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The industry seems to have finally turned the corner. This month's issue reveals emerging new trends in broadcast technology. With an eye on the future, BE editors help you know where the industry is going. In addition, this issue contains a never-before-seen behind the scene's Special Report on how new video technology brought the Gulf War live to American homes.

FEATURES:

22 Perspective on NAB '91
Putting into words the overall sense of the yearly NAB Convention is sometimes hard. Not so this year. Attendees and exhibitors went to the convention expecting the worst, but left feeling quite good about the industry's health.

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By Skip Pizzi, technical editor.
A thumbnail sketch of the annual industry ritual.

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By Rick Lehtinen and Skip Pizzi, technical editors
BE's panel of independent experts share their favorite new products from NAB '91.

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By Carl Bentz, special projects editor

SPECIAL REPORT:
The Persian Gulf conflict showed the world what the combination of technology, ingenuity and courage can do on today's battlefields. And the world witnessed all of this through the wonders of modern broadcast technology. This BE Special Report is an industry exclusive story on the technology behind the spell-binding coverage.

50 The Gulf War
By Peter Hammar, Hammar Communications
Broadcast technology broke new ground to bring the war home.

ON THE COVER
Digital technology is everywhere. Depicted on the cover is the industry's move from analog equipment into the world of digital hardware for video production. (Cover credit: Kim Bracken, BE graphic designer. Photo courtesy of VGV, HBO design: photography by Alex Trocker, graphic paintbox artist was Ron Britt.)
Television audio has been changing even faster than the rest of the industry. It's time to take a fresh look at the requirements of today's television station—and to find more effective methods of meeting them.

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By Dawn Hightower, senior associate editor

FAA and FCC simplify procedure for EMI cases

The Federal Aviation Administration (FAA) and Federal Communications Commission (FCC) have reached an agreement to simplify the handling of electromagnetic interference (EMI) issues with respect to AM broadcast stations, fixed microwave transmitters and cellular radiotelephone fixed transmitters. The FAA's concern arises from the possibility that such transmitters might be installed too close to remotely controlled aeronautical receivers, which can disrupt air traffic control communications and navigational aids.

The FAA will not issue a hazard determination to those applicants for licenses involving cellular fixed transmitters, fixed microwave transmitters, or AM broadcast transmitters that invite potential EMI, nor will the FAA request the applicants to use filtering beyond what is normally required by FCC rules. The FAA will include the following language in a Determination of Non-Hazard, assuming that physical obstruction is not an issue:

FAA facilities critical to aviation safety are located (distance) from your proposed transmitter site. You may cause harmful interference to these facilities if your equipment meets only minimal FCC standards for spurious emissions. Before you begin any transmission from your facility, call your local FAA contact to arrange procedures to verify that no interference is caused.

FCC requirements in:
- 47 C.F.R. 73.44(c) (in the case of AM broadcast stations)
- 47 C.F.R. 22.107(c) (in the case of fixed cellular transmitters)
- 47 CFR 21.107(b) (in the case of common-carrier fixed microwave transmitters)
- 47 CFR 74.23(a) (in the case of broadcast auxiliary transmitters)
- 47 CFR 94.71(d) (in the case of operational fixed service transmitters)

Note that licenses may need to employ extra filtering or take other measures if their transmissions disrupt other services. The commission requires its licensees to cooperate fully with users in other services, in this case the FAA, to eliminate any harmful interference covered by the previous requirements.

This agreement does not affect the requirement of an FCC applicant to notify the FAA of proposed construction or modification of towers under existing FAA and FCC rules.

For further information, contact FCC—Michael Marcus at 202-634-1550 or FCC—George Sakai at 202-267-9710.

Seminar questions assumptions on DRB's future

The Annenberg Washington Program's Digital Radio Seminar held in Washington, DC, April 11, made it obvious just how uncertain the future of digital radio broadcasting (DRB) is in the United States. FCC commissioner Ervin Duggan lamented that WARC-92 is hanging over our heads, and urged that fundamental mistakes regarding DRB could not be afforded.

Also contentious were indications by FCC representatives that DRB might not be regulated as a Mass Media service. FCC chief engineer Tom Stanley noted that DRB actually evolved from the Broadcast Satellite and Mobile Satellite proposals, and he questioned the view of DRB as purely an evolutionary development for terrestrial broadcasters. Stanley also indicated that each of the four new spectrum options (UHF TV, L-band and two S-band segments) presents an arguably insurmountable problem.

Spectrum is clearly the greatest challenge for "in-band" proponents, such as Garnett's USA Digital proposal. Eureka engineer George Plenge surprised some attendees by indicating that an increase in error correction, the Eureka system might be able to work within a bandwidth of 500kHz — and fit between existing FM stations.

NAB spokesmen painted a gloomy portrait of the radio industry's health, and concluded that new competition from satellite broadcasts would be a grave threat to local stations.

Regarding the U.S. position on DRB at the 1992 World Administrative Radio Conference, especially considering the growth of in-band possibilities, the FCC regulatory panel advocated a position of maximum flexibility. The commission was scheduled to announce the Draft U.S. position on WARC-92 at its June 13 meeting.

[1-7-2]
The point of news coverage and field production is to be in close. Broad in scope. With no distortion. All while capturing shots as appealing as a wide slice of pepperoni pizza.

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Missouri showmanship

As the FCC enters the uncharted waters of new technology, its chairman, Alfred Sikes, may encounter stormy weather. Sikes continues to sing the praises of deregulation and "effective competition" among broadcasters and cable and telephone companies. Although this may appear on the surface to be an equitable approach, there are powerful interests at work to sink his proposals.

One of Sikes' goals is the reassignment of spectrum space. This issue comes complete with enough political wrangling to derail any action. Every RF user wants more spectrum, but it's to be expected that those who currently have access to it aren't about to easily give it up. Users will be trying to salvage what spectrum they have, while at the same time, clamoring for more. There is likely to be an intense battle on this issue no matter what the FCC's report on spectrum usage says.

Broadcasters see new spectrum as an opportunity for new services, such as HDTV and DAB. Though such allocations may be forthcoming, it is likely any spectrum reallocation will carry the penalty of additional competition and a "spectrum fee." At a time of increasing budget deficits, there are plenty in Congress who see taxing something currently used for free as a golden opportunity.

Another of Sikes' controversial plans would allow the telephone companies to enter the video delivery business. While the phone companies sing the praises of fiber-delivered signals, the cable industry is crying foul. Sikes apparently doesn't agree with cable operators; he has called the cable industry an "unregulated monopoly." But changing the current rules of the game requires, literally, an act of Congress. Given the powerful lobbyists at work, he has perhaps a 50% chance of success.

Sikes has said that we're moving from the age of information into the age of knowledge. Even so, you have to wonder how much change can be tolerated by the communications industry in such a short time. New technologies are clamoring for spectrum. Telephone companies want access to program distribution rights. Broadcasters want spectrum to initiate new services. But the cable industry is trying to block any new competition, while promising its own new and improved services.

Sikes is facing stiff opposition to many of his plans by well-financed groups, each lobbying for its own agenda. Many established companies see the emerging technologies as threats. Sikes once referred to the phone companies and the cable operators as "bottlenecks." Given such conditions, does Sikes have any chance of being able to deliver on his dreams?

The telecommunications industry represents approximately 300 billion dollars and thousands of companies. With stakes this high, the only certainty is a rough road ahead for the chairman.

