Ward-Beck introduces affordable quality!

Advanced Ward-Beck technology has developed circuitry in the new WBS 470 Series that's exactly right for broadcasters seeking superior performance at a competitive price.

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.

Standardized assembly methods have reduced production time and expense, while traditionally impeccable Ward-Beck engineering and styling have been enhanced.

Now, we can supply most orders from stock. And you can afford to move up to Ward-Beck quality.
Cetec Schafer System 7000:
Post-graduate technology, elementary operation

System 7000 is the leading-edge in radio automation: Multiprocessor architecture, plug-in firmware boards, super-clean audio circuitry, almost limitless expandability.

**Keeping it simple to operate**
System 7000 also includes another design breakthrough: human engineering. This marvelous machine is people-oriented. The sophisticated and versatile solid-state electronics are programmed for simple, step-by-step direction in plain English language.

**Powerful and expandable**
Most of all, System 7000 is a powerful broadcasting tool for any radio operation. It guarantees consistently superior audio quality, precise timing, silky smooth transitions, and enhancement of any program format.

When you're ready, the 7000 helps you grow without growing pains. Add memory, 1000 events at a time, with plug-in boards. Ditto with additional audio sources, up to 64. Add video terminals — at any time, for any remote location. Add Verified English Logging. Plug-in a "debug card" for system self-diagnosis.

**A goof-proof keyboard**
You talk to the 7000 in English on a color-coded, mode-clustered keyboard that won't accept misprogramming errors. Your instructions are displayed on a video screen (or several video screens, if you wish). The system answers politely, in English, on the same screen(s). At any time, you can look forward or backward to verify program sequence, or real-time sequence, or to review editing-in-process.

The bottom-most line is that Cetec Schafer System 7000 can handle the toughest and most complex radio broadcast tasks easily and cost-effectively, and with built-in capability to take on tomorrow's added jobs.

All the details are in our new, full-color 7000 product book. Write to Andy McClure at Cetec Broadcast Group, or telephone him at (805) 684-7686.
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A fluid head with 378 combinations.

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The Model 50-D Fluid Head can be ordered with one of six different platforms. Each has its special features and purposes, but our newest is the ultimate.

First, it has a unique camera mounting plate which can be attached to your camera in one of eight different positions. This is used to balance your camera on the head, greatly improving the head’s performance.

Besides an adjustable camera mounting plate, the entire platform (with camera at top) can be shifted back and forth on the head so that you can find the precise center of gravity for whatever particular gear you’re using at any given moment, such as heavy lenses, large magazines, etc.

It takes only a second to release your entire camera with O'Connor's new quick release option. To prevent accidental releases, it has a built-in safety feature.

WITH BASES, WE'RE LOADED.

The Model 50 can be ordered with one of six bases. Besides two Pro Jr. types, Mitchell, Arri 16 and Arri 35, we also offer the O'Connor Claw Ball Base with the "ultra positive grip." The distinctive aluminum ridges dramatically increase the holding power with far less effort needed to secure it in position. This Claw Ball design can also be adjusted ±15° to the horizontal plane, and the top casting of the tripod to correct or alter your panning plane.

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Three counterbalance spring options are available for the Model 50. It is important that you use the proper method to determine which spring is correct for your needs. If you’re not sure, consult an O'Connor dealer or talk to us direct.

When you have the correct counterbalance spring, you should be able to stop the camera at any point in the normal tilting range and release the handle without the camera moving. And it should take no more effort to tilt it upward than it does to tilt it downward. We specifically design counterbalance into all our heads to correct this natural act of gravity so that your "tilts" are as steady as your "pans."

MORE CONTROLS FOR MORE CONTROL.

Like all O'Connor heads, the Model 50 is designed to provide maximum versatility. Separate controls for the pan drag, pan lock, tilt drag lock—all improve the flexibility and repeatability of camera movement.

O'CONNOR HAS MORE OPTIONS.

More options mean a more versatile system for you. In addition to some of the items already mentioned for the Model 50, we also have adjustable double video handles, hi-hats, cases, adapters, teak tripods and the ever amazing Hydro-ped.

ORDER IT YOUR WAY.

The basic O'Connor Model 50 fluid camera head can be ordered 378 different ways. If you’re not sure how you want yours, maybe you should send for our brochure and price list to help you pick the equipment that’s perfect for your needs.

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November, 1978

www.americanradiohistory.com
Television scanning problems

Both the television broadcasting industry and the FCC are currently in an uproar over the increasing failure of many tapes, especially those produced using ENG or other simple equipment, to meet the waveform requirements of the commission's rules. The most common manifestations of the problem are the failure during vertical scanning to begin the active picture on lines 21 or 22 as required, and the display of excessively wide horizontal synchronizing and blanking pulses. This results in black bars at the top and left of the picture and the commission has announced that the practice has got to stop.

The answer, however, is not nearly so simple as the question. Many broadcasters are simply declining to air any tapes not meeting the standards, and complain that this situation is costing them thousands of dollars. The FCC has announced that broadcasters are not obliged to carry political announcements not meeting the standards, so long as the same practice is followed with commercial material. At least one laboratory is advertising a service guaranteed to clean up non-standard tapes, which is bound to involve considerable expense and sophistication. In the meantime, the best solution for future tapes appears to be simply adequate attention to recording equipment performance.

Commission continues to grapple with processing backlog

For as long as we can remember, the commission has waged a losing battle to become current in processing radio applications, and to stay that way. At times, delays of two years or more have been commonplace in even getting around to AM applications, especially the more complicated ones. Now the FCC has announced the "acceptance for filing" of the last of a great batch of AM applications which were dropped in the hopper to beat the freeze deadline of June 30, 1976. This beats by almost six months our prediction in the column for August, 1976.

continued on page 8
No matter what your company's production specialty, news, commercial programming, or instructional television, the American Data complete line of field proven production switchers have the features you'll need to do the job.
To accomplish this herculean feat, however, the commission has found it necessary to divert most of the engineers from processing FM applications, and the FM line is beginning to bog down, although not nearly so badly, with about six months delay on an FM application being par. This has resulted in an increasing number of requests for expedited consideration, which in plain language means being put at the head of the line.

In two such recent requests, the commission granted expedited action on a non-commercial application for Lorton Reformatory (just outside of Washington, D.C.) on the grounds of needed service to and by minority inmates; but at the same time rejected a similar request by a commercial applicant who had asked for the special favor because he was physically handicapped—he was legally blind in one eye.

**New procedures on fines and forfeitures**

The commission has adopted new rules to reflect the passage of legislation authorizing the FCC to proceed directly against persons other than commission licensees who are charged with illegal operations. Previously, the FCC had no jurisdiction against unlicensed operators, or persons marketing illegal radio equipment; such cases had to be referred to the U.S. attorney for prosecution. The new rules also reflect several other new provisions, such as increases in maximum amounts of fines, extension of the statute of limitations, and other provisions.

**Short circuits**

The commission's December schedule includes consideration of proposals to drop in new VHF TV channel assignments to short spacings, and to break down some of the AM clear channels...Future cable carriage and non-duplication rights will be based on the commission's new propagation curves, but existing rights based on the old curves will be grandfathered...The commission's staff has proposed that future Citizens Band operations be shifted to frequencies around 900 MHz...The commission has begun an inquiry into the refund of fees collected between 1970 and 1977 and the adoption of new fee schedules to replace those struck down by the court in 1976; there's already a yelp of protest over the commission's proposal to start with refunds over $20...The commission declined to assign TV channel 17 to Florida on the basis of protest from a proposed land mobile operator supplying radio telephone service to offshore oil drilling operators in the Gulf of Mexico, using frequencies in the TV channel...The FCC is working on a new variation of Part 73 of the rules, which would consolidate all rules dealing with broadcasting in a single place.
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. Anywhere, anywhere from sub-zero to over 100°F operating temperatures.

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

A Hitachi-developed Automatic Beam Optimizer (ABO) circuit cuts out the comet-tailing effect common to lesser cameras when shooting highly reflective objects.

Three 2/3" Saticon tubes combine with a smaller-size high index beam splitting prism to deliver better than 500-line horizontal resolution and better than 51dB signal-to-noise ratio.

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.

Options include a built-in linear matrix masking amplifier for high fidelity color rendition and a complete remote operating unit which lets the camera range up to 1000 feet away on standard camera cable. For an even greater working range of over 3000 feet, a Digital Command Unit/Triaxial Cable System is also available.

Remarkably, the Hitachi SK-90 may be the first affordable, self-contained portable that doesn't compromise. Contact your Hitachi dealer for more details.
New Aspen Music Institute program teaches live-recording

A new program, the Aspen Audio-Recording Institute, was created at the Aspen Music Institute in order to fill the shortage of trained audio technicians in the U.S.

"There is a lack of programs all over the country that train audio students," said Harold Boxer, music director for Voice of America and founder of the program. "The great need today is in public institutions, where audio technicians are required to record live performances. The institutions don't know where they are going to find these people."

Boxer designed the Audio-Recording Institute as a 2-week workshop for those interested in learning basic recording techniques. Students get their training recording some of the world's leading musicians with professional recording equipment.

FCC rulemaking begins on uses of vertical blanking interval

The FCC has begun a rulemaking to consider permitting the transmission of program related signals during the Vertical Blanking Interval (VBI) of standard television signals.

The National Broadcasting Company (NBC) asked for the rulemaking, and statements supporting the NBC petition were filed by the Public Broadcasting Service (PBS), American Broadcasting Companies (ABC), the Joint committee on intersociety coordination, ad hoc committee on television broadcast ancillary signals and Daniel L. Repak, a television station broadcast engineer.

NBC proposed that Section 73.682 (a) (21) of the rules be amended to allow the transmission of a digital source identification (SID) signal on line 20 of the VBI. NBC proposed to use the SID signal to identify the originating network, the city of origination and the date and time of origination. It stated that potential use of the proposed signal would be for verification of network service transmitted; faster and more accurate program ratings; automatic logging; and automatic operation of cable television non-duplication switching equipment.

continued on page 12

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Telex/Magnecord broadcast cart machines run cool and steady. So cool no ventilation is required, so steady not even voltage or frequency fluctuations will alter their speed. Thanks to our dc servo flutter-filter drive.

The MC series offers broadcasters a host of options, including field convertability from mono to stereo or play to record and, of course, end of message, secondary/tertiary cue tones. Designed for type A or B carts, the MC series meets all NAB specifications, offers full immunity to EMI and RFI, is remote controllable and automation compatible with CMOS digital logic. Audio muting, air damped low voltage dc solenoid and fast forward are standard features on every MC unit.

Four broadcast cart machines to choose from in the Telex/Magnecord MC series. Running cool and steady. With a pleasant surprise—they're affordable.

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November, 1978
NAB committee and FCC discuss children's TV programming

The Hundred Plus Market Television Committee of the National Association of Broadcasters (NAB), and the FCC recently met to discuss children's TV programming. Following the meeting, Bill Bengtson, committee chairman and vice president and general manager of KOAM-TV, Pittsburg, KS, said he "appreciates the staff's sensitivity in realizing the difficulty of running a television station in the public interest while keeping up with the paperwork required by government." But the committee still is distressed over mixed messages broadcasters are receiving from the FCC.

Bengtson noted that while the commission talks in terms of zero-based regulation it also has opened up several old proceedings and proposed new regulations and more paperwork. He cited additional paperwork on public service announcements and children's television programming, more extensive instructions on employment forms, new categories for ascertainment forms and inclusion of the handicapped under its equal employment opportunity rules. The FCC has opened a new inquiry into children's television programming and advertising practices to revisit voluntary compliance by television broadcasters with the guidelines in its children's television report and policy statement, adopted in 1974.

Specific questions designed to assess licensee compliance with the guidelines of the 1974 children's report, include:
- Overall amount of programming aired for children;
- Amount of educational and information programming aired for children;
- Age-specific programming;
- Scheduling;
- Overcommercialization;
- Separation of program matter from commercial matter;
- Host selling; and
- Tie-ins.

The committee also discussed the Communication Act rewrite, and heard reports on congressional actions and research.

Smith joins EEOC

J. Clay Smith, Jr., FCC associate general counsel, has been nominated a member of the Equal Employment Opportunity Commission for a term expiring July 1, 1982. FCC chairman, Charles D. Ferris, has endorsed the nomination.

Smith was deputy chief of the FCC cable television bureau from 1974 to 1976 and named FCC Associate General Counsel in 1976.
Known for his daring and inventive camera work, independent producer/cinematographer Anton Wilson has done it all: documentaries, special feature stories for television, industrials ... most notably for ABC-TV's Good Morning, America and for industrial giants like AT&T, among others.

A former technical director for Arriflex, with a background in mechanical engineering, Wilson is also an authority on motion picture production techniques and equipment design. He is vice-president of Anton-Bauer, manufacturers of power supplies for film and video use, and a contributing editor to the American Cinematographer magazine.

"The quietest 16mm camera I've ever owned!"

"I first started out with an Arri 16BL, followed by an Eclair ACL," says Wilson. "Eventually I gave them both up. For various reasons, they just failed to satisfy my particular filming requirements.

"My assignments are so diversified and challenging, I need a versatile production camera that can do just about everything! And I find that the CP-16R/A is the only camera in existence versatile enough to do everything I want — and need — it to do. Best of all ... it is the quietest 16mm camera I've ever owned."

"CP-16R/A is the only game in town!"

"The studio-silent CP-16R/A is ideal for all double system work. Yet it is lightweight, compact, and has all the sophisticated features and accessories I consider indispensable: variable speeds, behind-the-lens metering, orientable viewfinder ... you name it.

"Most important, the CP-16R/A also has a high-quality single system sound capability that is integral to its original design — not a modification, or an afterthought.

"When I add it all up: CP-16R/A is the only game in town!"

Modern production techniques require high-quality single and double system sound.

Says Wilson: "Single system capability is essential these days for most documentary, industrial and PR films, as well as TV commercials. Because modern production techniques frequently call for the editing to be done on videotape, and single system sound makes video transfer real easy.

"That's why my CP-16R/A is frequently used much like a remote video camera ... but with far greater flexibility and superior results. Production costs in the field are cut dramatically, and we are far less conspicuous and obtrusive than any EFP crew would be.

"Occasionally, we want the quality of double system sound as well as single system sound backup and editing ease. So we shoot both ways simultaneously, running an additional feed from the mixer into the CP-16R/A built-in amplifier, and recording single system sound on stripped film. Incidentally, on a recent documentary shot this way, the single system sound quality was so outstanding that we never even used the sound from the Nagra tape!"
New film-processing technique shortens developing time in half

A new process tested by four television stations has nearly halved dry-to-dry time for film while leading to some cost-savings in chemicals. The process is a modification of the process VNF-1 used with Eastman Ektachrome video news films. A faster acting formulation of persulfate bleach and bleach accelerator replaces ferricyanide bleach and a second-stop bath.

WGR-TV, Buffalo; WIXT-TV, Syracuse; WTAR-TV, Norfolk; and WTEV-TV, New Bedford-Providence, have used process RVNP (Rapid Video News Process) with a variety of processing machines.

The ability to run film almost twice as fast with the new process has made a significant impact at WTAR-TV where the lab manager, Phil Trahatius, has seen an increase in the number of assignments covered with film. "We are getting some film as late as 5:40 PM, processing and editing it and making the 6 PM news."

WTAR-TV processes as much as 3,000 feet of film a day. Process RVNP has resulted in processing time being trimmed from 32 to 17 minutes.

WGR-TV color lab technician, Norm Fisher, has seen a slight saving in the cost of chemistry with process RVNP. WGR-TV processes approximately 1,200 feet of video news film each week in a Houston Fearless process, operating at a speed of 30 feet per minute. Film is processed, dry and ready for editing in about 15 minutes.

Lee Tanner, WTEV-TV manager of operations and engineering was negotiating for a new Allen processor when Kodak proposed the trade test. The Allen processor is handling about 3,000 feet of film a day and running at 82 feet a minute. Now once a photographer walks in the door, it is a matter of 10 minutes before the film is ready to be shown, compared previously to more than half an hour.

Six minutes may not seem like much, but to Rock Carbene, photo manager at WIXT-TV, it's a lot. The time saved with process RVNP at the Syracuse station means a great deal when it comes to editing, he notes.

NAB requests delay

The National Association of Broadcasters (NAB) has requested a federal court to stay the effective date of a FCC ruling permitting cable television systems to carry network programs already being shown over local TV stations.

In this filing, NAB said "because the loss of network non-duplication protection resulting from the commission's action will be substantial and widespread, numerous broadcast television stations, and particularly those most vulnerable to harm, would suffer irreparable injury in the absence of a stay."

continued on page 16
Think you’ve heard everything?

The world thought so, too. Then Thomas Edison invented a little thing called a phonograph. Suddenly sounds could not only be produced. They could be reproduced. And for 100 years, we've been reproducing sounds just about the way Tom did when his music went round and round.

But not any more. Sony has perfected a new kind of audio recording system for professional use. It's called PCM, which stands for Pulse Code Modulation. And it's part of the digital audio revolution—such a great improvement over conventional analog recording techniques, it's been called the best thing since night baseball.

It's here right now
We've taken those last important steps toward making digital audio a practical reality. And the 2-track PCM-1600 we're exhibiting at this fall's AES conference isn't just the most advanced professional digital equipment to come to the marketplace. It's an idea whose time has come.

The perfect master
Used as a Studio Master, the Sony PCM-1600 gives you true digital mastery of audio. Substantially better audio quality than is possible through even the best analog technology. It lets you record separate takes and assemble them. Make generation after generation of lacquers with no sound degeneration. And distribute any number of digital masters to, say, foreign affiliates giving France the same quality you gave England.

And you still haven't heard the best about the PCM-1600.
First, it uses a standard videotape recorder. The same kind of recorder already familiar to broadcasters across the nation. To edit, or to perform a digital-to-digital dub, you use a standard Sony video editing console—and do it all electronically.

Second, some very impressive numbers: Dynamic range greater than 90 dB. Harmonic distortion less than 0.05%. Wow and flutter so low it can't be measured. And absolutely no hint of hiss.

Third, we've solved the problem of dropouts. By introducing an error-correcting code technique originally developed for computers, we've given our PCM-1600 fail-safe signal reproduction. The kind computer applications take for granted.

And finally, Sony PCM equipment is ready to live up to the Sony name. It's rugged. Reliable. Designed to take anything professionals dish out. And once producers and artists hear the difference, conventional analog recording systems just don't sound good enough.

Now you've heard everything
Unless, of course, you haven't heard our PCM-1600 in action. In that case, we'll be glad to demonstrate...and even take your order now for fall and winter deliveries.

If you think you can wait, see our PCM exhibit at the 61st AES Convention, Waldorf Astoria, New York, November 3-6. Have a good look around.

Then have a good listen.

SONY
DIGITAL AUDIO


Circle (12) on Reply Card

November, 1978
Number 1 in design, performance and features

**Spotmaster**

**5300A**

MULTI-DECK

The cart machine with features competitors can’t match...

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<th>ITC 3D</th>
<th>HARRIS CC-III</th>
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<td>YES</td>
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Plug-in removable decks and superb electronics make this the most up-to-date monaural or stereo three deck cart machine available. Rugged machined deck, quiet air-damped solenoid, unique cartridge guidance system, drop down front panel and run lights next to each deck.

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**industry news**

continued from page 14

**Action Line organizes**

Action Line writers and broadcasters at the final session of the journalists' conference in Corning, NY, formed a national association called The Action Line Reporter Association.

The attendees of the conference, sponsored by Corning Glass Works, chose a steering committee of 10 to coordinate the initial plans and objectives of the new association.

The planning committee, in a meeting immediately following the final formal session, discussed plans to continue an annual conference. They discussed possible locations for the second conference and means of funding the association.

