E-MEM Concept to Post Production and Editing" by Bruce Rayner, The Grass Valley Group, Grass Valley, CA; "Advanced Applications of ¾-Inch Videocassettes" by Alfred Muller, Nexus Productions, New York, NY; "TeleVisa Mexicano: Film to All Eng Overnight" by Gabino Carrandi Ortiz, TeleVisa Mexicano, Mexico City, Mexico, D.F.; "Multi-Isolated Camera Videotape Production: Problems and Solutions to a Successful Application" by Richard Green and C.J. Cookson, ABC-TV, Hollywood, CA; "A Newly Developed 'Integrated Pick-Up Component' for High Performance and Economical TV Camera" by H. Sakai, T. Takawa, H. Sokei and T. Iida, Hitachi Ltd., Mobara, Japan.

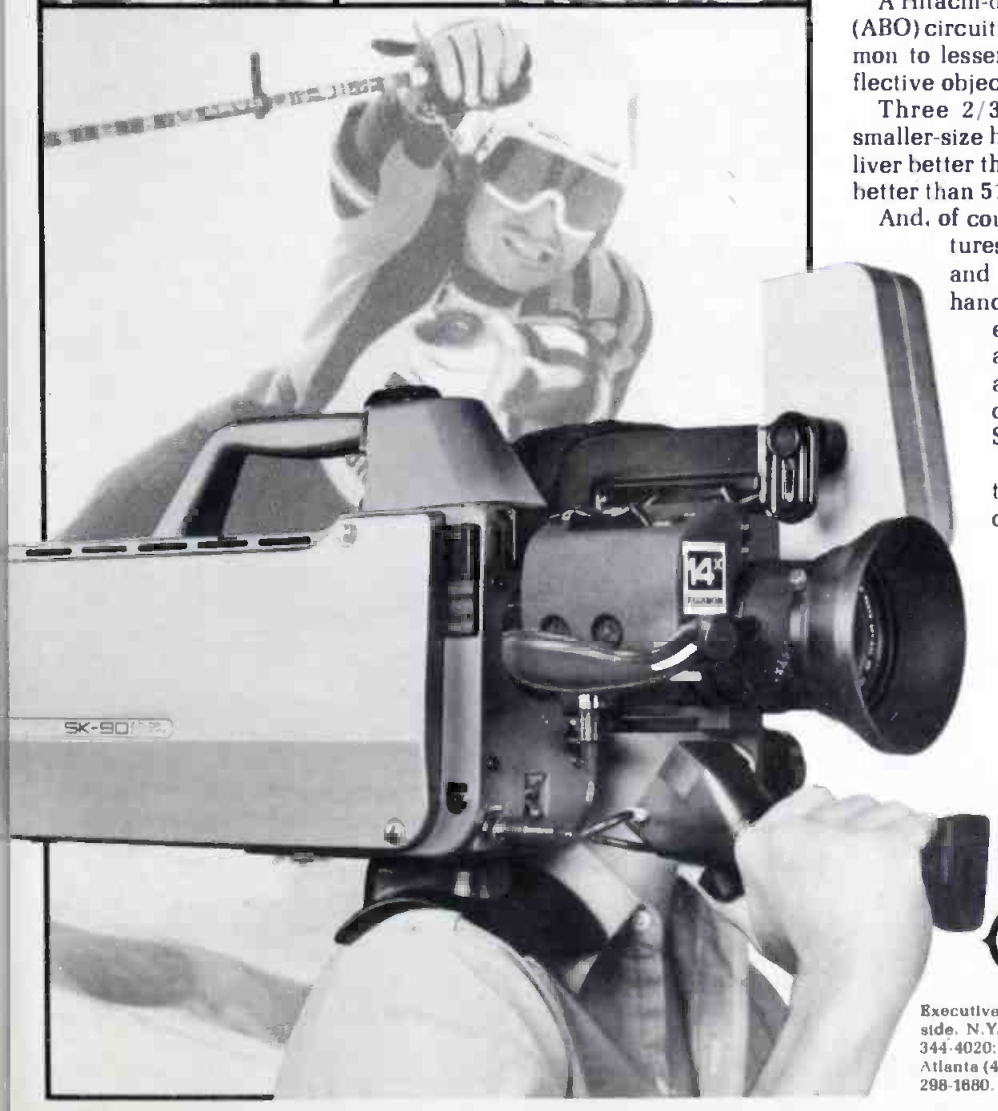
"Electronic Editing Techniques and Advancement" by John G. Campbell and George Bates, Convergence Corporation, Irvine, CA, is the featured presentation of the afternoon session—*Special Effects, Editing and Applications of Videodiscs*.

The *Sound Technology* session, also Thursday afternoon, features the following: "Program Audio Distribution Via Existing Video Transmission Facilities" by Steven B. Salamoff, Digital Communications Corporation, Gaithersburg, MD; and "A New Nationwide Television Sound Distribution Network" by American Telephone & Telegraph, New York, NY.

Equipment Exhibit

This year's exhibit is to be the biggest and most comprehensive the SMPTE has ever held in New York. More than 100 exhibitors have signed up for space necessitating the expansion of the exhibit area to a capacity of 211 booths. □





The HITACHI SK-90

Unsurpassed Picture Quality in a Free-Ranging Portable.

High technology in camera design is Hitachi's business. And the phenomenal SK-90 shines among Hitachi's previous successes.

With the comfortably balanced, self-contained SK-90, you can go on location and shoot action features, documentaries, commercials, training and sales tapes—without worrying about complex equipment, tripping over bulky cords, or staggering under heavy loads—and always producing an image truly worthy of broadcast transmission. The SK-90's sophistication makes it easy for you. Anyplace, anywhere from sub-zero to over 100° F. operating temperatures.

Technological advances? The SK-90 is brimming with them.

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And, of course, there are all the additional features that assure sharp, crisp pictures and true colors: built-in 2H contour enhancer with comb filter...standard I & Q encoder...switchable color bar generator...automatic white balance...automatic iris...and a built-in Genlock circuit using black burst to lock your SK-90 to other cameras.

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Remarkably, the Hitachi SK-90 may be the first affordable, self-contained portable that doesn't compromise. Contact your Hitachi dealer for more details.

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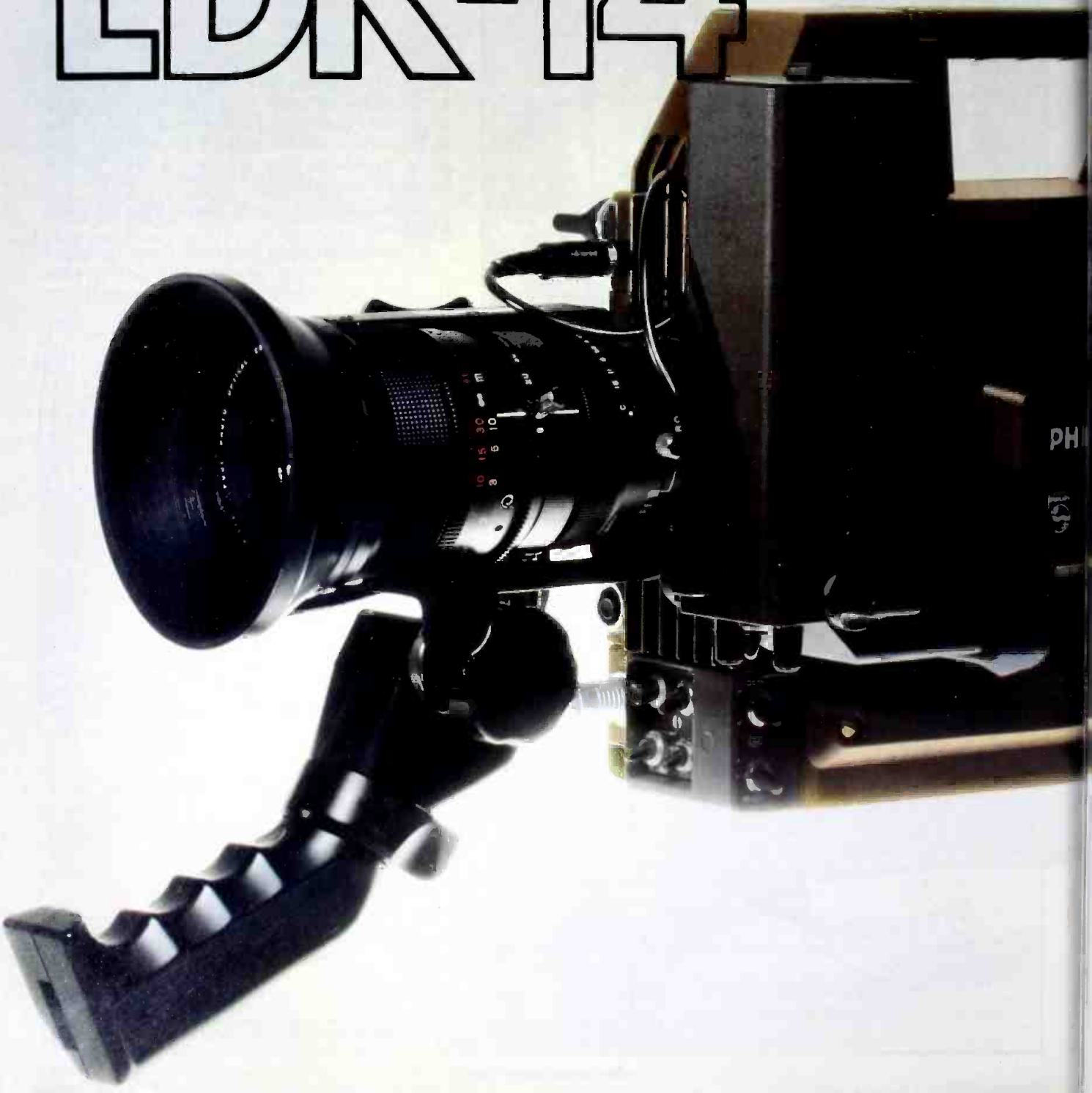
Circle (25) on Reply Card

New Standard for Portables...

LDK-14



In the great tradition of Philips portables:

1968...PCP-70 The industry's first portable. The one that started it all.

1969...PCP-90 Step two. World famous Minicam.

1975...LDK-15 First generation of triax field production cameras.

1976...LDK-11 A smaller, lighter, lower cost field and studio camera.

1977...Video 80 An innovation in lightweight camera and production system...**LDK-15L** Latest version of the LDK-15.

Evolving from this long history of portable equipment leadership, Philips' engineers have created a new concept in portable and field equipment. *The LDK-14 broadcast systems camera.*

A futurized camera offering three *advanced* configurations for field and studio use...all achieved *without equipment repackaging:*

1. *ENG*—studio quality portable; self-contained, one piece; film camera handling; weighing less than 15.5 lbs. (7 Kg) lens included; less than 12 lbs. (5.5 Kg) without lens.
2. *EFP*—studio quality portable, with remote control; timing and phase adjustable gen lock; instant convertibility to studio camera use by simple change of viewfinders.
3. *Studio*—compact, maneuverable; full broadcast quality; 5" viewfinder.

The LDK-14 combines innovative design and unique capabilities in a state-of-the-art 2/3 inch camera that is *much lighter* and *uses significantly less power* than the competitive ENG-only camera. Plus the LDK-14 gives you additional advantages in size, picture quality, stability, maintainability and cost.

Among its many other unique features for portable and studio use are:

- Only 27 watts power consumption (almost 1/3 less than the ENG-only competitive portable) gives longer continuous operation with choice of battery belt or small battery pack affixed to camera. A standby switch further conserves battery power between takes.

- Viewfinder displays include: contour enhanced camera picture or external video signal; status monitors for video level, color balance, bars on, battery discharge, VTR functioning, intercom call and camera tally.
- Automatics include: color balance; white and black level; centering; noise reduction when operating with extra gain; auto Iris with set and hold facility.
- Externally switchable black stretch and contrast expansion.
- Dynamic Beam Control (DBC), regulates beam current to suppress comet tailing and blooming.
- Circuitry designed to maximize advanced capabilities of the latest rear-loading Plumbicons.
- Optional remote control facilities.
- Easy access for set-up and maintenance. Rear casing flips up for access to five main plug-in circuit boards.
- The rugged magnesium housing and titanium quick-release lens mounting holds all optical and electrical components in absolute registration. (Lens mount is strong enough for the heaviest extended range zoom lenses.)
- Rain, splash and RFI proofed.
- Other features include electronic raster rotation for better registration; linear matrix for optimal and Philips compatible colorimetry; and 360-degree hue-selectable chroma key.
- Other competitive cameras may have some of these LDK-14 features—no one has them all.

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With this unmatched combination of performance and portability, the LDK-14 is *also the ideal camera for field recording of ENG and EFP.*

And just as Philips has always offered the widest selection of portable and studio cameras to meet your specific needs, the same policy now applies to your choice of 1" VTR's and TBC's. Offering 'C' format and 'B' format VTR's in both portable and studio configuration, Philips can provide the greatest objectivity and cost-effectiveness in packaging systems to match your requirements.

Philips, the company that started it all, now introduces the latest portable breakthrough, the LDK-14 broadcast systems camera. It will be the industry standard for years to come. And for a camera-recorder package to match your requirements, your choice of 1" VTR formats. Only from Philips.

For all the facts on this innovative new camera or camera-recorder system (please specify) write: Philips Broadcast Equipment Corp., 91 McKee Drive, Mahwah, N.J. 07430 (Canada: Philips Broadcast Equipment, 601 Milner Ave., Scarborough, Ontario M1B 1M8)

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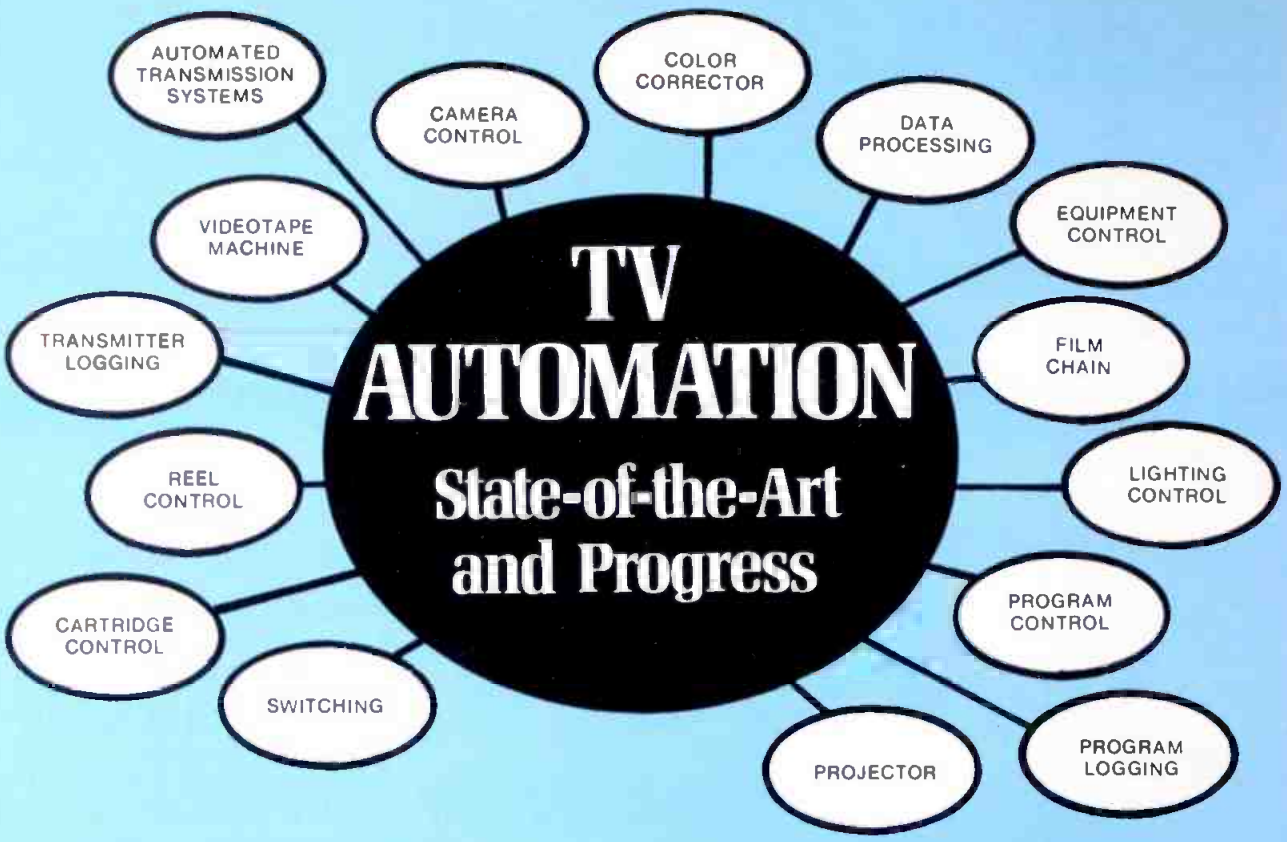

1978 OVER-VIEW OF AUTOMATION

By Bill Rhodes, Editorial Director

■The spectacular growth of broadcast automation has not come as a surprise to those who have kept their fingers on the pulse of this dynamic industry. However, what may have surprised most observers and, perhaps, those closely tied to this industry is that many of the big conglomerates have shied away from this lucrative market. In many instances, the market itself has been the main instrument in adapting new tecnologies to its needs in order to expand its services and improve profitability.

In this issue we will take a fresh look at several aspects of automation in the television industry. In next month's issue we will look similarly at automation in radio broadcasting.

To set the stage for our 1978 review, let's look first at a few frames from history.

Historical scene

In January, 1970 we published our first full-fledged article devoted to automation. From this modest first step we presented nine articles in 1970 followed by major automation review articles in June of 1971, July of 1974, and November of 1977.

We would have liked this year to have presented a chronology of first developments that played significant roles — provided crucial turning points — in TV broadcasting. However, the limitations of staff time and the lack of precise dates for plotting have made such a presentation impractical. Instead, another form of record can portray this field's growth quite apart from numbers of stations that have automated or dollars spent. The illustration above shows 15 separate categories of products for automation as compiled in our Annual Buyer's Guide published last month. Our 1970 edition required only one product category: program control.

What now

As of July, 1978 the FCC recorded 726 commercial TV stations and 260 education TV stations on the air in the U.S. It is not possible at this time to say how many of these stations have embarked on partial or total automation programs. But, many have done so, and it seems safe to surmise that all have seen the writing on the wall and have investigated just how they can best utilize automated equipment and services.

Even more significant is the fact that the confidence is so well founded in automation that new stations are being planned now for full automation right from the start. These plans alone may well be the most vivid testimony that automation has come of age.

This year's coverage of automation reflects the growing complexity of this topic. In no single resource can one find all the critical information to discuss automation from concept to turn-key, from financial investments to increased sales, from operational start-up headaches to man-hours saved, from improved reliability in program transmission to increased ratings.

Instead, on the following pages, we have opened our magazine to let stations and manufacturers speak out on this subject. Interestingly enough, some organizations declined to contribute because their key people were too busy installing systems! Nevertheless, the contributed material portrays the dynamic nature of TV automation.

continued on page 38

cetec broadcast group

Cetec Sparta Showcase:

First-quality broadcast components joined in a first-quality studio system

That's a Centurion II 12-mixer stereo console up front, the centerpiece of a custom Sparta grouping that's handsome, functional, and compact.

Start with Centurion II — more than 200 stations have already. One great reason is that when AM stereo arrives, you're ready right now. If 12 mixers and 36 inputs aren't enough, you can add one or two extender panels of 6 mixers each — to a maximum of 24 mixers and 72 inputs! You can have either rotary or slide pot controls — or even some of each. And of course Centurion is solid state all the way.

Put it in its place — along with Sparta's fine family of turntables, tape cart and remote control equipment — and complement it with sleek, low-profile furniture designed just for broadcast operations. And there you have it — a custom studio system at less than custom prices.

Of course, you can mix and match. That's the beauty of the big Cetec Sparta line — multiple choices in equipment and studio layout.

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Automation

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AUTOMATION: A boon for small, medium and major market TV stations *By Phil Dean*

Like the warning academics are given to "Publish or Perish," TV stations around the country are beginning to realize they have their own warning—"Automate or Vegetate" and consequently, more and more markets around the country, from KCBD-TV in Lubbock, TX, (ADI-132), to WNAC-TV in Boston, (ADI-6), are jumping into the automation scene with both feet and with ever increasing enthusiasm for a field that once scared them to death.

Lubbock's KCBD-TV

For KCBD-TV, the decision to go to automation vis a BIAS (Broadcast Industry Automated System) was prompted by a tremendous increase in volume over the past few years. According to Coy Dean, the station comptroller, the manual handling of the increased volume was cutting into the operational efficiency of the station. Dean cited a number of advantages the BIAS system has produced for the station, including a reduction in paperwork, an expansion in the variety of sales reports available, a constant and accurate report on spot inventory, a reduction of manual efforts and, as Dean puts it, "The salvation of the sanity of our traffic department."

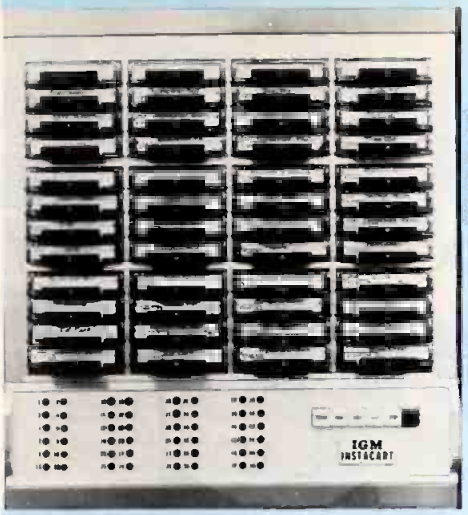
Bob McKinsey, vice president and general manager of KCBD-TV, an NBC-affiliate, disparaged the tags of "small, medium and large" when it came to automation for TV markets. "We're just as sophisticated and technically aware as the stations in Chicago, New York or Los Angeles," McKinsey said. "Any advances in technological efficiency are just as important to us as to the metropolitan stations. And we probably achieve as great a percentage of benefit as they do with our applications of the latest automated concepts."

Perhaps one of the immediate and remunerative benefits of KCBD-TV's decision to go into automation, the first station in the 3-station Lubbock market to do so, was the station's increase in annual revenues, which station officials put at about 20%. That's a hefty figure for any market—small, medium or large.

With its "On Line, Real Time" dedicated phone list connection with the BIAS computers at the Data Communications Corporation in Memphis, KCBD-TV now has the capability to make many assess-

Editor's note: Some of the following contributions on automation of TV stations are highly commercialized for certain vendors. We make no apology for such slant in the reports. We asked that our sources speak out about their experience and effort in automation, and they spoke about the systems they used. In panels (boxes), we have included other aspects of the subject to cover additional points and systems we felt needed attention.

The VIMAX-200 system by Vital Industries, as illustrated here, is designed to take charge of the Master Control ON-AIR operations, eliminating panic and providing smooth and continuous programming flow. The system provides full control over video and audio switching as well as automated machine controls for the tape and telecine areas. The basic system permits the schedule to be entered in advance. All executions necessary to switch audio and video; calculate time roll machines; flip mirrors and titles; control audio, over or under; stop machines; and printout records ready for the FCC are automatically accomplished. The system uses statements in easy-to-read English format in normal station headings that leave no doubt as to what is going on the air, and when. (*Graphic courtesy of Vital Industries*)



Many firms are involved when a TV station undergoes automation. Shown here is one firm's entry, the Instacart® by IGM, which has found wide acceptance in this movement. WAGA-TV of Atlanta uses a sister to the system shown in close-up here as part of an automation system installed by Vital Industries; it incorporates a Nova 3 mini-computer video/audio switcher and is coupled to BIAS for scheduling. WAGA uses the Instacart to handle sound so that live announcers don't have to stand by to do the audio portion required with stills, voice-overs, music, audio fills, tag lines, station IDs, etc. The Instacart is only one part of the total automation system; each tape is coded, given a start time, and actuated on schedule via computer. With up to 48 channels of tapes available for computer control, station personnel can be freed from routine tasks for more creative and productive work. (*Photograph courtesy of IGM*)

ments, evaluations and projections formerly unavailable to them. 'We can get instant read-outs," said McKinsey, "on national, regional and local sales reports: person-by-person sales breakdowns, projected sales revenues broken down by product category and a wide variety of other marketing data."