Sikes' roots are in Missouri, the "Show-Me State." Though he has owned several radio stations, his appointment as FCC chairman appears to have been based more on his ability to get certain Missouri politicians elected than on his broadcasting expertise. But successfully managing the campaigns and elections of fellow politicians and forging new technological frontiers among competing interests are far different tasks.

If even half of what Sikes has proposed becomes reality, he will have made an indelible imprint on the American entertainment industry for decades to come. To succeed, however, Sikes is going to need more than Missouri showmanship.
Bottom Line Orientation

Creating a "sound" that attracts and holds the largest possible audience is the bottom line in the radio business. And the new OPTIMOD-FM Digital 8200 is a technological breakthrough with bottom line impact.

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The power of digital propels the 8200 to new levels of performance and functionality. OPTIMOD-FM 8200 is a true digital audio processor—the audio is digitized and all control functions are digital.

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Take advantage of the power, potential and profitability of the OPTIMOD-FM 8200. Call your dealer now for a personal, hands-on evaluation of the 8200.

The OPTIMOD-FM 8200 is a technological breakthrough with bottom line impact. The power of OPTIMOD—in pure digital.
Children's TV standards adopted

By Harry C. Martin

In April the FCC adopted rules and policies implementing the Children's Television Act of 1990. The act requires TV stations and cable systems to limit advertising in children's programs to no more than 10.5 minutes an hour on weekends and no more than 12 minutes an hour on weekdays. The act also requires the FCC to review the extent to which TV renewal applicants have complied with these commercial limits, and the extent to which they have served the "educational and informational needs" of children through their overall programming, including programming specifically designed to serve these needs.

Commercial time limits

The FCC will apply the act's commercial limits to programs originally produced and broadcast primarily for an audience of children 12 years old and under. Cable systems must apply these limits to locally originated channels and to cable network programs, but they are not responsible for applying the limits to the over-the-air TV stations they carry or to access channels. The commission will define commercial matter as "air time sold for purposes of selling a product or service." In this regard, the commission will define a "program-length children's commercial" as any program associated with a product in which commercials for that product are aired. This definition would also cover programs in which a product or service is advertised within the body of the program, and not separated from program content, as children's commercials are required to be. All of the time included in program-length children's commercials will be counted in assessing compliance with the new commercial time limitations.

Renewal review requirement

In order to meet the renewal review requirement, commercial TV stations must maintain in their public inspection files a summary of their own children's programming, their non-broadcast efforts for children, and their support for other stations' programming directed to the educational and informational needs of children. These summaries must reflect the most significant programming related to these needs that the licensee has aired. The summaries will be submitted as part of commercial TV station renewal applications.

The renewal review provision will be applied to programs originally produced and broadcast primarily for an audience of children 16 years of age and under. The agency will not, however, require licensees to target their programming to all ages of children in the under-16 range. Also, the renewal review requirement will not apply to non-commercial educational TV stations.

In implementing this renewal requirement, the FCC will define educational and informational programming as programming that furthers "the positive development of the child in any respect, including the child's cognitive/intellectual or emotional/social needs." The agency did not establish a minimum amount of this type of programming that must be aired. Short-segment programming, including vignettes and PSAs, may qualify under the FCC's standard. But whether short-segment programming fully satisfies the obligation to air this type of children's programming depends on the entire context of the licensee's programming, and its non-broadcast efforts directed to children.

The effective date for the new rules and policies is Oct. 1, 1991. The first TV station renewal applications that must include information that demonstrates compliance are those to be filed on Feb. 1, 1992.

FCC relaxes financial interest and syndication rules

Also in April, the FCC substantially relaxed its financial interest and syndication rules that govern the ownership and distribution of TV programs that networks either buy from independent producers or produce themselves.

The commission's decision did the following:

1. Eliminated all limitations to all portions of the network schedule other than prime time entertainment programming.

2. Freed the networks to acquire all rights — financial interests, domestic syndication rights and foreign syndication rights — in outside program productions, provided that:
   • these rights are obtained in a secondary negotiation at least 30 days after the network and producer reach a license fee agreement.
   • the domestic syndication rights obtained from outside producers are timeously distributed by an independent syndicator.

3. Freed the networks to retain all rights in and to distribute domestically and internationally all the "in-house" productions that they air, including:
   • programs that are "solely produced" by the network. These are programs for which the network possesses full financial responsibility, full business and production control and 100% of the copyright.
   • co-productions between the network and an outside domestic producer provided the producer initiates the arrangement and is permitted a 30-day cooling off period before the agreement is binding.
   • co-productions between the network and a foreign producer.

4. Permitted networks to fill no more than 40% of their prime time entertainment schedule with in-house productions.

5. Prohibited the networks from favoring their affiliates or unduly delaying the syndication of those in-house productions they actively distribute themselves in the domestic marketplace.

6. Allowed the networks to engage in the foreign syndication business free of any such distribution safeguards.

7. Allowed the networks to retain a financial interest in and syndicate internationally programs they have solely produced in-house for first-run syndication. However, they may not acquire such rights from outside producers of first-run programming, or actively engage in the domestic distribution of any first-run programming.

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High-definition audio coming to TV

Digital techniques

By Rick Lehtinen, technical editor

The adage, "Sound doesn't matter to the TV viewer" no longer holds true. Many viewers today reproduce the audio from TV stations through high-quality stereo component systems. As these viewers begin to compare the TV audio with that available from CD players and other high-quality sources, any discrepancies in the transmitted audio become immediately noticeable.

The improvements gained through the introduction of stereo TV audio are primarily within the receiver. TV transmitters have been capable of high-quality audio since the early days of television. Let's look closer at the audio side of the TV signal.

The current TV audio system is designed to carry frequencies from approximately 50Hz to 15,000Hz in stereo. The secondary audio program (SAP) channel is also fairly wideband, from about 50Hz to 10kHz. Both audio channels, however, are analog and subject to the limitations of an analog FM transmission system. In addition, they are further troubled by demons unique to television, such as sync buzz and subcarrier beats. These limitations have become more obvious as TV transmission and reproduction hardware have been improved.

Researchers have now begun to address these problems. One interesting approach involves the application of digital audio compression techniques, similar to those being proposed for digital audio broadcasting (DAB) for radio, which will offer a new level of performance. The frequency response will extend from 20Hz to 20kHz, and the signal-to-noise ratio (SNR) may exceed 90dB. Many experts have gone so far as to predict that TV audio will someday be digital as part of a new HDTV system.

True-sounding remotes

Of course, digital audio won't muscle its way into TV broadcasting overnight. Currently, there are no receivers to accommodate it, and no authorized way to transmit it. However, even though digital audio is still on the horizon for home receivers, there are ways today's TV broadcasters can take advantage of modern digital technology.

A typical application of digital audio for television could be a backup audio feed for TV remotes. This would take the form of an analog-to-digital coder (codec), followed by a device that converts the codec output to a format acceptable by the phone company. The latter box, called a digital service unit (DSU), would be required at each end of the circuit. At the receive site, a digital-to-analog decoder would convert the signal back to analog. (See Figure 1.)

There is one problem, however. It takes about 1.5Mbit/s bandwidth to pass a CD-quality audio signal. Traditional phone lines are often pressed to meet the needs of a 19.2kbit/s modem signal, and special digital lines that can handle high data rates are expensive.