**ASC demonstrates communication services**

A direct, two-way satellite communications link has been placed in operation by American Satellite Corporation for Sperry Univac, a division of Sperry Rand Corporation. The demonstration at Blue Bell, PA, marked the first time small commercial earth stations located on the user's own property have been used to send and receive computer data, printed material and business video information simultaneously by satellite.

A request for a license to provide by the 1980s, domestic satellite communication services somewhat similar to that being provided in Blue Bell was returned to the FCC last week. Asking for further study, the court said the FCC should have given more consideration to anti-trust questions before granting the license to the company, a joint venture of Aetna Casualty & Surety Company, Communications Satellite Corporation, and International Business Machines Corporation.

**Mutual uses satellites**

Mutual has applied to the FCC for permission to transmit its network programs to earth stations installed at Mutual affiliates from coast to coast. Mutual news and sports programs originating at the network's Washington headquarters was received via satellite at the RTNDA meeting.
For you, the new breed of video professional, the new breed of professional video from JVC.
If you're a video professional today, you're a tougher customer than ever. So JVC's rugged professional line delivers the quality and features you demand at prices you want to pay.

We know you've got a lean new attitude about the video equipment you buy, no matter how long you've been in the business. Or whether you're in broadcasting, a sophisticated corporate A/V operation, a top production house...or building your first video capability.

And that attitude is, with all the people vying for your video dollar, you want more state-of-the-art technology in equipment that costs you less to own and maintain.

JVC's attitude is basic too. We build in engineering innovations—we don't add them on later. And we do it first. Which means you enjoy better picture and sound quality, easier operation, and sophisticated features you may not even find in equipment selling for twice the price.

For instance, you wanted faster performance and greater accuracy in 3/4-Inch video editing.

And JVC's new CR-8500LU Recorder/Editor System offers bi-directional fast/slow search from approximately 10 times to 1/20 time, with editing accuracy to ± 2 frames.

It's a new generation of 3/4-Inch VCR editing—the fastest, surest way to get the frame-by-frame accuracy you need.

But JVC's CR-8500LU is still priced well below its closest performing competition.

With a single unit, you can edit with full functions and broadcast quality. Even if you don't happen to have special technical knowledge.

With a complete editing system of two CR-8500LU units and the new RM-85U Control Unit, you can perform the most advanced editing feats at approximately 10 times actual speed, then stop on a single frame.

Here's how the CR-8500LU gives you that kind of precision.

• **Frame to frame editing** is made possible with the capstan servo/built in rotary erase head/blinking switch frame servo design. A design that also ensures true assembly and insert editing with no distortion at the edit points. Plus horizontal sync phase compensation to minimize timing error at the editing points.

• **Variable Speed auto-search** lets you perform both high speed and low speed search. You can search at approximately 10 times in fast forward or reverse to find edit points faster. Or slow speed search at 2 times, 1 time, 1/5 time and 1/20 time. Or use the special auto-speed shift feature to automatically slow you down from 2 times, real time, 1/5 time, 1/20 time.

• **Automatic pre-roll** enables you to pre-roll tape between edits, with an automatic on/off switch. Which can come in especially handy during successive assembly edits using camera signals.

• **Self-illuminated control buttons**, allowing easy identification of the operation mode.

• **Full logic control** for direct mode change without pressing the stop button.

• **Remote control** of all operations; with the optional remote control unit RM-85U.

• **Audio level control with meters**, preventing over-level recording without audible distortion, with attenuator. Also, manual audio level controls let you adjust the audio recording level by checking the level meters.

• **Auto/Manual selection for video recording level control**, adjustable by the automatic gain control circuit or manually by referring to an independent video level meter.

• **RF output** to connect an external drop-out compensator.

• **Patented color dubbing switch** for stable color multi-generation duplicates.

• **S.C./sync input connector** allows connection of time base corrector and allows for two second pre-roll.

• **Chroma level** can be controlled manually for convenient connection to an external system.

• **Built-in comb-filter** for playback (switchable on/off).

• **Servo-lock indicator** to check the tape transport condition.

• **Counter search mechanism**, permitting Auto-Search of a particular section of the tape.

• **Solid construction for easy maintenance**: both side panels, top and bottom panels are detachable for easy access to the inside.

• **Tracking control meters** for maximum tracking adjustment.

• **Heavy fan motor** for better circulation.

All that with one editing unit. But when you combine two editing units with our new RM-85U automatic editing control unit, you'll enjoy all the benefits of a total-performance system.

Starting with the kind of control only JVC's RM-85U can give you.

• **Independent LED time counters** for player and recorder, read out edit points in minutes, seconds and frames.

• **Edit-in and edit-out automatic control**. One built-in memories let you control edit-in and edit-out points of both the player and recorder. And once starting and ending points are determined, accurate editing is memory-controlled automatically.

• **Edit shift control** allows frame-to-frame edit point correction.

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• Lap time indicated for each insert edit length by LED display.
• Edit preview mode available, for "rehearsals" of actual edits.
• Edit-in point search mechanism. After each edit, a Return button rewinds the tape automatically to the edit-in point, so it's easier to check edit conditions.
• Auto-shift search mechanism to step down the tape speed automatically, and ensure quick and accurate location of the editing point.
• Tape safety guard circuit. Because leaving the unit in the still-frame mode can eventually cause damage to tape or video heads, a tape safety guard circuit places the unit into the stop mode automatically if it is left in the still-frame mode for more than 10 minutes.
• Selective editing modes—assemble editing, insert editing for audio channel-1, audio channel-2 or video.
• Versatile editing capability offering techniques like "edit-in/out," pre-roll, and automatic pre-roll.
You'll find that nothing in its price class performs anywhere near the CR 8500LU/RM-850U videocassette editing system. And that you'd have to spend a lot more on the competitive unit that offers many of the same features. That's what we mean by giving video people more of what they want, for less than they expect to pay.

You demanded more versatility in a moderate-priced, broadcast-quality camera.

And JVC's value-packed CY-8800U goes with you from studio to location.

Our CY-8800U offers a lot more than picture quality and stability that compares favorably with units costing twice as much. Thanks to JVC's technology, the CY-8800U camera, utilizing three 3/4" magnetic focus, magnetic deflection Plumbicon or Saticon tubes offer total flexibility. And a rugged die cast chassis in front and back to hold up under the roughest conditions.

With the Basic configuration, it's a compact ENG/EFP camera that's completely self-contained—no CCU required. It's easy to operate, ready to plug into our CR-4400LU/CR-4400U portable recorder, with optional cables available up to 65 feet.

With the Studio configuration it's a hard-working studio camera. Just add the RS-8800U remote Synchronizing unit and the large screen, top mounted viewfinder. And as for big-ticket features, we've built in what the others would let you add on later.

- A built-in 1.5 inch adjustable electronic viewfinder for the convenience of the operator.
- A built-in battery warning system.
- A built-in tally light.
- A built-in VSI—video system indicator for precision F-stop control.
- A built-in color bar generator.
- A built-in +6dB, +12dB sensitivity switch for low light level applications.
- A built-in auto white balance.
- A built-in fast warm-up capability.
- A built-in electrical color temperature adjustment for different applications (variable from 3000°K to 10,000°K).
- A built-in filter system (neutral density) for variable light levels.
- A built-in level switch (+50%, 0, -50%) provides F-stop adjustment, letting you fine tune for added contrast.
- A built-in time lapse meter to show total hours of camera use.
- A built-in intercom system for studio applications.
- An RGB output, and NTSC encoding (Y, I, Q).
- A built-in Gamma control to fine tune gamma level.
- An AC Adaptor—standard.
- Lightweight—17.4 lbs.—portability.
- Optional 12-to-1 zoom lens with automatic iris and power zoom.

And JVC's field-tested CR-4400LU Portable Videocassette Recorder with automatic editing lets you bring your recording/editing capability wherever you need to shoot.

If you spend time on location in either ENG or EFP applications, you need a portable video system that can shoot, edit, and give you something to show in no time flat. Without awkward equipment hassles. JVC's CR-4400LU is the one to take along when you can't bring a studio.

Because it's the lightweight machine with heavyweight features.

- Weighs in under 27 lbs. So you can take it anywhere, and assemble edit on the spot. You enjoy total flexibility. Complete freedom. Fast results.
- AEF (Automatic Editing Function) gives you clean assembly.
- Built-in, full color recording and playback circuitry. No need to buy an adapter.
- Low-power consumption that lets you operate on a miserly 13.5 watts, for longer battery life. A multi-purpose meter checks battery, audio, video and servo levels for precise control of all functions.
- Flexibility to record with the CY-8800U or other high quality color cameras.

So if you need a field tested recording system with the features you want at a price you can afford, check out our CR-4400LU Portable Videocassette Recorder.

*registered trademark of North American Philips Corporation.
†registered trademark of Hitachi Corp.
JVC's new breed of professional video.  
Backed by an old tradition of JVC quality and reliability.

For the past fifty years, more and more professionals have turned to JVC for innovative equipment they can count on to perform.  
Isn't it time you discovered why?  
Call your JVC representative for a demonstration. Or write to your nearest JVC office.

JVC INDUSTRIES COMPANY
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Home videocassette company

Bell & Howell and Memorex announce the formation of M/B&H Home Video, a company to manufacture home videocassettes. Paul Dotray, formerly with the 3M Company, has been appointed general manager of the company.

Dotray's immediate responsibility will be to establish the venture's manufacturing facility in the Chicago area, and see to operational start-up by early 1979. Dotray will also have responsibility for the overall, ongoing operation of M/B&H Home Video.

The two companies announced the joint venture in mid-July of this year. Plans call for the venture company to manufacture product for the two parent organizations. While M/B&H will produce both VHS and Beta format cassettes, it is likely the VHS cassettes will be introduced first, possibly by the first quarter of 1979.

Neve acquires orders

Neve Electronics International Limited has recently acquired orders in excess of $1 million from leading music recording studios and network broadcast authorities in North America.

A and R Studios, Electric Lady Studios and Mediasound, all in New York City, have each invested in Neve mixing consoles. Capital records, Studio 55 and Village Recorder, all in Los Angeles, have just installed the Neve NECAM computer consoles.

Successful year for Harris

Fiscal 1978 was the most successful year in Harris Corporation's history. New orders topped the billion-dollar level for the first time and sales rose 35% to $872 million. Earnings increased to $52 million.

RCA satellite distribution

RCA American Communications, about to enter its third year of operation, now carries more hours of nationwide television distribution on its system than any other carrier in the world.

The company's two orbiting satellites distribute more than 4,000 hours of television programming monthly. Using the RCA Americom satellite, 11 different program packages offer more than a dozen channels of television to millions of cable TV viewers. Four of these channels are offered 24 hours a day. Five channels of pay TV are offered for up to 12 hours or more each day. Many more TV offerings are available via satellite on a part-time or occasional basis in both cable and broadcast markets.

Cetec Audio renamed

Cetec Audio, a division of Cetec Corporation, has been renamed the Cetec Gauss Division, according to Hugh P. Moore, chairman of the board of the parent corporation.

The name change is due to the reputation and importance to the company of the Gauss high-speed audiotape duplicators and the Gauss professional loudspeakers.

Record Plant order

Ampex Corporation recently announced it has received an order from Record Plant, New York City, for six 24-track MM-1200 recorder/reproducers.

Ray Cicola, president of Record Plant, said two of the units will be placed in a recently-purchased mobile unit and the others will be used in the studio. The purchase is part of a program to upgrade facilities of the company.

AFRTS awards contract

The American Forces Radio and Television Service (AFRTS), in its effort to supply U.S. military personnel and their families with television entertainment and news, has awarded Bell & Howell the contract for duplication and distribution services of prerecorded videocassettes.

Bell & Howell plans to supply both ½-inch and ¼-inch prerecorded cassettes from its new duplication and distribution facility on the west coast.

Betamax ad campaign

Sony Consumer Products Company will spend nearly $4 million during the last four months of this year to advance the popularity of its Betamax recorder/player.

National consumer magazines and network television, along with newspapers in major markets, will spearhead the campaign that is designed to create an awareness of the Betamax SL-8600 and inform consumers of the recorder/player's benefits.

Don Gallagher, vice president/marketing communications of the consumer unit, said the campaign is the biggest in the history of the company for a single product.

IEEE directors call for trade wage differential

The board of directors of the Institute of Electrical and Electronics Engineers (IEEE) recently approved a fair reaching resolution which calls for industry and government to pay their engineers more than they pay their nonprofessional supporting personnel. The action follows a recent action of the National Society of Professional Engineers which limits its recommendations to cover civil service employees only.

The specific language of the resolution states in part, "Each employer, including all agencies of government, should establish engineer compensation schedules in accordance with certain criteria."

RCA agreement

In a recent agreement, RCA American Communications will provide daily satellite television service to Modern Talking Picture Service.

RCA Satcom I will be used for nationwide distribution of Modern Cable Programs, a series of free-loan video programs, to the cable television market. The satellite is expected to distribute a variety of programming to more than 800 earth stations serving about 1,000 cable TV systems and over 8,000,000 subscriber homes.

Sales appointments

The Penril data communications division recently announced the appointments of sales representative companies in the U.S. The appointment...continued on page 24
ATR-700
This is the portable audio recorder designed for commercial service—the Ampex ATR-700. A reel-to-reel tape recorder in a compact package, tough enough for the continuous demands of full-time broadcasting, or the bruising insults of location work.

Use the ATR-700 for full or half-track monaural, or full-range stereo, and you'll get a response that's virtually flat from 40 Hz to 18 kHz. And every switch and control is clearly marked on the compact front panel for easy identification. The back-lit meters show you the situation even when the room lights dim, and switchable equalization means instant setup for most situations.

ATR-700 durability runs deep. All switches and connectors are heavy duty, professional types, and the transport itself is a rigid, massive casting that keeps all moving parts aligned even after hundreds of trips back and forth between the studio and the field.

Now there's no excuse for less than professional audio in the programs, commercials and productions you turn out. Ampex has the finest, most up-to-date reel-to-reel portable on the market, and it's available at Ampex audio distributors in every major city.

AMPEx MAKES IT EXCITING.

Ampex Corporation, 401 Broadway, Redwood City, California 94063, 415/367-2011
Circle (16) on Reply Card
Earnings reported
Frank G. Hickey, chairman and chief executive, announced recently that General Instrument Corporation, set new quarterly revenue and earnings records for the period ended August 27, 1978, and that all-time records were also set for the first half.

Revenue for the second quarter increased from $123,117,261 a year ago to $131,299,517; earnings on common stock increased from $6,232,911 to $8,294,039, or from 83 cents per common share to $1.08 an increase of 30%.

Sales appointments
C. Harrison Associates has been appointed to represent the Professional Products Department of Sharp Electronics for the sale of video and security systems in the southeast. It was announced recently by Robert Garbutt, department manager.

The firm located in Norcross, GA, will represent Sharp in North Carolina, South Carolina, Georgia, Alabama, Tennessee and Mississippi.

Comcast dividend increase
Comcast Corporation recently announced an increase in its annual dividend from 10 cents per share to 12 cents. The first quarterly payment at the new rate of 3 cents will be made December 27 to stockholders of record December 6.

"Monitor" is VPA awards
The Videotape Production Association has announced that their annual creative awards will be called the "Monitor." The first annual Monitor awards will be presented at a dinner/dance in the fall, according to Morton Dubin and Joe DiBuono of the VPA.

Scientific-Atlanta terminal
Scientific-Atlanta has received an order for LANDSAT satellite tracking terminal for the National Remote Sensing Agency of India. The $619,000 terminal is to be installed near Hyderabad, India.

The terminal, consisting of antenna, pedestal, controls and receivers, is similar to several such terminals supplied by Scientific-Atlanta for use in Brazil, Italy, Canada and Iran.
Somewhere along the line, video technology got ahead of audio technology. Now, Audio Designs and Manufacturing has evened the score.

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

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

Learn more about how ADM can increase your audio capabilities. Contact Audio Designs and Manufacturing, Inc., 16005 Sturgeon, Roseville, Michigan 48066. Phone: (313) 778-8400. TLX-23-1114. Southeastern Office: Phone (904) 694-4032. AMPLEX® Distributed outside U.S.A. by Ampex International Operations, Inc.

With our new 3200 your audio can equal your video

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Comsat participates in U.N. experiment

A satellite 22,300 miles in space and small portable earth terminals were used to relay simultaneous language interpretations for a United Nations meeting in Buenos Aires, Argentina in an experiment to demonstrate and evaluate remote translation and interpretation.

In the experiment, speeches and documents presented during certain sessions of the U.N. conference on Technical Cooperation Among Developing Countries from August 30 to September 12, 1978 were relayed via satellite to U.N. Headquarters in New York. The U.N. interpreters in New York not only translated the documents for return the next day, but also provided simultaneous interpretation of the plenary session of the conference.

The United Nations, with the cooperation of NASA, Communications Satellite Corporation (COMSAT) and ENTEL of Argentina, conducted the experiment to demonstrate and evaluate the feasibility of remote simultaneous interpretation of a conference and the transmission by facsimile of documents for remote translation via satellite.

To carry out the experiment COMSAT Laboratories installed a transportable earth terminal with a 2-meter diameter antenna on the roof of the 12-story conference building in Buenos Aires. The COMSAT terminal was connected via the Communications Technology Satellite (CTS) to an earth terminal at the U.N. Building in New York. The New York earth terminal, owned and operated by NASA, consists of a bus containing all of the required electronics and a roof-mounted 2.4-meter antenna.

The communications links established between the COMSAT earth terminal in Buenos Aires and the NASA earth terminal in New York included one color television channel each way plus a high fidelity program audio channel and eight voice-grade channels in both directions.

During the experiment the voice and a television picture of the speaker in the conference in Buenos Aires were sent via CTS to New York. The simultaneous interpretations in five official U.N. languages were returned to Buenos Aires via satellite for transmission to the audio headsets of the delegates attending the conference. Each delegate selected the language of his choice. Two-way television was used at the end of the experiment to evaluate the results of the interpretation and translation experiment.

Facsimile copies of selected documents presented in Buenos Aires were also transmitted at high speed via satellite to New York for translation. Translated versions were returned the next day to Buenos Aires. For the experiment, Rapicom, Incorporated provided

continued on page 28
No more dirty movies.

The reason: the Ikegami TKC-950B film chain camera's unique optical system removes the correcting field lens from the focal plane where the aerial image is located. Thus, any dust that collects on the field lens is out-of-focus. When you run movies on the large-image field lens of the TKC-950B, the viewer receives a clean, sharp, dust-free picture on his home TV screen.

The TKC-950B system is dedicated to produce the highest color quality and picture stability. For example, a prism beam-splitter separates the images to its three one-inch vidicons.

The TKC-950B takes into consideration the tight quarters in which most film chains must be installed and operated. Remarkably small, it can accept an external multiplexer on either the left or right side of the unit for additional installation flexibility. Compatible with your existing equipment, it is easy to replace obsolete cameras.

Because film chain cameras must run with minimum supervision, we've built a lot of self-control into the Ikegami TKC-950B. A servo-controlled neutral-density filter disc, built into the optical system — along with fast-acting video gain control — respond so quickly, there is no need for individual light compensators with your projectors. A very stable color encoder provides precise color reproduction. Three types of test pulses with six functions, built into the unit, are provided to facilitate set-ups, daily checks and calibration of the gamma-correction circuit.

The TKC-950B is highly stable and any variations in the source material can be compensated for manually or with an optional new automatic color balance accessory which balances white, black and gamma automatically. And each function is available for local or remote control.