McKinsey forsees the day when automation data will enable the stations to accurately forecast advertising demands and provide the stations with demographic information on their markets. "In the long run," he said, "even the smallest station will have to automate to stay abreast of the competition."

Sacramento's KTXL-TV

In much the same way as the Lubbock station was forced into the utilization of automated equipment, station KTXL-TV, an independent UHF station in Sacramento, CA, has gone into automation in a major way and with startling results.

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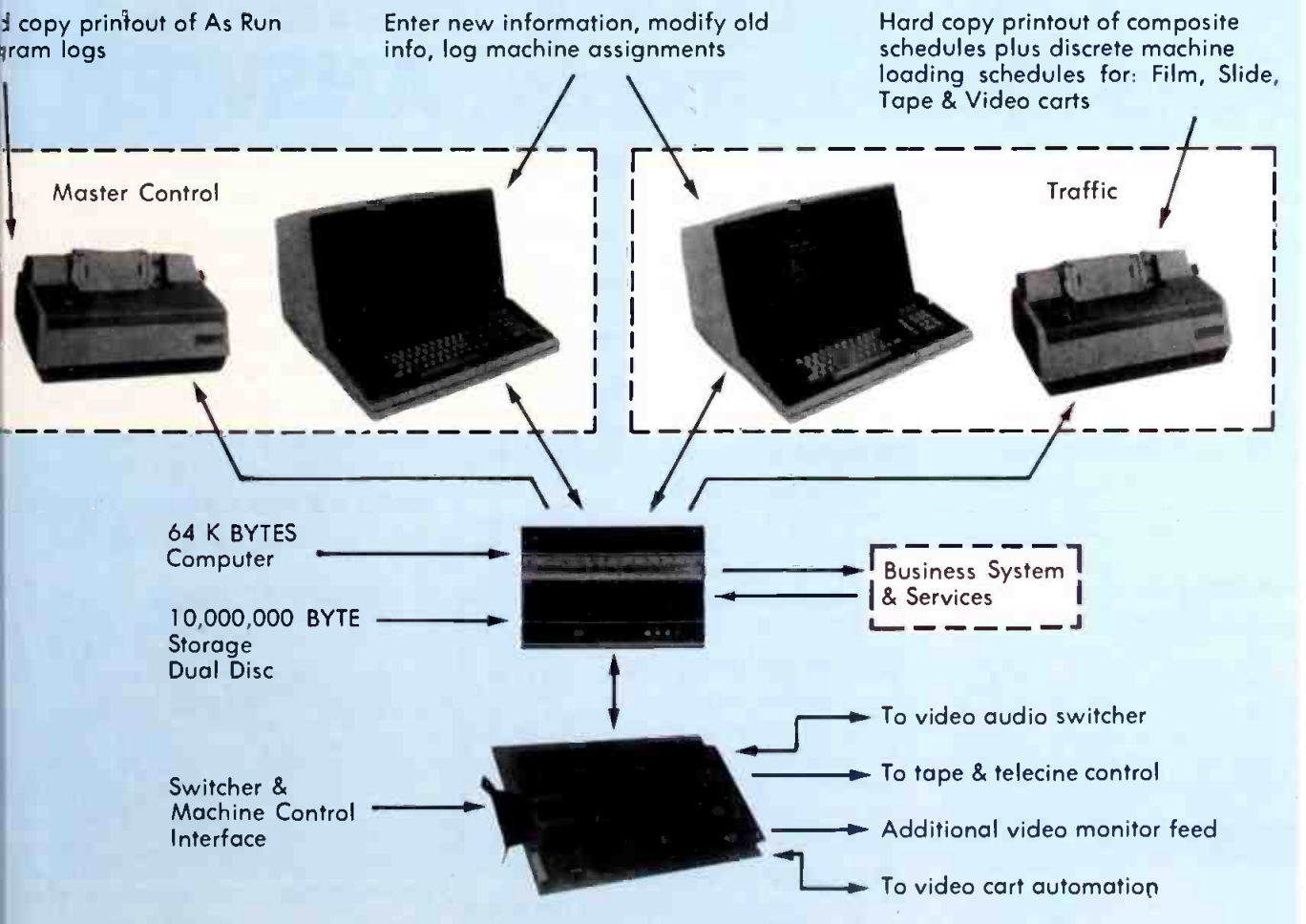

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A Significant Advance in Television Signal Measurements... ANSWER.™

Now you can automatically measure signal amplitude *and timing* parameters — quickly and precisely — with the **ANSWER** Automated Television Measurement System. For example, a complete in-service NTC 7 measurement routine can be completed and recorded in less than one minute — and with ±0.5%/0.5° worst case accuracies.

■ Easy accommodation of future measurement requirements.

Software programmability accommodates signal and measurement format changes or your own special requirements. You'll make a sound, long term investment with the **ANSWER** system.

■ Automatic operation.

Ideal for continuous surveillance at remote transmitter and earth station sites. The **ANSWER** system requires no operator attention, thus reducing training requirements, and freeing engineering personnel for more pressing tasks!

■ In-service evaluation of nearly all parameters.

Performance of your system over its entire dynamic range may be easily determined in-service. The **ANSWER** system not only measures signal average picture level, but may be programmed to instantaneously run a complete measurement routine when a specified APL condition occurs.

■ Fast identification and warning of system faults.

Two sets of programmable limits are provided for each measured parameter. Limits set #1 can trigger data logging; limits set #2 can initiate data logging and/or activate alarms.

■ High accuracy – low maintenance.

Up to 15 dB noise reduction through digital signal averaging gives improved measurement accuracy. In addition, all-digital circuitry minimizes drift and extends the time between periodic recalibrations.

■ System compatibility.

Three RS-232C interface ports are standard. An IEEE 488, 1975 (GPIB) interface is available as an option.

There's much more to learn about the economies, reliability, and measurement accuracy the **ANSWER** Automated Television Measurement System can offer you. For a fast response to your information needs, call Tektronix automatic answering service toll free: 1-800-547-1512. In Oregon, call collect: 644-9051. For even faster service, call your nearest Tektronix Field Engineer.

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- Transmission Quality ?
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1-20-78
5:32 PM
STL OUT
WRGN-TV

IN SERVICE MEASUREMENTS

VITS

INS GAIN		-2.2 IRE
LINE TIME DIST		2.9 IRE
SHORT TIME DIST		5.0 IRE
CHROM-LUM GAIN		-6.4 %
CHROM-LUM DELAY		50.0 NS
AMP/FREQ	0.5 MHZ	50.2 IRE
	1.0 MHZ	49.0 IRE
	2.0 MHZ	48.0 IRE
	3.0 MHZ	47.5 IRE
	3.58MHZ	47.0 IRE
	4.2 MHZ	46.2 IRE
LUM NON-LIN		-4.0 IRE
CHROM NON-LIN GAIN		-1.0 IRE
		-4.4 IRE
CHROM NON-LIN PHASE		4.7 DEG
DIFF GAIN		8.1 %
DIFF PHASE		4.6 DEG
CHROM-LUM XTALK		2.0 IRE
RANDOM NOISE		54.8 DB
REL BURST GAIN		-0.2 %
REL BURST PHASE		-0.7 DEG
SYNC GAIN		39.1 IRE
BURST GAIN		38.0 IRE
APL		41.0 %

TIMING

H SYNC	4.91 US
FRONT PORCH	1.79 US
SYNC-BURST END	7.79 US
SYNC-VIDEO START	9.61 US
H BLANKING	11.40 US
COLOR BURST	9.0 CYCLES
BREEZEWAY	0.56 US
EQ PULSE	2.46 US
SERRATION	4.73 US
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You can get individual measurements or complete sets of amplitude and timing measurements on-command or continuously from the **ANSWER** system. Hard copy, such as shown here, minimizes manual logging and provides a uniform, permanent record.

This sample output is one of many possible formats.

For Technical Data Only Circle (29) on Reply Card
For Demonstration Only Circle (30) on Reply Card

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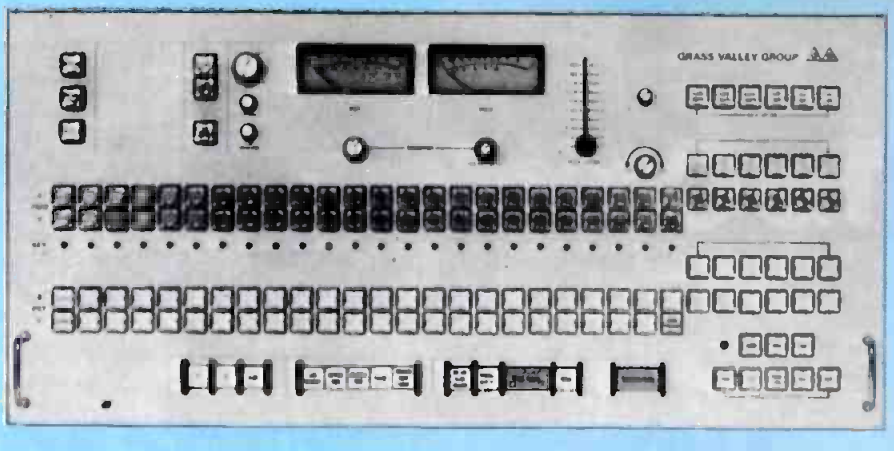


Audio/video switchers form an important link of instrumentation for TV station automation. Grass Valley Group's M200 model system above illustrates a modular interface approach to step-by-step total automation of a broadcast station's on-air switching and machine control functions. The modular approach allows user to expand their systems to higher levels, as required, while retaining features of previous levels. The M200 makes extensive use of micro-processors, random access memories (RAMs), programmable read-only memories (PROMs), and other LSI semiconductors as a cost-effective means of by-passing use of conventional mini-computers.

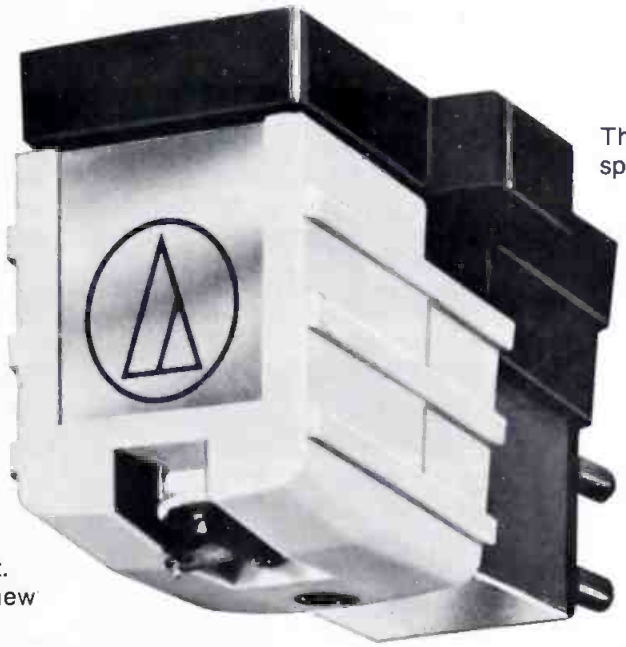
An additional block in a complete system is a CRT. As shown on the right, the GVG's CRT display uses a 24 line/64 character format and can show events or indicate system faults or other alarm conditions.

Local sales manager Ed Branca underlines his faith in KTXL-TV's automated system with the statement, "Fantastic! How we ever got along without automation before is beyond me." Branca estimated the budget increases of clients from 20% to as high as 400%. "The computer has given this whole Sacramento market an upgrading it long needed. It sets the rate schedule for the market and has enabled KTXL-TV to put new business on books, increase the spot volume and act as a spot rate setter for the market."

The station's computer is a Cox Data Services System, a complete in-house system with capacity to provide detailed information on sales formats, order entry, media instructions, log production, accounting and end of the month processing. Within each of these general categories the Cox Computer System also provides detailed and limited sales inventories for the sales format, with a weekly update.

continued on page 44

Audio-Technica rewrites the book on professional phono cartridges.



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The new Audio-Technica ATP Series Dual Magnet™ Stereo Phono Cartridges

What do you really need from a professional phono cartridge? Impeccable quality. Reliability. Uniformity. And reasonable cost. The goals we've met with the new ATP Series cartridges.

The new ATP Series are flat, smooth, low distortion performers that will do your station, studio, disco, library, or commercial installation proud. They are also very tough... the next best thing to "bullet proof". Because we know that "needle drop" isn't just a way to pay for music or SFX. It's a fact of life!

Both ATP cartridges and styli are *uniformly* excellent. When you at last need to replace a stylus, you always get "like new" performance again, and again, and again.

Don't confuse the ATP Series with other "professional" cartridges that are merely modified home units. ATP units don't have to be treated with kid gloves. And yet we haven't sacrificed tracking ability to make them rugged.

The all-new ATP cartridges were specially developed for the working environment. Three models provide a choice of either spherical or elliptical styli. Each cartridge is hand-tuned for optimum performance, with stereo channels matched within 1.5 dB to eliminate balance problems.

All ATP cartridges feature tapered cantilever tubes that combine high strength with minimum moving mass. There's no problem with back cueing, and the brightly colored cantilever tip is readily visible so that you can spot an LP cut quickly and accurately.

ATP cartridges are priced from $30.00 suggested professional net. Write for complete specifications. Try the ATP Professionals on your own turntables. We know you'll be pleased with what you hear. From the thoughtful pros at Audio-Technica.

Upgrade your entire record-playing system with new ATP tone arms. Rugged and precise, like ATP cartridges. Professional in every respect. Model ATP-12T or ATP-16T just $125.00 suggested professional net.

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Circle (32) on Reply Card

Automation

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Ronnie Wilkes goes over details with WNAC-TV engineer.

For the order entry it determines placement of spots, handles horizontal and vertical rotation, maintains rotation history, catches product conflicts, retains activity information and checks out pre-emptability while actually re-rotating spots and pre-empting lower priorities.

For media instructions, the computer provides the tools for keeping track of every physical piece of media that comes into the station. It reports out-of-date media, has a mechanism to delete media en mosse, provides lists indicating the media to be pulled for the day's log, has a method allowing the station to put its own identification on media and has a method for putting together multiple pieces of media for one commercial.

In accounting, the computer system provides the capability for invoices, production billing, credit and debit memos and cash receipts. The end-of-month processing provides detailed reports for sales and accounting for analysis and balancing purposes.

Jack Matranga, president and general manager of KTXL-TV, is no less enthusiastic about the station's computer system than his local sales manager. "It has proven to be one of the wisest investments we've ever made," said Matranga. "It has more than paid for itself in reduction in 'make-goods' alone, and it has given us an insight into developing rate structures for the Sacramento market that has been a revelation."

Matranga also pointed out that KTXL-TV had the capacity to go to full automation in both production and administration. "Our chief engineer, Bob Nelson," said Matranga, "is not 'gung ho' to go to full automation just because we have the capacity." Nelson is not convinced that total automation is the answer for all stations. "We do have a tremendous amount of production work," Nelson said, "and from my experience I'm not yet certain that the computer can provide the split-second reactions needed for some of the commercials we produce. I still believe in the concept of computers, but in some cases a little 'creative engineering' works out better."

Boston's WNAC-TV

In the East, one of the major metropolitan market TV stations, WNAC-TV, Boston, is completely dedicated to the concept of total automation—a status they reached early in 1977 after several years of planning. The final interface between production and administration included a connection between the BIAS system and a CDL-100 Technical Production Switcher. WNAC-TV's chief engineer, Ken McGowan, had evolved the total automation project over a period of years and is satisfied that the system is delivering the benefits that were pre-determined prior to the decision to go to full automation.

For Dave McCraken, traffic manager at WNAC-TV, the interface has been both a boon and a burden. The interface has created a new discipline in the traffic department and increased the responsibility of the department tremendously. However, as the staff has adjusted to the changes in operational techniques they have grown more confident, and the morale has increased almost in direct proportion to the increased responsibility.

With the total automation concept in use, WNAC-TV can now plan six months ahead for sales and traffic purposes with the various options the BIAS system offers. The daily log is prepared one day in advance of the actual scheduling date and is held in traffic until it is almost sure

continued on page 46

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OVER 100X IN LESS THAN A YEAR. ZOOM!

When our 18:1 was boldly introduced as "the ultimate studio lens," we were confident that its larger relative aperture, superior wide-angle coverage and shorter M.O.D. would raise a few eyebrows in the industry. Less than a year later, more than 100 network stations, independents, ETV installations and production houses proved we broke an industry precedent. With *under*statement. For more information, or to arrange a demonstration, please write or call:

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Canon Amsterdam N.V., Industrial Products Division: De Boelelaan 8, Amsterdam, Netherlands

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Automation

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that no changes will be made. The log is then transmitted to the DEC PDP-11.

With the traffic department spending a few additional hours providing the detailed information required for timing and the inputting of more detailed information on commercial media, the engineers, who formerly handled this delicate operation, have been freed for additional engineering-oriented work. Accounting is also relieved of most spot reconciliation duties, which are performed by the BIAS system and held for future invoicing. Neither traffic or engineering, however, have indicated they would like to see the return of the "good old days." As McCracken noted, "It's a whole new world, and we love it."

Cleveland's WEWS-TV

In Cleveland, WEWS (TV), a Scripps-Howard station, has also gone the total automation route. WEWS also utilized the BIAS automated business system to link up with a Grass Valley GVG 1400 technical switcher driven by a Vital 200 software package.

James Bloyd, vice president and chief engineer for WEWS, has looked at the concept of total automation as early as the 1960s, but held off until certain new technical advances in the broadcast automation field had been made. Jim has been extremely pleased with the

Traffic personnel at KCBD-TV check out computer data from BIAS System.

new concept and feels that WEWS is now as fully automated as the state-of-the-art permits at the present time.

Ed Cervenak, general manager of WEWS, notes that the "Scripps-Howard Broadcasting Company has long been a pioneer in the development of new methods of operation, as exemplified by WMC-TV, Memphis, (the pilot station for the first BIAS automated system in the early 1970s) and WEWS." Cervenak pointed out that the total automation of WEWS was just "an extension of the continuing effort of Scripps-Howard to be the leader in the broadcast field."

There is little doubt that the very near future will see many more TV and radio stations—large, medium and small—take the plunge into the automation field. With volume growing in record spurts and the broadcast industry under fire for quicker, more accurate and more efficient operational effort in both business and technical aspects and with a proliferation of paper work that threatens to deluge those still on manual operation, the need for automation of some kind in all stations becomes more pressing everyday. And the value of an automated system in terms of employee morale, overall efficiency, cost effectiveness, man-hour savings and the elimination of most human errors, is making the slogan "Automate or Vegetate" more meaningful than ever.

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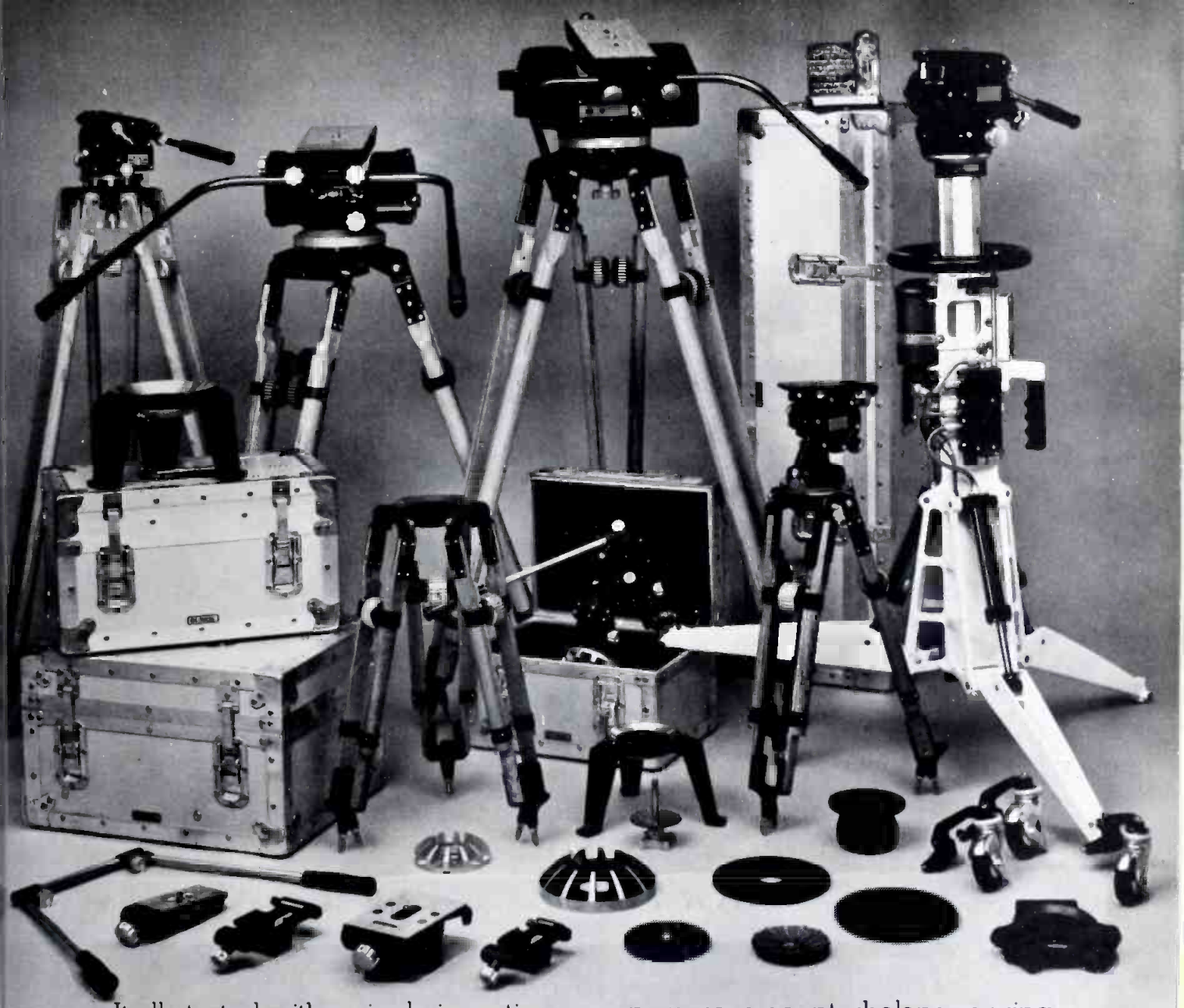

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FIRST THE O'CONNOR FLUID HEAD.

NOW THE TOTAL SYSTEM.

Circle (35) on Reply Card

Automation

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For TV, it's the year of the micro-computer

By Jim Ziegler, vice president, DCC/BIAS

With the continuing sophistication of the state-of-the-art in the mini-micro computer field, the concept of automation for the broadcast industry takes on new and intriguing proportions.

At Data Communications Corporation's BIAS (Broadcast Industry Automated System) division, the concept of the "Micro" has been foremost in planning for the past several years. With over 200 radio and TV stations on our client list in both the U.S. and Canada, we have been working to develop a micro computer for our station customers, and last year we unveiled our "Micro Bias" system, a micro-computer small enough to tuck under your arm and large enough to handle every facet of a broadcast operation.