ISDN: help on the way

One new, low-cost digital service is a 56kbit/s digital service that is available on

---

**Figure 1.** In a digital system, backup audio is digitized and then converted to telco standards in the digital service unit (DSU). The process is reversed in the station.

Ordinary dial-up telephone lines are barely adequate for backup programming feeds. However, higher performance can be obtained by using analog frequency extenders. These systems sometimes use multiple phone lines to frequency shift and then split the audio among the separate lines. Even with these sophisticated techniques, this method often limits the top frequency response to approximately 7.5kHz. Also, top-quality audio is available only through equalized telephone loops, which are expensive. This is where digital may offer a solution.

In the past year, ABC, CBS, CNN and NBC used it to carry the Super Bowl, the World Series, Monday Night Football, Desert Storm coverage and more.

Vyvx NVN, the first nationwide switched fiber-optic television transmission network.

Broadcast quality fiber-optic television transmission is no longer a futuristic technology. It’s here. It’s established. It’s proven. Just ask the major broadcast and cable networks who use it for transmitting news, sports and other programming.

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The point is, fiber-optic television transmission is no longer an emerging technology. Broadcasters are already relying on it and Vyvx NVN for their most critical transmission needs.

For more about the Vyvx NVN switched fiber-optic television network, call 1-800-324-8686.
Applying vectors

Simple vectorial operations

By John Battison, P.E.

Late last month I introduced vectors and discussed the method used to measure their azimuth or bearing. Now that we have laid the groundwork, we can discuss how vectors can be used in radio applications.

In addition to a general method called "vectorial addition," there are three ways to add vectors: arithmetically, algebraically, and geometrically.

Now, back to the addition methods. If vectors are at right angles, they can be added geometrically. For many engineers, the graphical method of handling vectors was the easiest until calculators appeared. DA problems in which monitor points did not behave as anticipated were often solved on a piece of paper on which the vectors were drawn and measured with a protractor.

Because today's calculators provide instructions on vector applications, I won't repeat them. However, I will provide a few thoughts on graphical solutions. In fact, the graphical method can sometimes help solve a problem because you can see the influences of the vectors with which you are dealing.

Figure 1 shows the phase circle that was introduced in last month's column. If scale here were set to 1 inch = 100V, vector OV, which represents the \( \pi /4 \) point on a 100V sine wave, would be drawn 1-inch long at an angle of 45°. Mathematically, the instantaneous voltage \( e \) generated as an armature rotates (or a circuit oscillates) is given by \( e = E_{\text{max}} \sin \theta \). Substituting, \( e = 100 \times 0.707 = 70.7 \text{V} \) with a phase of 45°. Graphically, the line eV would measure 0.7 inches, and would show the approximate instantaneous voltage. Vector OV would show the 45° azimuth corresponding to instantaneous phase.

Series resonance

Figure 2 shows a series resonant circuit. At resonance, the voltages across the reactances of the coil and capacitor are equal and in opposite phases. When the voltages across these reactances are added, the result is zero. The vectors OX₁ and OX₉ are dotted because they cancel. But what remains is \( V \), which is equal at resonance to the IR voltage drop across the circuit resistance. This is the only ohmic resistance in the circuit at resonance. The lower this resistance, the sharper the tuning and the higher the Q of the circuit will be. Remember, at resonance the current through the circuit is in phase with the voltage because there is only pure resistance left. (Because this resistance is normally so low, the term "zero resistance at resonance" is often used.) Therefore, vectors OV and OL are coincident in azimuth, but different in magnitude because of the resistive IR drop.

In tuning transmitters, the characteristics of changing reactance values are employed. By increasing one or the other of two such reactances, the circuit becomes either inductive or capacitive. In the first case, the voltage across the total circuit will lead the current, and vice versa. But in both cases, the equivalent vectors OL and OR will diverge in azimuth angle.

Next month, I will conclude this series on vectorial applications by discussing parallel resonances.

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

Figure 1. An instantaneous voltage in the phase circle and its equivalent vector form.

Figure 2. At resonance, \( OX_1 = OX_9 \). The current through R (denoted by vector OL) produces a voltage drop across it, which equals the total voltage through the circuit, as shown by OV. OL and OV are coincident because the purely resistive load means voltage and current are in phase.
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PORTABLE ONE

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SBE activates job line

By Bob Van Buhler

As promised by SBE’s leadership, a job line has been installed to provide SBE members with information about employment opportunities throughout the country.

Here’s how it works. Employers contact the SBE office and describe their openings. Each position is then listed on the line by an identification number, geographic location, job title and other related information.

When SBE members listen to the listings, they must write down the ID numbers for the positions in which they are interested. Then they can call the SBE office for more information. But before any additional information is given, the caller’s SBE membership status will be checked. Only SBE members will be given information. Also, potential employers will not be identified in order to protect the confidentiality of the employers and applicants.

The job line, which was first activated on May 1, lists only job openings, not “work wanted” situations. Employers interested in using the service to fill technical and engineering positions of all types should write the SBE national office at PO. Box 20450, Indianapolis, IN, 46220, or call Elbera Clayton at 317-253-1640.

The job line’s number is 317-253-0474. Current listings include technical positions in broadcast and manufacturing-related companies in a variety of market sizes. International employment opportunities are also listed.

Chapter award nominations

The SBE awards committee, chaired by Tom Weems, is accepting nominations for the six 1991 chapter awards. These awards represent the highest achievement in several areas of society work and set the example by which other chapter work is measured.

The awards will be presented at the 1991 SBE National Convention and Broadcast Engineering Conference. The Best Chapter Newsletter award, which the Madison, WI, chapter won last year, is one of the more difficult awards to bestow. Greater member participation and the proliferation of desktop publishing have resulted in the highest-quality newsletters ever.

Many of these newsletters inform members about technical problems and changes that affect their local and regional broadcast communities. Some of them have special columns that chronicle the chapter area’s broadcast history. Others are written with a considerable flair for humor, which makes for interesting reading.

Chapter leaders must think of the monthly newsletter as more than just a “meeting notice.” The chapter newsletter is an excellent way to update members about information from SBE’s “Short Circuits” and other national publications that may affect them. As the winning newsletters attest, the more local information the newsletter contains, the more widely read it will be.

Although the Madison newsletter editor won last year, the Best Chapter Newsletter Editor award is not automatically given to the chapter that wins the newsletter award.

Other awards

The statistics decide the winner of the Greatest Chapter New Member Growth award. This award is not necessarily given to new chapters in small, less organized areas. Last year’s winner, for example, was the Chicago chapter.

The chapter award that is most important to the overall broadcast industry is the Best Chapter Frequency Coordination Effort. The Madison chapter also received this award last year. SBE’s frequency coordination program continues to be an important society activity, and a tremendous service to the industry as a whole.

The last two awards, Best Technical Article or Paper and Best Regional Conference, were also presented to the Madison chapter last year.

Any SBE member can make nominations for the six awards by sending them to the SBE national office. Once compiled, the nominations will be forwarded to Tom Weems and his committee for evaluation. All nominations should completely describe the reasons for the nomination and include sufficient documentation so that the committee can thoroughly understand the nominee’s achievements.

Although the national office traditionally has had input to some of the categories, member input weighs just as heavily in the decision process. Deadline for nomination submission is Aug. 15.