For a complete picture of the Ikegami TKC-950B or a demonstration, contact: Ikegami Electronics (USA) Inc., 37 Brook Avenue, Maywood, N.J. 07607; phone: (201) 368-9171.
STL PRECISION TEST TAPES

WIDEST VARIETY—HIGHEST QUALITY

Do not accept lesser quality—Insist that the STANDARD TAPE LABORATORY name is on the label. We will ship to any Radio or TV station in the U.S.A. on open account. Write or phone for fast delivery. Also available through select dealers throughout the world.

BROADCAST CARTRIDGE TEST TAPES

Specify—Aristocart, Audiopak, Fidelipac 350, or Mastercart cartridge

<table>
<thead>
<tr>
<th>CATALOG # Mono/Stereo</th>
<th>DESCRIPTION</th>
<th>PRICE (EACH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mono</td>
<td>Reproduce Alignment—</td>
<td>$40.00</td>
</tr>
<tr>
<td>34-1 34-2 34</td>
<td>NAB 1976 &amp;/50µsec 160nW/m level, voice announced frequencies from 50-16000 Hz, 12.5 kHz azimuth, 1 kHz level set.</td>
<td></td>
</tr>
<tr>
<td>P-34-1 P-34-2 P-34</td>
<td>Pink Noise—20-20000Hz, &amp;/50µsec. For stereo phase check, and frequency alignment when used with a 1/2 octave analyzer.</td>
<td>$35.00</td>
</tr>
<tr>
<td>F-34-1 F-34-2 F-34</td>
<td>Sweep—700 to 15000 Hz, 100 ms log sweep repeated for 4 minutes with a dead section between sweeps to facilitate scope synchronization—Useful for fast response checks</td>
<td>$35.00</td>
</tr>
<tr>
<td>L-34</td>
<td>Level Set—1kHz, 160 nW/m, 11/2 min.</td>
<td>$25.00</td>
</tr>
<tr>
<td>A-34</td>
<td>Azimuth—12.5 kHz, 11/2 min.</td>
<td>$25.00</td>
</tr>
<tr>
<td>35</td>
<td>Flutter &amp; Speed—1 1/2 min.</td>
<td>$25.00</td>
</tr>
<tr>
<td>36</td>
<td>3150 Hz, tape accuracy—0.3% RMS Flutter—0.1% Speed at 74°F.</td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>Flutter &amp; Speed—1 1/2 min.</td>
<td>$25.00</td>
</tr>
<tr>
<td>36</td>
<td>3000 Hz, tape accuracy—0.3% RMS Flutter—0.1% Speed at 74°F.</td>
<td></td>
</tr>
<tr>
<td>O-34</td>
<td>Q Track Test—Upper and lower limit frequencies, upper and lower limit levels, long and short duration, on and off at zero crossings. Voice announced.</td>
<td>$35.00</td>
</tr>
</tbody>
</table>

STANDARD TAPE MANUAL

Recently announced, this data book is a must for the audio tape recordist, engineer, and designer—priced at $45.00.

FREE CATALOG

For a full description of the manual and a complete listing of all cassette and reel to reel test tapes please send for our latest catalog.

STANDARD TAPE LABORATORY, Inc.
26120 Eden Landing Road / #5 / Hayward, CA 94545
(415) 786-3546

news feature

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Rapifax 100 facsimile equipment in Buenos Aires and New York.

The satellite used in the experiment is owned jointly by Canada and the United States, and satellite time was shared equally between U.S. and Canadian experimenters. The Government of Canada made available some of its time on the satellite for the experiment.

CTS is a powerful communications satellite which simultaneously can transmit and receive color television, voice and data in both directions, between two earth terminals. The earth terminals operating with CTS transmit at a frequency of 14 GHz and receive at 12 GHz.

While the U.N. experiment was considered an overwhelming technological success, the results were extremely helpful in planning things differently for future experiments. The difficulties encountered were primarily human related. First, interpreters appear to need more overall familiarity with the system in order to do their jobs smoothly. Second, they seem to need visual contact with the speakers to lip sync translations and to generate mood, voice tones, etc. Third, broadcast-quality audio appears to be required for optimum translations.

Further work may be planned to continue these experiments. Details could not be learned at this time, but if these experiments could point the way for later elimination of the video, international broadcast and translations of political and technical meetings could be handled more economically.

The parents were angry when she was hired. Now they're glad she took the job.
Transmission Line Reliability

We have replaced every major coax manufacturer’s line and never had a breakdown or burn-out.

LUCK? No. We just build the most reliable transmission line you can buy.

Most TV & FM stations replace or make major repairs on their Coax System about every ten years. There are exceptions, ranging from 5 to 18 years, depending on the power & frequency of the station. Some Broadcasters believe this is the normal life cycle or bad luck. The fact is they buy the same type line that gave them the problems to begin with.

One with the finger connector.

Transmission line is like a chain. Weak links cause failure and the More Links you have the less reliability. Our transmission line alone has no fingers to make poor contact or split. We are the only manufacturer to give you one contact joint per section of line. All others give two. (½ the links).

Our wrist band connector makes contact at each segment of its spring giving it excellent surface contact. (The finger connector has as little as one high point per finger times eight fingers per connector). Our inner conductors are made with heavy wall copper for better heat transfer and are less susceptible to installation damage than thin wall line. The thick wall also allows a generous taper on the female cup eliminating the knife edge common on thin wall line. Unlike the back to back finger connector that allows metallic dust to fall on its own insulator below causing the line to self-destruct, our connector captures all dust generated during its daily expansion cycle allowing it to maintain peak performance. After 15 years instead of replacing contaminated line or $100 connectors, simply slip on a $20 wrist band spring (leave the dust where it’s at) and go on for another 15 years.

The chart below shows standard off the shelf 6-1/8 coax. The unshaded area indicates what we consider desirable in a premium line for reliability. Chart based on 75 Ω inner.

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>S.W.R., Inc.</th>
<th>R.C.A.</th>
<th>Prodelin</th>
<th>Phelps Dodge</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of contact joints each section of inner</td>
<td>One</td>
<td>Two</td>
<td>Two</td>
<td>Two</td>
</tr>
<tr>
<td>Types of contact at each section of coax line</td>
<td>Wrist Band Spring</td>
<td>Finger Connector Also</td>
<td>Finger Connector Also</td>
<td>Finger Connector Also</td>
</tr>
<tr>
<td>Standard wall thickness of inner offered</td>
<td>Heavy .040</td>
<td>Thin .025</td>
<td>Heavy .040</td>
<td>Heavy .040</td>
</tr>
<tr>
<td>Has design to capture wear</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Seals lower end of inner to prevent mfg. dust from falling out</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Years of warranty by mfg.</td>
<td>Two</td>
<td>One</td>
<td>One</td>
<td>One</td>
</tr>
</tbody>
</table>

Luck? No. RELIABILITY? YES!

NEW SYSTEM
A system that will perform like new after 15, 30, even 45 years. We fabricate all components in 3-1/8, 4-1/16, 6-1/8 and 8-3/16" line. Our engineering Dept. will assist you with any installation planning.

OLD SYSTEM
We at SWR can fabricate inner conductors with our patented connector for replacement of your existing line giving you a better line than you purchased originally at a considerable savings over the cost of new line.

Besides transmission line call or write for information on Gas Barriers, Coax Switches, and our complete line of T.V. Antennas both horizontal and circular-polarized.
PROTECTION ASSURED AGAINST LIGHTNING
1481 Stations Use The Wilkinson Line Surge Protector
IT REALLY WORKS!

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* Repairable — any component can be replaced easily.
* 200% Safety Margin on Voltage — 300% on Current.
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meetings, events & seminars

December 2 — The Annual Midwinter Symposium/Chairmen's reception will be held at the Ramada Inn O'Hare grand ballroom. The reception is sponsored by the SMPTE Chicago Section and honors section members who have given their time for the advancement of the society.

Magician/entertainer Howard Paul will be there along with the 17-piece band, The Music Makers.

For more information, contact: Paul Markun, Sharpe/Markun, Dept. BE, 230 East Ontario Street, Suite 2305, Chicago, IL 60611.

December 5 — Distributors in New England will hold a meeting in Woburn, MA. For more information, contact: Barbara Gifford, Dept. BE, Meetings Unlimited, 17 Cummings Park, Woburn, MA 01801, (617) 935-6494.

December 12-14 — The Midcon/78 Show and Convention will be held Tuesday through Thursday in the Dallas Convention Center. For more information, contact: William C. Weber, Jr., Dept. BE, Electrical and Electronic Exhibitions, Inc., 999 N. Sepulveda Boulevard, El Segunda, CA 90245, (213) 772-2965.

January 6-9 — The 1979 International Winter Consumer Electronics Show will be held in Las Vegas.

Over 650 consumer electronics manufacturers and importers will occupy 400,000 net square feet of exhibit space and utilize the entire facilities at the Las Vegas Convention Center and the nearby Jockey Club Hotel will accommodate over 100 esoteric high fidelity exhibitors. For more information, contact: Consumer Electronics Shows, Dept. BE, Two Illinois Center, Suite 1607, 233 N. Michigan, Chicago, IL 60601, (312) 321-1020.

April 1-4 — The 1979 IEEE Region 3 Conference and Exhibit will be held at the Hotel Roanoke in Roanoke, VA. Activities include technical and student paper sessions, exhibits, tours, professional activities committee meetings and region 3 committee meetings. For more information, contact: K. Reed Thompson, Dept. BE, Southeastcon '79, General Electric Company, 1501 Roanoke Boulevard, Room 244, Salem, VA 24153, (703) 387-7730.

April 30-May 2 — The 1979 IEEE MTT-S International Microwave Symposium will be held at the Sheraton-Twin Towers Hotel, Orlando, FL. The theme is "The World of Microwaves" emphasizing the ever-increasing role of microwaves in today's world. For more information, contact: Dr. James L. Allen, Dept. BE, Electrical and Electronic Systems, University of South Florida, Tampa, FL 33620.

July 17-20 — The second joint INTERMAG-MMM conference, jointly sponsored by the Magnetics Society of the Institute of Electrical and Electronics Engineers and the American Institute of Physics, will be held at the Statler-Hilton Hotel in New York City. The purpose of the conference is to provide a forum for the interaction and exchange of ideas between scientists and engineers working in fields of both fundamental and applied magnetism. For more information, contact: Dr. F.E. Luborsky, Dept. BE, General Electric R&D Center, P.O. Box 8, Schenectady, NY 12301.
You were so impressed by the RS-1500 you asked for a studio version.

Introducing Technics RS-1520.

The RS-1520 has all the performance of the award-winning RS-1500 plus the features you need in a studio deck.

Like bias and equalization fine adjustments for each channel to optimize any tape formula. A 1kHz/10kHz test-tone oscillator for accurate equipment checks. The precision of ASA standard VU meters with a +10dB sensitivity selector. A Cue/Edit switch for quick, safe edits. And balanced, low-impedance, XLR-type output connectors to match other widely used broadcast and studio equipment.

To match the performance of its predecessor, the RS-1520 features the “Isolated Loop” tape transport with a quartz-locked, phase-controlled, direct-drive capstan. By minimizing tape tension, it virtually eliminates all signal dropout. While reducing modulation noise and wow and flutter to a point where they are barely measurable by conventional laboratory equipment.


Compare studio features. Compare specifications.

TRACK SYSTEM: 2-track, 2-channel recording, playback and erase. 4-track, 2-channel playback. FREQ. RESP.: 30-30,000Hz, ±3dB (−10dB rec. level) at 15ips. WOW & FLUTTER: 0.018% WRMS at 15ips. S/N RATIO: 60dB (NAB weighted) at 15ips. SEPARATION: 50dB. RISE TIME: 0.7 secs. SPEED DEVIATION: ±0.1% with 1.0 or 1.5mil tape at 15ips. SPEED FLUCTUATION: 0.05% with 1.0 or 1.5mil tape at 15ips. PITCH CONTROL: ±6%.

people in the news

Manufacturers/Distributors

Ernest W. Pappenfus has been named to the position of president for the Cetec Vega Division of Cetec. Pappenfus has been general manager since he joined Vega eight years ago.

David E. Acker has been appointed president of Microtime, a subsidiary of Andersen Laboratories. Acker had been general manager and will continue as a vice president of Andersen.

William A. Fink has joined Thomson-CSF Laboratories as vice president, director of marketing. In his new position, he will be responsible for marketing the company’s line of professional broadcast equipment and for product planning and new ventures.

Merle C. Mueller has been appointed divisional vice president of finance and administration for the TAI division of E-Systems in Garland, TX. Mueller, formerly director of administration, will be responsible for contract administration, material, finance, accounting, facilities and personnel.

The new sales manager for Ampro Broadcasting is Tom Creighton. Prior to joining Ampro, Creighton was the eastern regional sales manager for TFI in Santa Clara, CA.

The newly created position of product marketing manager for audio terminals at Hughes Aircraft’s microwave communications products has been filled by Robert A. Park. Park, who has been with Hughes for seven years, was most recently involved in advanced spacecraft development in the company’s NASA systems division.

Robert A. Melling, Jr. has been promoted to production manager at Wide Band Engineering, Phoenix, AZ.

Roderick T. Ryan, district sales manager in the Hollywood office of Eastman Kodak Company’s motion picture and audiovisual markets division, will receive the 1978 Herbert T. Kalmus Memorial Award of the Society of Motion Picture and Television Engineers (SMPTE). Ryan was cited for “his continuing substantial contributions to color film printing and processing systems.”

Shelly J. Bunnett has been appointed a sales administrator at Uni-Sync. Bunnett’s duties will encompass co-op advertising, dealer and rep communications, and assisting in the application of the overall Uni-Sync marketing and sales program.

Recent appointments at GTE Lenkurt include Donald Lyang as manager of industrial engineering and Lyle Groberg as manager of engineering services. Lyang has been with the company since 1955, most recently as the head of an industrial engineering group. Groberg has been with the company since 1952, most recently as engineering section manager.

continued on page 34
Studer B67

It's got competitors ... but no competition!

When you buy the Studer B67 tape recorder/reproducer, you get more than just one of the world’s finest tape recorders.

You are buying an engineering philosophy where performance is first and there isn’t any second or third. You are buying a dedication to quality seldom seen in today’s world of “make ’em faster and cheaper.” At Studer, one person in every seven is a quality assurance inspector.

You are buying performance that stays within spec long after lesser equipment has given up. If performance is an important part of your tape recorder buying decision, test drive the Studer B67 before you decide. You’ll find the B67 is the recorder without competition.

To learn more, circle reader service number or contact:

Studer Revox America, Inc., 1869 Broadway, Nashville, Tenn. 37203 / (615) 329-9576 * In Canada: Studer Revox Canada, Ltd. / (416) 423-2831
Circle (25) on Reply Card

www.americanradiohistory.com
E-Systems ECI division recently announced the appointment of J. Lawrence Hess as director of international marketing. Since 1974, Hess has served as director of international business development for GTE Sylvania's communication systems division.

Radio/Television

Edward M. Anderson has been promoted to vice president of program operations for Warner's QUBE division. Anderson, who was QUBE assistant general manager of program operations, will direct day-to-day programming activities for the QUBE service.

The new director of engineering for Catholic Television network of Chicago (CTN/C) is Martin N. Kite. Kite comes to CTN/C with 25 years' experience in commercial broadcasting, including 17 years with WGN Continental Broadcasting.

Alex R. Papagan has been named director of marketing and programming for Universal Subscription Television (USTV). He will be responsible for introducing USTV's broadcast entertainment subscription television (BEST) service to the Boston market.

Robb Kunkle has been named to the post of news supervisor at the news department of Mutual Broadcasting System. Before joining Mutual, Kunkle was a news editor in NBC's Washington bureau.

Marilyn J. O'Connor has been named to the newly created position of director of special projects in the public affairs department of the National Association of Broadcasters. Since June, 1977, O'Connor has been editor of Highlights, the association's weekly newsletter.

The position of director of educational development for Warner Cable's QUBE division has been filled by Dr. Gerry Jordan, who was most recently a consultant for QUBE and school systems in Baltimore, New York and Connecticut.

Jay Hoffer has been named director of programming at KERE radio in Denver. Hoffer, former vice president of Hercules Broadcasting joined Mission Broadcasting Company's affiliate in Denver on October 2.

WRKO, Boston, has appointed Richard Ramirez as local sales manager in charge of local agency and retail sales. For the past year Ramirez has worked for the RKO rep firm in New York city as a representative.

Robben W. Fleming, president of the University of Michigan, has been named president of the Corporation for Public Broadcasting. Fleming has served with the Securities and Exchange Commission, the National Emergency Housing Program and the National Wage Stabilization Board.
Check Harris for all your broadcast equipment needs.

- Amplifier - AM, RF
- Antennas, Receiving FM
- Antennas, Transmitting
- Audio Connectors, Terminal Blocks
- Audio DAs, Monitor Amplifiers
- Audio Effects Generators
- Audio Noise Reduction Systems
- Audio Patch Panels, Patch Cords
- Audio Consoles
- Audio Portable Consoles, Mixers
- Audio Reverberation Units
- Audio Tape Recorders/Recorders - Reel to Reel
- Audio Tape Recorders - Cartridge
- Audio Test Equipment
- Automation Systems
- Cameras
- Camera Lens
- Camera Tripods, Dollys, Pedestals
- Cartridges - Tape
- Clocks
- Converters, Power Phase
- Demodulator, TV Video - Demodulator, Aural, Noise Meter
- Diplexers, Combiners - TV (VHF/UHF)
- Dummy Loads - AM, FM/TV
- EBS Systems
- Filters, Optical; Test Patterns; Test Slides
- FM Isocouplers, Combiners, Diplexers
- Generators, Engine - Emergency Power
- Generators, Sync; Proc. Amps; Video DAs; Terminal Equipment
- Headsets
- Land-Mobile Communications
- Lights, Studio
- Lights, Studio Warning
- Lights, Tower - Light Controls, Isolation Transformers
- Meters, Field Intensity - Phase Monitors - Impedance Bridges
- Microphones
- Microphone, Audio Cable
- Microphone Stands
- Microwave - TV
- Monitors, Picture
- Monitors, Waveform, Vectorscope
- Multiplexers, Optical
- Printers, Loggers, Terminals
- Projectors, Film/Accessories (Television)
- Projectors, Slide/Accessories (Television)
- Rack Cabinets, Tape Storage Cabinets
- Regulators, Primary Power
- Remote Broadcast
- Remote Control
- SCA Receivers
- Speakers, Loud: Baffles/Accessories
- Studio, Transmitter Links
- Switches, Coax - Manual & Motorized
- Switches, Video
- Tape Cartridge Machines
- Tape, Cartridges, Test Tapes
- Tape Splicers, Erasers
- Tone Arms
- Towers, Tower Erection
- Transmitters Line, AM-FM-TV
- Transmitters, AM-FM-TV
- Turntables
- Water Stills

For complete information on any of the products listed contact: Harris Corporation, Broadcast Products Division, Quincy, Illinois 62301.

November, 1978
Charlene Cassidy, WKXO-FM engineer, loads carts containing music selections in one of the station's 10 Instacarts used for the AOR format. While music is on banks of cartridges, voice track and commercials are on reel-to-reel units. This system illustrates but one of many major moves by stations all over the country to automate and improve business. (Photograph courtesy of IGM/NTI)
Last month's issue was devoted to automation in the TV industry; this month, automation in radio broadcasting will be covered.

Dramatic strides have been made in all facets of automation since BE presented its first articles on automation in 1950. The phenomenal interest in automation was vividly displayed at the NRBA Convention in San Francisco in September where some 14 of the 80 display booths dealt with one or more aspects of automation. (These were major contributors; those devoted to strictly programming, automated and remote controls, plus isolated instrument systems coupled to automated systems which were not included in the count.) In addition, two other organizations deeply involved in automation had hospitality suites but no booth displays.