The scope of the memory capability of the new Micro Bias, its convenient size (it can easily be moved any place in an office) and its speed, 4800 bits per second from the mainframe to the processor and 9600 bits per second from the processor to the peripherals, has made it one of the most popular and successful adjuncts to a constantly-changing broadcast-automation field.

Mini or micro?

The almost lightning-like change in automated broadcast equipment has caught many broadcasters short in their knowledge of new computer systems. Questions have poured into Data Communications Corporation concerning the comparative values and efficiency of the various computer systems. The primary question seems to be: How do computers compare? In particular, how do minis and micros compare?

Rather than being clearly distinguished, mini- and micro-computers form a whole spectrum of machine sizes from the smallest single-chip computers to super mini-computers which can perform as well as large commercial computers. There are no clear dividing lines between micros and minis. Indeed, some of the largest super mini-computers are built from collections of micros, and in most of the newer mini-computers, micro-computer chips are used as components for their construction.

The smallest computers available today are called single-chip micro-computers. These are entire four or eight-bit computers constructed on a single integrated circuit chip. They include 1000 to 2000 words of read-only program memory on the chip, 100-200 words on main memory and 10 to 30 single-bit input or output lines. They have one or two interrupts and may have some provision for expansion. Single chips such as these are available for $10 to $100 and are used for comparatively small electronic purposes.

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At WTCN-TV, Total Automation is a Reality!

At the heart of the station is a CDL Operations Computer System, which handles all the program switching, effects, material verification, run-sheet printing, FCC logging and machine control.

The first installation anywhere to have a *direct-wire link* to a Kaman Sciences, BCS-Traffic/Accounting System, the CDL System commands the receipt of scheduling information from and the transmission of log verification to the Traffic/Accounting Computer.

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CDL's latest news . . . a System 100 with *direct-link* capability to a DCC "BIAS" Traffic/Accounting System.

A truly modular approach, the CDL System 100 is today's answer to **Total Broadcast Automation.**

For more information or to arrange for consultation about your specific requirements, please call or write.

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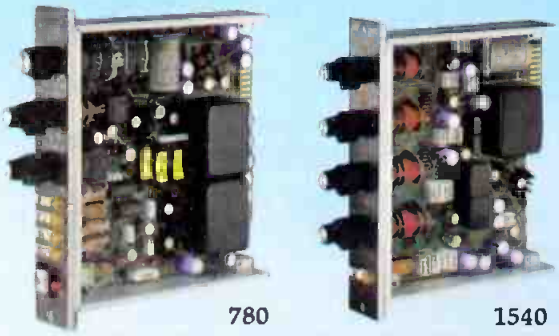

780 1540

Two of the major features of the 3200 and 1600 Series Production Consoles are the all-new 780 Preamplifier and the 1540 Four-Band Equalizer.

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THE PAGE...
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them well. The 3200 and 1600 series consoles are flexible, modular, multi-input, multi-studio and production center units with a host of capabilities. Although they feature a number of significant innovations, the new consoles consist of proven, practical components that are up-to-the-minute in state of the art techniques. And they are backed by ADM's *exclusive* 5-year warranty, the most comprehensive in the industry.

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contact Audio Designs and Manufacturing, Inc., 16005 Sturgeon, Roseville, Michigan 48066. Phone (313) 778-8400. TLX-23-1114. Southeastern Office: Phone (904) 694-4032. AMPEX Distributed outside U.S.A. by Ampex International Operations, Inc.

ADM

The Audio Company

Automation

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The next upward step in computer complexity would be the modular single board computer. The majority of these have an 8-bit word width, but they may range from 4-bit to 16-bit words. These computers normally have the following characteristics: 10 to 30 single bit input or output lines on the board, a single chip CPU along with 4000 words of data memory, provisions for Direct Memory Access (DMA) or interrupt capability, connection capability to mass storage devices and provisions for expansion of the memory, and additional input-output devices. The price range for these is normally in the $100 to $1000 area, and their use at a broadcast station would be for a limited amount of intelligence at the terminal location and the connections of terminals to another computer.

Operations handling

In the $1000 to $10,000 range, computer capabilities begin to assume the traditional role of opera-

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Jim Ziegler, vice president of Data Communications Corporation, demonstrates the portability of the Micro Bias microprocessor.

Both display units reveal latest results from central site input. Ziegler (left) of BIAS, display unit operator (seated, right), and Bryan Cottingham (background, left) both of WMC, observe race sequences called for from keypad (at fingertips of display unit operator).

Partial automation is evident on many fronts in broadcasting. In Memphis, TN three TV stations —WREG, WMC, and WHBQ— cooperated with BIAS in an "Electioncentral" system to follow election returns in virtually real time as data compiled throughout the county. Masterminded by Jim Ziegler of BIAS, the system uses a microprocessor and interfaces with switchers at each of the three stations. The result: viewers enjoyed fast display of returns on their home TV screens and station personnel enjoyed some relief from the staffing rigors of election return tabulation.

In a community effort, the Memphis Jaycees manned about 200 phones to call in election results to data input personnel at the central tabulation site. Data were compiled and checked using two microprocessors, eight CRT input terminals, and a line printer. The compiled results were available in updated form at the touch of a keypad. And, each station could, at the touch of a keypad, select and display the sequence of the election data as they wanted to broadcast it. News directors and editors praised the flexibility of the system and the high quality of the transmitted pictures.

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Automation

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tions handling. The small 8- or 16-bit computer systems with eight to 64,000 words of program or data memory would have direct access capability, probably vectored interrupts and the capability of handling slow to medium mass storage equipment. They would have a general purpose, flexible structure for connecting input-output devices similar to the traditional mini-computers and could be used for simple accounting, station play list schedules, transmitter data logging and similar activities.

Medium size mini-computers are usually 16-bit machines with a memory capacity of 16 to 256 thousand words. They also have the capability of handling fast, large mass memory storage systems with lightning fast DMA and vectored interrupt systems. They can be geared to perform parallel multiple input and output operations to mass storage and come with software support allowing a wide variety of sophisticated operating modes. They are suitable for automated radio station operation, automated remote transmitter operation, general purpose accounting and automated video switching. The price range for this size mini-computer is from $10,000 to $100,000.

There is little difference at the present state-of-art in the computer industry between the largest mini-computers and the smaller models of the largest commercial computer lines. The large minis use word widths of 16 to 32 bits or more, contain a memory capacity of from 64,000 to several million words of memory, and can handle multiple simultaneous high speed input-output operations. Some of these minis even use the same software and operating systems and rival in power the traditional mainframe computer. In this area of efficiency, the mini-computers will cost well over $100,000.

There is little question that the rapid advances in computer technology have provided increasing power and capability in the micro and mini-computer field. Many micros, for instance, can out perform the smaller minis, a trend I expect will continue as new microprocessors are brought on line. Performance is still the bottom line on the selection of any mini or micro-computer and the challenge to the broadcaster is to opt for the system which gives the best results in a comparison between cost and performance. *continued on page 56*

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Automation

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Wisconsin mini-network maximizes efficiency with 3-way computer tie-in

By Terry K. Shockley, president of Horizon Communications Corporation

Station WKOW-TV in Madison, WI, the flagship station of Horizon Broadcasting Company's network of stations in Wisconsin (along with WAOW-TV, Wausau and WXOW-TV, LaCrosse), has been utilizing an interconnected, three-way computer tie-in system which has enabled it to tighten the overall effectiveness of the "Mini-Network," decrease costs in a number of areas and erase discrepancies in lost spots which were exceeding $3,000 per month.

"If you'll pardon the pun," said Terry K. Shockley, president of Horizons Communication Corporation of Wisconsin, "we have expanded our horizons considerably with the computerized interconnection of the three stations on our mini-network. The new system has cut down on our paper work considerably, allowed us to follow a course of truly sophisticated selling, given our sales people at the other two stations a heightened sense of responsibility, created a feeling of unity and elevated morale in all three stations of the mini-network and, finally, has given us far greater control of manpower, overtime, program costs and other operational activities than we've ever had before."

Mini-network

The new automated system in use at the Horizon Communications Corporation mini-network is the BIAS Mini-Network System. It was specifically designed by the Data Communication's BIAS divison for TV stations which operate additional properties away from the main station. WKOW-TV, Madison, WI, is the "mother" station for the mini-network and feeds its ABC-TV programming to both WAOW-TV, Wausau, WI and WXOW-TV, La-Crosse, WI on a simulcast basis. Most network and entertainment programs are fed via microwave from the Madison station to Wausau and LaCrosse. Each station originates its own news, weather, sports and public service programming.

The configuration for the Horizon mini-network system consists of a mini-computer, three CRTs and two operational printers at the flagship station, WKOW-TV, with each of the other stations utilizing a micro BIAS processor, two CRTs and an operational printer. All three stations are linked directly with the BIAS host computer in Memphis, and each has access to the host computer and the computers at each of the stations. Thus, no prior order clearance through the flagship station is needed from either of the other stations.

Flexibility

"The beauty of this BIAS interconnection," said Dennis Selenka, vice president of administration for

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Automation

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the Wisconsin mini-network, "is the sales flexibility the computerized interconnection gives us. For instance, any salesman at any of the three stations can sell his own station or all three stations. Priority is given to the first order entered. Confirmation is immediate, and this capability engenders a competitiveness that is extremely healthy for the stations."

"The ability of the salespeople at each of the stations to ascertain availabilities for all three markets has also been a major boon," according to Selenka. The instant communication between the three stations and their staffs, made available via the computer terminals, has enhanced the teamwork aspects of the overall operation. We used to lose spots via manual operations or have spots run at the wrong time. Most of this has been eliminated. Prior to the installation of the BIAS three-station interconnection, all availabilities were phoned in from the stations two-to-three days before they could be assembled and properly scheduled. Now, all the salesman has to do is punch up his order and get his approval almost instantaneously."

The BIAS satellite system in use at Horizon's mini-network is a pilot project which is being made available to other TV stations operating separate facilities in similar mini-networks or group operations, according to Bill Boyce, sales manager of the BIAS division of Data Communications Corporation.

The new system lifts some of the burden of responsibility from the parent station for its affiliates and, for the first time, allows the affiliates to often act as independent TV stations. In addition, the new system provides each station with sufficient versatility in sales, traffic, accounting, and a back-up capability to either handle its own operations singly or defer to the parent station for combination operations.

Capabilities

The widely expanded capabilities now possible via the new computer system for each of the stations includes: automatic updating of sales at all sites at the time of entry; all orders written and entered directly from the selling station and coded to include the airing station or stations; total inventory control on a per-station hasis; ability to print all contracts at each station site; sales projections at each station which can be pulled as combined totals or station by station projections.

In the traffic area, programming information for simulcast and local shows need only be entered once and maintained by the one station responsible for updating the information automatically; copy information for simulcast spots need only be entered once; each station can independently do prep work and printing of the log at each site; the log reflects only those spots to air on station originating the log with a "feed" column to show all stations airing the spot; and spots can be manipulated for one or all stations depending on station policy. The system also enables each station to print its own daily log reconciliation, invoicing and monthly reports handled on combined basis by flagship station WKOW-TV.

Utilization of the BIAS Satellite system has enabled the Wisconsin Mini-Network to maximize its revenues, according to President Shockley. "It's cut down the paper work for our salesmen so that they can spend more time selling. It's enabled us to exploit more effectively the significant growth and volume we've been enjoying over the past few years and to plan accurately our projected growth for the future."

Efficiency

The introduction of the three-station interconnection, in the words of Dennis Selenka, has made the mini-network "efficiently efficient, where we used to be inefficiently efficient." In the specific areas of cost savings for the mini-network, Mr. Selenka noted that the system has eliminated discrepancies in spot scheduling which had amounted to $3000 to $5000 per month at the Madison station alone. "It's solved several personnel problems that we've had and resulted in a far more effective utilization of our manpower. It has reduced our copying cost by over $500 per month and, concurrently, cut down on our total manpower costs. Overall, it's just a great system for us and it is providing us with a tremendously solid foundation for the future."

For years, each of the three stations on the Wisconsin mini-network worked somewhat independently of each other, and any delays in the filing of the log from one station held up the operation of all three stations. With the interconnecting system there is now instantaneous communication between the three stations.

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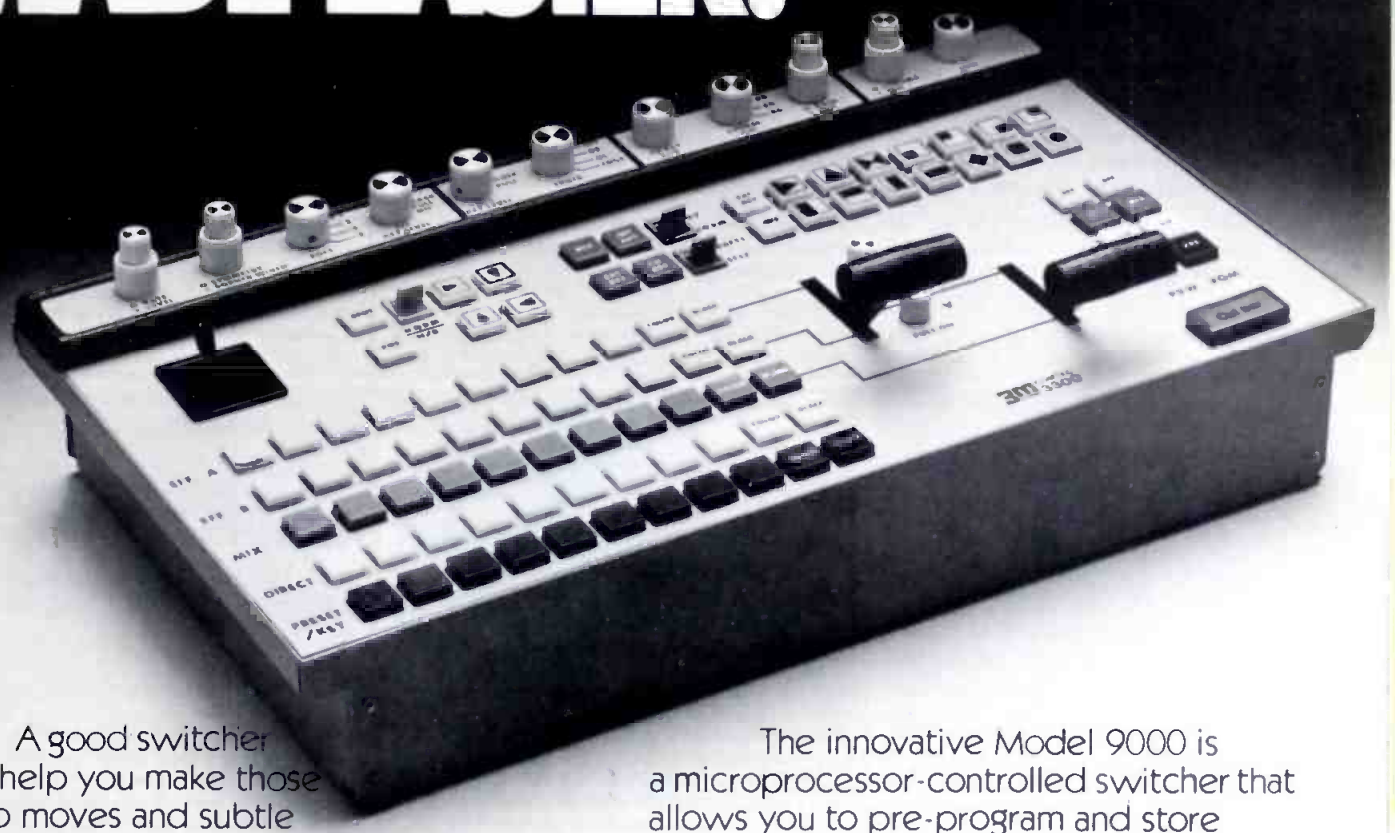
TECHNICAL DIRECTION MADE EASIER.



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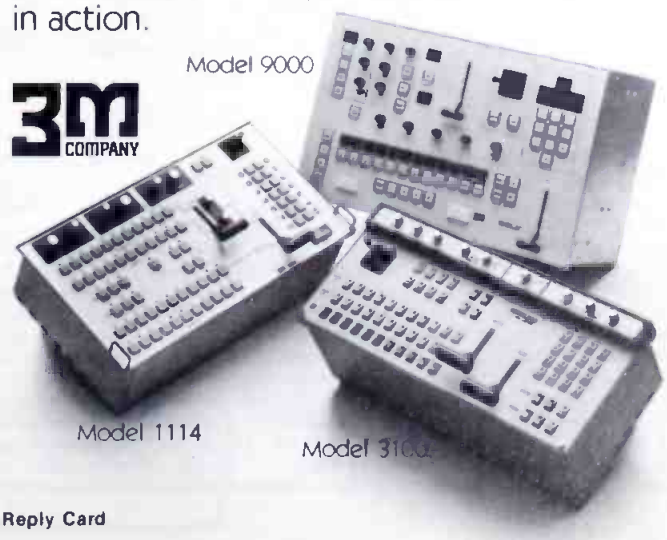

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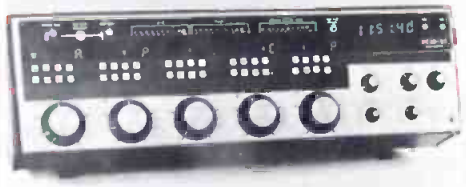

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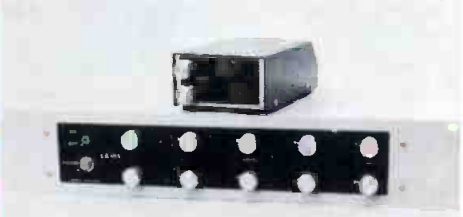
AUDIO ROUTER/ AMPLIFIER. The most versatile, feature loaded switcher on the market. Plug in cards for up to 16 inputs & 12 outputs. Each input has an amplifier and level adjust for attenuation and up to 17dB of gain. Output cards feature dual bal. 600 Ohm outputs, momentary BCD coded controls (may be slaved from other locations), LED output status lights show thru the front panel, and on-board mono/stereo select switch. A smoked plexiglass front panel allows the operator to tell the status of any output. Also on the front panel are 2 rows of silent momentary contact switches. One row for output selection & one row for input select. Contact RAMKO for further information and specs. Price — $716 - $2,108



LINE AMPLIFIERS. The ideal solution for your line level problems can be found in one of the 4 different models offered. LA-2 (table top or rack) and LA-5S/10M: mono or stereo, balanced or unbalanced high impedance inputs, +21dBm maximum input level, +21dBm maximum output into 600 ohm balanced line, frequency response +0 —1dB 10 Hz to 50kHz, distortion 0.008% at +8dBm out. The LA-2 is a 2 channel amplifier. The LA-5S/10M is a modular rack mount unit with up to 5 stereo or 10 mono channels. The LE-3 is a 3 channel mono line amplifier with equalization for high and low frequencies and is also modular. Gain of all units, variable to +20dB. Price — $16 to $469.

DUAL MIC COMPRESSOR/AMPLIFIERS. Portable dual mono & stero mic limiters that amplify, mix, limit and control gain. The DML-dual mono is used where 2 separate mics must be independently amplified and compressed and mixed into a common 600 ohm output. Primary and backup batteries (or an optional AC supply). Includes tone generator & talkback ability. The DML-1S is an AC powered, stereo version. Input: —60dB naminal, —18dB max. Gain: 90dB max. Limiting Output Level: DML-2M, +10dBm. DML-1S, +18dBm or +8dBm. Balanced Inputs and Outputs. Dist.: 0.3%. Attack Time: 2 microseconds. Noise: 60dB below limiting output. Size 2½" H x 5¼" W x 8½" D. Price — $239 to $274.

MIC/LINE AMPLIFIERS. Dual function for microphone or line. The MLA series are ideal for remote broadcasts, churches, mixer expansion, and emergency situations. Front panel controls for mic or line selection and level. Mic input —60dB in for +4dBm out. Line input balanced bridging with gain variable +26dB. —18dBm in provides +8dBm out with an additional 13dBm of headroom. Distortion is 0.1% or less. Response: Mic channel ±2dB 20Hz to 20kHz. High level channel: ±1dB 5Hz to 30kHz. Inputs may be used bal. or unbal. XLR Mic connectors. Single or dual channel, table top or rack mount. Price — $128 to $195.

STUDIO MONITOR AMPLIFIERS. Exceptional reproduction with high performance and versatility. 7 different models to choose from. MA-7 (mona), MA-14 (stereo): 5W per channel into 8 ohms. Response: +0, —2dB 20 Hz to 19kHz at rated output. Distortion: 0.4% max. at 1kHz and rated output. Input: 5k unbalanced, 0.7V in for max. output. Table top or rack mount. SMA series: mono or stero, table top or rack mount. 25W RMS per channel into 8 ohms. Inputs: high Z balanced bridging. Response: ±1dB 15Hz to 90kHz at rated output. Distortion: 0.6% at rated output. Built in muting circuit with input and output level controls and bass contour adjust. Price — $96 to $269.

AUTOMATIC CARTRIDGE & CASSETTE LOADER. Precision wind your own carts and cassettes and save up to 40% on reloading costs. The ACL-25/E is simple to use, just dial in the time desired and push the run switch. The ACL stops automatically, precisely to —0, +1 second of playback time. The exclusive playback speed selector ends mental gymnastics figuring tape length versus playback speed. Simply set the selector to 1⅞, 3¾, or 7½ i.p.s. and the ACL does the rest. An optional cassette adaptor enables you to wind both carts and cassettes on the same machine. An optional pancake adaptor is also available. The ACL-25/E has a nominal winding speed of 30 i.p.s. Price $325.

TECHNICS PROFESSIONAL SERIES BY PANASONIC. Ramko Research is proud to be one of the largest distributors of this extraordinary equipment. The SP-10MKII and the SL-1500-MK2 Turntables have set new standards by which turntables will be judged for many years. These direct drive units with Quartz-phase locked speed control maintain speed within 0.002%. Wow and flutter is 0.025% WRMS and Rumble —73dB. Also available are reel to reel tape recorders, portable and fixed cassette R/P units, power amps, parametric equalizers, tuners, and a series of studio monitor speakers that will astound you with their phase-linear reproduction.

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Automation

continued from page 58

Montana network launches automation

(Compiled for us by Ampex Corporation)

Any manager of a small television station who believes the more sophisticated broadcast systems are luxuries he can live without should consider the experience of the Montana Television Network.

The Montana Television Network, headquartered in Billings, operates four commercial stations in the growing, but still lightly-populated state. The largest market area it serves, Great Falls, has only 63,910 television homes. But that has not stopped MTN from investing in the sophisticated equipment to provide its viewers with top-quality broadcasting.

"Small stations have an undeserved reputation for the 'low quality' of their broadcast product," says Joseph S. Sample, president of the Montana Television Network. "We don't want to suffer by comparison with larger stations, so we have made it a policy to acquire the best equipment available."

The network's acquisitions include three Ampex ACR-25 videocassette recorders. The first two systems were acquired in 1974 for KTVQ-TV, Billings, and KRTV-TV, Great Falls. KXLF-TV, Butte, received its system in 1976. "MTN's fourth station, KPAX-TV, Missoula, was started from scratch 15 months ago and is building toward the day when it will need a similar system," Sample says.

The latest version of the system, the ACR-25B, is designed for automated and semi-automated television operations. Three accessories—the Automatic Scheduling Device (ASD), the Identification Data Accessory (IDA), and the Automatic Data Accessory (ADA)—give the ACR-25 automated programming capabilities.

But automation wasn't a major consideration when MTN decided to acquire its ACR-25s, according to Sample. "When we look at a piece of equipment, automation is desirable," he says. "But automation is so far in the future for us, it is not a big part of our thinking."