Contract engineering dilemma

The FCC’s decision in the 1970s to eliminate the First Class Operators License has brought many changes to the broadcast industry. Perhaps the most noticeable change has been the elimination of many operator positions.

Typically, every time a broadcast property is sold, the entire engineering staffing situation is re-examined. Today, only the larger stations are fortunate enough to have several engineers. Many stations have only one, usually overworked, engineer. Some radio stations don’t have even one. These stations use contract engineers, which eliminate the requirement to pay benefits to them.

SBE to the rescue

These factors have forced many SBE members to become independent contractors who work for several stations. In some cases, these engineers have opened shop without adequate business skills or training.

To meet this rising need, SBE is developing training programs for these engineers. But first it must learn more about the specifics of today’s contract engineering. A survey of SBE membership will gather information on the contract engineering field. It will first attempt to determine how many SBE members are involved in contract engineering work and then try to determine an accurate description of the type of work they perform and skills that are required. Third, it will determine how and under what conditions their services are rendered.

Armed with this information, the society will be able to develop seminars to help engineers learn to successfully operate their businesses as contract engineers. These seminars will be presented at the national convention. Further information will be provided when the survey is complete.
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We don’t ship tape recorders to you in pieces; you won’t get our new disk recorders that way either.

Our new DDR-10 digital disk recorder is a fully integrated system that comes ready to roll in and turn on. There’s no assembly, no cabling, nothing more to buy. And because it looks great, clients simply love it!

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Building with microcontrollers

The UART receiver

By Gerry Kaufhold II

The universal asynchronous receiver/transmitter (UART), which inputs a parallel byte and shifts it out one bit at a time to create a serial bitstream, is the heart of the microcontroller's serial communications capability. In last month's column, we introduced the UART transmitter's signals: a start bit begins the serial transfer, eight databits follow, and two stop bits signal the transfer's completion. This month, we'll examine the UART receiver and its operation.

![Figure 1. A framing error in which an incorrect stop bit will cause the receiving UART to issue an error signal. This will tell the transmitting UART to repeat the character.](image)

As I explained last month, a bit-time is how long it takes to move a single bit out of the transmit buffer. A character time is 11 bit-times. At least one mark (logic high) is sent between two characters. If a space (logic low) extends through more than one full character time, the receiver sends a continuous space, or break, which is a call for a system reset.

The UART receiver has a tough job. Unlike the transmitter that begins the communication sequence, the receiver must discern information and respond to it "on the fly."

Keeping the signals straight

Until the transmitter starts a transfer, the receiver sees a continuous mark. The beginning of a start bit is signalled when the transmitter changes the mark to a space. The receiver senses the change and immediately begins to count using timer T0's programmed baud rate. After half of a bit-time, the receiver samples its input line (port 3, bit 0) and verifies that there is still a space holding. However, if the input line has returned to the mark condition, the receiver assumes that there has been an error, or that noise has appeared on the line. It then resets itself to wait again for a valid start bit.

When a valid start bit is sensed, the receiver begins to sample the incoming line at intervals of one bit-time. Because the receiver has already waited one-half of one bit-time to read the initial start bit, these samples are taken in the middle of their bit-times. This provides a measure of noise immunity because each bit has a chance to settle before the receiver reads it.

After reading eight databits, the receiver waits one more bit-time, and then samples the incoming signal to verify that it is a space, which indicates a valid stop bit.

Framing errors

If the stop bit is not valid, the receiver

<table>
<thead>
<tr>
<th>8-bit databyte</th>
<th>No. of 1s</th>
<th>Even parity bit</th>
<th>Odd parity bit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1001 1001</td>
<td>4</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1011 1001</td>
<td>5</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>0011 1111</td>
<td>6</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 1. Some examples of even and odd parity.

will recognize a framing error. When this happens, the Z-8 master control program, which is written by the system engineer, must decide what to do.

In Figure 1, for example, the received character's stop bits did not stay in the space condition long enough. In order to solve this, the receiver transmits a message telling the sending UART that an error has occurred. The UART will then reset itself to the normal mark output, and repeat the entire transmission process again, from the start bit, through the databits, to the stop bits.

If the error persists, the master control program may force a break onto the communications lines to clear both UARTs before trying to communicate again.

Error detection

Serial data communications wires are often terminated in electrically noisy environments. UARTs use a variety of error-checking and correcting (ECC) codes to detect errors and recover from them. All of these codes require the addition of bits to each character. Some ECC schemes, however, add extra bytes at the front and back of each string of characters.

Parity is the most simple of these coding schemes. It adds a bit, called a parity bit, to the end of each character. This makes each character 12 bit-times in length, instead of 11. Both the transmitter and the receiver must be programmed to recognize parity.

The parity generator counts the number of 1s in each character. The final tally must be an even number for even parity, or odd for odd parity. The generator sets or clears the parity bit as required.

For example, in the databyte 1001 1001, there are four 1s. Because four is an even number, the parity bit will be a 0 for even parity, and a 1 for odd parity. The receiving
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DAT maintenance

Electronic adjustments

By Richard Maddox

If your DAT tape is recorded on an electronically misadjusted machine, you will probably have fatal playback problems when it is played on other machines, even though it will play back perfectly on the original machine.

Subcode data-reading problems are often a tip-off to electronic misadjustments. For example, if your machine moves slowly back and forth when searching for a start ID instead of rapidly searching-to-cue (and the problem remains after cleaning the heads), it is time to take out your operator's manual and check the adjustments.

These alignments should be checked about every six months, or whenever the head drum is changed. They should be checked more often, however, on machines used in mastering environments, or on machines that are moved frequently.

Typical DAT circuit adjustments

Tracking voltage adjustment. Typically, this adjustment must be set to 0V ± 2mV to compensate for aging components in the capstan servo loop. If it is misadjusted, the capstan speed will be affected, which will cause errors in absolute-time marking and tracking. (See Figure 1.)

To check this adjustment, load a 2-hour tape recorded on the machine under "test," rewind it to the beginning, reset the absolute-time counter and then fast-forward the tape to the end. Repeat this procedure with the same tape on another machine if one is available. Most DAT-120 tapes run for two hours, plus a minute or two. Tape readings of less than two hours or more than two hours and two minutes usually indicate that the tracking voltage is off. This misadjustment is often found in machines that are transported frequently.

PG adjustment. The head drum phase generator (PG) signal is used to set the recording start point for each track. If it is misadjusted, the tracks will not properly align on the tape. This misadjustment may cause slow start-ID location and other problems. This signal is also called delayed PG signal (DPG) or switch head timing (SWH). Although a special PG alignment tape is required to make this adjustment, it only needs to be done when the head drum is replaced.

ATF gain. The automatic track-finding (ATF) circuit controls the capstan speed in order to match the tape speed to the heads so that they accurately trace each track during playback. The ATF is recorded near the beginning and the end of each track, and its level is set using a level or ATF gain test tape.

RF record level. This sets the RF module's record level to yield a signal that will provide the correct playback level. Some manufacturers recommend that you do not adjust this level.

RF playback EQ. This adjusts the RF envelope's high-frequency playback level. It has a drastic effect on the number of errors detected during playback, and is typically adjusted to yield the lowest error count.

VCO free-run adjustment. A PLL circuit is normally used to generate the playback data clock. Its free-running frequency must be accurately adjusted by using either a frequency counter or an audio playback test tape.