The count
As of July, 1978 the FCC recorded 8,511 radio broadcast stations on the air: 4,529 in AM; 3,049 in FM; and 933 in FM educational. It is not possible at this time to accurately estimate how many of these stations have automated their facilities. Many have done so; the evidence is clear. And, it seems conservative to say that all probably have either automated or have considered some degree of automation.

People the key
In reviewing the dynamics of automation, it is obvious that people have been the key to getting the industry where it is today. These have been predominately directly from the broadcast industry—engineers, managers' controllers. People who recognize the advantages and opportunities offered by computers and were willing to devote the energy needed to adapt new technology to change an industry.

However, others were also attracted to this field who were not primarily from broadcasting—computer experts, bankers, electromechanical specialists, NASA technologists and others. All have made their contributions felt in terms of reliable hardware and comprehensive software.

Because this has been a people-directed growth industry, it is not surprising that it grew more rapidly in some directions than in others. Early history in developing the interfaces to couple business computers to the business aspects of a station operation was traced at the end of last month's article.

Some historical highlights in broadcast and its automation are as follows:

- 1901—Guglielmo Marconi sent a Morse Code signal across the Atlantic to begin wireless as a means of communications.
- 1920—KDKA in Pittsburgh reported the Harding-Cox election returns by radio, beginning regular broadcasting in the U.S.
- 1929—Bell Laboratories demonstrated the feasibility of color TV as an accessory to telephone service.
- 1947—Audiotaping of the Bing Crosby show marked the first network use of a radio series in which complete programs were prerecorded.
- 1947—Paul Schafer developed an automatic switching system for hybrid tape machines.
- 1959—BE published the first short notes and articles on broadcast automation.
- 1962—SMC developed the carousel multiple playback cartridge unit.
- 1962—Scully developed the first reel-to-reel playback system for radio automation.
- 1969—ICM introduced the first instant random access cartridge playback device at the NAB show in Chicago.
- 1969—KVOR-Radio in Colorado Springs asked Kaman to write a computer program for generating daily program logs and monthly invoices.
- 1969—First color TV returns from the Apollo 11 successful moon mission (with over 1 billion viewers).
- 1974—ICM introduced the first cartridge playback unit to use a microprocessor.

Consequently, it was the development of magnetic tape recorders right after WWII, the evolution of the cartridge machines in the 1950s and the microprocessor of the 1970s that have brought automation to its present state.

It can be seen that coupling business operations to a business computer was an early, and continuing, emphasis in broadcast automation. But more dramatic in the recent trends has been the adaptation of microprocessors to dedicated control systems for total automation.

At NRBA it appeared that this trend has progressed in an orderly fashion, with station-conscious manufacturers implementing systems that would be precisely dedicated to station use. We have been told that
We gave you one-inch.

In the last few months, you've had a chance to do some serious thinking about all the new products displayed at this year's NAB Show. Sony Broadcast products. And products by other manufacturers, too. You've read about them. You've talked about them. You may even have seen some of them in action. And by now, one fact should be obvious. There's a new dimension in broadcast equipment. One-inch. It's here, and it's here to stay. The SMPTE Type C Standard proves it.

The width of things to come.

Sony Broadcast BVH Series 1" recorders, as we've been saying for some time, are part of a change that will affect every aspect of video production and broadcasting.

But it's one thing to say it. And it's another thing to see it happen.

Because broadcasters and production facilities have taken our one-inch equipment, and run with it.

From coast to coast, Sony Broadcast BVH-1000 recorders are lending their unique advantages to more and more professional video applications.

Advantages like BIDIREX. That gives you full bi-directional search capability in both forward and reverse, with recognizable picture - even at more than 30 times normal speed. And also lets you position the tape reels as if by hand, for the "film" feeling top creative editors demand.

Advantages like single-camera technique. Because you've got 100% post-production creative freedom, you can use the one camera/one recorder setup once possible only with film. No more dependence on "on the fly," editing using production switchers. Yet you still retain all the economic advantages of video.

And other economic advantages, too.

The BVH-1000 costs less to acquire. Takes up less space, so you save room in the studio. Cuts down on maintenance costs. And gives you the dramatic savings of 1" videotape, that costs only about half as much as 2" tape.

With a system this good, we predict you'll go far.

And the advantages of one-inch recording don't end in the studio.

Now there's a fully porta-
Now take it a mile.

ible 1” recorder from Sony Broadcast. The BVH-500.

The BVH-500 weighs just 43 pounds, including tape and battery. Operates for 90 minutes on a single rechargeable Ni-Cd battery. And delivers more than an hour of non-stop recording time from each reel of 1” videotape.

To give you continuous usable video for the full length of that tape, the BVH-500 features auto back-space assemble editing. Which achieves scene-to-scene transitions without picture breakup.

And naturally, there’s more. Full monitoring capability. A unique video confidence head, to tell you your RF signal is on the tape. Digital servo system, to minimize gyroscopic error. Built-in SMPTE time code generator. And rugged housing, that stands up to extreme field conditions.

But here’s the best part. Our BVH-500 is fully compatible with our BVH-1000. That means you can record in the field, on 1” tape. Then bring it home and edit or broadcast without converting to another format.

To wrap things up, we’ve got the best tape.

We gave you a 1” recorder that’s revolutionizing studio and field production techniques. The BVH-1000.

We gave you the 1” portable recorder to go with it. The BVH-500.

And in case you hadn’t heard, we’ll let you in on the best 1” tape to use with your Sony Broadcast 1” equipment.

That’s right. Sony 1” tape. We make all of our V-16 Series 1” High-Band Master Videotape ourselves. That makes us different from just about any other manufacturer of video recorders.

Since we make both recorders and tape ourselves, we know how to produce a tape that gets the most from our equipment. After all, we want our tape to make our recorders look good. And vice-versa.

So for wide frequency range, high signal-to-noise ratio, minimum dropouts, and precision winding, always choose Sony V-16 Series videotape for your Sony Broadcast BVH Series equipment.

That’s our story.
Now it’s your turn. Write Sony Broadcast, 9 West 57th Street, New York, N.Y. 10019. Or call us direct. In New York, our number is (212) 371-5800. In Chicago, we’re at (312) 792-3600. And in Los Angeles, at (213) 537-4300.

We’ve given you one-inch. Now, give us a chance to prove how far it can take you.
this effort has required extremely close cooperation between the manufacturers and the microprocessor source to be sure of success.

From this brief sketch it is obvious that automation has had a long growth phase in coming of age. While the computer, and especially the microprocessor, has been the chief tool making this growth possible, it has been the combined efforts of key industry people which has made that growth truly productive.

In the accompanying article we have asked IGM/NTI to trace some of the steps in the development of a system significant in broadcast automation. To do so they had to discuss one of their own systems to provide in-depth details. But, it was interesting to note in discussions at NRBA that other industry leaders experienced similar growth pains and expressed similar dedication of efforts in bringing forth new systems to serve the industry. Consequently, the article by IGM may well be considered representative of what must be done in evolving a new system from concept into an industry-accepted product, especially in the high-technology area of automated broadcasting.

Following the IGM article we have touched on some of the systems shown and discussed at NRBA convention in San Francisco held September 17-20, 1978. Other sources may be found in the BE Buyer's Guide published in September.

Automation:
Designing a new controller

By Nick Solberg and Charles Minzel,
IGM/NTI, Bellingham, WA

No single factor determines why a manufacturer decides to invest months of research and thousands of dollars in a particular new product. Product development is not creation in a vacuum, an ethereal inspiration, nor the engineering of new equipment just to have something different to market. It is a cry from an industry, the answer provided when enough potential users say, "it sure would be nice if we had X to achieve Y."

Therefore, IGM's decision to enter a lengthy design program of an English language programming control/switcher, designated BASIC A. (see Figure 1) came as the result of its key position in manufacturing products conceived in response to economic laws of supply and demand. Briefly, here is the progression of broadcast equipment in the industry from about 1950 to the present:

- syndicated formats on reel
- development of simple multiple playback cartridge units (SMC Carousel)
- simple switchers using real-time clocks to manage several audio sources
- introduction of first INSTANT random access cartridge playback device (IGM Instacart)
- program control system using a mini-computer and disk memory (IGM 700's)
- solid-state programming/switching control units that used a digital code (IGM RAM, Schuefer 903 and 902, Harris 90, SMC DP-1)
- first cartridge playback unit using a microprocessor (IGM Go-Cart)
- manual assist remote control using a microprocessor for disk jockeys (IGM MARC VII), and

continued on page 42
One thing is crystal clear. You can’t buy a better television demodulator than the TEKTRONIX 1450 System M Demod. Why? Because it’s “transparent.” The 1450 allows signals to pass through for inspection without altering their characteristics. In other words, if you use a 1450, you’ll get the true picture of your transmitter’s output.

You’ll want to use the 1450 for other reasons, too.

**Save time (and money) on transmitter alignment**
- Synchronous detection eliminates confusing quadrature distortion.
- Precise bandpass characteristic and linear detector plus flat IF and video response give faithful signal reproduction.
- Split carrier sound detection speeds troubleshooting and alignment of the aural transmitter because no vision carrier is required.

**Reduce equipment maintenance costs**
- S.A.W. filter IF strip requires no adjustment; extends time between normal periodic recalibrations.

**Improve your program sound**
- Synchronous detection and dual video detectors operating in phase quadrature facilitate measurement of the incidental phase modulation of the vision carrier that appears as noise in the received sound.

You can use the 1450 anywhere — at the transmitter or off-air at a remote site — without attenuators or external amplifiers.

If you think there’s a problem with the performance of your transmitter or antenna system but you’re not sure, choose our 1450. The Transparent Demod will clear the air for accurate, reliable television transmission.

Call your nearest Tektronix Field Office and ask for a demonstration of our 1450 Television Demodulator. Or, for additional specifications, write Tektronix, Inc. P.O. Box 500, Beaverton, OR 97077

Tektronix
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Automation
continued from page 40

- BASIC A, the first English programmer.
  BASIC A was a natural leap forward as broadcast technology grew, responding to a need for better operator-computer communication, better management of memory means, and reduction of operator time in pre-programming a station format.

Relying heavily on feedback from key people actually engaged in radio station operation, IGM/NTI assembled the parameters for its new control system. Simultaneously, salesmen were queried as to how many X units could be sold in their territories. A rough draft of the unit was composed so that accounting and marketing departments could price components, determine availability of parts, and ultimately comprise an estimated selling/cost price relationship, based on numbers to be produced vs. manufacturing costs. Research and development costs, by now closely estimated, would have to be amortized over such numbers of projected sales, too.

When feasibility studies were positive, rough plans began to narrow to specifics. The overall purpose of the device was defined comprehensively, including such details as:

- Compatibility with existing hardware in the field (so user wouldn't have to buy new gear).
- Easy communication with human operator from control unit, which meant ENGLISH.
- Decision for a CRT readout of programming.
- Decision for modular programming concept, where formats could be entered into memory and recalled as a block.
- Amount of total memory required for the tasks involved.
- System should perform tasks as simply as possible for operator comprehension.
- Error protection for operator—improper commands to be recognized or rejected.
- Physical appearance of control unit, color of case, etc.
- Sources to be controlled by such device.

- Engineering to include ease of maintenance.
- I/O port to be provided for later addition of automated traffic and billing systems by user.

Engineers now knew what the control system must do; the task was to devise means of accomplishment. Two facets needed coordination: the physical or mechanical aspect—such matters as keyboard selection, CRT type, OEM components like VU meters, logging means, printer, etc.—and the software, by far the greater task.

Software development consisted of a series of continuous, closely related stages: (1) Problem definition, (2) Program design to implement that task or problem, (3) Coding, (4) Debugging, (5) Verification or testing of software written, and (6) Preparation of documentation such as maintenance manuals, operations manuals.

In defining a problem and the resultant program to achieve a solution, IGM's engineer used a flow chart—a logic diagram or master design. A sample portion of an actual flow chart is illustrated in Figure 2.

Figure 2. Engineer's actual flow diagram used to thoroughly define a design problem and its resultant solution.
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- New long life Nortronics Duracore® heads. Ten times longer head life.
- Improved head mounting blocks provide better stability.
- Improved air-damped solenoid with Teflon® coated plunger for quieter operation.
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IGM decided to use three Intel 8085 microprocessors in the design, if possible. Before such critical component decisions could be finalized, the manufacturer had to be consulted to ascertain the availability of the component (the Intel 8085 in this case) at projected time of completion. This seems elementary, but a designer may eagerly seize upon a capable component only to find that it is still in research status and has limited production. Intel worked closely with IGM and extended full benefit of its engineering experience with the 8085, its latest microprocessor which had suitable delivery schedules projected. One criterion for selection is that the 8085 runs on a single 5-volt power supply, which the earlier and popular 8080 could not handle.

IGM's reason for splitting the tasks of BASIC A into three portions was to avoid over-utilization of any one microprocessor, to facilitate separations of specific functions, and to implement a certain amount of redundancy (because the monitor panel processor is capable of acting as a back-up controller, if the central processor fails).

Here are the chief duties of the three separate microprocessors:

**Number 1** is the central processor unit (CPU), master of the system and clearinghouse for all intercommunication of the various aspects of the system. The operating software inherent to the RMX-80 and the additional software written by IGM is stored in a PROM memory (32K capacity), to be queried as needed by the central processor. The central processor also keeps track of the broadcast schedule stored in RAM. It manages clock time, sends commands to the other two processors in accordance with the programming, analyzes the responses and communicates with the human operator through the keyboard and CRT. (See Figure 3.)

**Number 2**, the audio processor, is a separate logic function, and "intelligent" controller because it can process commands received from the central microprocessor and return status information. For its continued on page 46
Introducing the SPG 130N... a new design approach in digital Source Sync Generators with ten times better horizontal resolution. A perfect companion to the SPG 102N N.T.S.C. Master Generator.
Automation
continued from page 44

operating instructions it needs only a PROM of 1K capacity. Essentially, it actuates and controls all of the hardware being managed such as tape playback units, reel-to-reel units, live studio, etc.

Number 3, processor is the operations manager, handling the monitor panel functions such as permitting the operator to preview audio sources before they are selected or monitor on-air audio, controlling monitor volume and VU meter switching, starting or stopping playback units, and such details. The operator can manage the hardware or playbacks from the monitor panel; in fact, a station could use the BASIC A simply as a manual assist device in an emergency.

The systems configuration for BASIC A is shown in detail in Figure 4. Not how the keyboard is interfaced into the main microprocessor, how the main CPU acts as a receiver and router for all system inputs, and how the audio chassis can handle up to 16 source cards.

The eventual capabilities of the BASIC A control system were broken down under the three categories based on microprocessor functions. Tasks to be performed by each of the groups were defined in another flow chart or diagram. Linking the three microprocessors were RS232 interfaces used to isolate the microprocessors and to channel the orderly input and output of information. IGM software designers, used Assembler Language for the programs under RMS-80, Intel’s real-time software support system, which is highly modular in design. There was very deliberate reasoning for this choice. Since broadcast programming of formats is basically modular, where blocks of schedule items really do not change appreciably hour by hour, the use of RMX-80 relieved the designer of writing a special operating system.

True, the order and arrangement of such broadcast schedule items do vary but such variations are somewhat finite.

Therefore, the operating system of RMX-80 was utilized to implement the purposes of BASIC A’s broadcast schedule and switching responsibilities as described below:

Primary software is broken into eight modules. The RMX-80 is a fixed-priority, multi-tasking operating system ("fixed-priority" meaning that each task is assigned a priority or "pecking order," and those priorities never change). When there is more than one task ready to run, a typical situation in broadcasting, the task with the highest priority will be executed first by the CPU. In other words, within the processor a "scheduler" resolves conflict between the demands and defers to the task with the highest fixed priority. In practice, internal

continued on page 48
Imagine an EFP system with one tape format for field and studio—and a proven track record worldwide

The Bosch Fernseh KCA-BCN lets you shoot in the field and play back in the studio without changing VTR formats.

Here is a remarkable electronic package from Bosch Fernseh that is on the job right now in working applications in the U.S. and around the world:

- The BCN 20 recorder, the first portable VTR with a 1-inch tape format compatible with a full size studio machine;
- The KCA 90 color camera, providing ENG mobility without a backpack and EFP versatility in a C.C.U. mode.

The system begins with the SMPTE Type B tape format (see diagram), a development of Bosch Fernseh research that made it possible to put 2-inch broadcast quality on a 1-inch format. We introduced it in 1975 on the Bosch Fernseh BCN 50 studio recorder.

But the BCN 50 was only the beginning. The Bosch Fernseh 1-inch breakthrough opened the way for an even more remarkable possibility—portability without sacrificing compatibility.

No need to switch formats
The secret was in the scanner. Its small diameter (50mm), short track length and 190° wrap made it perfect for mobile applications: The result was the Bosch Fernseh BCN 20.

With the 48-pound BCN 20 you can tape up to 65 minutes in the field and edit or even broadcast in the studio without switching formats—without losing a generation.

The scanner is so compact it's practically immune to the gyroscopic effects of sudden motion inherent in the other 1-inch systems with larger scanners. You can use the BCN 20 in a moving car and never worry about serious variations in performance.

Lock-up time is ten times faster than the other 1-inch systems, a remarkable 2.5 seconds. And the BCN 20 has the only 1-inch format that is being developed as a cassette as well.

KCA ideal for ENG or EFP
The versatility of the BCN 20 tape format is matched on the camera side by the Bosch Fernseh KCA 90.

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Automation
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requirements of the operating system—like clock updates and aux tomes—take precedence over fixed-priority over programming, for example. The very brief fraction of a second needed to handle the higher priority item, however, would not even be noticed by the programming person. It merely means that the system keeps itself on time or on cue—a high priority necessity.

Here are the essential duties of the eight modules of the BASIC A software written permanently into the 32K PROM for the central processor:

SYSINT [System Initialization]—The highest priority task, the portion that gets control when the system is powered up.

SIOR [Serial I/O Port Handler]—When the main CPU wants to send a message to the audio processor, monitor panel, Extel printer or Techtran disk drive—or wants to receive data from any of these—it passes through the SIOR.

BCLI [Keyboard interrupt handler]—When a key is depressed on the keyboard, it causes an interrupt which RMX-80 handles, passing the key stroke first to BCLI. BCLI examines the key stroke and processes it in a variety of suitable ways.

Clock—The clock receives control once per second. Its function is to maintain the system’s date, time, day of week, Julian date, daylight saving, etc.

VRMDVR [Video Ram Driver]—The driver’s function is to interface to the CRT, handling such things as cursor positioning, and displaying information on the screen. It has additional duties in the optional color CRT that is available on BASIC A.

LOGGOO—Cues up messages to be logged. Its primary function is to allow messages to be stacked up or “buffered” in the event that you are logging faster than the Extel can print.

RTAXOO—Handles all real-time switching tasks.

UTILLOO—Governs all three modes of BASIC A—the on-air, utility and programming modes. These three are separate logics within BASIC A, only one mode can be viewed at a time on the CRT. They are “mutually exclusive.”

Finally, all of the above decisions as to distribution of labor and

continued on page 50

Figure 5. The SIRO serves as an interface that lets the CPU command system components.
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Dramatic improvements have been accomplished in both studio and remote applications. 2" multi-generation video tape, U-Matic multi-generation, studio cameras, film-to-tape transfers, Electronic Film Production, microwave transmission, C.A.T.V., satellite transmission, off-air reception, Telecine film grain reduction and Electronic Journalism at low light levels are some examples of the Model 9000 Digital Noise Reducer's successful applications.