Cost, dependability and ease of operation were the deciding factors. "The cost wasn't that much greater over a reel-to-reel machine," Sample says. "We work with relatively few operators, and its very important that we be able to load the machine and not have to sequence the cassettes. Those were big factors in our decision."

The ACR-25 can accommodate as many as 24 cassettes at a time, ranging in length from 10 seconds to six minutes, and has a random

A technician at KTVQ-TV finishes loading cassettes into the station's Ampex ACR-25 videocassette recorder in preparation for the broadcast day.

A technician at television station KTVQ-TV previews a cassette on the station's Ampex ACR-25 videocassette recorder. The station uses the recorder to broadcast 300 to 400 cassettes during a typical broadcast day.

access capability that eliminates the need for sequential loading.

MTN uses the ACR-25s for the broadcast of commercials, station breaks, news segments—just about anything they can put on a cassette. KTVQ, Billings, is a good example.

The station has an active library of over 1,700 casseites and uses 300 to 400 of them during a typical broadcast day, according to J.R. Middleton, chief engineer at KTVQ.

A single operator runs the ACR-25, and he programs the unit before the start of the broadcast day. The system eliminates manual switching sequences between multiple picture sources — film chains, live studio and VTRs—to help shave costs.

And the system is used extensively during the station's two daily news broadcasts. MTN starts its new programs with a 15-minute segment devoted to state and regional news that is broadcast by all four stations, then goes to each station for 15 minutes of local news. The opening segment is broadcast by KRTV-TV, Great Falls, which gets regular news reports from its sister stations throughout the broadcast day.

At KTVQ, news film is transferred to videotape on an Ampex VR-1200 videotape recorder, then edited to broadcast length. The tape is then transferred to cassettes for use on the 5:30 and 10:00 news broadcasts.

"For material that is needed on a more urgent basis, the transfer is done directly from film to cassette." Middleton says. "The ACR-25 has been fantastic when you consider how many cycles it goes through," he adds. "Down time has been minimal."

An extensive remodeling of the Billings studio was started shortly after the ACR-25 arrived. "We had a very dirty environment," Middleton says. "We tried to protect the machine the best we could, but it was still exposed to a lot of dirt and dust. But it held up well."

Sample adds: "Our people have been delighted with the system. When the unit was delivered to Butte, we got thank you notes from the engineers up there. I don't think that's ever happened before."

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Automation

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Editor's Postscript: The Competition in Automation

Our approach to covering the topic of automation in the TV industry was along different lines this year as compared to articles in previous years. The reason for this departure in format was dictated by several factors. Foremost of these is that automation is a high-technology area incorporating many disciplines and specialists: solid state devices; computers;—mainframe, dedicated and minis; interfaces; data processing hardware and software; communications lines; engineers; designers; consultants; business managers; programmers...and the list goes on.

It is not possible to cover all aspects of such automation fully in a single article or with a single author. Consequently, we have tried to cover the subject with independent articles supplemented with panels that touched on other aspects of the subject, or on other sources.

One of the difficulties in covering this topic thoroughly is the stiff competition among the industry sources and the pride they express in their accomplishments. And we, the publishers, sometimes get caught in the middle trying to provide an objective service to the industry—and especially to those considering updating their own facilities.

In 1976, **Broadcast Engineering** ran a 3-part series on automation that described in detail the history of automation by Metromedia stations WNEW-TV, WTTG, WCTN-TV, KMBC-TV, and WXIX-TV in cooperation with Ampex, Westinghouse, CDL (Central Dynamics, Ltd.), BCS (Business Computer Systems of Karman Sciences, Colorado Springs, CO), and DEC (Digital Equipment Corp.). A brief recap of this history can be helpful.

• In 1973, Metromedia selected the CDL System 200 Technical Operations Automation system and the Ampex ACR-25s for its stations. Then, CDL, Metromedia, Westinghouse, and Ampex jointly defined an intelligence interfaces to permit the CDL System 200 to program and control the Ampex ACR-25s automatically. The two interfaces are

better known as the Ampex ADA (Automation Data Accessory) and the CDL ARCH (Automatic Remote Cassette Handler).

• Early in 1974, Hal Christiansen, controller of Metromedia Television, formed a team to define and select a Business Computer for the Metromedia stations.

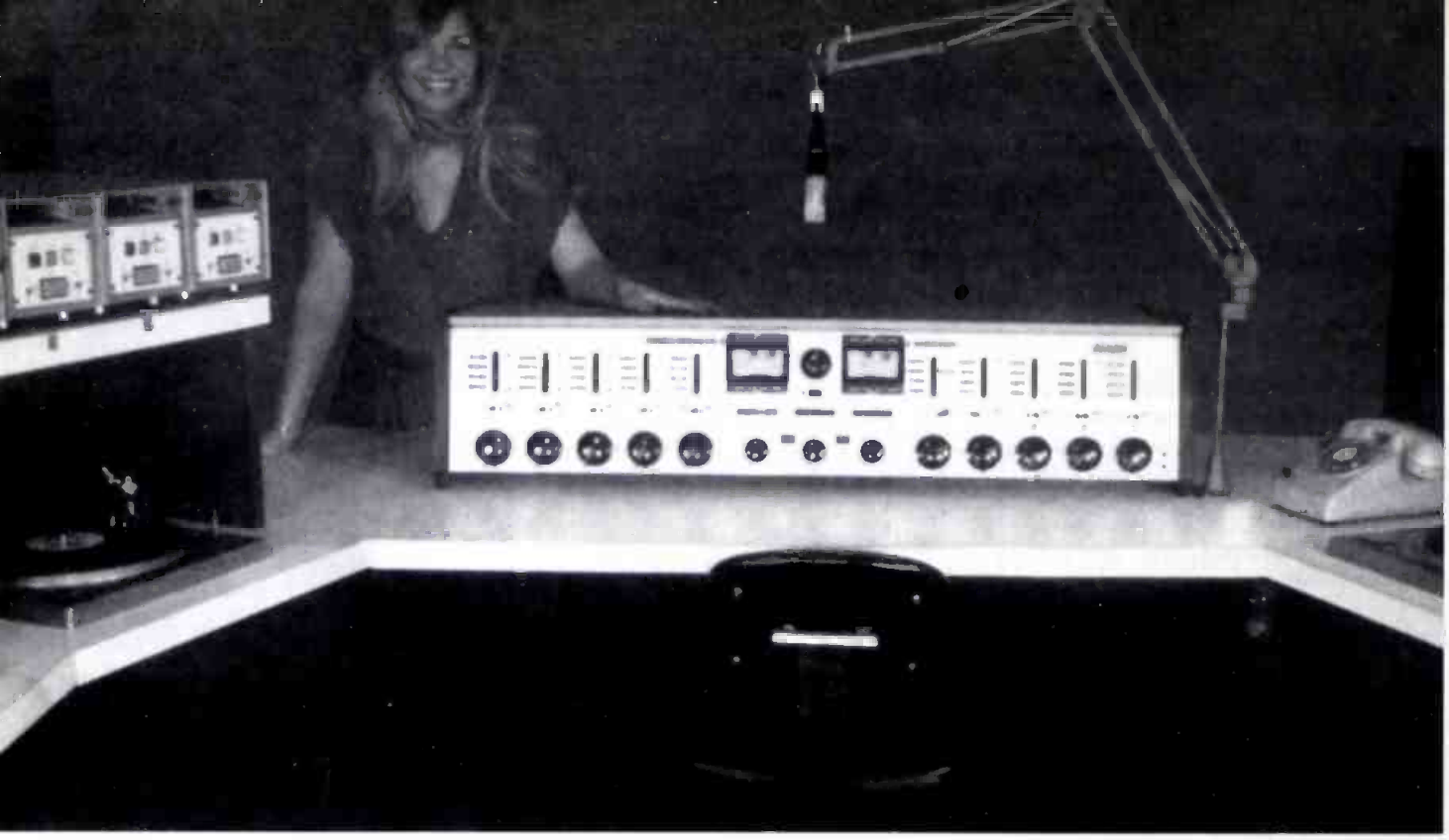
• In 1974 the Kaman Sciences BCS-1100 Business Computer system was selected. This system was relatively new, but it communicated well with the CDL System 200, and both used the DEC. PDP-11/05 minicomputer and random access mass storage discs for data.

• The WTCN operation went with the CDL system in May, 1974. In January, 1975 the first ACR-25 was interfaced to the CDL system using ADA/ARCH interfaces. This became the first totally automated system when, in May, 1975 the BCS-1100 Business Computer System was hard-wired to the CDL System 200 Technical Operations Automation System.

Accordingly, Richard E. W. Smith, vice-president, Kaman Sciences Corporation, points out that "BCS developed, demonstrated, and had operational in the field the first standard interface. And, we've interfaced to CDL, Vital, and Grass Valley systems... in fact, we demonstrated this at the 1975 NAB."

Jack Finlayson, manager, BCS Marketing, continues the BCS development story. "The BCS interface," he said, "not only sends and receives the log to and from the switchers, but also creates exact timings and inserts all effects such as dissolves, fades, etc. These include multiple simultaneous events such as voice overs, super slides, and many other features not contained in our competitor's interfaces. And that's not all because our R&D goes on. You should see our new tape cassette inventory, news inventory, film library management and amortization programs.

BCS appears to be fully dedicated to continuing its tradition of supplying the automation industry the tools it needs. Their current computer services include: traffic, accounting, film inventory and amortization, tape cassette inventory and news inventory. BCS is now in the process of releasing its Demographics Program which will allow stations to prepare and have printed sales avail submissions via the BCS 1100 system. □



Stereo console roundup

In preparing this roundup article on stereo consoles we wrote every manufacturer listed in our 1978 September Buyers' Guide, contacted exhibitors at the NRBA conference in San Francisco last month, and solicited inputs from firms found listed elsewhere who had not previously responded to our requests for data to list in our Buyers' Guide.

As with all roundups of this type, not everyone responded to our cry for supporting data and good photographs. But, we did get inputs for both AM and FM stereo consoles as well as monaural consoles. So, we've compromised our position in the article to let the contributors tell much of their product development story on audio consoles. Detailed manufacturer's data may be obtained using our reader service card and the table at the end of this rounup article.

Ampro's Approach

Ampro has been a major supplier of professional broadcast equipment to many of the largest broadcast and sound installations for over ten years, supplying equipment from individual components to custom-designed studios.

The Ampro audio consoles and support equipment have been well-conceived, well-engineered, and well-constructed by experienced broadcasting professionals who know the critical needs of stations and studios. They feature state-of-the-art technology and provide a high level of performance, reliability, and total versatility.

The Ampro system shown above illustrates the modular approach possible in a studio design. And, Ampro helps plan an installation to meet exacting performance standards and takes into consideration highly important human engineering factors to provide a comfortable, efficient operating environment. After installation Ampro offers full technical back-up and service to keep the equipment operating at peak performance.

The lady in the picture above is shown with her left hand resting on an Ampro console. The system provides professional performance and appearance in an attractive, rugged package; it's a complete, full-function audio control center requiring no options. Each console features total flexibility and versatility for nearly every control situation and is available with 6- to 12-channel capabilities. The 6-channel console is available in mono, dual mono, and stereo; all 8-, 10-, and 12-channel models are available in mono, stereo, dual stereo, and simulcast configurations.

The console shown here features step-type rotary faders with silver contacts and detented cue on each channel, but Ampro's LC series offers up to 12 channels with linear fading.

1. Autogram

Autogram features 6- and 10-channel mono and stereo audio consoles. The 10-channel system shown here is 10-in. high by 20-in. deep by 44-in. wide and can accept 28 stereo inputs and one high level cassette source. The outputs, depend-

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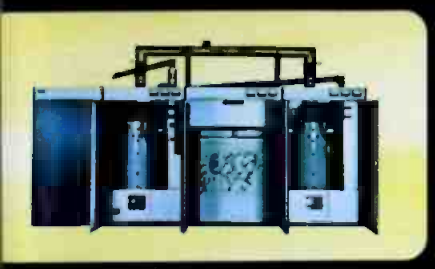
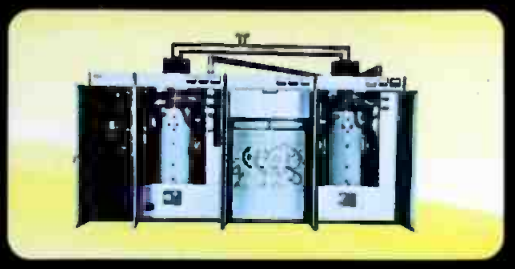



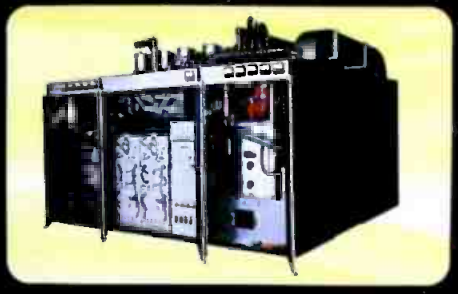


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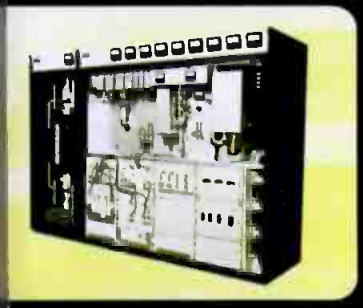
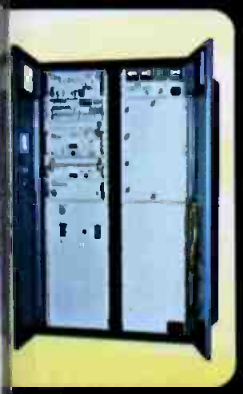
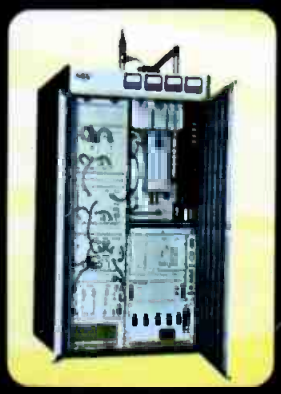
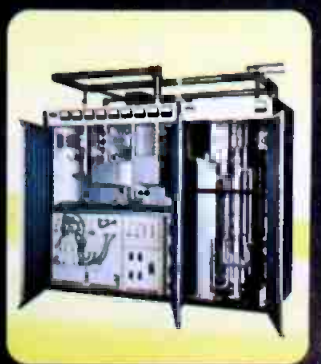
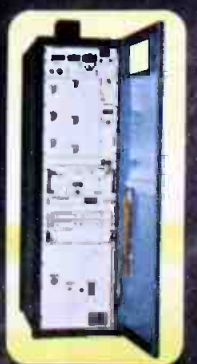










What others promise, the Ikegami HK-312 has been delivering for 2 years.

The Ikegami HK-312 is a high-quality broadcast studio color television camera with unusual capability. In addition to delivering superb pictures, it can be easily interfaced with a microprocessor-computer control unit that automatically performs a complete camera set-up in 45 seconds or less. This is not a vague promise, it's what the HK-312 computer has been doing at leading stations such as WABC, WGBH, WLS, KABC, and KGO. They've put the HK-312 and its computer through the testing and evaluation wringer– the HK-312 cameras you buy today are based on two years of on-air field experience and incorporate the suggestions of a variety of users.

By itself the HK-312 is a state-of-the-art camera with Ikegami performance, quality and reliability.

Performance designed-in by the engineering group responsible for the well-known Ikegami HL-33, HL-35, HL-37, and HL-77.

Quality assured by 30-mm Plumbicon® tubes, preamps furnishing a signal-to-noise ratio of −53 dB minimum, precise video signal processing, and an excellent detail corrector. For the very cleanest first-generation VTR masters a −3 dB gain control delivers pictures with virtually invisible noise.

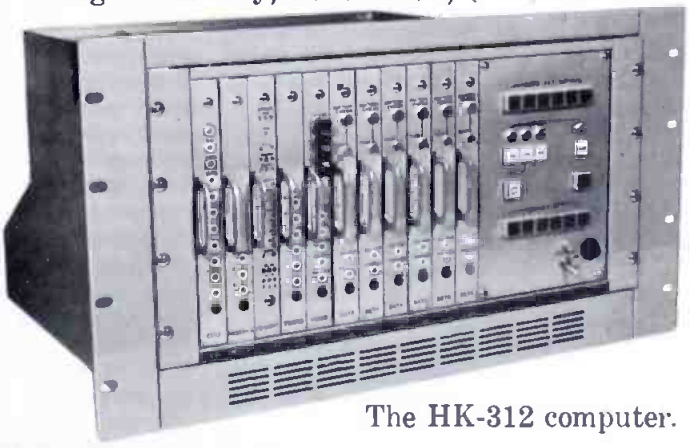
Reliability built into every HK-312 and verified by complete testing before delivery.

The computer is available for instant integration and operation. Plug it in and the HK-312 camera can be automatically interrogated and set-up to produce an essentially perfect picture: centered, aligned, registered, skew-gamma-flare-corrected, black-balanced, color-balanced, set-up completely and double-checked in about 45 seconds. A single computer can sequentially serve up to six HK-312 cameras. A single push-button starts the entire sequence; the computer can be programmed to skip any camera or any function.

The HK-312 computer quickly pays for itself by liberating your talented personnel for more-productive work. Its automatic adjustments are consistent and do not vary with the taste and judgment of the operator. The HK-312 camera head can be connected to its camera control unit with any TV-81 or TV-81 mini cable.

A second Ikegami computer-compatible color camera, the HK-357A, suitable for field or studio applications, is now available. It features one-inch diode-gun Plumbicon® tubes for high resolution and lowest lag as well as a choice of self-contained camera operation or connection to a full-function base station by multicore or triax cable. Full monitoring capability and a chroma-key signal are available.

For details or a demonstration, ask Ikegami Electronics (USA) Inc., 29-19 39th Ave., Long Island City, N.Y. 11101; (212) 932-2577.



The HK-312 computer.

Ikegami

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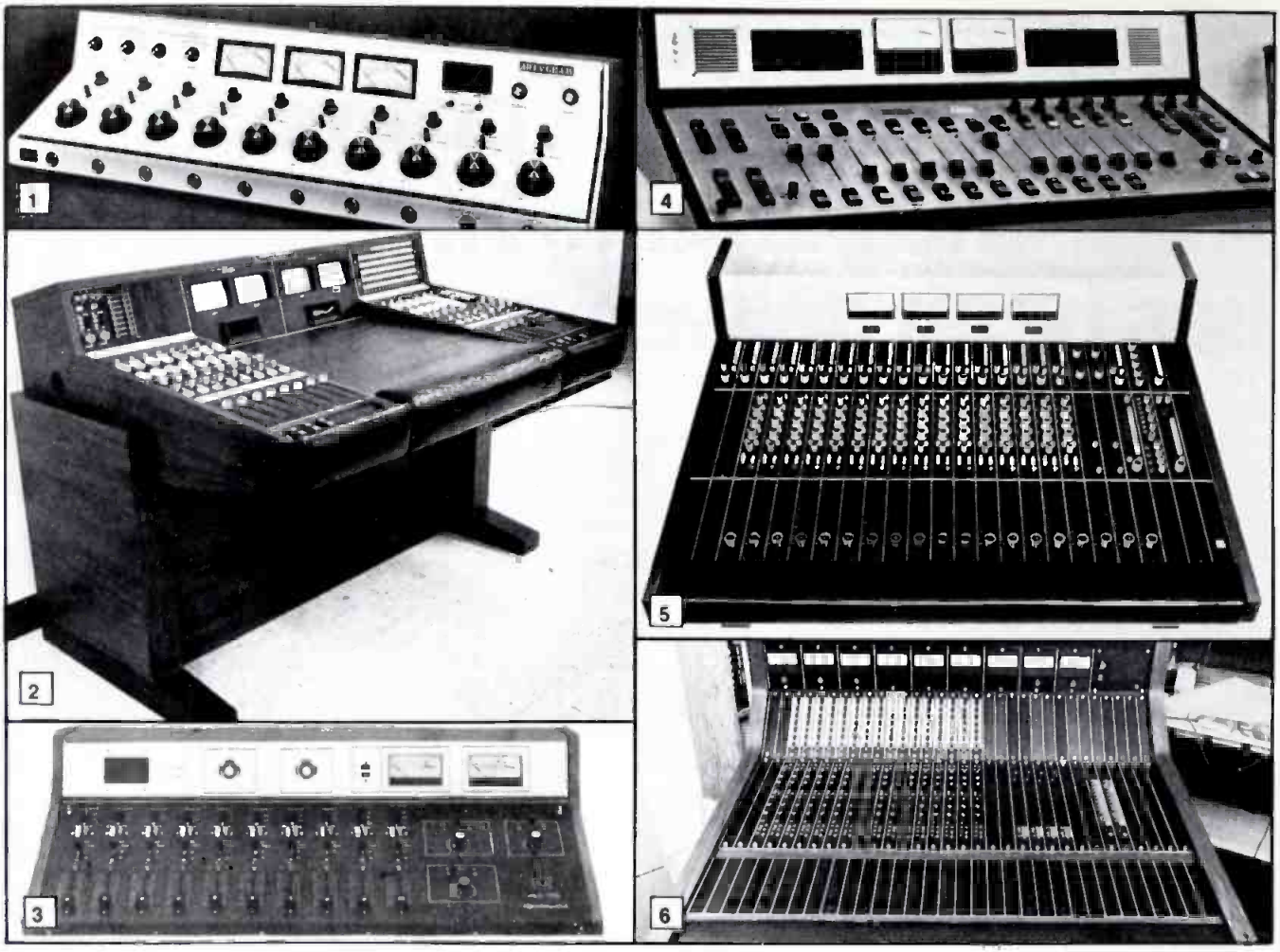


Stereo console roundup

continued from page 66

ing on the modules used. may be: one stereo program, one stereo audition, one monophonic program, two monitor amplifiers, two headphone amplifiers, and one cue amplifier.

2. Automated Processes

Audio consoles are but one of more than 100 audio products available from Automated Processes, Incorporated (API). They pride themselves on being a world leader in manufacturing audio consoles, with high on-air reliability, modular construction for flexibility, and outstanding performance.

The console here is but one of many configurations possible with the API modular concept. Customized consoles can be fully modularized for recording-studio production or for 'on air' use.

3. Broadcast Electronics

Broadcast Electronics offers 15 audio mono/stereo consoles for demanding control room or production use. These include the dual-channel mono and stereo consoles for simultaneous, multi-channel level control. The Series 200A rotary-mixer cnsoles featuring ladder-type maintainable step attenuators with cue bus switching; Series 100A rotary mixer consoles with sealed potentiometers for long-life; and 4-mixer models ideal for production, news rooms, or on-air use. Shown here is the model SL-3110 with dual-channel stereo output, vertical attenuators, and 10 mixing channels.

4. Dyma Engineering

Dyma manufactures radio broadcast and TV custom consoles and control centers from state-of-the-art electronic components and equipment. Each is tailored to the user's requirements and engineered to provide in one control center all the pieces required for creative operation. They feature proprietary switching systems, illuminated status indication, machine control, equalization and effects.

5. Harris Corporation

The Harris Model M90 is one of the most versatile audio control consoles available. Completely modular in concept and design, it is readily customized and field expandable—a professional on-air/production/reinforcement system. The console provides two or four output channels with up to 26 mixing (52 inputs), or up to 24 mixing positions (48 inputs) in the 8-output channel version. Combined monaural output is standard in all versions.