A/D or D/A offset or balance. This compensates for circuit aging in the A/D and D/A converters, and minimizes low-level audio distortion. Although some manufacturers recommend using a distortion analyzer, other manufacturers recommend using an analog input 1kHz sine wave and setting its level to just above the noise floor. To optimize this adjustment, observe the output waveform on an oscilloscope.

Next month, we'll look at troubleshooting a DAT deck by symptom analysis.
HDTV REDEFINES LENS PERFORMANCE

HDTV has probably done more to advance the state of broadcast lens technology than any other breakthrough. Many achievements are already being transferred to today's broadcast lenses.

HDTV lenses must be optically, mechanically, and electrically superior in every way. They must have the highest obtainable resolution and dynamic range, and flare must be reduced to unprecedented levels. Maximum aperture and light transmission must be high, and coma, field curvature, shading, and distortion must be extremely low.

All this must be achieved in a small, lightweight package familiar in feel to both cine and video camera operators. The need for such high performance often requires a fresh approach to solving a familiar problem such as chromatic aberration, with the use of new materials and highly refined versions of existing ones.

Compounds such as crystalline fluorite are being used to produce HDTV lens elements with low dispersion and a very high refractive index. New lens coating methods are employed that reduce flare more completely than ever.

The Floating Group
Control of chromatic aberration, distortion, field curvature, and shading is also much more difficult in HDTV lenses, especially those with large zoom ratios. To satisfy the stringent requirements in each of these areas, Fujinon developed a lens assembly called a “floating group” that provides real-time error compensation.

The floating group is a motorized lens system mounted behind the iris of the lens. The microprocessor-controlled system monitors zoom, focus, and iris position. The data is compared with stored values of field curvature, registration, and shading, and instructions are sent to the camera where corrections are made. The floating group method also delivers a dramatic reduction in lens size and weight.

Fujinon is a pioneer in HDTV lens technology and is committed to the development of next-generation broadcast equipment, as well as to continuing support for all its products, no matter how many years they have been in service.

For more information about HDTV lenses or any of Fujinon's broadcast products, contact Fujinon at (201) 633-5600, or write Fujinon, 10 High Point Dr., Wayne, New Jersey 07470.
Management for engineers

Time management
Organizing your paperwork

By Judith E.A. Perkinson

If you ask any 10 people in administrative or supervisory positions in American corporations how they feel about paperwork, at least eight of them will say they hate it. Even so, most of us are required to spend a great deal of time doing paperwork.

We all know people who are drowning in a sea of paperwork. On the other hand, we also know people who always know where everything is. The difference between these two kinds of people is not the quantity of paperwork they handle or the amount of outside work they do. Usually, the difference can be traced to their paperwork management strategies and tools.

All paperwork organizational tools fall into one of two categories: tools for catching up with your paper flow and tools for keeping up with it.

Catching up with your paper flow

It does no good to bemoan the fact that you have let yourself get so far behind. This will not get your work done. The following three steps will help you get your paperwork under control.

Step 1. The first step in catching up with your paperwork is to make a solid commitment to do it. Don't promise, commit.

Step 2. The second step is to select a paper management system you think you can use. Try out a system on a small scale first before converting your entire paper-handling system to it. After all, if the system doesn't work in one area, it would be a waste of time to completely reorganize your office to accommodate it.

Step 3. The third step is the most difficult. You must set aside a regular block of time to do your paperwork. This block of time should lie outside of your normal work routine so you will not be interrupted or tempted to do other work activities. Of course, the amount of time it will take to catch up is directly related to how far behind you are.

But sometimes your ability to dedicate this time depends on retraining yourself and the people around you. In order to get your work done, you must send the message that you are not to be disturbed. To do this, close your door, transfer your calls and do not entertain interruptions. If you are interrupted, try to schedule a time later in the day to discuss the matter at hand.

Most of all, don't feel guilty. Many people in technical areas feel that paperwork is not productive. But paperwork is work. Not only is it productive, it is essential. If you take it seriously, so will the people around you.

The most important factor in paperwork management is an effective system.

Keeping up with your paper flow

You must have two items in order to keep up with your paper flow: a paperwork organizational system and dedicated time for paper processing. Your paperwork management system must be well planned if it is to work. Once you have a system that works for you, the time you spend maintaining the system will become less and less. The key is to use the system that works for you.

Paperwork organizational system

Of course, the most important factor in paperwork management is an effective system. You must have a place to store and access paper that is generated by or comes into your office.

Two of the most effective systems are folders and 3-ring binders, or using a combination of the two.

Folders. Folders are easy to create, label, carry and store. Their only drawback, however, is their size. Once a folder becomes too full, it looks sloppy, and it becomes difficult to find specific information. So when your folder is thicker than a half-inch, divide it.

Three-ring binders. Begin a particular subject or project in a file folder and progress to a 3-ring binder when it becomes apparent that the subject will be an ongoing effort. Like file folders, binder management has a few guiderules.

- Start a subject or project in a 1½-inch binder.
- Ongoing projects often require a 2-inch binder.
- Three-inch binders are difficult to carry, but are serviceable for reports and historic files.
- All binders need subject dividers because they help you sort and find material. Common divisions include notes, correspondence, research material, reports and contracts or proposals.

Management by piles

Some of you may never stop making piles of paper. If this is the case, learn to manage your paperwork stacks. You should have two distinct piles.

"Don't ignore" pile. This pile contains items that you must respond to quickly. Promise yourself that every piece of paper in this pile will be acted on within 48 hours without exception. In this way, you will avoid a great deal of trouble and will not miss deadlines. In addition, you will be more organized even if your office doesn't show it.

"All the rest of the stuff" pile. You can let everything else pile up as you are currently doing. However, you will be more organized if you divide your piles into subject groupings. This will help you find certain papers when you need them and make organizing your files easier if you ever decide to organize them.

Management, not magic

Because your paperwork will never go away, organizing it is an essential element in your management success. These organizational strategies and tools can be your life boat if you are drowning in a sea of paperwork.

Next month, I'll introduce you to the dreaded "time thieves." Sometimes we waste time, but other times we have our time taken away from us. Learn how to foil the time thieves.
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Prices start at just $5,950. Models with freeze frame, digital effects, and RGB are priced accordingly. As with all Prime Image products, the HR600+ carries our full 3 year warranty and features the high-quality design, manufacturing, and proven reliability that are making our TBCs the standard, worldwide.

Call or write today for more information.
More people and more buying power made this year's show in Vegas a better deal.

Putting the 1991 NAB Convention into perspective this year was easy. First, the show returned to Las Vegas, which has been home to many successful NAB shows. Second, attendance was good, and third, people were actually buying equipment.

Although many exhibitors expected the convention to be slow and not well attended, that wasn't the case. Every exhibitor I talked to was pleased with the action on the floor. Many exhibitors also expected the show to be less than successful, because broadcast hardware sales have been down and stations have kept equipment purchases to a minimum. Nevertheless, attendees had their checkbooks out and were buying or planning purchases as they toured the convention floor. Needless to say, that brought smiles to many of the exhibitors’ faces.

Key technologies that were exhibited included digital RF products, STLs, FM exciters and solid-state transmitters. "More for less" described what video vendors were providing. The ever-increasing cost of improved video capability seems to have slowed. Now, manufacturers are concentrating on providing enhanced capability at prices that used to buy fewer features.