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manner of design are drafted in an orderly fashion. Only now does software writing begin. Software coding is a sort of clerical task, somewhat like typing the letter after you have decided what you're going to say.

Today, system engineers often say that design consists of 20% hardware design and 80% software. Of the software, 40% of the time is devoted to planning or design, 20% to writing the programs, and 40% for testing or validation of programs. Each function that BASIC A is to perform is outlined separately and the suitable instructions written. As an example, let's take the function of setting the station ID and location on top of the CRT. When the system is powered up, system initialization places on the screen the following (See Figure 6):

Here's how operator performs just one step:

- Depresses keyboard key to cause cursor to indicate the line on the CRT saying "Set Station Identifier."
- Press return key, whereupon the CRT indicates "Station, City and State—Change."
- Operator enters 25 characters, like: "WZZZ, Toontown, Ohio."
- Operator hits return key. (End of this task)

The actual software written to implement the above function or task is shown in Figure 7.

Similarly, there is a set of software to cover every single function that must occur in the operation of BASIC A. All of BASIC A's software is written in Assembler Language, somewhat more expensive and difficult in initial writing but which, once written, makes more efficient use of memory space than certain other languages.

Although computer and microprocessors operate digitally, it is the interface with human beings that makes English language desirable. Thus, in the BASIC A control system, each operator instruction is converted into English from digital code to appear in readable form on the CRT. Behind the scenes, the English phrase "Avail" that appears on the CRT is discernible to the processor as:

```
41 56 41 49 4C
A V A I L
```

Such code is standard HEX ASCII Language (American Standard Code for Information Interchange). ASCII is an industry-wide standardization of meaning for each of 256 possible digital combinations—instead of having every computer user assign his own arbitrary meanings to these codes.

Upon completion of all software writings, there begins the tedious and exacting period of double-checking every single function and
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The inter-relationship of the control system connected now to the hardware it will control. Designers attempt to determine every conceivable aberration that might be entered by an operator and to write software blocking incorrect or invalid entries. Despite such care, the “de-bugging” phase could extend over into actual practice for the first few units. Concurrent with the final wrap-up of a design, internal software is documented by the designer. It is essential to describe how the software is structured, so that persons other than the original designer (or even the designer himself a few months later) can understand how a problem was approached and implemented. Imagine the chaos if this were not done, if the original designer left the firm, and no one else knew what his approach might have been!

Further documentation at this phase consists of writing of a maintenance manual in orderly and specific terms, for the guidance of customer service personnel and station engineers. Next is an operator’s manual, detailing exactly how to use the system, to enter schedules, and all normal broadcast programming procedures. It should be emphasized strongly that the OPERATOR or USER of the control system does not need to know how the microprocessor works, how the interfaces achieve their tasks, or how the system is designed. All he has to know is what to do to make the system work, to achieve the programming methods he desires. An analogy is that, through the controls, the driver of an automobile may know how to govern the engine to get to his destination, but need not have any idea how the pistons, carburetor and other mechanisms work. It is IGM’s opinion, however, that in today’s world—where microprocessors appear in cameras, calculators, machinery, and hosts of common uses—the broadcast engineer must be given the instruction needed (in seminars or advanced study, for example) to update his technology from the tube and transistor era.

BASIC A is what the industry calls a “friendly system”; manufacturers always keep the end user in mind. It’s easy to operate and very forgiving. You don’t have to use a lot of obscure digital codes. Most operator errors are blocked by software from causing trouble. If you put an extra space or two in some instruction, the system doesn’t

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Automation

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care and accepts the command—but commands potentially damaging to the system's schedule switching or other critical matters are rejected. The whole purpose of using modern technology is to create a very sophisticated piece of gear that can be operated in a very simple, foolproof manner. As indicated above, the end user really does not have to know how the "black boxes' work.

Editor's Note: Our thanks to JoAnn Burkhart of IGM for her efforts in coordinating this story underlying the development of the BASIC A audio control system.

We fully acknowledge that the development story covered here is limited to IGM's specific system. However, we wanted to provide some instruction, the system doesn't ing processes behind a significant system for broadcast automation. In presenting that insight, IGM could only speak authoritatively about their own efforts. It is significant, however, that when we discussed similar developments with other firms at the NRBA '78 Convention in San Francisco in September, those firms faced similar critical decisions—and these obstacles were resolved using the expertise of key personnel, the availability of preferred hardware, and the close cooperation of the microprocessor source. Much of this will be covered, insofar as possible, on the following page and continued in the December issue.

continued on page 58
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At the NRBA Convention in San Francisco a number of manufacturers displayed their individual systems for automation in various aspects of radio. The above collage illustrates a sprinkling of these systems and their data printouts. This article will be continued in December with a brief description of the hardware, software, and special features of the systems being marketed by organizations at NRBA.
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November, 1978
The use of synchronous detection instead of the usual envelope detection in a Nyquist TV demodulator overcomes one of the major problems in broadcast quality control by eliminating quadrature distortion. This allows quantitative testing continuously at full modulation depth, essential for testing during broadcasting hours.

Monitoring transmitter performance is an essential part of video chain testing. Generally this is carried out using a directional coupler in the transmitter antenna feed to pick up the signal or by picking up directly off the air. The broadcast signal is demodulated, normally using a high-quality Nyquist demodulator, and then checked.

Until recently, such testing has been possible only on a qualitative basis during broadcast hours. Achieving quantitative measurements meant reducing modulation depth to overcome the sort of distortion inherent in vestigial-sideband modulation.

Increasing broadcasting hours means that less and less time is available for full field testing with reduced modulation depth. Because of increasing quality demands, testing methods such as VITS (Vertical Interfield Test Signals) permit continuous checking during broadcasting. So, some method of monitoring was necessary to allow the use of VITS in the transmitter signals.

**Basic parameters**

Several basic parameters have to be checked on the transmitted video signal. Two main ones can be distinguished: Linear distortion (because of group delay and amplitude/frequency response of filters) and non-linear distortion (due to amplifiers and other active components).

Other checks which need to be continued on page 64.
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We really shouldn't have to give you all the specs. The name Ikegami alone is enough to tell you how good they are. But if you do insist on more, ask Ikegami. Ikegami, the leading manufacturer of ENG cameras, manufacturer of the best in studio cameras, and now the best in monitors, too.

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November, 1978
Synchronous detection
continued from page 62

carried out include tilt and sag, modulation depth, signal/noise ratio and so on. The simplest method of checking all these parameters is to use VITS.

Two basic VITS signals are recommended for use with the 525 line NTSC color system: the composite test signal shown in Figure 1A and made up of a line bar, a 2T pulse, a 12.5T composite pulse and a 5-riser staircase with chroma; and the combination pulse shown in Figure 1B consisting of a white flag, multiburst and 3-level chrominance signal. The amplitude/frequency response, for example, can be checked using the multiburst, and is complementary to pulse-to-bar ratio and chrominance-luminance gain inequality measurements.

Linear distortions can be checked using several different parameters, including insertion gain and line-time waveform distortion on the line bar, short-time waveform distortion on the 2T pulse and chrominance-luminance gain and delay inequalities on the 12.5T pulse.

Non-linear distortions can be monitored by checking the luminance non-linearity using the staircase, the differential gain and phase from the modulated staircase and the chrominance-luminance intermodulation from the chrominance bar.

Quadrature distortion
Such signals and their analysis can provide a lot of information about the transmitting station—both the modulator and the transmitter itself. But the problem of quadrature distortion when envelope detecting a vestigial-sideband transmission tends to mask transmitter deficiencies.

The quadrature distortion problem is simple. Due to the vestigial-sideband filter in the transmitter, the double-sideband signal from the modulator unit is distorted to single-sideband signal, from the modulator unit is distorted to a single-sideband signal, when \( f > f_1 \). A block diagram of a transmitter is shown in Figure 2.

Later on in the receiver the Nyquist filter compensates for the difference in power between the double-sideband component \( (f_1 < f < f_2) \) and the single-sideband component. But the Nyquist filter itself introduces a distortion of the spectra of the signal. The result is that the signal fed to the envelope detector in the receiver can be considered more or less as a single-sideband signal.

Figure 3 shows the difference vectorially between a double-sideband signal and a single-sideband signal, when modulating with a sinusoidal signal. The length OA represents the envelope-detected signal and the length OB the vestigial-sideband signal.

The vector OB can be resolved into an in-phase component OC and a quadrature component CB. Because of this quadrature component, the envelope of the modulated carrier is no longer a replica of the modulating signal. So when this signal is passed through a normal amplitude-responding envelope detector, the resulting signal will also contain the quadrature distortion. A typical example is shown in Figures 4A and 4B.

Modulation depth
As can be seen, the problem increases with the modulation depth. Near black, the distortion is minimal, but as the signal approaches the white level, distortion becomes very marked. Therefore, to obtain accurate measurement on the demodulated signal, the modulation depth has to be reduced—preferable to a modulation index under 30%.

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Synchronous detection

continued from page 64

to overcome the effect of this distortion. Perhaps the most widely known is that of providing precorrection at the transmitter to offset the effect of the distortion. This allows the envelope detection system to provide a reasonably faithful reproduction of the modulating signal.

Such a method is suitable for quality improvement of signals received with domestic receivers, but still leaves a lot to be desired for transmitter testing. Here the main problem is distinguishing between transmitter distortion and that of the transmitting method.

Synchronous demodulation

Quantitative testing can only be carried out accurately if the transmitter conditions are clearly established.

So, the solution must be some form of demodulation which will give the original modulation signal directly—no masking of transmitter faults by quadrature distortion. This continued on page 68

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November, 1978
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**Synchronous detection**
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is just what synchronous demodulation provides.

The block diagram of a Nyquist demodulator with both envelope and synchronous detection is shown in Figure 5. The broadcast signal is passed first through a broadband down converter from broadcast frequency to the IF of the demodulator, here 38.9 MHz. This converter does not affect the group delay.

Because of the vestigial sideband, the resulting signal has to be passed through a Nyquist filter to remove the vestigial sideband. At this stage, some group delay correction is carried out to adjust the conditions to the standard group delay of a typical domestic receiver.

The filtered signal is then passed to a conventional amplitude-responding envelope detector or to the synchronous detector. The synchronous detector uses sampling and phase locking techniques to regenerate the carrier of the IF signal.

**Straightforward operation**

Operation is reasonably straightforward as the block diagram in Figure 6 indicates. The signal \( f_v \) from the filter stage is mixed with a signal \( f_v \) coming from a local oscillator.

The resulting signal can be written as:

\[ p.f_v + q.f_v \], where \( p, q = \pm 0, 1 \ldots \]

But, \( f_v = f_c - f_v \), where \( f_c \) is the carrier signal and \( f_v \) is the video signal.

However, due to the phase-locked loop, \( f_v = f_c \).

So, when \( p = \pm 1 \) and \( q = -1 \), the result is a signal \( -f_v \). When \( p = -1 \) and \( q = \pm 1 \), the result is a signal of \( f_v \).

Due to this mirror effect in the mixer, the missing sideband is regenerated and the demodulated output is equal to that of a double sideband. This system works very well, functioning satisfactorily even in cases of overmodulation. And within the normal modulation range, an extremely linear performance is obtained.

The synchronous stage can be switched out if necessary. For example, when performing differential phase measurements, the incidental phase modulation found in some older types of transmitters can sometimes disturb such checking in the synchronous detection mode.

**Practical applications**

Just how necessary is synchron-
Figure 8A

Figure 8B

Figure 8C

Figure 8D

Figure 8E

Figure 8F

Figure 8G

November, 1978

ous detection? The answer is shown clearly in Figure 8, which shows the comparison between differential gain and phase measurements by means of VITS from an off-air signal using the two modes. Figure 8A shows the VITS applied to the transmitter.

Figure 8B shows the envelope-detected signal, while Figure 8C and 8D indicate the results of the differential gain and phase measurements carried out on the 5-riser chroma staircase. Distortion is fairly bad, but compare this to the distortion on the signal from the synchronous detection stage shown in Figure 8E, 8F and 8G.

By using synchronous detection, true transmitter distortion can be picked up and shown clearly. Quantitative measurements made on the VITS, therefore, relate directly to transmission chain problems and not quadrature distortion.
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EBS: Another Link in the chain

By Nancy Pridgeon

On a summer's night in North Dakota, at about 10:15, a flash flood warning is called by the National Weather Service for Bismarck and the surrounding counties. Minutes later, area residents hear the message and begin to prepare for the worst.

In Paragould, AR, employees of radio station KRDS open the back door as they are leaving for home and find a tornado staring them in the face. Seconds later, the station broadcasts the word about the dire emergency, and the town's disaster preparedness plan springs into action.

In Laconia, NH, a tanker filled with 9,000 gallons of liquid propane overturns in a populated area. Local radio station WEMJ remains on the air throughout the night with evacuation notices and half-hourly live reports from the scene.

In Charleston, WV, the governor of the state, John D. Rockefeller IV, takes to the airwaves to broadcast a message far and wide that a crippling blizzard is on the way. His warning is heeded by citizens prepared to do battle with the icy monster.

Getting the word

These success stories are of people in the vicinity of a hazard who got the message in time to react defensively. Getting the message was as easy as listening to the radio or watching TV; it wasn't even necessary to change channels. The incidents, and many more like them, are the fulfillment of everything Joe Conte, NWS emergency broadcast system program manager, has tried for the past two years to achieve for his program—to forge another link in weather service's warning-preparedness chain.

"The 2-year program," Conte said, "was designed to revitalize and prominently place the Emergency Broadcast System on the nation's most wanted list."

Severe weather and other emergencies demand quick action on many fronts so that every person who may be in danger may be warned in time. Already in operation by the weather service are such technical achievements as the NOAA weather radio (which requires a special receiver) and the NOAA weather wire (available by subscription). To make the chain stronger, a way was needed to send the warning directly into the greatest number of private homes that possibly could reach.

The emergency broadcast system offered one solution, but before it could be considered an effective tool, new ways had to be sought to bring the system up to date, to enlist the aid of community disaster preparedness agencies, and to motivate each community's broadcast media to put themselves into the picture as an important voluntary link.

To do all this, Conte, FCC communications chief Ray Seddon, and DCPA emergency communications officer Bill Beatty traveled more than 100,000 air miles, journeying to all 50 states, Puerto Rico and the Virgin Islands, Guam and the U.S. trust territories. All along the way, they were given a hand by dedicated FCC, DCPA, and NWS employees in the field.

Replaced CONELRAD

The emergency broadcast system first came to life in 1964 to give the President of the United States a way to get in touch surely and quickly with the American people in the event of war, threat of war, or national emergency. It replaced the World War II-generated CONELRAD (CONtrol of Electromagnetic RADIation) system, where a single, continuous tone alerted the listener to tune to the 640 or 1240 band on AM radios to hear what danger was imminent.

The CONELRAD system worked by putting into action a network of broadcasters (radio station personnel) previously configured and trained, to get word to the people and activate civil defense and Red Cross plans to instruct people what to do or where to go. CONELRAD was intended to hold the country together and unify responses to military threats.

The new Emergency Broadcast System works the same way, with two important differences: CONELRAD preempted two radio bands and all other stations went off the air, but EBS uses all radio stations, all TV stations, all available broadcast frequencies. CONELRAD was activated only from the top, from the highest office in the land, but EBS also can be activated by state or local public officials, civil defense officials, or the National Weather Service. This means that in addition to the broad sweep of a national alert, EBS can be fine-tuned to pinpoint an exact area of danger, a locale, even a single street.

Participating in the system today to give the national alerts are the Aerospace Defense Command (ADCOM) and the Federal Preparedness Agency (FPA). On the local level are state emergency communications committees, local operational area emergency communications committees and state associations of broadcasters. On the national level are the National Association of Broadcasters and the National Industry Advisory Committee. The federal civilian agencies participating are the Federal Communications Commission.
A purpose, a schedule, a timetable

The plan of action for the three federal lead agencies—FCC, DCPA, and NOAA—began with a purpose, a schedule, and a timetable.

The purpose was to persuade state and local broadcast stations to develop written plans for reacting to sudden emergency situations, whatever their nature, and to help state and local community preparedness committees to develop written plans for community response. To do this, it often was necessary to overcome the apathy and the perception of broadcasters that the existing state and local emergency broadcast systems were fragmented and uncoordinated.

The schedule called for seminars and workshops to be held in each state, arranged by each state’s emergency communications committee and co-chaired with a state or local representative of its office of emergency services or disaster preparedness. And meeting with the group of broadcasters, local civil defense officials, and local law enforcement agents were the three federal agency representatives.

“We’d fly in, pick up the local MIC (NWS Meteorologist-In-Charge), and go to the meeting,” said Conte. “And we’d get to the meeting any way we could. Sometimes we went by car; sometimes by plane. Sometimes a private plane was furnished by interested parties. We did six cities in Texas in two weeks that way.”

About 150 people would show up for the preliminary meeting. The meeting would be held in a hotel, an available hall, or wherever space could be found.

“I knew what a political caucus is like,” Conte said. “In those meetings, we got together to smooth out the infighting and the little hassles, and to iron out the wrinkles.”

Focal point stations

During the seminar that followed, Conte presented the weather service side, the how and why of forecast and warning. Then the communities were asked for input on what they would need. Help in writing a community plan was always given by DCPA in a workshop.

If the seminar was going well, the group was asked to pick a common station to act much as the pool stations act during important political broadcasts. That is, one station would agree to act as the focal point, to collect and to broadcast emergency information simultaneously over all stations in a community.

In past emergency situations, most radio and television stations functioned admirably as individual stations, getting emergency information to the public as quickly as it could be gathered by the station’s staff. In the emergency broadcast system, all radio and TV stations have access to all information and also provide important feedback to the common carrier.

The results can only be in the public’s best interest: simultaneous broadcast of warnings and preparedness information by all the stations in the community; authentication of emergency instructions; and interconnection of all types of communications systems (police and fire radio, amateur radio and citizens band radio) into a coordinated system.

To help each community prepare for a potential disaster, DCPA urges that written procedures be tested and rehearsed well in advance so that officials, broadcasters, and the public are familiar with the emergency plan and will know just what to do when time is short.

Activating EBS

Should an emergency occur, there are many ways available (radio, telephone, Associated Press and United Press International wire services, the NOAA weather wire teletype, the NOAA weather radio) to activate EBS, to get the message to the EBS “common program control station.” This key station is the one that will push the button. So the public will get the word, no matter what station may be tuned in at the time.

This sounds easy to explain at this point. But at the beginning of the project, it seemed a monumental task. Conte wrote articles for broadcasters’ in-house magazines. He helped write the EBS national plan and construct the national agreements. He set up the visitation schedule and coordinated the action.

“It was a low budget project—around $100,000 total cost.”

The cost was born by all three agencies. As Conte wrote the script, DCPA prepared the publications, presentation slides and artwork. When the scheduling was ready, the timetable came into focus. The project was slated to run from October, 1976 to October, 1978.

All was not rosy out on the road. While many communities entered enthusiastically into the system, some resisted the idea. During a seminar that took place in the state of Washington, for example, one topic was the danger of radioactive emissions from a nuclear plant close by. One member of the press attending the meeting objected that there was no problem, and the meeting ended with no decision made. But three days after the team departed, there was a local radioactive explosion. The community lost no time in putting a plan into effect for the next emergency.

Nature helps out

While it would not be true to say that the EBS team scheduled its seminars to mesh with weather emergencies, if an emergency were expected, its proximity was usually put to good use.

At the Little Rock seminar, there was a tornado warning in effect during the meeting; the tornado hit Fort Smith just as the seminar wound up. During the meeting, the attendees were kept posted by the MIC, who was tied in to the forecast office and used the stage microphone to give the latest word to the assembly.