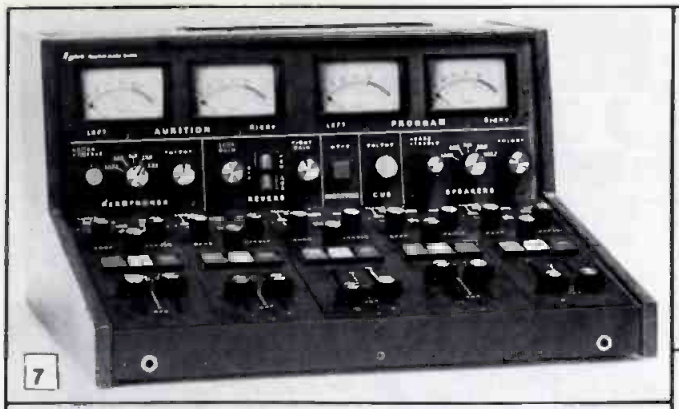
In addition to plug-in modules for customization, the M90 has easily altered console functions that are 'programmed' by jumper leads.

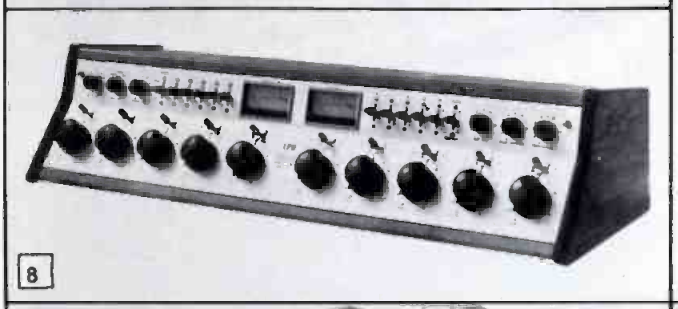
6. Industrial Sciences, Inc.

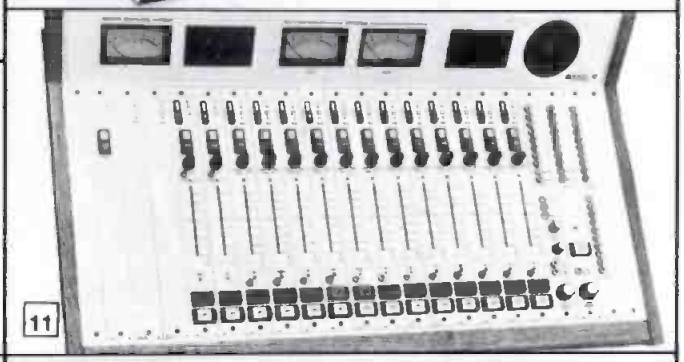
The ISI 700 series audio console is designed for station customization. The console is configured into four main sections. Section A contains the VU metering and program output modules; section B the input switching, section C the input mixing, and section D the fingertip-controlled attenuators.

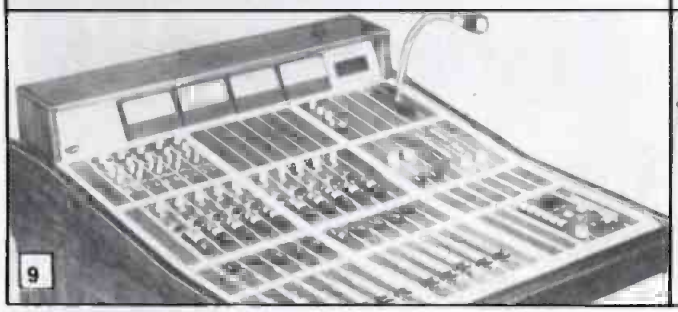
7. Logitek Electronic Systems

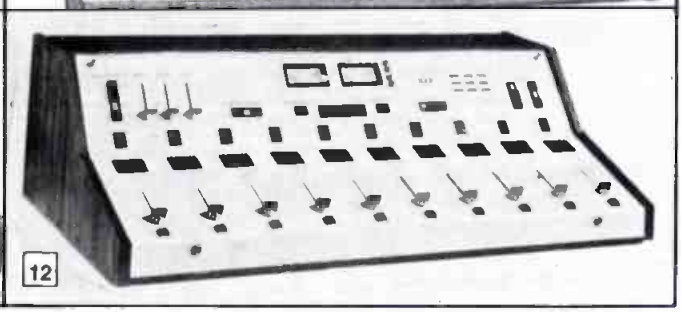
The Logitek custom audio series is designed using a modular approach to provide a wide variety of options and configurations at affordable prices. By using the latest tech-











niques in electronic circuitry and innerconnection methods. Logitek systems have achieved a high level of performance, quality and serviceability.

The custom audio series meets the needs of broadcast engineers and operators alike by emphasizing simplicity in operation, installation, and servicing.

8. LPB

The LPB model S-13C mixer stereo/mono console accepts a total of 24 transformer-coupled audio inputs, three to each of the eight mixers. Additional features include: step attenuators, plug-in modules, LED peak indicators, switch selectable mic gain, transformer inputs and outputs, 12-watt monitor, and demonstrated RF immunity.

A cue position is provided on every mixer, and an internal cue system is included with amplifier, level control and 5-inch speaker.

9. McCurdy Radio Industries

The McCurdy SS8500 stereo console is a fully modular, free-standing audio production and mixing system providing full facilities for broadcast or other professional applications. Compact and flexible, its ideally suited for use as on 'on-air' console or master control center in radio facilities. Custom tailoring is accomplished with a wide range of optional modules.

Ten stereo input channels are provided, complete with A/B switching, allowing for 20 stereo sources.

10. McMartin Industries

The McMartin B-1000 series of audio consoles is a new breed of human-engineered, easy-to-live-with consoles that last and last. Clean design keeps board operations tight and accurate. Clean construction and internal lay-out makes service, when required, fast and easy...with clean engineering yielding clean signal.

The 8-channel models have 18 inputs, the 5-channel models, 10. Both mono and stereo versions come with slide or rotary attenuators.

11. Pacific Recorders & Engineering

Both the BMX-12 broadcast mixer (shown here) and the System One broadcast consoles from Pacific Recorders and Engineering Corporation merge classic engineering with true innovation for exceptional performance, flexibility, and reliability. Both utilize CMOS logic and Penny and Giles conductive plastic faders. In the System One, CMOS logic is used, but transistor switching is not used for the audio so as to avoid distortion. Instead, miniature, hermetically-sealed relays are used for all logic-controlled audio switching. In the BMX-12, CMOS logic is used for input channel on-off control and for remote controls.

12. QRK Electronics Products

The QRK Omega audio console (shown here) has been created with operational features for the disc jockey, yet maintains ease of installation and service for the engineer. It features solid-state attenuators to assure zero tracking error on stereo, digital switching. An FET analog, DC controlled switch eliminates audio wiring on the front panel. Programmable gain is available on 16 input channels.

13. Quad/Eight Electronics

The new 'Pacifica' multi-track console by Quad-Eight is configured as a 16, 24, or 36 modular input console with eight mixing busses and stereo mix-down and monitoring capability. Two independent cue

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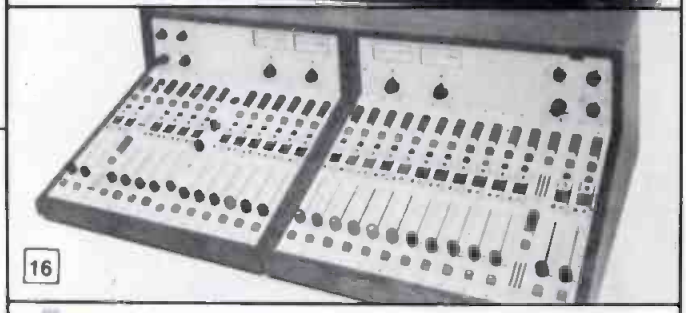

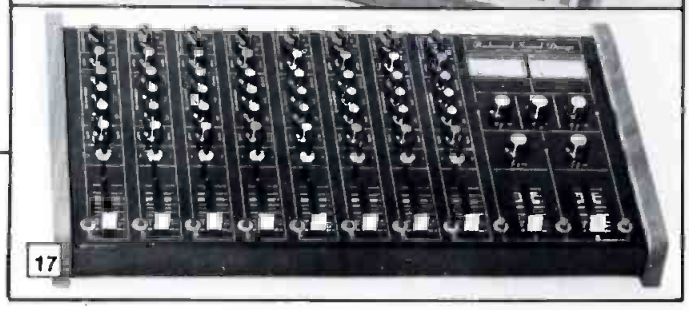

Stereo console roundup

continued from page 71

mixing circuits are provided for each input, plus four mixing circuits for echo/foldback.

14. Quantum Audio

Quantum Audio Labs has developed a line of stereo broadcast production consoles to fill a need for low-cost, high-performance products. The 8-channel version accepts 19 inputs and is available with either two or four stereo inputs. Twelve channels are available.

15. Ramko Research

Ramko manufactures four series of stereo consoles: the DC-5, DC-8, DC-12, and DC38. The DC38 (shown here) is an example of outstanding versatility and advanced technology. Unparalleled features include four inputs/mixer, back-lit readouts for each mixer and 4-year warranty.

16. RCA Broadcast Equipment

RCA's custom-built audio console, type BC-50, is a do-it-yourself modular system that provides: essentially unlimited input facilities; wide range of output capabilities; easy future revision; and mono, stereo, quad or multi-channel performance.

17. Richmond Sound Design

The Richmond broadcast audio control console for production or on-air features state-of-the-art transformerless inputs, full equalization facilities, and complete monitoring facilities. It's especially designed for: production and recording; on-air audio control; re-recording, mixing and processing; and remote audio control.

18. Robins Broadcast & Sound

Shown here is Robins' TV audio mixing console with 16 input mixing channels, but Robins' Series 30000 broadcast consoles feature advanced design and up to 10 stereo channels.

19. Rockwell International [Collins]

The Collins IC-6 (6-channel) and IC-10 (10-channel) audio consoles for AM and FM stations offer flexible, plug-in modular construction. Both are designed for professional quality and maximum on-air service with a minimum of maintenance.

20. Rupert Neve

The Neve models 5302 and 5312 multi-purpose sound mixing consoles are designed as versatile broadcasting and sound mixing consoles of high quality for FM/AM mono and stereo, or for stereo recording.

21. UMC Broadcast Products

The new UMC/Beaucart audio consoles are 8-channel, stereo units that are easily expandable to 16 channels with the addition of top plug-in modules. Each channel module has three selectable inputs allowing a maximum of 48 hard wired inputs for the console—such as mics, cart machines, or reel-to-reel machines.

22. UREI

The Mod One consoles by United Recording Electronics Industries are modular, pc board construction providing extreme flexibility at low cost and feature all solid-state design with performance that exceeds all FCC proof-of-performance requirements.

23. Ward-Beck

Ward-Beck Systems Limited announces that something has happened to radio—now, for the first time, there are operator-oriented radio consoles designed in the Ward-Beck tradition.

The new WBS R1200 and R2000 Radio Programming and Production facilities are assiduously engineered for AM and FM, assembled AM stereo ready in anticipation of the time when this phase of the industry is ready to move.

The WBS engineering team devoted their full, concentrated attention to the new-generation features included in the 1200/2000 systems. The quality, performance, and singular statement of stylish simplicity are evidence of their design and engineering success.

24. Wilkinson

The TACS-2C audio console by Wilkinson Electronics is designed to provide audio amplification, switching and monitoring facilities necessary to radio stations broadcasting stereo programming. True broadcast audio is reproduced by distortion-free amplifiers controlled by long-life vertical step attenuators.

Stereo console manufacturers

The following firms reported in our Buyers' Guide published last month that they manufacture and supply stereo consoles. Details of their products may be obtained by circling the appropriate numbers on our reader service card and mailing it. Those that supplied literature for review are shown in boldfaced type. Other sources, such as dealers, consultants, and reps, may be reached through use of the Buyers' Guide.

Ampro Broadcasting **105**
Audio Designs & Manufacturing 106
Audio Interface 107
Auditronics 108
Autogram Corporation **109**
Automated Processes **110**
Broadcast Electronics **111**
Cetec Broadcast Group 112
Custom Audio Electronics 113
Dyma Engineering **114**
Electrohome, Ltd. 115
GLI Division VSC 116
Harris Corporation, Broadcast Products Division **117**
Industrial Sciences **118**
International Communications & Control 119
LPB **120**
Listec TV Equipment Corporation 121
Logitek Electronic Systems **122**
McCurdy Radio Industries **123**
McMartin Industries **124**
Micro-Trak Corporation 125
Modular Devices 126
Opamp Labs 127
Pacific Recorders & Engineering Corporation **128**
QRK Electronic Products **129**
Quad-Eight Electronics **130**
Quantum Audio Labs **131**
RCA Broadcast Systems **132**
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Richmond Sound Design, Ltd. **134**
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Russco Electronics Manufacturing 138
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Tangent Systems 143
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UMC Electronics, Broadcast Products Division **145**
United Recording Electronics Industries **146**
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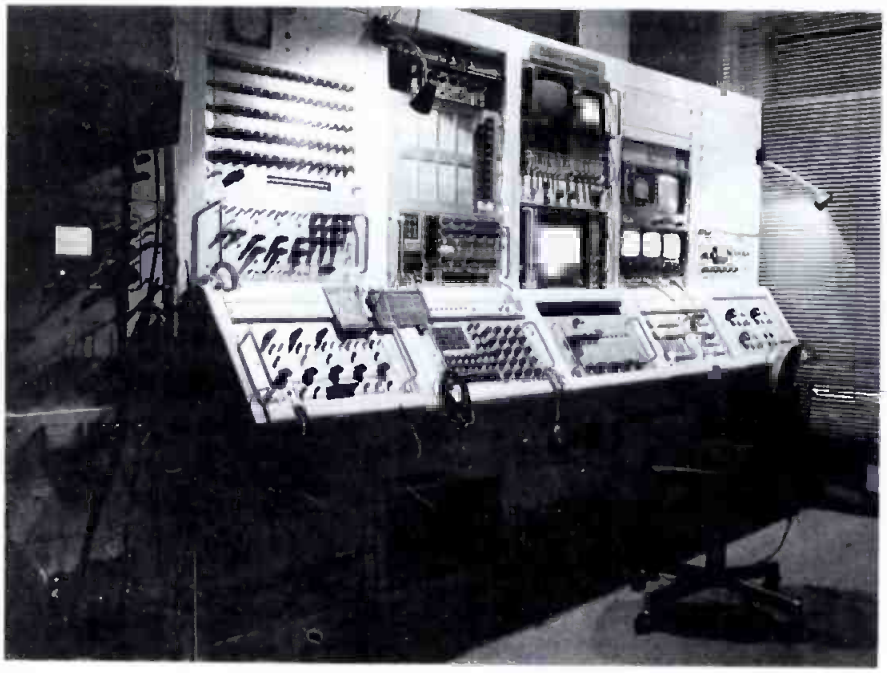
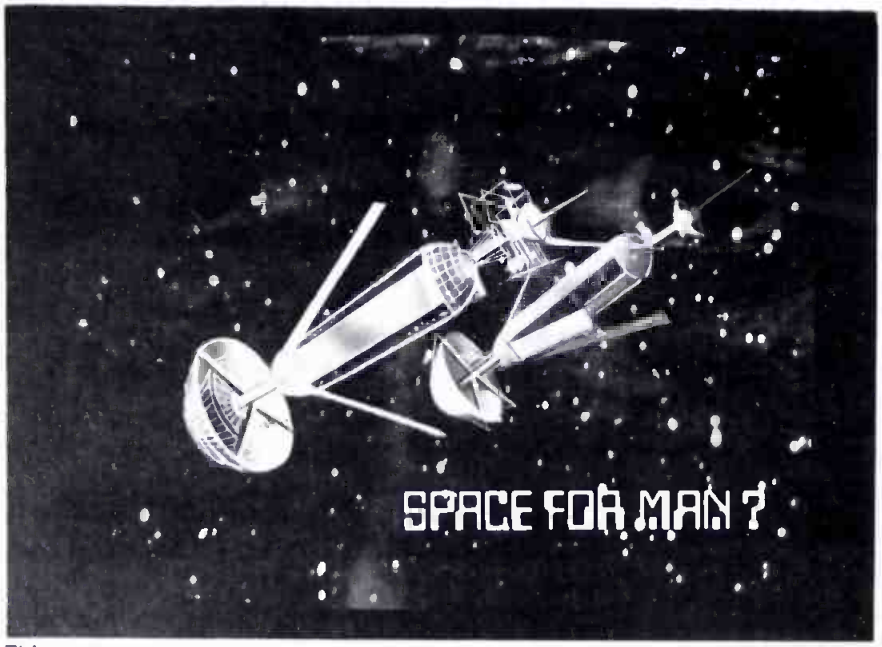
Wilkinson Electronics **148**

CREATING COMPUTER IMAGES

By Bill Rhodes, Editorial Director



Dolphin Productions in New York uses a complex systems of computers, CRTs, electronic controls, cameras and art to produce complex animations. Our cover this month portrays a simple, computer-generated graphic developed by this system in full color. Below is another creation.



This computer generated graphic by the Dolphin system from "Space For Man" was produced for Enpact/WETA Washington, D.C.

Images, still and moving, form a vital link in man's communications and his arts. Computers had barely appeared on the scene as scientific and business tools before creative people began to apply them to yield forms of graphics. Early creations of this type were typically displayed on the walls of most computer sites as printouts of illustrations and greetings, especially at holiday seasons.

Today, computer-aided images are so extensively developed that they have become almost commonplace. Yet, in all these applications, the computer is but a tool which, in the hands of talented and creative people, helps to stimulate the mind through visual or audio means. The end result may be to create a mood, develop a train of thought, stimulate pleasure, or evolve a useful scientific or engineering design/concept. In general, the extent to which an 'artist' is successful in this imagery depends upon the complexity of the equipment employed, his skills in using the system, and his own imagination.

In this article we will discuss a few people and firms currently using computers to develop visual images. This is not an exhaustive treatment of the subject—it would take books to do that effectively. Instead, a few of the exciting results of applying the use of computers in developing visuals will be demonstrated.

However, before getting into this main theme, there are other areas where computer 'images' have made significant contributions. As an engineering tool, computer aided designs are helping engineers to create better (or more cost-effective) automobiles, aircraft, tools, bridges, buildings, etc. In short, what the engineer can design on paper or with math, man can also design with a computer—often with exceptional clarity, greater flexibility, and with far greater speed. Similar applications have been made in the fields of physics, chemistry, biology, and medicine.

People and systems

It is not known how many people are involved in using computers to create visual images on a commercial basis. I looked at the achievements of two firms as representative of what can be accomplished when graphic and computer technologies are strategically combined. These firms are: Dolphin Productions in New York and Computer Image Corporation in Denver. Also, the science of computer programming that makes such images

possible was considered. For this, Integrated Computer Systems in Santa Monica was consulted. They run a series of technical courses on Computer Graphics, but they could not put an article together on their works in time to meet this issue. However, notes on their forthcoming courses will be found at the end of this article and in future **BE** calendars.

The Dolphin story

Bruce Tallerman of Dolphin Productions, Inc. in New York was very enthusiastic about their operations and contributions to computer animations. The following is essentially his story. The cover for this issue of **Broadcast Engineering** was developed on the Dolphin system.

Transforming visuals of the imagination into a full spectrum of color, movement, and dimension on a television monitor might be the function of a 23rd century child's electro-telepathic dream-toy. But, with the complex electronic animation system at Dolphin Productions, the process of turning mental concepts into striking motion graphics is a very real phenomenon.

Imagination is the principal element in the process of constructing, storing, and recording an animated sequence at Dolphin, for it is imagination alone that dictates movement on the computer—there virtually are no limits to what kinds of effects and movements can be created. Any idea that can be verbalized or translated to a storyboard can be transformed, in real time, into impressive, memorable motion graphics on Dolphin's computer.

The object at Dolphin is to create dynamic visual movement that speaks for itself. As expressed by Vivian Moss, a producer of *The Red River*, a CBS network television feature, "Your pictures should be so explicit that they don't need words." In this program, Dolphin animation injected lifelike motion illustration into a portrayal of the human body. This work illustrates important differences and advantages of electronic animation over traditional film cell movement.

A sequence of frame-by-frame cell "motion" requires up to 1440 separate, hand-drawn cells per minute of animation—a drain on time, energy and budget. Dolphin, which utilizes a hybrid analog/digital system in concert with an expert creative team, uses a single Kodalith cell to produce sequential movement.

The Kodalith is a transparent negative which contains black and white artwork. From the Kodalith (or a number of other video sources), the computer can create rolls, twists, undulations, strobes, and pulsations of unlimited variety. Since only a single piece of art is needed to produce movement, it is possible to finalize a five to ten second logo in one afternoon.

Dolphin's president, Allen Stanley, considers the time factor an asset when working with producers that have a tight air deadline. "We're able to accomplish exciting visuals in a matter of days," Stanley says. This time advantage also allows the client a maximum of opportunity to suggest ideas during the process, stay with the job from beginning to end and become more intimately involved with their production.

There are other systems called computer animation, but not all possess the real-time capability of Dolphin's. With real-time generation, the computer is creating successive frames at 30-per-second. The result: animated motion is perceived as one smooth, continuous flow as it is produced.

This differs from the system

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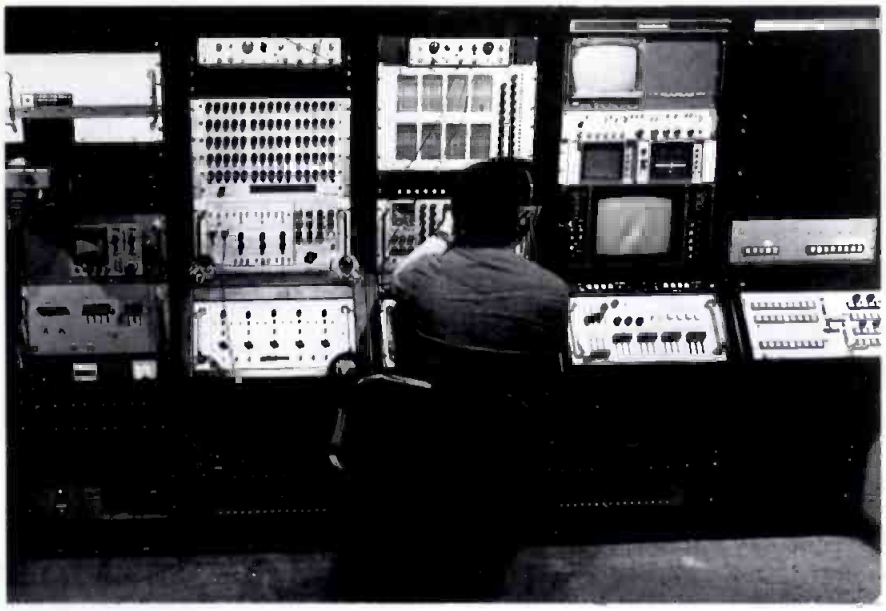
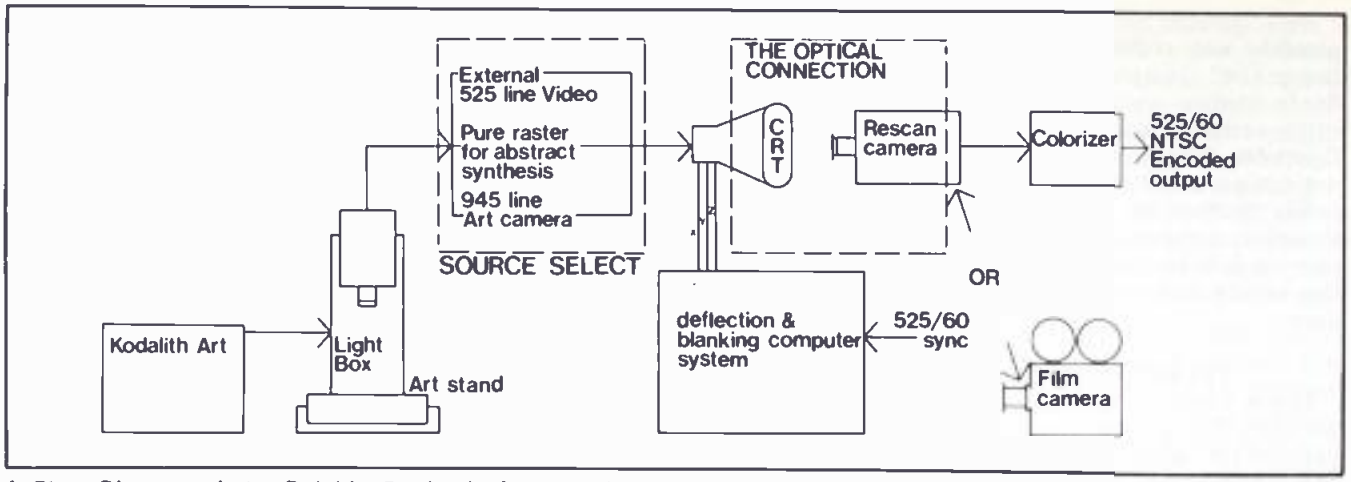


Computer Image of Denver uses a complex, hybrid system code named 'Scanimate' to produce 3-D graphics in real time. The system, an artistic tool designed exclusively for graphic and technical animation, allows the creative director to control the animation as easily as live productions—and with great speed and flexibility.