Hard disk storage for audio was the norm, not the exception, as in previous years. Automation held center stage for television as broadcasters continued to look for more economical ways to operate their facilities.

Part of these improvements are based on more sophisticated semiconductors. Just as important is the realization that pockets aren’t as deep as they used to be. Challenges from personal computer-based equipment have forced vendors to push the limits of technical capability while still maintaining competitive prices.

Future technology
The engineering sessions were full of future technology. Digital was the operative term for audio and video. Attendees viewed HDTV, DAB and just about every other type of improved signal capability that has been invented.

The NHK exhibit was a treat for many attendees. It provided a look into the future (at least as the Japanese view it). A variety of companies exhibited equipment and designs that are still years away from sales. The exhibits weren’t designed to show products (hardware that could be bought), but working ideas and concepts. A short tour of the exhibit provided an advance look at what we’ll be buying in only a few years time.

The battle of HDTV proponents continued. It’s still not clear who’s ahead in this arena. Despite the FCC’s decision to first select an HDTV standard, there appears to be growing interest in some form of “enhanced or improved” TV broadcast system. Even PBS entered the fray by recently announcing the production of three of its programs using the SuperNTSC system.

It’s unfortunate if you missed the show. However, you hold in your hands the second-best thing to being there — a thorough review of products and technology of the 1991 NAB Convention. So read on and see what lies around the corner for your facility.

Brad Dick, editor
If you think there's no difference monitors, we have a few possibilities.

Wouldn't it be great to have a TV station monitor that could help you detect problems in your other equipment. A monitor with SMPTE C phosphors to prevent color inconsistency between monitors. And over 600 lines of horizontal resolution to eliminate fuzzy details.

Of course, it would be really great if it had a beam current feedback system to stop color drift. And a broadcast CRT with an aperture grille designed to handle higher brightness without warping or doming—while maintaining color purity and uniformity. And if it had a flatter screen to provide you with a truer perspective and an auto set up system to let you avoid tweaking, that would be ideal.

Well, that's the right word for Sony's BVM-1915. It was specifically designed to meet the broadcast industry's tough standards for precise color reproduction and reliability.

If you're using anything else, your idea of what a TV station monitor can do for you may be a bit cloudy.

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BUSINESS AND PROFESSIONAL GROUP
A thumbnail sketch of the annual industry ritual.

By Skip Pizzi, technical editor

Broadcasting in transition. This could easily have been the theme for NAB '91, as the many changes that the industry is undergoing were manifested on the show floor and in meeting rooms throughout Las Vegas. The changes that the Las Vegas Convention Center has undergone and is suffering through since NAB's last visit in 1989 made an appropriate venue for these new industry directions. A summary of these directions is presented here.

One world, many voices

Overall attendance was slightly up from last year's show in Atlanta. A significant 40% rise occurred in international attendance, with foreign attendees and exhibitors present at the convention, which was a welcome trend for the show and the industry. Many of the foreign exhibitors and attendees were at the show for the first time.

Engineering sessions began with an appropriate look back, before jumping into the more than 100 papers and presentations. Larry Cervon, past president of Broadcast Electronics, was presented with a special citation for his career of service to the broadcast industry by the NAB. He delivered a tribute of his own to some of the broadcast industry's most notable engineering pioneers, presenting their recorded voices on tape (cartridges, of course) culled from interviews he had conducted with them over the years. Among those heard from were Hilmer Swanson, Parker Gates, George Brown, George Marti, Jack Moseley, Carl Smith and Art Collins.

Trends in radio

This year, there seemed to be more new developments on the audio side than on the video side. Primary among them were the following:

- New DAT applications: DAT seems to have at last achieved a comfortable identity as a professional format. Its maturity was in evidence with a few new applications and enhancements, including a multichannel DAT logger, time-code-equipped DAT editing systems, faster search speeds and slower record speeds on standard DAT recorders, confidence replay features, error counters and expanded computer interfacing and control capabilities.

- DAT time code comes in "A-code" (formerly known as "Absolute Time," offered on some earlier decks) and "R-code." The former is a 1-second resolution, subcoded timing track available on most new machines, including low-end models, while the latter is a frame-accurate, SMPTE-emulating subcode suitable for video-style editing and synchronization.

- Faster search speeds allow any point on a 2-hour DAT tape to be located in under 30 seconds, and a slower record speed allows up to 4 hours to be recorded with 12-bit resolution and 32kHz sampling, at last implementing a portion of the original DAT standard that had yet to see its way to hardware. (The industry still awaits implementation of that standard's 12-bit/32kHz 4-channel option. Maybe next year....)

- The appearance of 4-digit LED error counters on DAT hardware may assuage the last of the format's critics. It provides an empirical way to observe tape aging, head wear and other gradually occurring problems that would otherwise be masked by error correction.

- Digital FM audio chain: Incremental progress toward a fully digitized path from audio source to transmitter took a big step forward, as several digital broadcast audio processors, a digital 950MHz STL (more on this later) and the first digital FM exciter were introduced. Most include AES/EBU and S/PDIF digital I/O along with analog connections, allowing the digital domain of the pathway to continue to extend its reach.

However, it also brought up the issue of compatibility in the digital RF domain. As elsewhere, there is a need to avoid unnecessary reconversions to analog just to pass between boxes. Digital audio standards avoid that between audio products, but now that three sequential digital RF-domain devices exist (stereo generator, STL and exciter), should an industry standard digital FM composite be established?

Or, as one manufacturer suggested, perhaps the structure of the audio chain should be reconsidered, with baseband generation and first RF stage combined (the current functions of the stereo generator and the exciter). In this way, an AES/EBU digital audio signal can be delivered from the digital audio processor or STL receiver to the digital audio input of the "transmitter," which would incorporate the function of the stereo generator internally, and eliminate the shipping about of composite RF signals in either digital or analog form.

Another interesting point in this area was the consideration of where broadcast audio processing should take place i.e. a data-compressed air chain. Because data compression algorithms take advantage of the masking phenomena of human hearing, some manufacturers maintained that no further significant alteration of the audio should take place after data compr...
Sometimes you get further ahead by not re-inventing the wheel. For proof, take a look at our high-efficiency UM Series UHF transmitters. Their evolutionary MSDC klystrons can cut your power costs in half. Without compromising 24-hour-a-day, 365-day-per-year reliability.

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The trend that has been percolating on the TV station side has also invaded radio. PC-based automation systems are appearing for radio station master control, production and newsroom operations. These systems control a wide variety of conventional hardware, and, in many cases, play back program audio from internal hard drives. They can interface with each other via LAN, and interact with PC-based traffic/logging software. Most are designed to work in a variety of applications from full local automation to live-assist operation to integrating with satellite-delivered programming. Some earlier systems are improving in their second generation, and a modular, transitional "master plan" approach to implementation of stationwide automation has become evident.

Trends in television

Although there was no lack of interest in TV technologies at this year's show, the TV side seemed to exhibit a little more of the industry's current difficulties, with greater cost-effectiveness being a widely repeated pitch. Many exhibitors entered the show with doubts about the attendees' interest in purchasing. Fortunately, buying new hardware seemed to be on the mind of just about everyone. For video, the hardware theme seemed to be on refinements rather than revolutionary introductions.

- **Wideband systems**: Movement in the direction of some kind of higher-definition TV format continued, with switches and other video pathways of 30MHz and higher bandwidths being widely advocated for any new facility designs or hardware purchases.