In California, a tropical storm came up the coast while the EBS team was in the area, so the

continued on page 74
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Another link
continued from page 73

meetings held at San Francisco and Fresno got "blow-by-blow" accounts.

"It did a lot to sell the program," Conte said. "It helped to have something tangible so we could say, 'You, as a broadcaster, are responsible to the people.'"

Georgia was one of the first states to activate the Emergency Broadcast System state-wide. The Georgia plan consists of 11 EBS areas. Eleven radio stations act as primary entry points for emergency messages so that the system blankets the state.

In a ceremony held in November, 1977 in Atlanta, Georgia's governor George Busbeee presented awards to the persons who brought the system to operational readiness and personally tested the activation with a special test message.

Among those present for the ceremony were major general Billy M. Jones, Georgia state director of civil defense, local weather service personnel, and a host of Washington dignitaries as well as members of the EBS team, of course.

The Emergency Broadcast System's biggest advantage, as Conte sees it, is that people do not have to change stations or risk missing a warning that could save their lives. The station they were listening to would bring them the message.

"We're dedicated to getting warning messages in every possible way to all the people possible," Conte said.

Ahead of schedule

Before the program began in 1976, the old EBS was activated fewer than 50 times at the local and state level. According to an FCC survey of 600 stations, with 480 responding, more than 1,000 activations have been put into effect since the beginning of 1977.

By July, the EBS team will be ahead of the timetable, and the program will be turned over to the people. Videotapes and handouts prepared by DCPA are ready for distribution to let the public know what EBS is and what it will do for them. The team's "mission impossible" can be stamped "mission accomplished."

"Except for the backpackers," Conte said. "I worry about how we'll get the word to backpackers."
Studio quality microphones that don’t need a studio to survive.

The CS15P condenser cardioid microphone is equally at home in a recording environment or broadcast studio. When hand-held it puts sex appeal in a voice with its bass-boosting proximity effect. With shaped high-frequency response and its ability to handle high sound pressure levels (140dB with 1% THD at 1kHz), the CS15P is ideal for close-up vocal or solo instrument miking applications.

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Electro-Voice backs up these two microphones with the only unconditional warranty in the business: for two years we will replace or repair your CS15P or CO15P microphone, when returned to Electro-Voice for service, at no charge - no matter what caused the damage!

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Lighting exhibits to sell products

By Imero Fiorentino, president of Imero Fiorentino Associates

For 14 consecutive years, leading manufacturers have called upon Imero Fiorentino Associates to provide lighting, design and production services for their TV camera exhibits at the NAB Convention. The challenges inherent in this undertaking could well be described as unique—for whether the end product is the creation of a small scale display area, or a larger, more complex production, we still have to work within the boundaries of a specific framework. This framework is established by the answers to two basic, but key questions.

Basic questions
The initial question is: "Why is the manufacturer spending time and money to exhibit at the NAB Convention in the first place? Although some manufacturers may want to have an exhibit to keep up their name and position in the marketplace, their foremost and primary object is to sell. This means that in addition to having camera equipment and sales personnel present at the booth, the manufacturer must provide a display or demonstration that is arresting enough to attract a potential customer to the area. Then, the pictures appearing on the monitors have to be good enough to impress this potential client with the quality of the camera so that after the demo the customer will stay and talk with a salesman.

The second key question is: What are we, the production consultants, trying to achieve in our concepts, design and direction of these exhibits? In the final analysis, the answer to this question turns out to be the same as the answer to the first question directed at the manufacturer. We are not at the NAB to do "show business" per se. Although our mini-productions may be entertaining, our major intention is to find a way to help our clients sell their products. Even though we are professionals with a theatrical orientation, our years of experience at the NAB have taught us to down-play pure entertainment and sharpen our sensitivity to the problems of selling. Once we establish the framework of salesmanship, we then employ our television and theatrical production skills as a tool to reach our goal, which is identical to the goal of our client.

Selling approaches
Now, what are some of the selling approaches that are utilized at the NAB? Naturally, the first consideration is to make the booth as attractive as possible. Among the numerous ways to accomplish this are eye-catching colors, interesting materials, modern graphics, an attractive model standing by the product, properly designed lighting, etc. These elements are sufficient for a static display, but when the manufacturer wants to actively demonstrate his cameras' capabilities on a regular basis, we go further in our approach.

We mount that demonstration in a somewhat theatrical manner because we know that NAB audiences of today are not only comprised of people solely interested in the detailed technical, electronic aspects of the equipment. There are also attendees who are more involved with the creative production side of television. Their main concern is how the TV pictures ultimately will look to the home viewer, and how the camera performs under actual production conditions.

Ignoring production
At this point, I must interject that experience has proven to me that there are still many corporate executives and salesmen at the various manufacturing firms who definitely lack this awareness of NAB audiences and choose to ignore the production side of television.

continued on page 78
UN-CAN IT.

The tape cartridge is a handy little device. Unfortunately the sound quality of programming varies noticeably between “live” and “canned.”

dbx has overcome this problem by developing a tape noise reduction system especially for broadcast use. It provides 30 dB noise reduction and 10 dB headroom improvement. This dbx system offers the same benefits as the dbx tape noise reduction system used by recording studios.

The new dbx 148 provides 8 channels of playback (decode) noise reduction in a plug-in modular chassis (space is provided for a spare module). There are two modules available—the 408, for tape playback, and the 409, for playback of noise-free dbx-encoded discs. Typically, the 148 is used in the control room to play back tapes recorded in the production studio with the dbx 142, a 2-channel, switchable (encode-decode) tape noise reduction unit.

Besides “un-canning” carts, the dbx system extends the useful life of old reel-to-reel machines, quiets audio tracks on VTR’s, and even cleans up full-frequency telephone lines and microwave links. Because it prevents noise from coming between you and your listeners—and you and your advertisers—it just may be the most important investment you will ever make.

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617-964-3210

dbx
UNLOCK YOUR EARS
Lighting exhibits
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I will even venture to say that there is resistance and often animosity on the part of some management level personnel who will not accept the fact that these fantastic engineering tools which they are selling are production tools at the same time. The most well-designed, marvelous pieces of machinery are insignificant by themselves—they only become valuable when utilized by creative, as well as technical, professionals to turn out an end product.

Eventually, this end product will be viewed and scrutinized by the American public, who doesn't know or probably doesn't care about the engineering feats accomplished by the equipment used to produce the program on their home screen. All they see and evaluate is the final picture. So the many corporate executives, who may otherwise be progressive innovators in engineering technology, actually do themselves a disservice if they don't simultaneously progress in production sensitivity; for there is a direct interrelationship between these two areas.

Every year we contend with this persistant corporate attitude, especially when the various executives arrive at the exhibit hall the evening before the NAB opens and request a multitude of changes. By no means am I implying that the changes requested by management are whimsical; it is just that they often lose sight of the original purpose of the production. That purpose is to attract the wide range of people attending the NAB to the specific exhibit, and sustain their interest throughout the brief period of time allotted to the camera demonstration.

Careful structuring

As mentioned before, the demo is mounted in the form of a mini-production, which is carefully structured so that it maintains a certain point of view from beginning to end. The show may incorporate music, an announcer, models and performers; and it will definitely entail camera shots to visually exemplify the special capabilities of the equipment. In producing the program, we meticulously select and coordinate all the moves, the shots, the scenic elements and the dialogue with an acute sense of timing so that there is impact when an important camera feature is being related to the audience.

In this manner, we have employed theatrical techniques to create a demonstration that is impressive and hopefully interesting within the scope of selling hardware. However, if one of the corporate executives decides on Saturday night that he wants the show on Sunday to include an additional segment with charts and graphs (for example), he unwittingly stalls the timing of the whole production.

Although the information he wants to add may be pertinent, his way of presenting it to the audience could be completely wrong, and if so, it diminishes the total selling impact by weighing down the show with too much detail and defeating his own purpose. The show is meant to generate enthusiasm about the product. If successful, potential customers will want to remain at the exhibit after the demonstration—that is the time for salesmen to supply details.

Disagreements

In addition to handling the problems that arise with the more complex productions, we also face corporate misunderstandings with exhibits that are purely fundamental. For example, a small NAB set may simply be comprised of a colorful bouquet of flowers and an attractive model, as the main visual elements. We believe that even this type of set, which is unadorned with a variety of props and scenery, can be elegant and should therefore receive the same careful lighting and production considerations.

Our procedure is to position the girl away from the background, and, once all the camera positions and angles are established, design the lighting so that everything is correctly balanced and looks lovely both on and off camera. Then, along comes someone from the company who disregards what we have done on his behalf and moves the camera to a different location. Now, when the camera shoots the set from the changed angle, the girl's key light, back light, etc., are out of balance, causing inferior quality pictures on the monitor. At other times, a company executive walks by the exhibit and decides that he wants the model to be sitting right up against the white background—a decision that completely refutes good TV production practice.

Time after time we raise objections, but the final choice, of course, rests with the client. Our
experience enables us to handle, all of these last minute changes, but they are accomplished at great expense to the client. Obviously, I feel that this is the wrong approach.

To solve this dilemma, I strongly recommend that in the future all of the decision-making executives, managers and salesmen should be present at the initial NAB production meetings that take place several months prior to the actual convention. This is the time — not the night before the exhibit opens — when they should contribute ideas and voice their opinions about how the exhibit should look and what they want demonstrated. A forum for discussion can be established whereby we would be exchanging viewpoints and working together with a common purpose.

**Talent egos**

Beyond corporate client complications, NAB productions challenge us with yet another problem: preventing the show from becoming a platform for the egos of the talent we hire, whether they be models, actors, singers, dancers, etc. Characteristic of all industrial shows is the unique premise that the product is the "star attraction", while the talent is just employed as a tool to highlight or direct attention towards that product. However, performers have a natural tendency to get carried away and go beyond this framework.

Therefore, at the very onset we alert our production team to this potential hazard so that they channel the performers' energy in the right direction. At the same time we continuously try to make the talent feel important and proud of their role so that they will put forth their best efforts, yet exercise proper restraint. Supervising creative egos is an arduous task, but again, that's just another part of our responsibility to our clients.

Although NAB productions have changed and grown more sophisticated with each passing year, our goal and that of our clients never varies. As stated in the beginning, our mutual object is to sell; therefore, for every exhibit we must have input from the manufacturers about their equipment, just as they require our production expertise, so that collectively we end up with a dynamic product: an interesting demonstration, top-quality pictures, and most of all, a selling message that gets across to the audience.

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November, 1978
Solid-state devices tame transient voltages
By Al Gilmore, engineer, WTOW/Baltimore, MD

Lightning has always been a gremlin interfering with the orderly operation of radio and TV transmitters. It has been generally accepted that damage to transmitters due to transient overvoltages induced on the AC line by lightning was a problem that, while uncomfortable, could reasonably be overcome with spark-type lightning arresters or varistor devices. However, as miniaturized circuits took the place of tubes in transmitters, conventional devices were unable to stop the chief engineer's classic middle-of-the-night trek to the transmitter and the laborious job of replacing diodes. None of these devices stopped the general manager from bemoaning lost time, lost advertising revenue and concerned audiences.

To overcome inadequacies of the other protection devices, we have investigated devices developed by Transector Systems to protect broadcast AM/FM television stations. These are solid-state, silicon devices (no MOVs or gas tubes) specifically designed for transient suppressors to ease the tensions of chief engineers and general managers.

The spring and summer of 1978 has seen high lightning activity along the middle Atlantic states, especially during May and June. On one such evening, Baltimore experienced a real grandaddy of electrical storms. Two stations in the area, WTOW-AM and WLIF-FM, which shared adjacent transmitter sites on the same hill, were both struck by high-energy voltage surges. At WTOW we got a voltage spike at about 6:15 PM, and it appeared on both the triple-phase and the single-phase power lines which fed the audio equipment and the 5 kV transmitter. Also, we had damage to two types of commercial surge protectors at that time. We had an internal short from phase-to-ground on both the 120 V legs. It blew the two line fuses that were

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EditMate II is a compact, reliable editor that interfaces to most video cassette decks and to the 1-inch type "C" machines. It offers automatic cue, preview, edit and review capability at the push of a button. Cut-type edits can be accomplished in either insert mode or assemble mode.

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The total package is a versatile editor with all the features needed to perform off-line edits simply and efficiently . . . . at low cost.

If you want to log your edits on a hardcopy or punched paper tape edit decision list, EditMate III is the editor to choose. It has all the versatile editing features of EditMate II, plus the built in capability to generate industry standard-format edit decision listings as the edits are performed.

With EditMate III, you can perform edits on low-cost off-line equipment, list those edits and later input the list to a more sophisticated editing system for addition of special effects and auto assembly of a master videotape.

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going to the protector and we lost power to our audio rack. We lost an hour and two minutes worth of air time, including taped programs and commercials.

However, a different situation was experienced at WLIF radio, next door to us and equipped with Transtector surge protectors on their transmitter. They had the same voltage surge as we had, but the surge was blocked by Transtector surge protectors to trip their circuit breakers. All this chief engineer had to do was to reset the circuit breaker and they went back on the air.

The five technical specifications mentioned below should be strictly observed in selecting surge protectors for broadcast transmitters and audio process equipment.

Response time: Nanoseconds response is a must because of rise times of the induced transients: lightning, 600 volts to 1000 volts usec; power line surges, 100 volts to 300 volts usec; electromagnetic pulse, 5 kV/nsec.

Suppression capability: 0.1 to 1.5 mW, and up 50,000/amps on the AC line.

Voltage suppression and clamping ratio: Low threshold and less than 1:1.5 clamping ratio. The device is to turn on and start suppression at 120% of nominal line, and at

continued on page 82

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For the professionals in sound
Station-to-Station
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maximum suppression (power) capability not to exceed 150% of nominal line (a clamping ratio of 1:1.5). If a protector does not begin to suppress at low voltage threshold, it will allow the low level surges through to damage the equipment.

High reliability: The device should be totally solid-state, with redundant circuitry and be failsafe.

Operation: Automatic or resettable, to prevent an interruption in service.

We’ve switched to Transtopper protectors based upon our field observations in Baltimore and because their devices meet the parameters considered crucial to our needs. We would appreciate hearing from others who have had related field experience with voltage transients and comparing solutions.

Portable on-location clock

By Alex F. Burr, consultant, Las Cruces, NM

The problem was to assure a smooth transition between the ending of the interview show from a remote location to the network news. The show was conducted in the dining room of a prominent motel some distance from the studios of the small AM station. The hostess for the show acted as engineer, announcer and interviewer. It was a major problem to pace the reading of the final commercials so they just filled the time between the end of the interview and the start of the network news.

The dining room did not have an accurate wall clock. A watch was too small when one eye must be kept on the guest and one on the commercial. Therefore it was decided to build a small, compact, digital clock with a large readout.

There are many digital clocks on the market, most of which are not suitable for this use. If the readout digits are smaller than 0.4 inches, they are hard to see at a glance. The clock must have six digits because the seconds are important in this operation. The clock must have an internal crystal time base so that it could be carried to the motel each day without losing time and be battery operated for the same reason.

It was decided to get a complete kit for car clocks including time base and case from Optoelectronics. It was mounted on top of a 4-inch x 4-inch x 2-inch utility box which housed the 8 AA NICAD cells used to power the clock. Two switches were also placed on the box. One, SPST/NO, stopped the time base for setting the time. The other, SPST, turned the display off when it was not needed. The clock drew only 10 mA when the display was off, but averaged over 120 mA when the seven segment LED display was on. Switches for setting the time were located in the clock case. A jack for charging the batteries was also located in the utility box.

The only trouble encountered in several months of use was when one wire leading to the battery pack broke because a small motion of the pack as the clock was carried about caused it to flex too much. This problem was cured with more packing around the battery pack and resoldering. Thereafter the clock provided an inexpensive solution to this remote timing problem.

continued on page 84
The Technics ST-9030 tuner. Purists would feel better if it cost over $1,000.

To some, tuners that offer 0.08% THD, 50 dB stereo separation, a capture ratio of 0.8 dB and waveform fidelity should demand a price tag of over $1,000. But with the ST-9030 this performance can be yours for under $450. That's quite a feat for a tuner. But then the ST-9030 is quite a tuner. It has two completely independent IF circuits: A narrow band, for ultra-sharp selectivity. And a wide band, for ultra-high separation and ultra-low distortion. It even selects the right band, depending on reception conditions, automatically.

Both bands give you the same extended flat frequency response. Because, unlike conventional tuners, the ST-9030 utilizes an electronic pilot cancel circuit that cuts the pilot signal, without cutting any of the high end. It's ingenious. And a Technics innovation.

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THD (stereo): Wide—0.08% (1kHz). Narrow—0.3% (1kHz). S/N: 80 dB. FREQUENCY RESPONSE: 20Hz—18 kHz + 0.1 — 0.5 dB. SELECTIVITY: Wide—25 dB. Narrow—90 dB. CAPTURE RATIO: Wide—0.8 dB. Narrow—2.0 dB. IF, IMAGE and SPOURIOUS RESPONSE REJECTIONS (98 mHz): 135 dB. AM SUPPRESSION (wide): 58 dB. STEREO SEPARATION (1 kHz): Wide—50 dB. Narrow—40 dB. CARRIER LEAK: Variable — 65 dB (19 kHz). Fixed — 70 dB (19 kHz, 38 kHz). SUGGESTED RETAIL PRICE: $449.95*


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Station-To-Station
continued from page 82

Using a Pulse-Cross Monitor to check Blanking Parameters
By Wray Dudley, Engineer, WWBT-TV, Richmond, VA

As we find the FCC tightening up enforcement of TV blanking parameters, we also find that video for broadcast is coming to us from an increasingly wider variety of sources. Everything that comes in must be closely checked because we are responsible, of course, for everything that we transmit regardless of who produced it. We do not need to be reminded that some of this material is coming from sources that are not as heavily regulated or informed as we. ("Wadda ya mean the sync is too wide?"—sound familiar?)

We need a quick, dependable and reasonably accurate way to check everything that comes into the house, as well as what is already there. It occurred to me that a system used in years past to check sync could be revived and could provide a quick and positive check to determine that the sync was within the prescribed limits. A standard precision (to minimize drift) pulse-cross monitor will display horizontal and vertical blanking and, by marking the blanking width limits on the face of the CRT, one can quickly see whether or not further evaluation with a calibrated waveform monitor will be necessary. Calibration of the monitor and its markings can be readily checked simply by displaying a known signal, such as the house test signal generator.

This system is intended to be a quick check to save the "busy operator" time by not having to calibrate a scope then switch ranges and count lines or graticule marks and is not an actual measurement. If the pulse-cross monitor indicates an out-of-tolerance condition, the scope should be used in the conventional manner for the measurement.

We have had this system in use here at WWBT-TV on a trial basis for a short period of time using the monitor in a VTR. The Demod display will show what is recorded on the tape and input can be used to check any source that can be routed to the VTR. We have not had significant monitor size drift and our operators have already caught several instances of unexpected "illegal" material.

![Pulse-Cross Monitor display showing horizontal and vertical blankings within limit markings.](image-url)
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Send your items to: Station-to-Station editor, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212. Please indicate if you want to receive the Handbook or prefer to receive a check.

The Handbook can also be purchased directly from the NAB at $30 a copy for NAB members and $45 a copy for non-members. Write to: Station Services Dept., NAB 1771 N Street, N.W., Washington, D.C. 20036.

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The ratings ASTVC style, or How does it grab you?

The scene is NBC's studio 8H in Radio City. Once the home of Arturo Toscanini and the NBC Symphony, it is now the launching pad for Saturday Nite Live. There is no action at the moment, except for several stagehands and a crew of cleaning people, for it's just after midnight and the Friday night rehearsal ended some time ago. So what is there about this almost deserted studio that captures our interest enough to jot down some notes on paper and pass them along to you via the pages of Broadcast Engineering?