Spring flowers have been generated here in full color using the Scanimate system at Computer Image for a spring commercial. This is just one of eight gloriously-colored graphics supplied for this article.



A Flow Diagram of the Dolphin Production's animation computer system shows how the marriage of electronics, art, computers and film is accomplished in a dedicated system created to develop complex electronic images.

Computer Images

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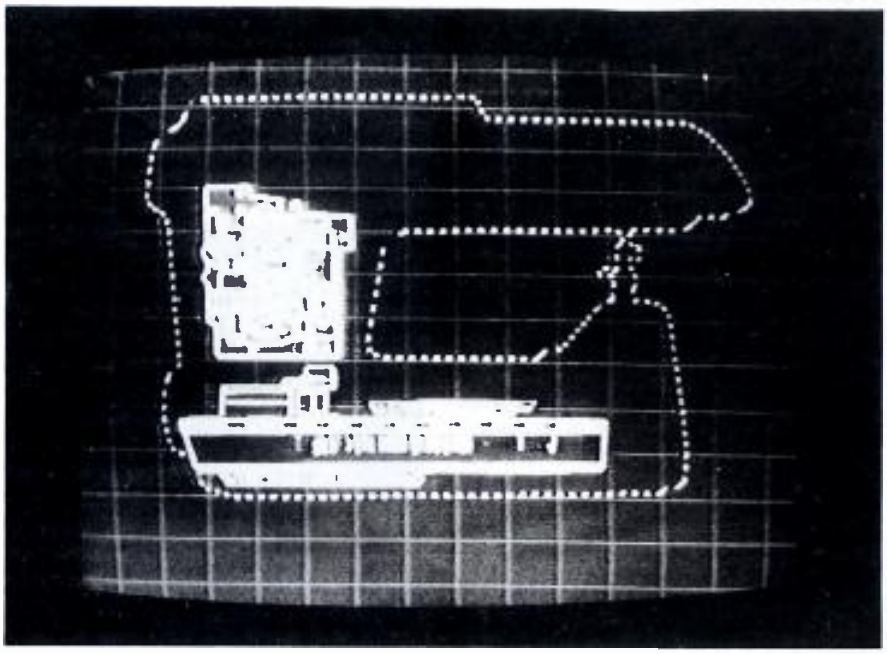
George Lucas used to create a "wire" graph of the Death Star for *Star Wars*. Larry Cuba, the animator responsible for the computerized readout, first constructed the starship's modules from polyurethane foam. He then photographed the modules and traced them onto a Vector General graphic computer tablet electronically. The x and y coordinates were thus digitized and stored. A program was written so that each section of the module could be called up sequentially, then photographed.

In a real-time situation, the movement is programmed directly into the computer instead of piece-by-piece from a separate program. The result is a sequence that appears to move more smoothly, and one that is created in less time.

Flat art (Kodalith) is placed on a light box and read by a 945 scan-line art camera. At Dolphin, the producer has a choice of computer inputs: art, live studio props, stock footage, or pure raster. Watching the image on a monitor, the operator manipulates the image using controls that effect specific characteristics, such as image position, size, intensity and duration of movement.

With initial and final position controls, the operator can specify the origin and final position of the animation. Another control activates the animation cycle itself, which takes on its already programmed characteristics, and moves between the two destined points. The speed of the movement ranges from a fraction of a second to several minutes.

An intrinsic advantage to Dolphin's almost instantaneous system is the ability to produce variations of a sequence in a matter of minutes. Once a basic program is entered, individual characteristics—size, color, speed—can be altered with no time spent on extra art preparations.



This 'X-Ray' view of a Singer sewing machine was created on the Dolphin Production's computer image system. Note the internal details.

The application's of Dolphin's electronic animation system are about as varied as the effects it produces. There is an ever increasing demand for TV visuals that not only capture—but enrapture—the audience's attention, especially among advertisers. Memorability is the key to successful commercials and promotions, and electronic animation Dolphin style is being recognized as the ultimate tool for capturing and stimulating the viewer.

Stanley calls this effect "reaching beyond the viewer's eye into his mind, grabbing the viewer's attention in such a way that there is immediate understanding through motion, in such a way that the viewer's senses are entranced until the message is complete.

Picture these movements coming alive on the home TV screen: an electric guitar hurtling into a black starfield, then rushing back as a gleaming spaceship above a crystalline landscape, a body turning acrid yellow and expanding horizontally on the word "indigestion," a spinning globe composing in three dimensions, zooming back, and becoming the CBS "Eye," a flavor drop melting into and expanding a piece of gum. All are electronically-created motion graphics, and are but a sample of Dolphin projects.

Conveying a message instantly through computer graphics is becoming prevalent in scientific and educational organizations to train,

educate, and inspire clients and constituents. Teaching a group about a technical or scientific process often relies on conventional illustration techniques which become far more exciting and sophisticated with computerized graphics.

For example, electronic animation lends itself effectively to presentations which require a sequential process—one for which conventional techniques may lack impact. Computers are able to illustrate the otherwise enigmatic properties and effects of a new sleep-inducing drug, as part of a presentation designed to increase understanding of the drug within the medical profession. Dolphin's work in this field extends to an award-winning animation sequence depicting "Acta-Scanner," an electronic X-ray scanner manufactured by Pfizer Medical Systems. There was an uncanny similarity between the visual readout properties of the scanner, and the Dolphin system's own electronic scan and colorization abilities.

While the staff often animates concepts and processes for which no artwork exists, the animation can be extended or dramatized when other sources are added—graphic cards, actors shot in studio, etc. In the case of *Rediscovery*, an educational film produced by NASA, the goal was to add dramatic, almost disturbing effectiveness to stock footage of volcanoes and earthquakes. By electronically quantitizing the filmed sequences, Dolphin was able to achieve remarkable intensity and stark realism in the seismic movements of *Rediscovery*.

Stanley compares the Dolphin animation system to "an electronic sketchboard" that helps the professional "talk visually." He says that this highly versatile instrument is especially useful in de-scrambling complicated subjects, making them approachable and memorable. An example was AT&T's monumental task of describing the communications process, especially how the concept of "mindspace" works in human communication. Dolphin was able to dramatize the process by animating two human figures, physical "mindspace" within their brains, and an array of lines and colors representing messages.

The benefits of electronic animation in unraveling the mysteries and unknowns of technology are endless, as producer Moss notes: "When people see something, they understand." Understanding by seeing was the purpose of creating a realistic dramatization of life in space. Physicist Gerald O'Neill wanted to show his concept for a work habitat in outer space, as a solution to ecological problems on earth.

Computer developed graphics like this CBS News logo is a snap with electronic animation systems.

Electronic animation was the natural medium to demonstate zero-gravity conditions around the Solarus satellite. *Space for Man*, a nationally-televised documentary on PBS, portrayed living and manufacturing in space as a practical and plausible idea. Simply put, no other visual medium could have done it as effectively as the Dolphin computer system.

As invaluable as computer animation may be to the arts of persuasion and stimulation, its uses have been far from exhausted, its potential hardly exploited. "We are always learning new things that can be done on the system," says Stanley. "Each project that comes in is initiated because people are looking for new, individual art forms."

Computer Image

Computer Image Corporation (CIC) of Denver provided great inputs to this article, but their color material did not arrive in time to make the cover. However, one of these photos is shown on page 75 in full color along with the photo of CIC's 'Scanimate' system.

Still another system available at CIC is their CESAR (Computer Animated Episode using single axis rotation). This system has the ability to animate complex characters and concepts, including lipsync. A client needs no knowledge of computers to take advantage of this system. With just a storybook and soundtrack, the CIC staff can sit down with the client and work out the detailed production he wants.

Lee Harrison, President and Chairman of the Board of CIC,

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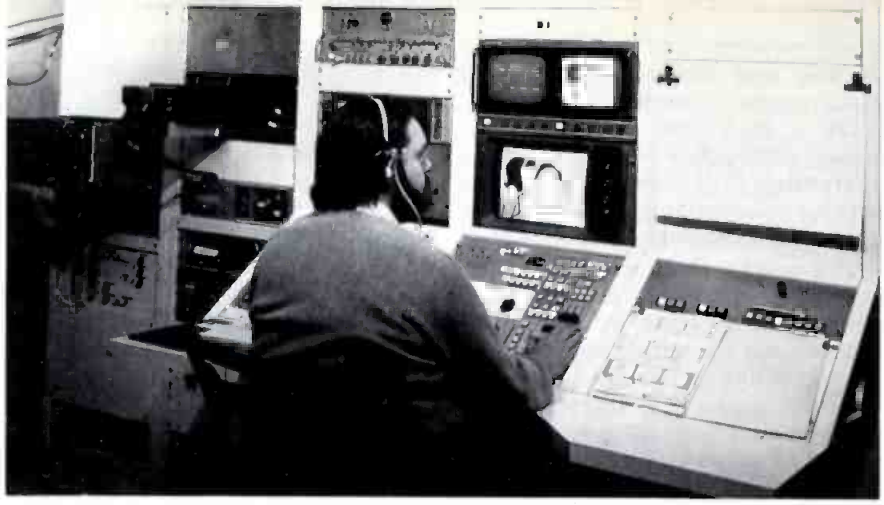
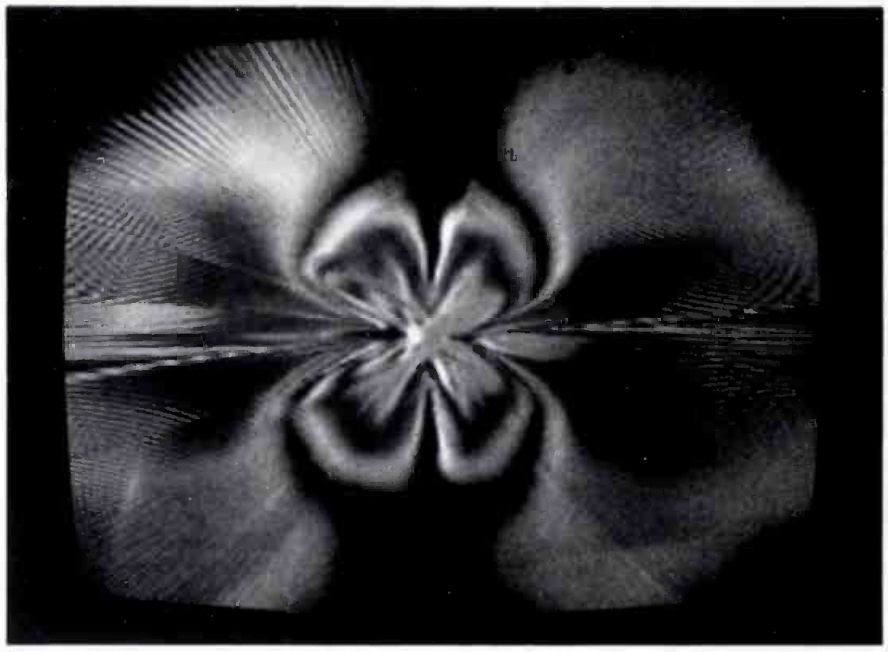


Computer Image also uses a system code named CAESAR (Computer Animated Episodes using Single Axis Rotation) which has the ability to animate complex characters and concepts, including lipsync. The operator here is animating a complex scene for a 30 second internal relations spot. Note the storybook on his right that guides his creations.



This abstract raster pattern, in beautiful color, was produced on the Computer Image 'Scanimate' video animation equipment.

Computer Images

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explains their operations and how clients from around the world work with his staff and his *Scanimate*, CESAR, and a "new generation" computer. "We make machines which are to the visual imagination what cameras are to real life."

Harrison began work on the original concept of his system in 1960 and received an Emmy Award for his efforts in 1972. The "new generation" computer currently under development will combine and expand the capabilities of *Scanimate* and CESAR in another step toward his lifetime goal of providing "effective communication by people, for people who like the ease, low cost, and control afforded by unique machinery."

Commenting on the graphics industry, Harrison says that competitors tend to perpetrate the myth that CEI is 'only the inventor' of computer animation. "We are proud to accept acknowledgement as the inventors," said Harrison. "However, we are also happy to report our creativity extends to dynamic, competitive animation. We are not simply concerned with utilitarian approaches to computer animation,

but are highly involved in our computers as psychogenic communications tools."

Integrated Computer Systems

As indicated at the beginning of this article, we contacted a firm in Los Angeles, Integrated Computer Systems, which teaches a series of special courses on the state-of-the art techniques and applications of computer graphics. They also provided beautiful color reproductions of what they have generated with their systems, one of which is shown in black and white below.

We have been pleased with the cooperation and response of firms supplying materials for this **BE** article. We regret that not all of the contributions could be included, especially the wealth of photographs in beautiful color. And, because this is an important commercial tool, we could not cite all the references to applications which you would recognize from current movie and TV runs.

However, if you'd like to know more about these firms and their services, circle 100 on the reader service card and we'll pass your interests along. The forthcoming Integrated Computer Systems courses are as follows: in Los Angeles, Oct. 17-20; in Chicago, Nov. 7-10; in Boston, Dec. 12-15. Further courses are also scheduled for 1979. For more details, contact Michael B. Sanson at (213) 450-2060. □

Automatic analysis of VITS speeds up video network testing

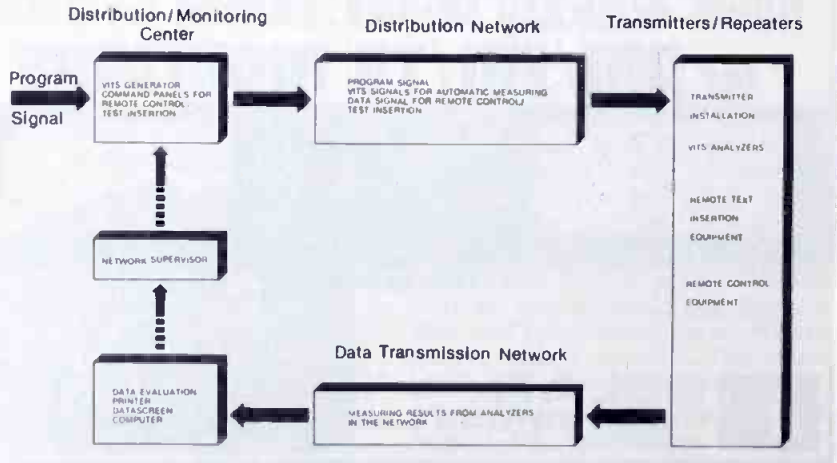
by Paul Wachmann,
Phillips Elektronik
Industri, Denmark

■ The automatic analysis of VITS—Vertical Interval Test Signals can do much to speed up video chain testing and reduce testing costs. Combine with remote control and a data transmission system, the complete video network can be monitored and controlled centrally.

VITS analysis is ideal wherever video equipment—from amplifiers and equalizers to transmission links and transmitters or complete program networks from source to transmitter—has to be checked, adjusted or constantly supervised.

Since VITS were first used, there has been an increasing need for automatic analysis of these signals. Existing manual methods are very time consuming and expensive—and remote video interfaces such as repeater transmitters do not always provide ideal working conditions. And, of course, automatic analysis takes advantage of the fact that, unlike full field testing, VITS can be used continuously-so providing permanent quality control.

Figure 1 A typical combination of program and data transmission networks can be seen here, with the testing and other equipment required.



Testing evolution

Early TV quality testing was very subjective, and provided only qualitative results. Standard methods meant using a video input, such as a camera or flying spot scanner, to pick up some form of test card and feeding this through the system. Not only were such methods highly unsatisfactory for basic input quality, but they also required taking any video link out of operation for such a full field test.

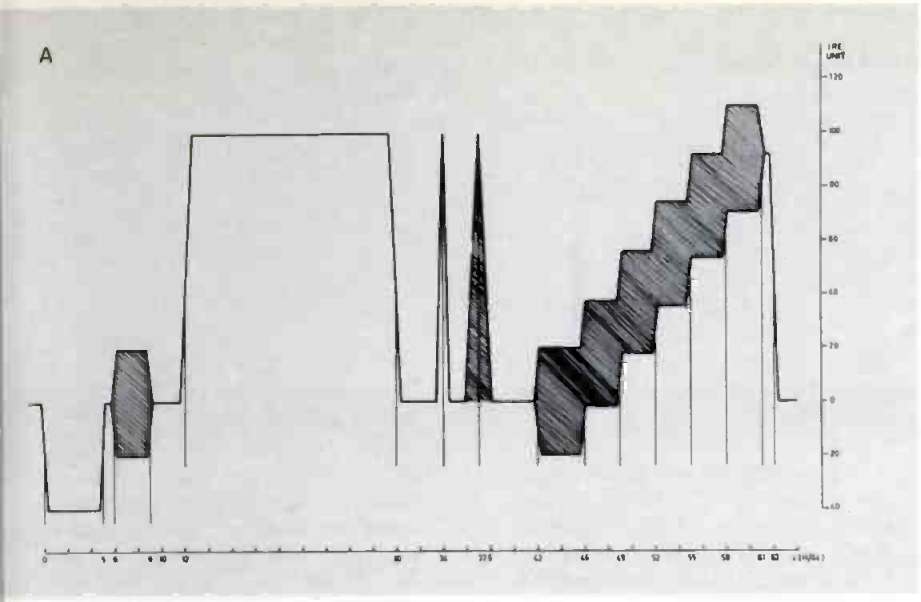
The introduction of VITS using the vertical field blanking—in a limited form for monochrome in the late 50s and only three or four years ago as a widespread practice—means that testing could be carried out at any time without interfering with broadcasts. And testing can be continuous. State-of-the-art practice with the widespread use of national and international standard time-based VITS means that visual defects can be traced easily. Either complete networks or particular interfaces can be checked with ease.

Several standard VITS exist, but this article will deal with the standards recommended by the Network Transmission Committee (NTC) in NTC Report No. 7. These allow the evaluation of facilities used to transmit 525/60 NTSC color television signals. However, the basic principles can be applied to any system (CCIR, EBU and national recommendations).

Ideally, complete quality control involves not only inserting the relevant test signals and analyzing them at the various points in the system, but also controlling and monitoring the results from one central point. A typical combination of program and data transmission networks with the testing and other equipment required is shown in Figure 1.

Standard VITS

All the testing systems have to



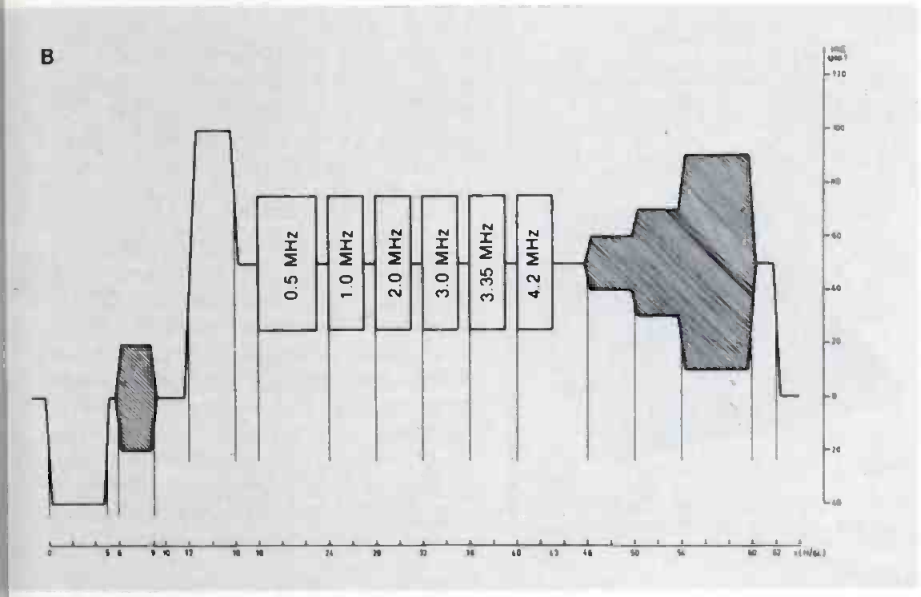


Figure 2 The two NTC-recommended VITS are: A) the composite test signal which is inserted in line 17, field 1; and B) the combination test signal which is inserted in line 17, field 2.

rely on the basic VITS input. The NTC recommends two signals: a composite test signal and a combination test signal. These are inserted in line 17 field 1 and line 17 field 2, respectively, as standard.

The composite test signal is shown in Figure 2A and is made up of a line bar, a 2T pulse, a 12.5T composite pulse and a five-riser staircase with chroma. The combination test signal, shown in Figure 2B, is made up of a white flag, multiburst and a three-level chrominance signal.

From these two signals it is possible to set performance objectives and measure up to 21 different parameters. Table 1 gives a list of those parameters and typical limits. The parameters can be divided into three groups: those covering linear distortion, those covering non-linear distortion and miscellaneous. Parameters that can be checked for linear distortion include:

- Video gain—measured from the bar amplitude;
- Amplitude response—using the multiburst;
- Low-frequency response—from line time distortion of the bar;
- Step response—from bar overshoot on leading and lagging edges;
- Pulse response—from amplitude (pulse-to-bar ratio) of the 2T pulse; and
- Chrominance/luminance gain and delay inequalities—from the 12.5T pulse.

Among the parameters that can be

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VITS

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TABLE 1

	PARAMETER	Lower Limit	Upper Limit	Unit
1	Video Gain	80	120	IRE
2	Sync Amplitude	30	50	IRE
3	Color Burst	30	50	IRE
4	Line Time Distortion	0	10	IRE
5	Bar Overshoot	0	10	IRE
6	Bar Undershoot	0	10	IRE
7	Pulse/Bar Ratio	80	120	IRE
8	Luminance Non-linearity	0	20	IRE
9	Chrom/Lum Intermodulation	0	20	IRE
10	12.5T Gain	0	10	IRE
11	12.5T Delay	0	100	nS
12	Differential Gain	0	10	IRE
13	Differential Phase	0	20	DEG
14	Signal/Noise Ratio	35	-	dB
15	Modulation Depth	0	99	IRE
16	Multiburst 1	40	60	IRE
17	Multiburst 2	40	60	IRE
18	Multiburst 3	40	60	IRE
19	Multiburst 4	40	60	IRE
20	Multiburst 5	40	60	IRE
21	Multiburst 6	40	60	IRE

checked for non-linear distortion are:

•Luminance non-linearity—from the staircase;

•Chrominance/luminance intermodulation—from the three-level chrominance signal; and

•Differential gain and phase—from the modulated staircase.

Other measurements possible include checking the sync amplitude and color burst of the transmitted signal and measuring noise and modulation depth. Checking quality requires measurement of all these parameters.