- **Transmission improvements**: Increm-
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tal improvements in transmitter efficiencies, primarily in the UHF domain, continued with a growing trend toward solid-state. Digital transmission was also discussed theoretically, and a bit more was heard about ghost-canceling techniques.

Stripline technology for high-power transmission lines was presented as a viable option, providing simplicity, reliability and convenience over conventional coaxial designs.

- Stereo TV audio: The growing popularity of stereo and especially surround broadcasts via MTS have created an increased need for flexible TV audio mixing consoles. Some significant answers were presented at the show, along with an overall heightened awareness of TV sound quality, from microphones through VCRs. New test equipment and software specifically designed for the BTSC format was also introduced.

- Integrated automation: Some further steps were taken at this year's show toward reaching the goal of fully integrated TV station automation. Although once considered unattainable and utopian as Einstein's general theory, modular and flexible approaches were presented from several different quarters, making believers out of some former skeptics. The dangling carrot of lower operating expense has significant allure for TV managers, and manufacturers made their awareness of this fact quite clear. Customized support and building of phased-in systems to maximize use of present station equipment were key features in most presentations.

- Digital effects: The trend this year is toward improved cost-effectiveness. New low-cost, feature-laden and versatile devices were highlighted. Emphasis was not so much on what they could do, but on how much they could do for so little. Vendors introduced several products aimed at easing the sticker shock associated with the purchase of digital video systems. Low-priced starter packages abounded, as did systems with an integrated theme.

- Digital video: Most discussion centered on transition from analog and component vs. composite. A composite digital format using 1/2-inch tape was introduced. Again, cost-effectiveness and flexibility were often stressed. Digital video compression was also a hot topic for satellite and terrestrial distribution, along with some early discussion of digital TV broadcasting, where the BBC seems to have the lead.

- The ubiquitous PC: TV equipment manufacturers seem ever more willing to surrender control to a user's PC. RS-232 ports have become a standard feature on most new hardware. The use of a standard, low-cost platform for user interface saves manufacturers from having to continuously reinvent the wheel, and provides the user with high value and consistency. Personnel who are not yet computer-literate had better get up to speed.

- Interactive television: A relatively new area of interest involved the subject of over-the-air viewer-response interactivity in television. Various technologies and commercial and non-commercial applications were presented.

Digital radio broadcasting No less than eight different digital radio broadcasting (DRB) "formats" were discussed, although only two were publicly demonstrated. The other six exist to date only in theory, and that too is in varying forms of completion among those propo-
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With analog systems, color correction used to be limited to adjustments at the point of origination. Colorado changes all by giving you the power to execute perfect color matching in post production. Because Colorado is digital, you can make all the modifications you want without any loss of picture quality.

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Colorado takes you beyond color correction, giving you the power to accentuate, modify and sculpt the exact image you want at any point during post production. Image quality will never be sacrificed. With Colorado, color becomes a new and powerful dimension of your creativity. Colorado. It's the new state of perfect creative control.
International and Corporate Computer Systems. The Eureka system requires new spectrum, and places several stations' signal on the same carrier. Acorn DAB is the first of the so-called "in-band" systems (using existing broadcast spectrum) to be brought to hardware form.

Eureka 147/DAB was demonstrated in a multi-channel audio and data transmission, receivable at the Eureka booth and on a 40-passenger bus equipped with headphones and a live operator acting as tour guide.

The Eureka system transmitter (using UHF TV channel 15) and a 30W FM transmitter (on 94.5MHz) used for comparison purposes were located on the roof of the Las Vegas Hilton. Unlike previous Eureka/FM comparisons, the Eureka carrier's power was equal to the FM carrier's on a per stereo channel basis. Therefore, the Eureka carrier's nine slots — eight stereo audio plus one data — were broadcast with a 270W ERP. (The carriers were also in different bands, with the Eureka system's higher frequency of operation rendering it more subject to air loss.) FM multipath effects were observed in the downtown area of Las Vegas, and the Eureka signal was shown to be impervious to them. A time-domain oscilloscope display was distributed on video monitors throughout the bus, showing the direct and reflected signals arriving at the mobile receiver's antenna. A 1W Eureka "gap-filler" on-channel repeater (on the roof of the Golden Nugget Hotel) was included in the demonstration, and its signal was also seen on the display as the bus approached it. No detectable switching or dropouts were heard as the receiver moved from the main transmitter to the gap-filler.

The buses reportedly ran 75% of capacity on average, meaning approximately 3,000 people heard the demonstration. Although most of the riders were impressed with the system's performance, some expressed disappointment that the frequency used by the Eureka system in Britain (476-482MHz) was considerably lower than the L-band (1.5GHz) currently favored for its implementation in the United States. Many listeners also reported that the difference between the AM and FM signals was far more noticeable than the difference between FM and Eureka 147, with the exception of Eureka's elimination of multipath.

An ancillary item that garnered attention at the Eureka booth was a prototype multipath simulation system from a well-known European radio manufacturer.

Acorn DAB's demonstration was limited to a booth in which listeners could hear a digital and an FM signal occupying the same modulated channel, using working prototype equipment. In fact, at the current state of progress, the two signals were not actually centered on the same frequency, but rather on adjacent FM channels (although the digital signal's lower modulated level placed it within the RF mask of the FM signal). SRI's "frequency reuse module," designed to allow actual common-centering of the two RF signals, is still under development. Also yet to be achieved is the system's target of recovering the digital signal from 40dB below the FM carrier level, currently at 37dB. These and other code refinements remain to be implemented, but the system has been in development for less than a year. USA Digital Radio plans a full mobile demonstration of the completed Acorn DAB system at the Radio '91 Convention in San Francisco this September.

Other formats previously introduced and reported on at this year's conference included those from Stanford Telecom (the system included in Satellite CD Radio's proposal, also requiring new spectrum) and Kintel Technologies (Power Multiplexing, the "original" in-band system). New DBR concepts making their first NAB appearance — all are terrestrial in-band systems — were those from Mercury Digital Communications (the Multi-Frequency Modulation or MMF system), American Digital Radio (the ADR system), Synetcom Digital (the Digital FMAS system) and a presently unnamed format from LinCom Corporation. (An in-depth analysis of all the DBR proposals will appear in the July issue.)

HDTV World

New this year was a complete parallel event, with its own exhibits and sessions, called HDTV World '91. The exhibits were more convention-like and less "gee-whiz" than in previous years, as the industry gears up for serious business — at least on the production side. ATV broadcast format proponents were also on hand, reflected by presentations from the United States and abroad, and updates on format testing from the Advanced Television Test Center (ATTC) and others. Audio for HDTV systems was discussed, primarily in the context of data-compressed digital systems of more than two channels.

Interest in the transition process to HDTV was understandably high, and concerns about cost seemed paramount. The screening of several inspiring HDTV productions from around the world seemed to rededicate some of the skeptics toward the establishment of advanced TV systems, but more questions than answers remained in this regard.

Some intriguing broadcast and non-point-to-point delivery technologies were.

Although some progress was shown, it seemed to feel that exciting — is still several reality in the U.S. broadcast

A new addition to the the NHK Technology Ex- got a glimpse into the world of DAB, with more than two strations of high-tech works, presented in a World's Fair or-of-the-future style. Among these were portable flat-panel smart a for DBS, tiny HDTV cameras, 3-D advances in recording and transmission, and a digital player-piano (other musical instrument) that performs music live in the listener's home control signals received off-air, along with an accompanying video of the actual performer (playing the "master" instruction-generating instrument) in sync.