If you look closely under the RCA TK-46 on the pedestal, you can read those words on a small black and silver sticker, "Fulmar Pedestal... 1974/5 award (given by The British) Guild of Television Cameramen."

Say, what goes? The British here in studio 8H on our camera? No. Not on our camera, but on a British-made Vinten pedestal and pan-head. What is this piece of gear doing here and why is it sporting this particular award label? What is the Guild of Cameramen award?

In May 1972, 37 British TV cameramen got together to discuss mutual interests and problems. They decided, among other things, that cameramen should have a decisive say in the choice of equipment. The British Guild was established and grew to where they are today.

This group of people has a program that we call a testing and evaluation procedure. Vinten is a case in point. One might presume that a manufacturer makes available a piece of gear that is either in current use in the field or something that is about to be introduced into operations. This equipment is then field-tested by assigned Guild personnel under operational conditions and all facets of this performance would then be noted, evaluated and then reported through channels back to the manufacturer. This is our assumption as to how such a program might be handled by our British cousins.

A step further might see the piece of gear rated along with similar equipment produced by various other manufacturers. Here is where an award would be properly given for that particular item that most closely resembles what the cameraman would like to get his hands on.

How does this relate to what the ASTVC has in store? Along with our colleagues in the United Kingdom, we have recognized how important a dialogue might be between the equipment producer and the user in the field. In line with this, we have informed potential, and present, corporate sponsor members of the ASTVC that we are most interested in a program very similar to the one currently in effect in Great Britain. While there may be some differences in the manner of conducting our T&E program, we also believe that all parties concerned will benefit from this interchange of technical information.

In accordance with our aims, we have selected the Telex Communication Corporation as the first manufacturer to have their products evaluated by us. The item that we will be concerned with is their Telex Cameraman's Series headset. We will probably start with the CS-83 (single-side w/PPT sw) and the CS-87 (dual-side w/PPT sw). We hope to have samples of this equipment in our possession in the very near future and will, after appropriate testing and evaluation, make our known observations to the manufacturer. We then hope for the
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American Cancer Society
The society is doubly happy this month to announce the addition of two new SBE chapters: Chapter 54—Tidewater area, VA, and Chapter 55—St. Louis area, MO. Chapter 54 was organized under the direction of Doyle Thompson, director of engineering, Landmark Communication, Norfolk, VA, and has elected William Pulliam, Jr. of WTPA as chairman; John Heimerl, WZAM/WMYK, as vice-chairman and Sam Holben, WWVA, secretary/treasurer. Chapter 55 was organized through the efforts of William B. Martin, RCA Broadcast Systems. Bill has also been elected chairman; John Koch, KTIV, vice chairman and William Beeman, KDLN, secretary/treasurer. The society is very proud of these gentlemen and especially for their efforts in recruiting so many new members to start their chapters.

CHAPTER REPORTS

Chapter 3—Kansas

The September 12 meeting was held at KFDI in Wichita. Annual election of chapter officers was held with the following results: Brad Dick of KANU, Lawrence; Bob Folkerson, KPTS-TV, Wichita, vice-chairman; and Dave Wiese of KICK, Junction City, secretary/treasurer. RCA radio sales development manager Fred Huffman presented the program which dealt with FM broadcast antenna application and theory. A tour of the KFDI plant followed the meeting.

Chapter 11—Boston, MA

The September 21 meeting was held at WGBH in Allston. Tim Hall, director of engineering and Alex deKoster, senior design engineer of Acoustic Research, speaker manufacturer, presented an interesting, informative and entertaining discussion and demonstration of design factors that influence development of loudspeaker drivers, crossovers and cabinet to result in a coherent system. Their top of the line AR-9 was demonstrated with impressive results.

Chapter 16—Seattle, WA

The regular luncheon meeting was held September 13 at the Black Angus. Chuck Morris, director of engineering for KIRO, coordinated a spirited discussion about the local impact of the recent announcement by the FCC in effect, holding the line and not liberalizing the standards for horizontal and vertical blanking. Eric Aker, assistant chief engineer for KING, presented his recent device that measures blanking and displays the results digitally.

Chapter 18—Philadelphia, PA

The first meeting of the fall season was held September 19 in the Presidential Hotel. James Hurley, the national president of SBE, was the guest for the evening and gave a report on the activities of SBE.

Chapter 20—Pittsburgh, PA

The September 21 meeting in the Viking Motor Inn featured a program by Bob Lasher of Lofstrom Electronics. He demonstrated the use of the Hydro-Ped from O'Conor. It is a hydraulic pedestal camera support unit used in uneven terrain conditions. He also demonstrated the JVC CY8800 3-tube color camera which is primarily used for ENG and EFP.

Chapter 21—Spokane, WA

The September 28 evening meeting featured a program by Ron Valley and Warren Pritchard, chapter members, on the TV blanking FCC rules.

Chapter 34—Albuquerque, NM

The September 14 meeting was held in the Royal Fork Cafe. A program was not planned because a number of business items had to be discussed relative to the chapter and membership.

Chapter 38—El Paso, TX

The September 13 meeting was held in the studios of KDBC-TV. KDBC also presented the program and provided additional videotapes on digital theory.
The Humor Corner

Editor's Note: It is my contention that work need not be dull and without humor. For this reason, I'd like to have a 'humor corner' in BE which will include stories, clever lines, bloopers, limericks, jokes, cartoons—whatever lends comedy, humor and cheer to our profession. I'll kick it off with a few entries and gauge your interest from the poll below. If you like my intent, I'll keep the door open for reader contributions. So, on that note, here goes.

An editor well known for his wit
Writes limericks for fun and enjoys it
If the readers respond
We might carry this on
And have one a month just to grin a bit.

Guess who/ KOHOH

There once was a hermit named Dave
Who kept his transmitter in a cave
His hair would extend
With corona at the ends
And he served as his antenna that way

Dave! WOW! Mammoth Cave, KY

An FMer highly rated for his sound
Got the call feared by all the world 'round
He was fit to be tied
When his listeners cried
There's no power from your tower, you're down!

WOES / KCMO

OPINION POLL

Your opinion is requested as to whether or not we should continue this monthly 'humor corner' in BE. Check the options below and register your opinion using the reader service card.

Choice 1: I'm glad you took the bull by the horns and added this feature. I'll read it and maybe contribute something for future issues. (Circle 101 on the R.S. card.)

Choice 2: A little bull goes a long way. Maybe every other month would suffice. (Circle 102 on the R.S. card.)

Choice 3: Ah, it's OK. Bull is bull. I'll go by the majority vote. (Circle 103 on the R.S. card.)

Choice 4: Forget it. It's too much bull. (Circle 104 on the R.S. card.)
Introduction of small Earth Station Antennas.

Anixter-Mark offers a complete line of small diameter earth station antennas in sizes from 6 ft. (1.83 m) through 10 ft. (3.0 m). Ruggedly constructed of spun aluminum with heli-arc welded backframe and with a reflecting surface painted with a light gray, optically scattering finish. Standard mounts, made of heavy wall aluminum pipe for lifetime maintenance free operation, are available in both manual and motor driven with remote control.

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Portable camera
RCA—Full color catalog, CA, 1450, describes the TKP-46 portable production camera in detail. The 12-page booklet includes technical data, specifications and diagrams showing the system and operational flexibility of the camera.

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Advertising kit
Altec Lansing—A coop advertising kit has been developed in response to dealer demand. The 71-page book explains the coop advertising policy and contains line drawings, veloxes, suggested copy for both newspaper and radio, logos and merchandising aids.

Circle (111) on Reply Card

Test instruments
Continental Resources—Sales catalog for summer and fall 1978 lists over 500 electronic test instruments by manufacturer and model number. Included are Tektronix oscilloscopes, General Radio counters, Hewlett Packard spectrum analyzers and oscillators.

Circle (112) on Reply Card

MIDWEST CORPORATION
TELECOMMUNICATIONS DIVISION

New Addresses
The following addresses update incorrect listings in Broadcast Engineering's 1978 Buyers' Guide Issue. Please correct your records.

Midwest Telecommunications
300 First Avenue
PO Box 385
Nitro, West Virginia 25143

Mr. Elvan Midkiff, Vice President and Division Manager
Mr. John Garmer, Assistant to the Vice President
Phone: (304) 223-2921

Midwest Telecommunications
4037 Harford Avenue
Beltsville, Maryland 20705

Mr. Bob Smith, Manager
Mr. Owen Wood, Government Sales Manager
Phone: (301) 937-1890

Midwest Telecommunications
3331 NW 82nd Avenue
Miami, Florida 33122

Mr. Bill Darcy, Manager
Mr. Russ Thorn, Export Sales Manager
Phone: (305) 592-5355

Midwest Telecommunications
1804 Cargo Court
Louisville, Kentucky 40299

Mr. Jerry Willingham, Sales
Phone: (502) 491-2888

Midwest Telecommunications
1150C W. Eighth Street
Cincinnati, Ohio 45203

Dr. Dave Barnes, Manager
Phone: (513) 691-1904

Midwest Telecommunications
15046 Beltway Drive
Dallas, Texas 75240

Mr. Jack Wood, Manager
Phone: (214) 387-2755

Midwest Telecommunications
5200 Mitchelldale, Suite F28
Houston, Texas 77002

Mr. George Bates, Manager
Phone: (713) 686-9278

Midwest Telecommunications
1305 Air Rail Avenue
Virginia Beach, Virginia 23455

Mr. Kevin Zmarthie, Manager
Phone: (804) 494-6255

Midwest Telecommunications
1301 First Avenue
Nitro, West Virginia 25143

Mr. Ron Crockett, Manager
Phone: (304) 223-2921

Broadcast Engineering
Font composite unit
Chyron—A brochure on graphics and titling system which includes information on the wide assortment of font styles and sizes, instant italics, color palette and action graphics is available.
Circle (113) on Reply Card

Filter catalog
Bird Electronics—RF filter catalog displays nearly 200 coaxial filters, filter/couplers and filter/coupler switches. The filter tables in this 20-page catalog list performance data and mechanical specifications of low pass, high pass and band pass models with cut-off frequencies from 1 MHz to 21.27 GHz.
Circle (114) on Reply Card

Relays and switches
International Rectifier—Catalog describes the complete line of Crydom power relays and switches. The catalog features descriptions, specifications and pictures of the line.
Circle (115) on Reply Card

Bipolar circuits
TRW LSI Products—Short-form catalog describes their expanded line of bipolar LSI and VLSI circuits. Included are data on a family of multiplier chips, accumulators, video-speed DACs and A/D converters, shift registers and a 15-MHz data-signature correlator.
Circle (116) on Reply Card

Video cable equalizer
Cohu—Product data sheet describes its 9800 series video cable equalizer. The sheet lists the unit’s features and specifications as well as applications.
Circle (117) on Reply Card

Cables
Brand-Rex—A 28-page brochure of technical data and charts on flat cable provides information on features and advantages of the cable as well as capabilities, definitions and categories.
Circle (118) on Reply Card

A Winning Combination
In Routing Switchers

Best Performance
Whether you’re looking at published specs or as-installed performance, you’ll see us beat our competitors—all of them—hands down.
Our Diff Ø, Diff Gain, Video Noise, Audio Distortion, Audio Output Level and Audio Hum and Noise specs are the industry’s best . . . and any of you that saw our demonstrations at the Las Vegas NAB show know that we can beat our own specs by wide margins.

Broadest Product Line
With 15 separate matrix designs and 21 different control panels, we can offer the most efficient package to fit your needs for any size switching system.

Lowest Prices
Ask us for a quote and see if you don’t agree.
new products

Videodisc system

JVC has unveiled the "VHD/AHD," grooveless, capacitive pick-up videodisc system.

The player, when connected to an ordinary domestic color TV receiver, plays a 12-inch, grooveless plastic disc which contains up to a total of two hours both sides of color programs with sound. The player will also play digitally recorded, super hi-fi audio (PCM) discs.

The system features: picture and sound information recorded as pits on the disc surface without grooves to guide a pick-up stylus; for recording, a single laser beam split in two, one half for recording information to be retrieved, the other for recording the tracking signal; information and tracking signals simultaneously picked up electronically as capacitance variations between the disc surface and an electrode on the tracking stylus; a servo-controlled cantilever arm to track the imaginary grooves on the disc; and, electro-conductive PVC plastic disc material which requires no additional processing after being pressed.

Business system

The MITS 300 business system from Pertec Computer Corporation was designed specifically to solve the problems of small businesses.

The cornerstone function, a general ledger, keeps a detailed record of all financial transactions and generates the balance sheet and income statement.

Also included are an accounts receivable and payable function, payroll, inventory management and word processing functions.

Color production system

Panasonic Video Systems has introduced a system of broadcast quality color production equipment including the AS-6100 self-contained special effects generator; the AS-2000 chroma key generator and the AS-1000 color sync generator.

The special effects generator features 10 video inputs, four input bases, two sets of fade/wipe levers, 14 wipe patterns, positioner, spotlight, colorizer, two downstream key inputs, two external key inputs plus three auxiliary inputs.
Model AS-2000 chroma key generator adds an extra dimension of special effects to the AS-6100 SEG. Coarse and fine hue adjustments are provided by a rotary switch and variable resistor.

Model AS-1000 color sync generator produces broadcast-stable EIA ES-170 sync using a crystal oscillator. It also genlocks to incoming, non-synchronous composite video signals or composite sync.

Special effects generator

The image video model SEG-800 color special effects generator from Listec Television Equipment, is designed to meet the needs of ENG, EFP and VTR post production.

It functions as a standard six input video switcher with mix and effects transition. Matte keys and fade to blacks can be performed with non-synchronous sources using the downstream key function.

Communications transistor

TRW RF Semiconductors has introduced a 200-watt transistor for 2-30 MHz communications systems. The device is designed for use in military, commercial and marine radios and is said to cut in half the number of power transistors required for a typical 1KW transmitter.

Its low thermal impedance of 0.42°C/W assures reliable operation at 100°C, even while outputting a minimum of 200 watts PEP (peak envelope power).

Cameraman's Headset...

Keeps the crew in touch

A professional TV Cameraman's Headset series specifically designed to interface with existing Western Electric circuits. Single side unit receives intercom only. Dual side, binaural unit receives intercom and monitors program. Carbon boom mike with optional push-to-talk switch. Designed for comfort and rugged dependability in every day use. Keeps the crew in touch in or out of the studio. For complete information please write:

TELEX COMMUNICATIONS, INC.
9000 ALCORICH AVENUE SOUTH
MINNEAPOLIS, MINN. 55420 U.S.A.
Europe: 22, rue de la Legion d'Honneur.
92100 St. Denis, France
Canada: Telak Electronics, Ltd., Scarborough, Ontario

November, 1978
When accuracy Counts... Count on Belar for AM/FM/TV Monitors

BELAR CALL ARNO MEYER (215) 687-5550
ELECTRONICS LABORATORY, INC.
LANCASTER AVENUE AT DORSET, DEVON, PA 19333 - BOX 821 - (215) 687-5550
Circle (64) on Reply Card

Mark IV-T Metric Weatherminder

The original weather console designed especially for the announcer's table. Now equipped with dials reading Metric or combination U.S./Metric. The basic instrument cluster for local programming. Professional equipment at modest cost.

Department B
Texas Electronics, Inc.
P. O. Box 7225
Dallas, TX 75209 (214) 631-2490

Circle (77) on Reply Card

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CONSOLES RT/S & WIRED AMPLIFIERS MIC, EQ, A/C LINE, TAPE, DISC, POWER OSCILLATORS AUDIO TAPE RIA'S POWER SUPPLIES

OPAMP LABS INC.

Circle (78) on Reply Card

PASS FCC EXAMS

The Original FCC Tests Answers exam material that prepares you for FCC First and Second Class Mariner's License. Nearly revised multiple choice exam style at point. Includes FCC Technical Information Available From the FCC. Names of American Radio Society, 833 Third Ave., New York, N.Y. 10022. Circle (79) on Reply Card

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BROADCAST ENGINEERING

Advertising Sales Offices

KANSAS CITY, MISSOURI
Home office, P. O. Box 12901,
Overland Park, KS 66212;
Phone: (913) 886-4664

NEW YORK, NEW YORK
Joe Concert, 60 E. 42 St., Room 1227,
New York, NY 10017;
Phone: (212) 617-7240

CHICAGO, ILLINOIS
Helen Huff, P. O. Box 12901,
Overland Park, KS 66212;
Phone: (913) 886-4664

SAN FRANCISCO, CALIFORNIA
John McCall, 703 Market St., Room 1109,
San Francisco, CA 94043;
Phone: (415) 546-1040

LONDON, ENGLAND
John Ashcraft & Co., 12 Bear St.,
Leicester Square, London, W.C.2, England;
Phone: 930-0526

AMSTERDAM, HOLLAND
John Ashcraft & Co., John J. Lucassen,
Slotweg 203, 1171 VC-Baarloedorp,
Holland;
Phone: 2968-6226

TOKYO, JAPAN
International Media Representatives, Ltd.,
2-29, Toranomon 1-chome, Minato-ku,
Tokyo 105, Japan;
Phone: 502-0666

Circle (124) on Reply Card

Video delay lines

BAL video and pulse delay lines from Listec Television Equipment feature video delay times from 3 to 1000 ns and pulse delay times from 5 to 4500 ns.

Many different configurations are available including switchable, programmable and fixed box packages, DIP and encapsulated mountings for PC insertion.

All video delay lines are equalized to 5.5 MHz with smooth roll-off above 5.5 MHz.

Circle (125) on Reply Card

Remote control assist

The manual assist remote control unit from JGM/NTI can control seven audio sources, each as many as 99 sub-sources, from a simple keyboard.

As many as 18 events can be entered at a time and are displayed on a CRT.

With the addition of a paper tape reader, the unit can automatically run the station, although its main function is as an assist.

Circle (126) on Reply Card

FREE CATALOG

For a free government catalog listing more than 200 helpful booklets, write:
Consumer Information
Center, Dept. A, Pueblo,
Colorado 81009.

Circle (80) on Reply Card

new products

continued from page 93

contained ENG color camera enables instantaneous color coverage of on-the-spot news, sports and entertainment events.
Channel Stereo

Hundreds of Meter Built STL

Distortion Response Noise

Stereo SPECIFICATIONS

or

MARTI STL

The unit features a longer delay with a flat loss of 3db for any delay setting. The delay range is from 0 to 2075 nanoseconds in 25 nanosecond steps.

Circle (75) on Reply Card

L-C delay line

Allen Avionics has announced model VP2075, passive L-C delay lines in 75 ohms, designed specifically for the video industry.

The unit features a longer delay with a flat loss of 3db for any delay setting. The delay range is from 0 to 2075 nanoseconds in 25 nanosecond steps.

Circle (128) on Reply Card

Adhesive labels

Avery Label has announced a line of self-adhesive labels for word processing supplies. White, self-adhesive labels with pre-printed information lines in two sizes are available for standard and mini-cassette tapes.

Circle (127) on Reply Card

STL-8 TRANSMITTER • All Solid State • Direct FM Modulator • Modular Construction • Test Meter Built-In • Proven Reliability in hundreds of installations • Unsurpassed for Dual Channel Stereo STL, Single Channel AM STL or Inter City Relay.

SPECIFICATIONS - STEREO

Stereo Cross Talk — 65 DB Noise — 65 DB or less Response ±0.5 DB 30-15000 Hz

Distortion Less than 0.5%

MARTI Electronics, Inc.

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Circle (75) on Reply Card

Audio Tape

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REEL TO REEL TAPE

Ampex, 3M All grades. On reels or hubs.

CASSETTES, C-10-C-90.