Insert signals anywhere

Test signals can be inserted anywhere in the video chain. Typically, to check overall system quality, the generator would be in the studio or at the network switching center.

Internally in the studio complex, VITS find many applications, from checking individual pieces of video equipment such as video switchers and videotape recorders to checking studio video links. Apart from continuous checking of permanent links, VITS find use in checking special links: anything from a particular outside broadcast line to a full scale international switching network for a major political or sporting event.

Once a test signal has been inserted, it stays there. But it is a simple matter to take out the signal and put in a fresh one for analyzing particular sections. This is useful for checking the performance of a transmitter, for example, where the VITS can be inserted at the transmitter input and measured at the output, either directly or off-air. VITS are also useful for checking the performance of remote video interfaces where such measurements can be passed back centrally over data lines. Broadcast is not the only application area since checking video equipment in production also requires similar equipment. Again, the automatic analysis can do much to hasten production testing.

Manual checking limited

Conventional analysis requires checking manually with oscilloscopes or waveform monitors fitted with speciall-calibrated graticules. While feasible for on-off or alignment testing, it is expensive in time, requires skilled staff, and is not very useful for unmanned locations. Automation of analysis is the ideal solution. It not only takes the effort out of the analysis but also allows

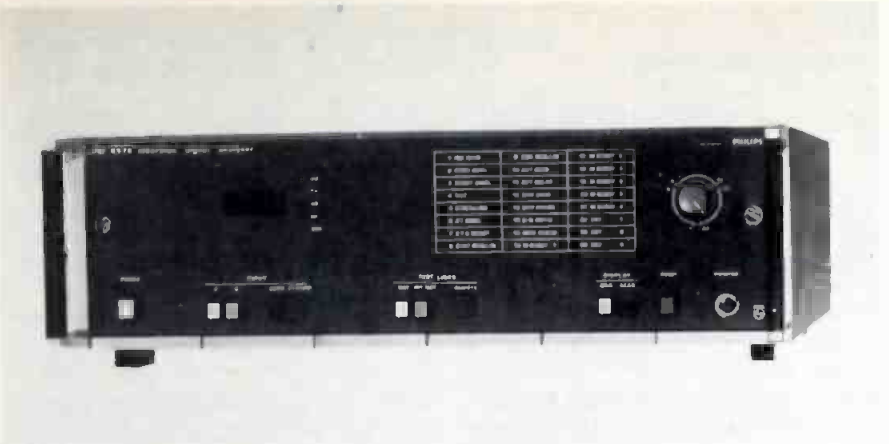

Figure 3 Philips PM 5578 VITS analyzer measures up to 21 parameters and provides out-of-tolerance alarms, remote control and monitoring.

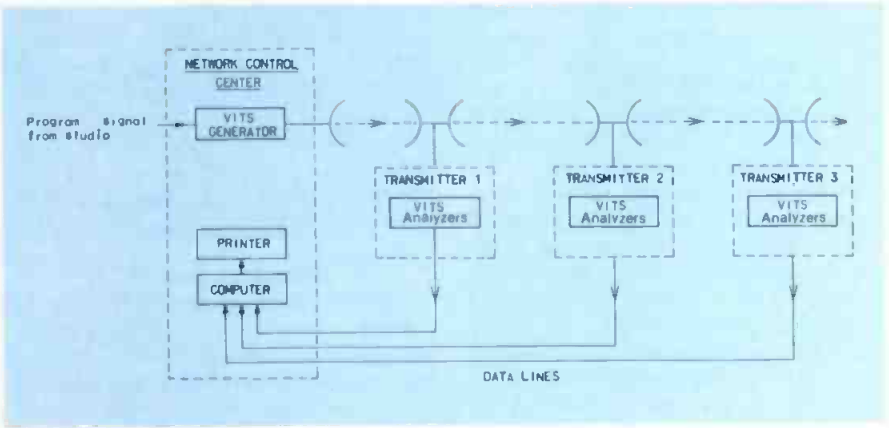

Figure 4 Data output from VITS analyzers can easily be passed back to network control center or elsewhere for analysis.

continuous, permanent monitoring—thus, exploiting fully the benefits of VITS.

A typical automatic VITS analyzer is shown in Figure 3. This instrument provides a number of circuits which detect, analyze and measure particular parameters. The DC output voltages, proportional to the parameters measured, are applied through analog switches to A/D converters driving both digital display and digital data outputs for printers and so on. Up to 21 parameters can be checked on five different video inputs. Three auxiliary functions can also be controlled. Each system parameter, selectable by a rotary switch, may be read directly on the built-in digital display. A scanning mode is also available going through the whole selection of measurements. A LED in front of the selected or monitored parameter will light up and flash if the parameter is out of limits. The digital data output allows the results to be printed out on a teletype, with the out-of-limits parameter being so marked.

Another LED lights up if the VITS is below 6 dB of nominal value, or even not present at all. A further alarm circuit detects the absence of sync pulses in the video input being monitored.

Automatic logging and monitoring

The addition of an automatic printout unit turns the VITS analyzer into a fully automatic logging and monitoring system. The data output provides a continuous printout. The automatic print unit controls the data stream and only allows a printout for particular reasons.

The unit is controlled by a microprocessor and, in addition to controlling the printout, also formats the information, adding headins with the name of the parameter involved and giving the date and time. Printouts can be made automatically for several reasons:

- At fixed time intervals during set periods;
- When one of the parameters is out of limits and gives an alarm;
- When an out-of-limits alarm stops;

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VITS

continued from page 83

•When the VITS signal drops too low, the sync disappears or even the video signal disappears;
•When the above condition ceases; and
•When the data signal disappears or returns.

This automatic logging system can be left to run unattended for a limited period. Such a system is ideal for monitoring critical parts in a TV network. Typical applications include checking new equipment during the run-in phase, monitoring equipment which suffers from periodic faults and testing equipment that has abnormally high failure rates.

Central control

Of course, monitoring equipment need not be at a remote location. The data output from the VITS analyzer can easily be passed over a data line to the central network control as shown in Figure 4. This allows in particular, immediate action to be taken if there is equipment failure. Action can range from simple transmission of apologies for a particular fault to switching to another video link or bypassing an optional piece of video equipment.

Remote control can be carried out also by using an empty line in the field blanking interval to transmit command codes from the network center to a number of relay units fitted elsewhere in the network. This allows not only switching in and out faulty equipment, bypassing any problems, but also direct control of main and reserve transmitters and to other video equipment.

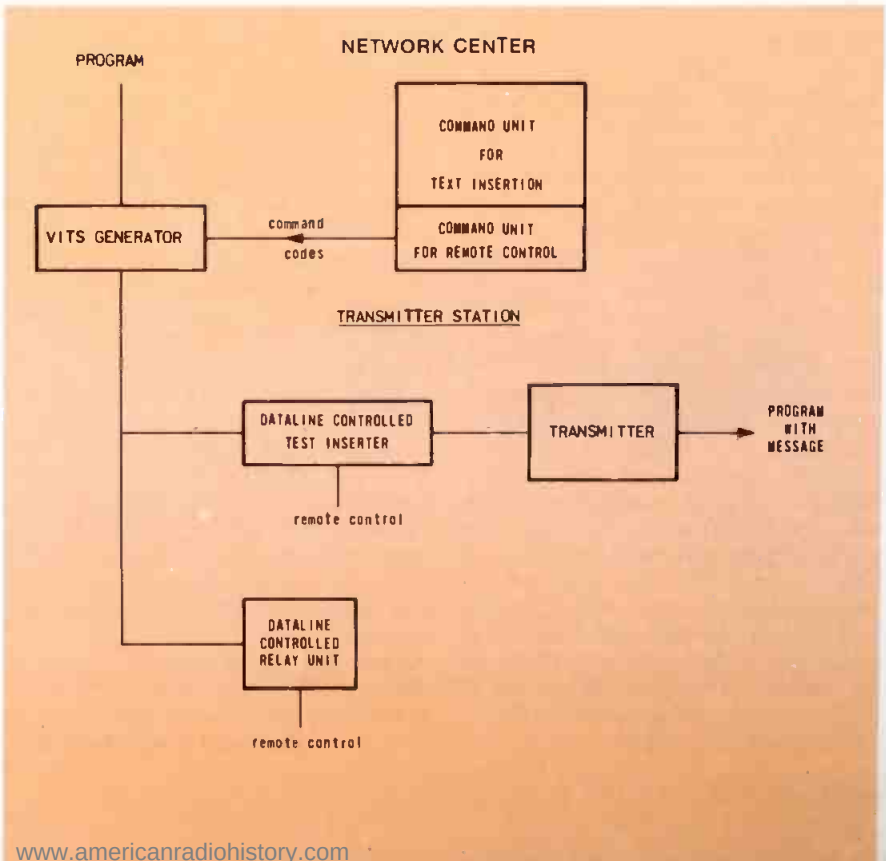
A further refinement is a dataline-controlled test inserter situated at the transmitter which can insert a number of pre-programmed messages or apologies on the screen. A typical system is shown in Figure 5. The advantages of this is that if a fault is only at a specific location, only that location needs to broadcast the message.

Typical examples of messages include:
•Please do not adjust your set, faulty transmissions;
•We apologize for the breakdown of the sound transmission;
•Test pattern will not be sent tomorrow due to repairs; and so on.

Complete control

Any selection of the various aids talked about here makes video testing and control much easier. The combination of the items gives complete control of the video chain with the minimum of effort and the maximum of speed and efficiency. □

Figure 5 A dataline-controlled text inserter can be situated at the transmitter for inserting pre-programmed messages. Such a system can be combined simply with a VITS system as shown here.



station-to-station

Simple ENG cable tester

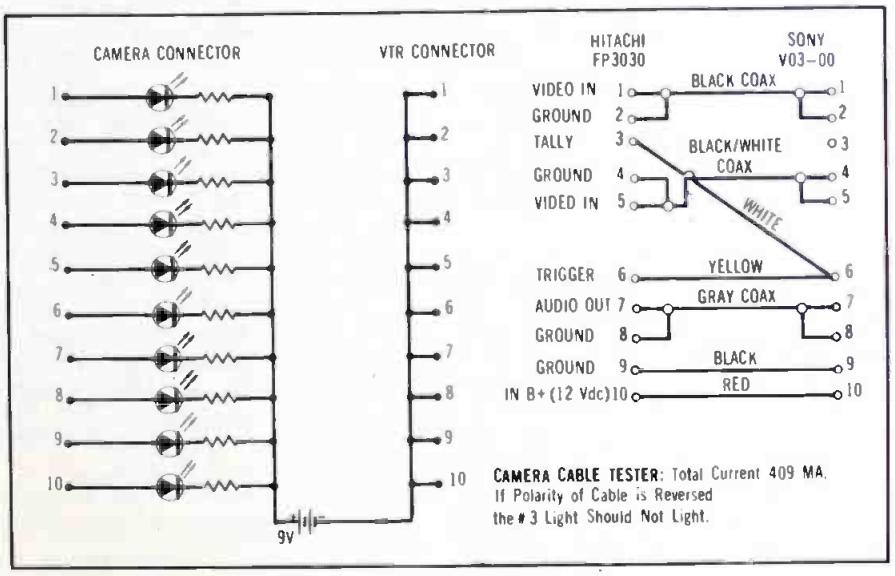
By Fred Lewis, Engineer, WCBI-TV, Columbus, MS

Here's an idea that is similar to the old mike cable tester. We have several ENG units each of which has two cables. These units are Hitachi cameras and Sony VTRs. They all have ten-conductor cables which seem to be breaking all the time, and it takes considerable time to check each conductor separately with an ohm (continuity) meter.

To simplify this checking procedure, I developed a circuit shown in the attached sketch. I started with a small aluminum chassis to which I mounted two female ten-pin connectors. (These can be ordered from Sony Broadcast as part no. 1-508-382-00.) I then added ten LEDs which sell for 18 cents each.

The cathodes of the diodes are connected through ten 2200 ohm resistors to the negative side of a 9 V transistor battery. The positive side of the battery is connected to all ten pins of the socket labeled VTR. The anodes of the diodes are connected one to each of the ten pins labeled CAMERA.

By connecting the cable to the tester, we can tell if we have any open circuits.



Great Steamboat Race covered by microwave-in-copter

By Marvin Born, WAVE-TV, Louisville, KY

A long overhead shot of the Great Steamboat race has long intrigued our promotion and production departments. The cost of such a shot was looked upon with displeasure by our treasurer. To rent equipment for the shot would cost over $1000 per day and would require a larger helicopter that rents for $200 per hour. We had some microwave equipment, but an omni-directional antenna for that equipment is also expensive, $8000. Such expenditures could not be justified for one boat race per year. The news room was interested, but they could always use a film camera in the regular company "traffic-copter."

To get the overhead shot before the competition, we were required

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Station-to-Station

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to use present equipment, use the smaller helicopters available locally, and not spend much money. The station already had a Microwave Associates Model MA-13 window type microwave which has a range of two miles. (Another station had equipped this unit with long range antennas and tried without success to get the same shot last year because the long range antennas were too narrow and could not be maintained on path from a moving aircraft.)

Our solution was to use the wider cone (horn) type of antenna and maintain it in position during the actual picture feed. The cone antenna has a beam width of 45° versus 3° for the long range dish. The shot was accomplished with very little expense using a method devised to hold the horn steady once it was adjusted on target. The race course was up river six miles to an island, followed by a 180° turnaround, and then back down river. Since the captains of the three steamboats usually had some trick up their sleeves and the island turnaround was usually where they employed it, the director wanted this spot for the overhead copter shot.

Since the microwave system with cone antennas had a range of two miles, we used our mini-cam truck to relay the signal six miles back to town. Also, a second camera was used on the shore near the truck for a second angle at this location.

A mount (see photo) was constructed and attached to the left side of the helicopter so that the pilot could adjust the unit. Since helicopters maintain their position by use of the "stick" and horizontal position by foot pedals, the pilot's left hand was used to adjust the microwave once the copter was at the correct height.

Because the mount was designed so the pilot could move it while flying, we were able to maintain over four minutes of picture in a 30 knot wind while actually flying the helicopter (not just hovering). We not only got our overhead shot, but we were also able to follow the steamboats up and down river for two miles. The total cost: $50 for helicopter time; $100 in materials and labor building the mounts; equipment costs, zero.

The only restriction was the mini-cam truck which had to be on the left of the aircraft and the subject to be photographed must be on the right side where the photographer was sitting. This whole package was rebuilt and welded to reduce vibration problems and cables were installed on the aircraft.

If the newsroom wants to use the helicopter for live shots of some disaster, all it has to do is call the heli-port and tell them to install the mounting package. When the photographer arrives, he attaches the microwave to the previously installed cables and the helicopter flys to the scene of the disaster. Since the newsroom always dispatches the mini-cam truck to such disasters, it will be on scene to relay the copter signal back to the station. It is actually possible to have live helicopter pictures on the air in thirty minutes from first notice, much faster than using a film camera, then racing back to the studio to process and edit it before air time. It is possible for the helicopter to arrive overhead before the mini-cam truck arrives.

That wide overhead shot makes a spectacular opening to any news story. □

SOCIETY OF
BROADCAST ENGINEERS, INC.
P.O. Box 50844, Indianapolis, Indiana 46250

Hurley meets with FCC blanking committee

SBE president James Hurley recently represented the society at a meeting of the FCC ad-hoc committee on TV blanking widths. The meeting was held at NAB Headquarters, Washington, D.C.

For the first two hours, there was an open discussion with Neil McNaughten and John Reiser of the FCC Broadcast Bureau and John Hudak of the FCC Field Service. The exchange of views was enlightening with respect to the parts that each play and the responsibility each has in keeping those parameters within specifications.

Future meetings are scheduled with the committee chairmen to try to reach a standard on tolerances that is acceptable to all parties.

CHAPTER REPORTS

Chapter 1—Binghamton, New York

The September 12 meeting was held in the Owego Treadway with a program on Automatic Transmission Systems. Charles Haubrich, president and William Hoeltzel, vice president sales of QEI Corporation, demonstrated a complete system and emphasized that automatic transmission systems are here, they are FCC approved and in successful operation in many locations. This was an excellent program and of great interest to all the AM, FM and TV broadcasters.

Chapter 2—Northeastern Pennsylvania

The chapter met October 2 at the stuidos of WVIA TV-FM, Pittston, to hear Paul Evanosky, assistant manager, engineering, talk on Earth Station 44, which is WVIA's satellite interconnection to the nationwide public television system. The satellite receiving station had its birth in August and is now receiving live programs for WVIA's Public Broadcast Center. Future plans call for WVIA TV to originate programs for transmission to other stations. Program transmission and reception are by way of Western Union's Westar II. The meeting included a tour of the new facilities.

Chapter 21—Spokane, Washington

The chapter meets each Monday noon at Scotts Restaurant, 57th and Regal in Spokane, and invites members and guests to stop in when in town. We have evening meetings every 6 to 8 weeks.

Chapter 25—Indianapolis

The August 8 meeting was an informal lunch at LaScala Italian Restaurant and a discussion of programs for the fall and remainder of the year. Many suggestions from the membership were shared with the new program chairman, Gary Hinderliter.

Chapter 26—Chicago

The August 22 meeting was held in the Sonart/DB Studios in Chicago and John Phelan, manager of Professional Sound Products at Shure Brothers in Evanston, IL, was the speaker. Phelan demonstrated Shure's new SM81 condenser microphone and V15 Type IV cartridge and discussed the design considerations of both. A tour of the Sonart/DB facilities followed the meeting.

Chapter 41—Central Pennsylvania

The August 17 meeting in the WHP Stations Community Room in Harrisburg featured an equipment demonstration by Keith Leach of Collins Radio.

Chapter 43—Sacramento

The August 22 meeting was held at KXTV, Studio "C". Shintaro Asano, president and founder of the Shintron Company, was the special guest. Joining him was Ekhard Konkel, western sales representative for Shintron. Included in Shintron's diverse product line are video switchers, monitors, SMPTE time code encoders/decoders and digital devices.

Chapter 45—Charlottle, North Carolina

The August 14 evening meeting was held in the Banquet room of the Barclay Cafeteria. Shintaro Asano was the guest speaker. In the early 1960s he started what is now Shintron Company, a manufacturer of video switchers, special effects generators, character generators and other video equipment. □

new literature

Switchers

American Data—Their short form catalog briefly describes their full line of production switchers, one bus quad split, RGB chroma keyer, black burst and color background generators, automatic control TV switcher, distribution switchers, audio switching matrix, and modular amplifiers. New items added in 1978 included production and distribution switchers and automation controls.

Circle (150) on Reply Card

Pattern recorders

Scientific-Atlanta—An 8-page instrumentation products brochure describes a new generation of antenna pattern recorders, including applications, specifications and ordering information. The series 1580 recorder is featured along with available options and accessories.

Circle (151) on Reply Card

Recorders

RCA—Catalog TA.3720 is a 16-page publication which features descriptions and features of the TH-100 studio recorder; the companion TH-50 portable recorder, and an array of related accessory equipment.

Circle (152) on Reply Card

Oscilloscope application

Tektronix—Digital Processing Oscilloscope Application Note No. 45K2.5 describes an automated test setup employing a Tektronix Oscilloscope. The system uses SPS Basic software, a user-oriented language tailored to the requirements of test and measurement. Practical considerations in making RF swept measurements are considered in detail.

Circle (153) on Reply Card

Broadcast equipment

Rohde & Schwarz—The main feature of issue 81 of the company-owned magazine are the new products shown at 1978's Hannover Fair: digital RF millivoltmeter URV 4 with additional analog tendency display, TV test transmitter SBUF covering 25 continuously through 1000 MHz and TV monitoring receiver EKF 2 with its envelope and synchronous detector.

Circle (154) on Reply Card

Electronic equipment

Caringello Electronics—Electric equipment and kits are featured in this 36-page factory mail-order catalog. Each product is completely described with all technical specifications, photo, application information, schematic diagram, and a complete description of how each unit works.

Circle (155) on Reply Card

Oscilloscopes

Leader Instruments—Application features and complete specifications for a series of dual and single

trace oscilloscopes are featured in a recent full-color catalog from Leader Instruments. The 16-page catalog details eight principal oscilloscopes being made available in 5-inch and 3-inch CRT display formats.

Circle (156) on Reply Card

Product bulletin

Switchcraft—Product literature provides details on two series of line voltage selector switches designed for test equipment, instruments, appliances and similar OEM products sold in international markets. EPS components are offered with printed circuit or solder lug terminals and 2A, 250 VAC rating for electrical and electronic equipment. Flush (screwdriver slot) actuators are standard, as are 115V-230V legends. On special order, actuator knobs and other legends are available.

Circle (157) on Reply Card

Remote TV brochure

Nurad—This 8-page product brochure on remote television broadcast systems contains details of various Nurad antennas, including hemispherical, directional circularly polarized and rod on commount mount types.

Circle (158) on Reply Card

Editing deck

Sony—An 8-page brochure on the VO-2860 videocassette editing deck and RM-430 automatic editing control unit provides a detailed description and complete set of instructions for the machines. It also includes schematic renderings of sample editing and recording installations using the new units. The brochure explains that besides allowing for automatic tape-to-tape editing with a pair of 2860s, the RM-430 permits the direct interface between U-Matic and Betamax videocassette systems.

Circle (159) on Reply Card

Antennas

Andrew—Catalog 30 is a 160-page publication featuring antennas for all types of broadcast applications. Complete descriptions and illustrations are included along with a price list and shipping information.

Circle (160) on Reply Card

Test system

Tektronix—Note No. 45S1.0 covers a test system that uses Tektronix's Digital Processing Oscilloscope, together with graphics display terminal and hard-copier. Calculations are performed using the SPS Basic software, which is designed specially for test and measurement applications. The note describes measurement techniques, test setups, and calculations. It includes typical specifications sheets prepared by the system.

Circle (161) on Reply Card

□

new products

Camera tube

A 1-inch Plumbicon TV camera tube has been designed by *Amperex* for portable EFP cameras. Physically interchangeable with conventional 1-inch Plumbicon pickup tubes, the S73XQ can be used in existing cameras with only minor circuit modifications. Its limiting resolution is 1000 TV lines; modulation depth is 65% at 400 TV lines, a 50% advance over previous 1-inch Plumbicon tubes.

In addition to the new tube's high resolution, the increased beam acceptance of its photoconductive layer reduces signal decay lag at 50 msec to 2% at signal levels down to 50 nA.

Circle (162) on Reply Card

Reporting system

Chyron Telesystems introduced an election reporting system which accumulates race results and produces broadcasts through the station's Chyron graphics and titling system.

The system provides multiple formats, analysis and display of predetermined subsets and totalling, analysis of race classifications, programmable winner declarations, vote overflow control, computer and communications backups, and editing capability.

Circle (163) on Reply Card

TV measurement set

Tektronix is offering Answer, a microprocessor-based automated television measurement set programmed for 37 measurements. It can run an in-service NTC-7 and timing measurement routine in less than one minute.

The set will measure video signal timing, blanking, sync, and burst parameters; transmission quality parameters, including signal to noise ratio, per NTC-7; and, any VIT, VIR or full field test signal.

Circle (164) on Reply Card

Cable testers

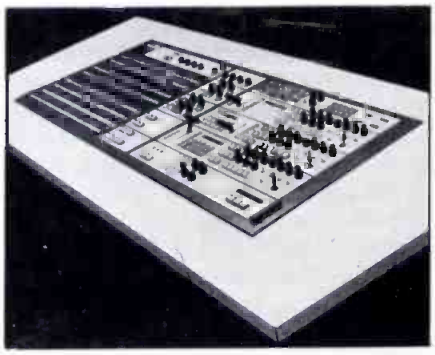
The *Switchcraft* Q-Chek Cable Testers enable quick checking of most audio cables for continuity, shorts, opens and crossed wiring between terminations.