With Agfa, Ampex, 3M tape.

LEADER & SPlicing TAPE

EMPTY REELS & BOXES

All widths, sizes.

—COMPETITIVE • FROM STOCK—

For your catalog, call or write: Tom Franke 312/297-0955

Recording Supply Co.

1233 Rand Road

Des Plaines, IL 60016

Circle (76) on Reply Card

Stud mount terminations

Solitron/Microwave has developed a line of high power 20 watt stud mount stripline terminations featuring low VSWR characteristics.

Design characteristics include: frequency range of DC to 10 GHz; a standard 50-ohm impedance; a temperature range of 55°C to 150°C; power rating of 20 watts at 85°C derated linearly to zero at 150°C; and a temperature coefficient less than 100 PPM/°C.

Circle (129) on Reply Card

Reflex cameras

Cinema Products announces the CP-16R and CP-16R/A 16mm reflex cameras.

The cameras feature a bolt-driven, focal plane-type, 170° shutter which provides approximately 10% more light to the film plane.

For low-light conditions the standard viewfinder features positive click-stop 90° rotation, and provides 12X magnification.

Circle (128) on Reply Card

S22.08 per lb. the best Soft-Life buy on the market.

Berkey Colortran's versatile new 1K/4K Soft-Life is the answer for your studio and location needs. Higher, smoother output is made possible by our newly designed, maintenance free matte pelak • reflector. Convenience from tier tip selection of four intensities — 1k, 2k, 3k or 4k — on individually switched soft-lites.

These features combined with ultra lightweight (19.25 lbs.) and compact size make this the truly flexible soft-lite.

For more information, fill out the coupon below.

BE1178

Mail this coupon to: Berkey Colortran, 1015 Chestnut St., Burbank, CA 91502.

Send me a Data Sheet on this 1K/4K Soft-Life. Have a salesman call on me.

Name

Position

Firm

Address

City

State Zip
SERVICES

BUILD YOUR OWN TV AND RADIO PRODUCTION EQUIPMENT. Easy, inexpensive, (mostly IC). Plans or kits: Special Effects Generator, Video Editing System, Video Switcher, Solid State Lighting Board, Presto Audio Video Board, Presto Lighting Board, Crystal Control (Studio & Remote) Pro-Amp with compensation and regeneration for adapting High Scan VTR's to broadcast standards. PLUS specialized correspondence courses in TELEPHONE Engineering ($39.50), and Integrated Circuit Engineering course from $5.95 to $15. PREP. Plus CATALOG plus years updating of new devices All $1.00. Don Britton Enterprises, P.O. Drawer G, Waikiki, H. 96815. 9-77-321

TOWER SERVICE: Erection, Sales, Service. Financing and leasing contracts. Pioneer Tower Service, P.O. Box 253, Gerritson, Missouri 64633, (818) 542-0840. 8-78-71

EQUIPMENT FOR SALE


**TRAINING**

FIRST PHONE

In six to twelve weeks through tape recorded lessons at home plus one week personal instruction in Boston, Philadelphia, Detroit, Atlanta, St. Louis, Seattle or Los Angeles. Our twentieth year teaching FCC license courses. Bob Johnson Radio License Preparation, 1201 Ninth, Manhattan Beach, Calif. 90266. Telephone (213) 563-6141. For free brochure, Information Desk, Grantham College of Engineering, 2000 Stoner Avenue, Los Angeles, Ca 90025. 10-77-11

EQUIPMENT FOR SALE

SOLID STATE PRODUCTS. Large stock—bargain prices—tested and certified. Offer for price and stock lists. Sierra Western Electric, Box 23782, Oakland, Calif. 94623. Telephone (415) 832-3527. 1-73-1

HELIX-STRIOLEX. Large stock—bargain prices—tested and certified. Offer for price and stock lists. Sierra Western Electric, Box 23782, Oakland, Calif. 94623. Telephone (415) 832-3527. 1-73-1

**SERVICES**

**SALE**

LITHTING DIMMER SYSTEM for sale. 32 - 3K dimmers, 32 faders with 16 preset memory console. Packed for touring. Must sell! Asking price: $14,950.00. CBSG Enterprises. P.O. Box 708, Colorado Springs, Colorado 80001. (303) 751-5991 or (303) 424-615. 9-79-31

FOR SALE—DATATRON 5050-200 EDIT COMBINE WITH JAM SYNCH GENERATOR FOR TIME CODE. WITH TAPE TRANSPORT. 550-120. Bob Brandon, P.O. Box 993, Houston 17-77-6-631 11-77-51

FOR SALE—IVC TIT 100 Color Camera with CCU. Cinecon 12-120 mm lens w/Auto Zoom, 150 camera cable, cases included. For Information, call or write Louisiana Marketing, 901 Ninth Street Drive, Lake Charles, La 70601. (318) 438-3624. 10-78-21

$500 OR OFFER. Ampex 1000B, serial 729. Drake University Journalism, Des Moines. 11-75-11

BROADCAST CRYSTALS for AM. FM or TV transmitters, frequency change, repair or replacement of over types. Also VFOs, 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. Edson Electronic Co., Box 96, Temple, Texas 76501. Phone (817) 773-9301. 12-74-1

ASACA—5 Cameras—$ 4 7000, 1 ACC 1000 for sale. Used for demonstration only, value over $150,000. Best cash offer, Art Florian, F.B.I. C.S.S., 9125 Santa Monica Blvd., Hollywood, California 90237, or call (213) 466-9316. 1-87-61

AMPEX AUDIO RECORDER: 9 AG-440 mono in console, $1,750.00, 1,600 mono portable $550.00, 1,300-2 track completely rebuilt electronics w/good prep & tune, no rebadging or modification. For audio tapes, 8MMere not included. Send $5.00 for F.O.B. price. Robert Hansell, P.O. Box 8057, Pensacola, Florida 32501. 11-67-11

TELEVISION TRAILER—FRITZ-HARDKING, 40' ALUMINUM BODY. Contact: A. F. Associates, Inc., 100 Stonehurst Court, Northvale, New Jersey 07647, (201) 767-1600. 11-77-11

FM TRANSMITTER Westinghouse 10KW monitored type 2-1950, S.N. 30833 Mfg. In 1956. In original shipping crate—never used. This is a fabulous find—we have no additional technical data. First cash offer over $300. For Alagood Liquidators, 636 S. Pickett St., Alex., VA 22304, Phone 703-823-2503. 11-77-11

(2) LDH SERIES NORELCO COLOR TELEVISION CAMERAS. One LDH-20 and one LDH-1 modified for color. Both with some specifications, some modules modified for color. Available: LAWHEL, LTD., 388 Reed Road, Broomall, Pa. 19008. (215) 543-7600. 4-78-71

CONVERGENCE ECS-18 edit syst. with TT-6, PC-3, 3-VO-2860, 2.9" B&W Mon. & cases. Solid State VO-3800 VTRs. M. Schinski, (213) 594-8700. 11-77-11

WANTED

WCWL, a non-commercial educational FM radio broadcasting station seeks to purchase a 1200 MHz 200 watt FM transmitter. Latest model, good condition, with modified zoom lenses, CCU's, cables, local control units (tubes not included). Good condition. Contact: John A. Mathews, WII, 3400 Lakeshore Blvd., Toronto, Ontario, M6S 2A1. 11-77-11

WANTED: ONE 6 KW OR LESS TELEVISION TRANSMITTER IN GOOD CONDITION TUNED CH. 3. XEBF TV 3, BOX 1875, Muleshoe, Texas 79346. N. L., MEXICO. 11-77-11

WANTED: Pre-1920 radio equipment and tubes. August J. Link, Sucorum Associates, 305 Wisconsin Ave., Ocean City, Ca. 90254, (714) 722-6162. 3-76-11

November, 1978

97
PROFESSIONALS ACCREDITED

PROFESSIONAL BACHELOR DEGREE...learned with 4 or more years of Broadcast Business Management, Sales, or Servicing Experience. For FREE Information Write: Eben PROFESSIONALS INSTITUTE, Box 1651, Dept. B, Columbus, Missouri 65201 6-76-66

SITUATIONS WANTED

TELEVISION—CTV Video Maintenance Technicians. Full Benefits. Greater New York, Suffolk County or New Jersey Area. Send resume to: VPC, P.O. Box 206, New Hyde Park, N.Y. 11040. 6-77-76

RADIO CHIEF ENGINEER, good audio and transmitter worker. Excellent conditions, salary, and fringe benefits, at West Coast oldest station. Send resume to: WATL, P.O. Box J-70, Vancouver, Oregon 97501, or call (503) 773-1440. 9-78-41

HELP WANTED

CHIEF ENGINEER AND ASST. CHIEF ENGINEER

Las Vegas CBS affiliate, KLAS-TV, is expanding its Engineering Department and invites you to be part of that growth. We are searching for a Chief Engineer with ten to fifteen years of broadcasting experience, the fast five of which should be as Chief or Assistant Chief. Your Equipment familiarity should include TK-76, TV-100, AE600's, TCR-100, TKP-45, TK-46, and parallel GE transmitters. Also, since we maintain our own 350 mile network microwave system, your background should include some familiarity with Linknet, Microwave Associates, or Farinon Microwave. If you are selected as Chief Engineer, you will be answering to the Director of Engineering and be earning in the upper teens. KLAS-TV is also searching for an Assistant Chief Engineer who has five to ten years in broadcasting, with the past three to five years as Assistant Chief or as a heavy studio maintenance engineer. The Assistant Chief will report to the Chief Engineer and will be earning in the mid 'teens. Please send complete resume, salary history, salary requirements, and references to Linda Imboden, KLAS-TV, P.O. Box 15047, Las Vegas, NV 89114.

Equal Opportunity Employer

TV MAINTENANCE ENGINEER. Central California NBC affiliate needs an engineer with strong background in all areas of commercial TV engineering, especially maintenance and 2' reel-to-reel VTR machines. TCR-100 cartridge tape equipment and E.N.G. experience/knowledge highly desirable. 1st phone required, 40 hour week, annual salary range $17,190.00 with excellent fringe benefits. Send complete resume, or call Bob Hiss, Chief Engineer, KML-TV, Channel 34, 1544 Van Ness Avenue, Fresno, California 93779. (209) 269-6666. An Affirmative Action/Equal Opportunity Employer. 11-78-21

HELP WANTED (CONT.)

VIDEO SALES ENGINEERS

Choice territories in Washington, D.C., Indianapolis, New Orleans, Atlanta

Tektronix's recent expansion into television instrumentation necessitates adding additional professional sales staff.

Tektronix, Inc., a Fortune 500 electronics leader, manufactures an extensive line of broadcast quality waveform and picture monitors, test and sync pulse generators, vectorscopes, chrominance correctors, and other test and processing equipment. We're looking for a solid technical background in broadcast TV, an EP, or the equivalent experience, and successful sales experience in a professional broadcast or CATV environment.

An enthusiastic, self-motivated personality is required since you will be operating with a high degree of independence. We offer a very competitive salary, bonus incentives, commissions and a company car.

Please contact on Illinois McCarthy, TVL, FREE at (404) 638-4053, or submit your resume to his attention at TEKTRONIX, INC., 2 Research Court, Rockville, Maryland 20850.

All replies will be held in strict confidence.

An Equal Opportunity Employer M/F/H

TELEVISION ENGINEER—Experienced in studio equipment maintenance including quad tape. Must have first phone. Salary dependent upon experience. Call or write Dick White, First Baptist Church of Atlanta, 754 Peachtree Street, Atlanta, GA 30306, 404-381-1286. 11-78-11

RADIO ENGINEER—Immediate opening for engi- neer with heavy maintenance experience on 50 KW AM and automated Class B FM. First phone required. Minimum 5 years experience. Salary negotiable. An Equal Opportunity Employer. Send resume to Lana Allright, WP administran- tion, WLW Radio, Inc., Suite 700, 3 East Fourth Street, Cincinnati, Ohio 45202. No phone calls please. 11-78-11

ENGINEERS: International accounting firm, with established broadcast quality color studio, is seeking a quality-minded ASSISTANT CHIEF with strong maintenance ability. RCA Quadus, studio cameras, and field production camera for remotes. Become involved in new studio con- struction in near future. Pleasant mildwest suburban location. Also an opening for a STAFF ENGINEER who is aggressive, with strong tech- nical capability. We are an Equal Opportunity Employer. Send resume to Dept. 436, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212. 11-78-11

VIDEO OPERATING ENGINEERS, maintenance engineers, camera operators, wanted for Wash- ington, DC video tape production house. Experi- enced only. Reply to: Dept. 431, Broadcast Engi- neering, P.O. Box 12901, Overland Park, KS 66212. 10-78-21

CCTV, VTR TECHS—Experienced video equip- ment repair, full or P/T. Video Marketing Inc., Horsesh, PA 19044, (215) 343-3000. 11-78-11

VIDEOTAPE MAINTENANCE ENGINEER. Quality Northern Rockies station in top outdoor recre- ation area, sharp operation, seeking the right person to help us stay that way. Must have First Phone and solid TV studio and Videotape mainte- nance experience EDE Contact Kari Black, KRTV, Box 1331, Great Falls, Montana 59403. 11-78-11

WANTED: An announcer-engineer with first phone. Mostly announcing duties, some engi- neering back-up. Want someone who is looking for a small town (pop. 6000), no cities near. Contact S. D. Crawford, Chief Engineer, P.O. Box 27, Colby, KS 67701. 913-462-3305. 11-78-11

VIDEOTAPE EDITOR: Southern California video production company requires videotape editor/engineer with at least 2 years CMX or CDL editing experience. Salary commensurate with experience. Write Dept. 434, Broadcast Engineer- ing, P.O. Box 12901, Overland Park, KS 66212. 11-78-11

ASSISTANT CHIEF ENGINEER OF MAINTENANCE, independent videotape production facility. Emphasis on Camera and VCR maintenance and production editing. Submit resume and salary requirements to Spring Branch Inde- pendent School District, P.O. Box 19432, Houston, Texas 77024. Attn: Personnel, E.O.E. 11-78-11

EXPERIENCED AM/FM Engineer position available immediately in the Memphis area. Preferred experience with Directional Systems 50 KW AM and 100 KW FM Systems. First class FCC required. Send resume to Chief Engineer, WCIA Radio Station, P.O. Box 12045 Memphis, Tennessee 38112. An Equal Opportunity Employer. 11-78-11

11-78-1f

www.americanradiohistory.com

BROADCAST ENGINEERING
HELP WANTED (CONT.)

Broadcast Engineering Personnel Service
(coast to coast)

We specialize in the placement of well qualified people in the Broadcast Engineering Industry: TELEVISION & RADIO STATION; Chief Engineers, Assistant Chiefs, Maintenance Engineers, etc. MANUFACTURING, VIDEO SYSTEMS, CCTV, ITV, CATV, Engineering Management, R&D, Project, Design & Development, Maintenance & Service, Systems, Applications, Sales & Marketing. Nationwide Data Bank for Employers & Employees. No fee to Applicant, Professional, Confidential Phone/Resume—Alain Kornish, KEY SYSTEMS New Bridge Center, Kingston, Penna. 18704. Employers Inquiries invited. (717) 822-2196. No. 1 in the USA. 10-11

TV TECHNICAL HELP WANTED: Experienced Chief Engineer, for independent UHF Family Christian Television in South Florida. RF experience a must. Contact G. Kent Smith, WHFT, P.O. Box TV 45, Miami, Fla. 33169, 305-962-1700. Equal Opportunity Employer. 11-78-11

MAINTENANCE ENGINEER—1st Class License, Exp. on Quad VTR's, Studio Cameras, Umatic VCR's and E.N.G. Equip. helpful. Submit resume to: Jim Bush, Chief Engineer, KDFA-TV, Amarillo, Texas 79109. 11-78-11

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. 10-78-11

HEAD OF AUDIO-VISUAL TECHNICAL SERVICES. To be responsible for the selection, maintenance, repair and inventory of audio-visual equipment at a large community college with three campuses; to oversee the production of video and audio tapes to support the educational program of the College; to supervise four experienced technicians; to report to and direct the College Library administrator regarding audio-visual services for students and faculty. Thor-ough knowledge of audio-visual equipment required. Equipment to include television cassette and reel-to-reel recorders and players, color television monitors and receivers, color video cameras and editing systems, audio recording equipment and sound systems. Appropriate degree at Master's level. Rank of Assistant Professor and salary dependent upon academic qualifications and experience. College offers excellent benefits. Send resume to Leonard R. Johnson, Executive Director of Libraries, Suffolk County Community College, 533 College Road, Selden, New York 11784. An Equal Opportunity, Affirmative Action Employer. 11-78-11

TELEVISION TRANSMITTER SUPERVISOR—We need a top engineer to maintain two parallel Harris BT18H's on Channel 11, located in the world's 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 full resume in confidence to: Larry W. Ocker, Director of Engineering, WTTW-TV, 5400 N. St. Louis Ave., Chicago, Illinois 60625. 10-78-21

WORK IN THE NORTHWEST: Successful northwest Broadcasting Corporation seeks qualified engineers and switchers with a 1st phone. If you're experienced, this is a great chance for you to continue on in all phases of a television operation and do it in the beautiful Northwest. Write Dept. 435, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212. 11-78-21

TELEVISION MAINTENANCE ENGINEER

Needed immediately in mile high Denver. First class license and three years studio maintenance experience, preferably on RCA equipment required. Group broadcaster. Excellent benefits and commensurate salary. Send full resume to Ted Everett, KMGH-TV, 723 Speer Boulevard, Denver, Colorado 80217. An Equal Opportunity Employer. 11-78-11


MAINTENANCE ENGINEER: University located on Long Island, New York. Responsible for installing and maintaining CCTV system which includes broadcast quality color cameras, video tape recorders, switches, monitors, processors. Writing specifications on and evaluating purchases of new electronic equipment for color and black and white studios. Installing and maintaining fire and intrusion alarm systems, maintenance and operation of electronic gear and supervising office and technical staff. First class radio-telephone license required. Technical school required; ten years practical experience. Excellent fringe benefits including free tuition. Send resume to Mr. George Nave, Hofstra University, Plant Department, 1000 Fulton Avenue, Hempstead, New York 11550. 11-78-11

HELP WANTED (CONT.)

MIDDLE EASTERN OPPORTUNITY

SENIOR PRODUCTION/MAINTENANCE ENGINEER

Raytheon Company has a challenging Middle Eastern assignment based in Jeddah, Saudi Arabia for a qualified individual meeting the following criteria:

- A.S. in electronics or specialized courses in Radio and TV Trade Schools.
- 5 years minimum experience commercial and/or closed circuit TV.
- First Class FCC license desirable.
- Working knowledge of PAL SECAM as well as NTSC desirable.

The selected candidate would supervise and perform the installation and maintenance of all Television Studio and transmitting equipment.

Another important element of the job would be the effective training of customer technicians in Television maintenance.

The assignment has the option of single or family status.

We offer an excellent starting salary, plus overseas premiums and cost-of-living adjustment. Company paid housing and a full range of recreational facilities are also provided.

Interested applicants should forward resume and salary requirements to Mr. J. E. Curry, Raytheon Middle East Systems, International Personnel, 350 Lowell St., Andover, MA 01810, or call him collect at 617-475-2459.

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November, 1978

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SALES ENGINEER
PROFESSIONAL AUDIO PRODUCTS

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- Some managerial or supervisory experience.

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Assistant to the President

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HELP WANTED (CONT.)

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. 10-78-21

HELP WANTED (CONT.)

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THIS KEY MANAGEMENT POSITION OFFERS A GREAT CAREER OPPORTUNITY FOR AN OUTSTANDING HIGHLY EXPERIENCED EXECUTIVE ENGINEER.

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