Seven audio adapters are supplied with model QC1002, making up to 350 cable/connector combinations possible.

Circle (165) on Reply Card

Production switcher

Ampex's Duca-Richardson model 4000E1 production switcher offers 16 active inputs plus color black and color background, with the main operating controls located on a subpanel that puts each control within easy reach of the operator.



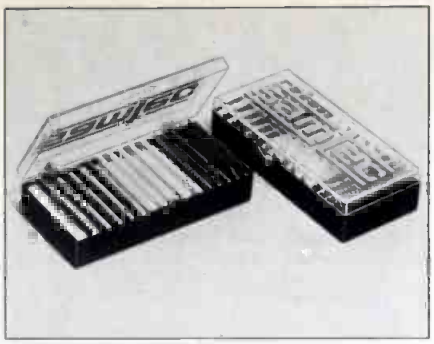
Wipe panel patterns and key sources can be preselected from the compact 15-button keyboard illustrated in a decal on the control console.

Automatic transition intervals range from 0.1 seconds to 9.9 seconds in 0.1 second increments; and key selections include six RGB chroma keys, the preview bus, the B bus and two external sources.

Circle (166) on Reply Card

Strip connector kit

Samtec offers a strip connector kit which can socket any DIP-Type IC with lead-size of .015-inch to .022-inch cross-section. Terminations are PC solder and wire-wrap.



Terminal strips mate with socket strips or can be used separately.

Circle (167) on Reply Card

Microcomputer system

Signetics Instructor 50 microcomputer system demonstrates how

a microprocessor functions. The self-contained system was designed to enable the user to make the transition to other microprocessors.

Circle (168) on Reply Card

Speaker systems

Electro-Voice is offering a series of stage speaker systems. The S12-2 is a 2-way system; the S15-3 is a 3-way. The S15-3 is virtually flat down to 50 Hz. The S12-2 uses the EVM12S while the S15-3 uses the EVM15L for low-frequency reproduction.

The upper limit of both systems is 16,000 Hz. By using the ST350A tweeter (a driver also) found in the firm's studio monitor speakers, these systems are able to project high frequencies uniformly over a 120° angle. Power handling capability is 100 watts RMS for each system.

The S15-3 utilizes a vented midrange cone speaker. This design makes it possible to achieve high

sound pressure levels (up to 116 dB) without resorting to a horn midrange driver.

Circle (169) on Reply Card

Master videotape

A master broadcast videotape for professional applications using the 1-inch format was unveiled by *3M Company*. Scotch 479 master broadcast videotape has 3 dB RF output, 2.5 dB S/N ratio and 3 dB color noise improvement.

The rugged base of the tape permits stop motion, frame-by-frame editing; jogging and slow motion. Back treatment improves handling and eliminates the backside scratching, a cause of dropouts.

A cushioned-flange reel provides extra protection for tape edges during use, handling and shipping. It is offered in 30, 45, 60 and 90 minute lengths.

Circle (170) on Reply Card

Sync generator system

Sharp Electronics introduced a Sync Generator System (XSG-370) capable of driving five independent cameras.

The system has four subcarrier and four horizontal outputs which are independently phase adjustable from the front panel. The horizontal outputs may be sync or horizontal drive.

Circle (171) on Reply Card

Amplifier

A dual low-noise general purpose operational amplifier is available from *Signetics*.

The NE5533 can drive 10V (RMS) into 600 Ohms directly and features a bandwidth of 10 MHz and power bandwidth of 200 kHz.

Circle (172) on Reply Card

Audio oscillator card

A PC Card Audio Oscillator offered by *Modular Audio Products* is intended as a source of test, alignment, cue or slating tones.

Featuring low distortion, 0.15% THD at +20dBm (direct) output, the output frequency of the unit may be externally set or remotely varied

continued on page 92

new products

continued from page 91

from 40 Hz to 20 kHz. A built-in output transformer provides up to +27 dBm into a 600 ohm load. The output level may also be externally varied.

Circle (173) on Reply Card

Equalizer module

The MAP model 3270, a 3-band reciprocal peaking and shelving equalizer has been announced by *Modular Audio Products*.

The unit provides reciprocal peaking and shelving equalization of three independent overlapping frequency ranges, with 11 selectable frequencies per band.

A total of 26 one-third octave center frequencies, provides graphic-like coverage of the audio spectrum from 50 Hz to 16 kHz.

Circle (174) on Reply Card

Tube replacement

A junction-field-effect device, which replaces first playback stage tubes in most Ampex professional audiotape recorders, has been developed by *VIF International*.

The VIF 1006 withstands the high (B+) voltage supply of vacuum tubes, and simulates the tube's dynamic performance.

The lifetime is estimated to be 600 times longer than tubes.

Circle (175) on Reply Card

Network analyzer

The *Hewlett-Packard* model 8754A network analyzer provides measurements of magnitude, phase, absolute power and polar reflection coefficient from 4-1300 MHz.

The instrument includes a built-in source, a 3-channel 80 dB dynamic range, spurious-free receiver and a CRT display.

Circle (176) on Reply Card

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advertisers' index

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WANTED

EQUIPMENT WANTED

REMOTE TELEVISION VAN. MUST HAVE AT LEAST FOUR CAMERA CAPABILITY PLUS ROOM FOR VIDEOTAPE AND SLO-MO. CONTACT ROBERT O. DONAHUE, WMAR-TV, 6400 YORK ROAD, BALTIMORE, MARYLAND 21212. 9-78-3t

TK-27 FILM CHAIN and TR-60 Videorecorder. (901) 458-2521 C.E. 9-78-2t

WANTED: MICROWAVE SYSTEM for parts, including Head Chassis to Controller interconnect cable (MI-26759-49) for RCA's TVM-1B. If you have any or all of the above, call (815) 965-9600; ask for Jim Landes. 10-78-1t

WANTED: Recording gear of all ages and variety. Microphones, outboard gear, etc. Dan Alexander, 6026 Bernhard, Richmond, CA 94805, (415) 232-7933. 4-78-6t

WANTED: Pre-1926 radio equipment and tubes. August J. Link, Surcom Associates, 305 Wisconsin Ave., Oceanside, Ca. 92054, (714) 722-6162. 3-76-tf

EQUIPMENT FOR SALE

EQUIPMENT FOR SALE: Merlin Hi Band Quad VTR. Total time 200 hrs. Includes Ampex TBC 800 for Quad and ¾" playback. RCA FR 35B Projector. Total time 188 hrs. Includes remote control, fast start, optical sound, variable speed, 6000' kit, and 135 mm lens. Write P.O. Box 47502, Dallas, Texas 75247. 10-78-1t

VIDEO EQUIPMENT, incl. CAMERAS: GE PE-350, MARCONI MK7, RCA TK60; SWITCHER: WARD-LEONARD TS206 with TA902 fader & RIKER 540 SE (8x21); GE 4PE27 KEY CAMERA; VTRs: AMPEX VR-1000's ED.; CABLE: BELDEN 8284 bulk; CONSONE: LANGEMAN 16x4. More. Send large SASE for list or call Malcolm Montgomery, Chief Engineer, Broadcasting Div., College-Conservatory of Music, Univ. Cincinnati, Cincinnati, OH 45221, 513-475-4394. 10-78-2t

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TRANSMITTER G.E. TT. 25-A 12KW good condition, frequency 488-494 MHZ, Channel 17, complete with spare tubes and manuals. In service, available in November 1978. Reply to: Tom Ballew, KJTV Channel 17, 2831 Eye Street, Bakersfield, CA 93301, (805) 327-7511. 10-78-1t

LIGHTING DIMMER SYSTEM for sale. 32 - 3K dimmers, 32 faders with 16 preset memory console. Packed for touring. Must sell! Asking price: $14,950.00. BC&G Enterprises, P.O. Box 708, Arvada, Colorado 80001. (303) 751-5991 or (303) 424-6151. 9-78-3t

IKEGAMI HL-77A w/10-100 Canon Auto-Zoom, Gen lock, AC power supply, power cable, and case. M. Schlansky (212) 594-8700. 10-78-1t

FOR SALE: IVC 7000P Color Camera with CCU, Canon 12-120 mm lens w/Auto Zoom, 150' camera cable, cases included. For information, call or write: Louisiana Marketing, 901 Lakeshore Drive, Lake Charles, LA 70601, (318) 439-3624. 10-78-2t

NEW 7/8" HARDLINE Cableware SLA 78-50J. 1,000 ft. Lots only. $.80 per ft. Henry, (301) 855-6777. 9-78-2t

BROADCAST CRYSTALS for AM, FM or TV transmitters, frequency change, repair or replacement of oven types. Also vacuum types for RCA, Gates, Collins, etc. transmitters. Quality products, reasonable prices and better delivery! Don't be without a spare crystal. Frequency change and service for AM and FM monitors. Over 30 years in the business. Eidson Electronic Co., Box 96, Temple, Texas 76501. Phone (817) 773-3901. 12-74-tf

ASACA—5 Cameras—4 ACC 7000, 1 ACC 1000 for sale. Used for demonstration only, value over $150,000. Best cash offer. Art Florman, F&B/CECO, 7051 Santa Monica Blvd., Hollywood, Ca. 90038, or call (213) 466-9361. 8-78-6t

AMPEX VPR-5800 color production recorders, VPR-1 compatible, very good condition, 4 available at $2250 each. Bill Dorsey, 630 Ninth Avenue, New York, N.Y. 10036, (212) 541-9295. 10-78-1t

AMPEX 1" VPR5800. Bought 1977. Never used. Save 67%. Magnavox Chromavue 400 color camera with zoom and CCU. Used Scotch UCA 60's, one recording no more than six passes—guaranteed. Video Station, 422 McDowell St., Asheville, N.C. 28803, Phone (704) 258-1145. 10-78-1t

AMPEX AUDIO RECORDERS: 9 AG440 mono in console $1,750.00; 1 600 mono portable $550.00; 1 300 2-track completely rebuilt electronics w/solid state preamp $1,100.00. All in excellent condition. Contact Rod Hall: (213) 577-5400. 10-78-2t

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PROFESSIONAL BACHELOR DEGREE....earned with 4 or more years of Broadcast Business Management, Sales, or Servicing Experience. For FREE information Write: Ebert PROFESSIONALS INSTITUTE, Box 1651, Dept. B, Columbia, Missouri 65201. 6-78-6t

SITUATIONS WANTED

TELEVISION—CCTV Video Maintenance Technicians. Full Benefits. Greater New York, Suffolk County or New Jersey Area. Send resume to: VPC, P.O. Box 268, New Hyde Park, N.Y. 11040. 6-77-tf

RADIO CHIEF ENGINEER, good audio and transmitter worker. Excellent conditions, salary, and fringes, at West Coasts oldest station. Send resume to KMED, P.O. Box 1440, Medford, Oregon 97501, or call (503) 773-1440. 9-78-4t

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TELEVISION TRANSMITTER SUPERVISOR—We need a top engineer to maintain two parallel Harris BT18H's on Channel 11, located in the worlds tallest building. First Class FCC license plus five years of high power RF experience is required, along with a good understanding of digital electronics. Good benefits go along with a salary of $27,924 per year. Send your resume in confidence to: Larry W. Ocker, Director of Engineering, WTTW-TV, 5400 N. St. Louis Ave., Chicago, Illinois 60625. 10-78-2t

CHIEF ENGINEER: AM-FM Station in New Orleans has immediate opening for **experienced** Chief Engineer. Send resumes to: Mr. Jon Peterson, Box 15860, Orlando, Florida 32858. 10-78-1t

CHIEF ENGINEER—New T.V. station located in major Northeast suburban market requires a 1st class licensed Engineer knowledgeable in all phases of T.V. station equipment. Attractive salary, benefits. Send complete resume, salary history and references to Dept. 432, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212. All replies strictly confidential. 10-78-2t

SERVICE ENGINEERS—Due to increased demand, one of the world's leading manufacturers distributors of highly advanced TV equipment including KCK cameras and BCN videotape equipment has immediate openings in the Los Angeles area. To qualify for these challenging growth opportunities in our FERNSEH division, you must have a minimum of 3 years successful experience in the broadcasting industry. A BS degree or equivalent, camera and VTR experience are pluses. In return, we offer an excellent fringe benefit package. Send your resume with earnings history in confidence to: Fred Bundesmann, National Sales Manager, Robert Bosch Corp., 279 Midland Ave., Saddle Brook, N.J. 07662. AN EQUAL OPPORTUNITY EMPLOYER. 10-78-1t

MAINTENANCE TECHNICIAN—Midtown New York videotape facility seeks qualified VTR maintenance technician. Quad experience essential. Excellent pay and benefits. Immediate opening. Send resumes to Personnel, Teletronics International Inc., 231 E. 55th St., NYC 10022. 10-78 1t

VIDEO TAPE SUPERVISOR needed by major VHF station in Tulsa, Oklahoma. Must be experienced in maintenance and operation of Ampex videotape recorders. Very good opportunity for the right person. Send resume to KTEW, P.O. Box 3002, Tulsa, Oklahoma 74101 or contact Jim McDaniel, (918) 742-5561. KTEW is an equal opportunity employer. 10-78-1t

VIDEO OPERATING ENGINEERS, maintenance engineers, camera operators, wanted for Washington, DC videotape production house. Experienced only. Reply to: Dept. 431, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212. 10-78-2t

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Want to join an aggressive, expanding production company using the latest equipment? How about TRI•COMM PRODUCTIONS of Hilton Head Island, South Carolina? You've seen our ads. We need a versatile, production-oriented television engineer. Send resumes to: Denny Fussell, TRI•COMM PRODUCTIONS, INC., P.O. Box 5242, Hilton Head Island, SC 29928.

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Major market station needs person with 1st class FCC license, technical education, and 2 years previous experience in all phases of television engineering.

Salary in low 20s for individual with proper experience.

Send all information to Jack Hastings
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CHIEF ENGINEER/FM RADIO—Excellent career opportunity for FCC First Class Engineer-Major Broadcast Group, excellent benefits, 100,000 Watt Stereo. Should be experienced in transmitter work, STL and have strong audio background. Salary open depending on experience and ability. Equal Opportunity Employer. Contact Raymond Yorke, WYNF Radio, 813-576-0950 between 9 AM - 5:30 PM or P.O. Box 20147, St. Petersburg, Fla. 33742. 10-78-1t

CHIEF ENGINEER for 100,000 watt FM stereo contemporary station. Good company with good pay for a good engineer. Contact: Mike Miller, Oklahoma City, OK. Area 405-478-0444. 10-78-1t

EQUAL OPPORTUNITY EMPLOYER—TV Station seeking individual, male or female, with 5 years combined experience in studio and transmitter engineering areas. Send resume to Box 7620, Pittsburgh, PA 15214. 10-78-1t

WANTED IN DALLAS: Young, energetic, creative engineer. First phone not required. Camera, VTR Maintenance and Production experience helpful. Come join the fastest growing production facility in the Southwest.

Editing Director for Datatron Tempo On-Line System. Must qualify with editorial judgement, speedy keyboard operation, interaction with clients and a hell of a sense of humor. Write to P.O. Box 47502, Dallas, Texas 75247. 10-78-1t

RADIO/TV ENGINEERING SUPERVISOR. B.S. Degree from an accredited college with a major in Electrical Engineering or Electronic Engineering Technology or High School Diploma and four years experience in Radio and/or TV Electronics. First Class FCC License required. Salary $11,275. Apply University of South Florida Personnel Office, FAO-011, Tampa, Florida 33620. Deadline for applications October 26, 1978. An Affirmative Action, Equal Opportunity Employer. 10-78-1t

IMMEDIATE OPENING—Need 1st Class FCC Engineer to maintain new full color television studio and stereo FM radio station. Must be familiar with Hitachi studio and mini-cameras, JVC, IVC and Sony ENG equipment as well as character generator, special effects, telecine and audio equipment. Experience preferred but will consider knowledgeable licensed beginner. Application deadline is October 31. Contact the Dean of Instruction, Central Wyoming College, Riverton, Wyoming 82501, or call (307) 856-9291. EOE/M/F. 10-78-1t

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Design assemblies and subassemblies of mobile communications equipment. Background should include experience or education in analog circuit design, software techniques and logic design. BSEE required/MSEE desired. Entry and advanced positions available.

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Mr. M. H. Kessler, Mgr. Employment
RCA Broadcast Systems, Dept. BE-10
Bldg. 3-2
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Training Engineers, Los Angeles

Sony is looking for several Engineers with maintenance skills to teach theory and maintenance of our Video Products. Both classroom instruction and Writer-Producer-Directors for Instructional Video Tapes are needed. Salary commensurates with experience and excellent fringe benefits are offered, combined with the beautiful Southern California climate. Send your Resume in confidence to:

Sony Corp. of America
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Compton, CA 90220
Attn: June Howerton

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Busy corporate non-broadcast studio midtown Manhattan seeks staff engineer for all maintenance and some operational duties. 3 Harris TE 301 cameras, BVU 200 recorders with editor, Grass Valley 1600A switch, equivalent sync/sig. processing, distribution and monitoring equipment. 5 years relevant technical experience. Must be able to trouble-shoot and repair IC/transistorized circuits, both analog and digital. Degree helpful but not mandatory. Good benefits and working conditions. Salary to low $20's depending upon qualifications.

Resume to: Box 444, Suite 1501
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6	18	30	42	54	66	78	90	102	114	126	138	150	162	174	186	198	210	222	234	246	258	270	282	294	306	318
7	19	31	43	55	67	79	91	103	115	127	139	151	163	175	187	199	211	223	235	247	259	271	283	295	307	319
8	20	32	44	56	68	80	92	104	116	128	140	152	164	176	188	200	212	224	236	248	260	272	284	296	308	320
9	21	33	45	57	69	81	93	105	117	129	141	153	165	177	189	201	213	225	237	249	261	273	285	297	309	321
10	22	34	46	58	70	82	94	106	118	130	142	154	166	178	190	202	214	226	238	250	262	274	286	298	310	322
11	23	35	47	59	71	83	95	107	119	131	143	155	167	179	191	203	215	227	239	251	263	275	287	299	311	323
12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324

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4	16	28	40	52	64	76	88	100	112	124	136	148	160	172	184	196	208	220	232	244	256	268	280	292	304	316
5	17	29	41	53	65	77	89	101	113	125	137	149	161	173	185	197	209	221	233	245	257	269	281	293	305	317
6	18	30	42	54	66	78	90	102	114	126	138	150	162	174	186	198	210	222	234	246	258	270	282	294	306	318
7	19	31	43	55	67	79	91	103	115	127	139	151	163	175	187	199	211	223	235	247	259	271	283	295	307	319
8	20	32	44	56	68	80	92	104	116	128	140	152	164	176	188	200	212	224	236	248	260	272	284	296	308	320
9	21	33	45	57	69	81	93	105	117	129	141	153	165	177	189	201	213	225	237	249	261	273	285	297	309	321
10	22	34	46	58	70	82	94	106	118	130	142	154	166	178	190	202	214	226	238	250	262	274	286	298	310	322
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12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324

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4	16	28	40	52	64	76	88	100	112	124	136	148	160	172	184	196	208	220	232	244	256	268	280	292	304	316
5	17	29	41	53	65	77	89	101	113	125	137	149	161	173	185	197	209	221	233	245	257	269	281	293	305	317
6	18	30	42	54	66	78	90	102	114	126	138	150	162	174	186	198	210	222	234	246	258	270	282	294	306	318
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- ☐ CCTV (*If you check this category, please answer details listed in 1(b) below.*)
- ☐ Other: Specify _____

1(b). Check your CCTV Applications:

- ☐ Business or Commercial (for personnel & sales training)
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- ☐ Security (surveillance)
- ☐ Educational or Instructional (academic or vocational institutions)
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2. Check the category that best describes your title.

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3. Does your occupational responsibility extend to more than one station or facility?

Yes ☐ No ☐

4. If none of the foregoing businesses or occupational categories fits your situations, please describe specifically your occupation or interest in BROADCAST ENGINEERING magazine: _____

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Make final decision to buy a specific make or model

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5(b). Is specifying and buying major equipment, components and accessories a group or committee activity in your facility?

Yes ☐ No ☐

5(c). If the response to the foregoing question is yes, indicate whether you are an active member of the committee or group.

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fact:
you can choose your microphone to enhance your productions.

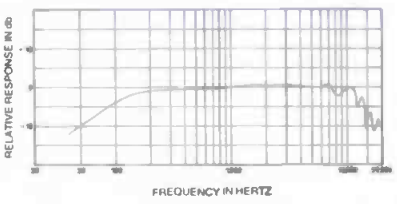
Shure makes microphones for every imaginable use.
Like musical instruments, each different type of Shure microphone has a distinctive "sound," or physical characteristic that optimizes it for particular applications, voices, or effects.
Take, for example, the Shure SM58 and SM59 microphones:

SM59

Mellow, smooth, silent...

The SM59 is a relatively new, dynamic cardioid microphone. Yet it is already widely accepted as a standard for distinguished studio productions. In fact, you'll often see it on TV . . . especially on musical shows where perfection of sound quality is a major consideration. This revolutionary cardioid microphone has an exceptionally flat frequency response and neutral sound that reproduces exactly what it hears. It's designed to give good bass response when miking at a distance. Remarkably rugged — it's built to shrug off rough handling. And, it is superb in rejecting mechanical stand noise such as floor and desk vibrations because of a unique, patented built-in shock mount. It also features a special hum-bucking coil for superior noise reduction!

Some like it essentially flat...

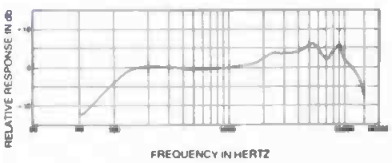


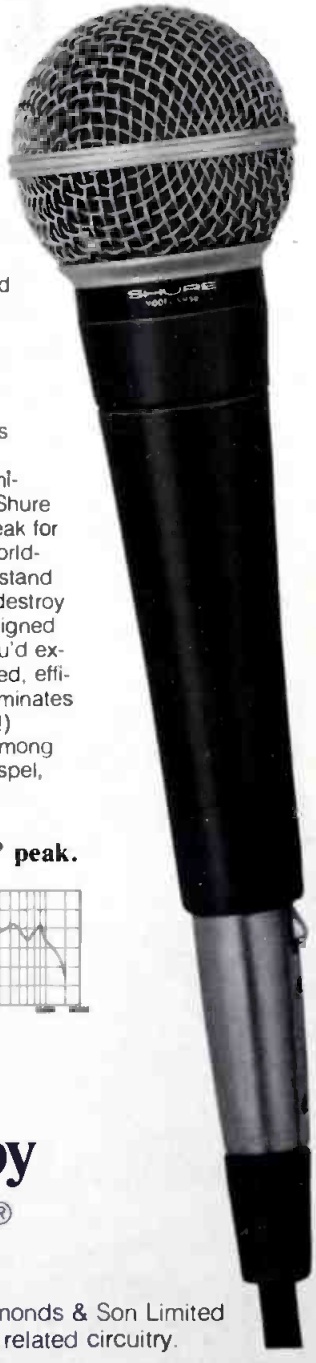
SM58

Crisp, bright "abuse proof"

Probably the most widely used on-stage, hand-held cardioid dynamic microphone. The SM58 dynamic microphone is preferred for its punch in live vocal applications . . . especially where close-up miking is important. It is THE world-standard professional stage microphone with the distinctive Shure upper mid-range presence peak for an intelligible, lively sound. World-renowned for its ability to withstand the kind of abuse that would destroy many other microphones. Designed to minimize the boominess you'd expect from close miking. Rugged, efficient spherical windscreen eliminates pops. Lightweight (15 ounces!) hand-sized. The first choice among rock, pop, R & B, country, gospel, and jazz vocalists.

...some like a "presence" peak.





professional microphones...by SHURE®

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