Dolby speaks

Ray Dolby delivered the keynote address at the Engineering luncheon, and talked about ergonomics. He provided worth-while wisdom, exhorting engineers to consider the needs and wishes of consumers when designing new services and hard-ware. Dolby pointed out that his own choice of a new car came down to the one in which he could most easily read the dashboard markings, and that his son's recent choice of a cassette player had been based purely on his requirement for a music search function. (Dolby's ironic query of, "What about signal-to-noise ratio?" drew only an apathetic shrug from the boy, he recalled.)

Dolby also referred to ergonomic criteria in the determination of new broadcast services. Calling FM multipath an ergo- nomic problem, he advocated any digital radio solution that would eliminate the distortion multipath causes. He ascribed a higher priority to such a radio service than to any higher-definition TV system, based on his assessment of overall audience desires.

Although such clarity was not always in evidence at NAB '91, these remarks reminded attendees that the real bottom line in the industry is serving the public interest, need and necessity. Whatever changes the broadcast world may under- go, maintaining that tenet as an ultimate touchstone is always good advice.
"During prime time last night, our viewer base increased 300% at 317 Elm St. ..."

"...and in thousands of other homes where our signal quality had been poor. Recently, we installed a new Andrew TRASAR® antenna. We know that plenty of homes are wired for cable, but usually only one set in each home. Our advertisers are buying the potential of reaching everyone in the house — Mom, Dad, and the kids. Because of the Andrew Trasar's circular polarization, we believe that we can more easily reach those second, third and fourth sets, plus all the non-cable homes in our coverage area.

"Today, we face more diverse competition than ever before. Every additional set we can reach is part of our competitive edge. Upgrading our broadcast signal is an investment in our future that's paying off today."

TRASAR® VHF
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Broadcasting Quality You Can See.

John Dornan
President and General Manager
WDRB-TV
Louisville, Kentucky
How do you obtain high quality and performance with today's tight budgets? Where do you get a video system that can deliver top quality video from acquisition to master tape? How do you reduce the appetite for archive and machine real estate? And what system do you choose for compatibility with other machines already in the mix?

Panasonic's answer is the lower-cost, high quality 1/2-inch videotape recording system, a family of recorders priced like 3/4-inch, but with performance and quality more like one-inch. With cassettes nearly 50% smaller than 3/4-inch (and providing up to 50% more recording time), Panasonic's MII not only provides much more flexibility in the field; it takes up far less archival real estate. Matsushita's engineering and VLSI technologies combine to make a new series of recorders that work smarter, fit better, and cost less than comparable systems.

**FIELD ACQUISITION SYSTEMS**

If you're thinking 3/4-inch systems for the field, think again. You can compare 3/4-inch to the MII for price, but you can't compare the quality, features or performance. And, you simply can't get a 3/4-inch camera/recorder.

The AU-410 Dockable Recorder mates to virtually any video camera designed for camcorder operation. Now, your favorite camera can make pictures with quality that rivals that of one-inch VTRs. The AU-520 Field Recorder provides all the high-end production features required in the real world, and, unlike 3/4-inch, offers full 90-minute video cassette record capability in the field.
STUDIO AND POST PRODUCTION SYSTEMS

Don't let the low prices of these studio production VTRs fool you. All use full bandwidth video and an advanced analog component CTCM video signal system for video excellence, generation after generation.

Each recorder has digital time base correction built-in, and advanced VLSI techniques have cut the total PC board area by 40 percent, power consumption by 40 percent, and system weight by 20 percent.

Want the machine to wake-up in a specific mode? A non-volatile memory and on-screen menus allow you to program each machine's operating personality to suit yours: shuttle knob speed, machine status and time code displays, machine address, ballistics emulation (C, Beta, MIL, SMPTE time code* or CTL, pause-to-standby characteristics, etc.) or revert to the factory default settings with one touch.

To ensure reliability, all these MII machines feature self-cleaning heads, a drum motor confidence check during edits, a modular power supply, plus a Super Dropout Compensation* (SDOC) system, which corrects for up to one field.

For systems compatibility with almost any mix of VTRs in use today, each of the MII production VTRs includes a 9-pin RS-422A serial/parallel input via an optional interface board.

AU-63 Studio Player with AT Auto Tracking for superior slow-motion is the perfect companion for an AU-65-based suite.

AU-62 Studio Player, the ultimate in low-cost, high performance utility players.

AU-65 Studio VTR, the perfect editing platform for sourcing from MII or other formats.

AU-65 Studio VTR, the perfect editing platform for sourcing from MII or other formats.

AU-7750 S-VHS Recorder with Y/C 3:1:8 component I/O, time code, RS-422A and digital TBC assures maximum quality dubbing to and from S-VHS.

AG-7750 S-VHS Recorder with Y/C 3:1:8 component I/O, time code, RS-422A and digital TBC assures maximum quality dubbing to and from S-VHS.

Leveling using the system's Y/C in/out for dubbing to or from S-VHS. The AU-62 Studio Player is the ideal utility machine for high quality, low-cost video playback. The AU-65 Studio VTR is the perfect editing platform with 1-event assemble and insert editing for video and audio.

Variable memory editing makes the AU-65 incomparable for slow-motion inserts. The AU-63 Studio Player with AT Auto Tracking is the perfect companion for an AU-65-based suite or wherever the best in variable speed performance is important.

Panasonic's MII is a standing invitation to every producer to step up to the world of full bandwidth video. Now, the question becomes, "Can you afford to pay more for less?" That's a question only you can answer.

Panasonic
One Panasonic Way, Secaucus, NJ 07094
For more information call: 1-800-524-0864

Circle (20) on Reply Card
www.americanradiohistory.com
BE's panel of independent experts share their favorite new products from NAB '91.

By Rick Lehtinen and Skip Pizzi, technical editors.

Occasionally, there are a few new products that stand out among the rest — new ideas that deserve special attention. To highlight these products in a fair and unbiased fashion, BE convenes a Pick Hits committee each year. This committee is a group of industry experts who prowl the aisles of NAB, scouting out what is new. This year, we asked the Pick Hits committee to shop around as they normally would, and to take good notes. Near the end of the show, we pried them from their orange juice and doughnuts, and asked them to develop lists of what they found most interesting. BE merely provided a forum; the judges did the nominating and voting.

This year's list contains 10 new products for radio and 10 for television. The judges felt these products would have a positive impact on this industry. We present the list in alphabetical order.

Radio Pick Hits

Belar: The Wizard FM modulation monitor

The Wizard is a 1-rack-unit FM digital modulation monitor capable of displaying parameters on its 16-character alphanumeric window, a PC graphic display via RS-232 or on an off-site PC via modem. Display is in either real or past time, with variable peak hold time and peak indication/alarm. Measurement of SCA injection and pilot injection/modulation is provided, plus an adjustable loss-of-program alarm. Peak weighting time constants may be set from 100µs to 2ms, and two level-adjusting loop-throughs are available for remote control of modulation levels. Displays include infinite or sliding window histograms, and a peaks-per-quarter-hour window that can be saved to disk. Three levels of password protection are included, and external alarms can be accepted and displayed.

Broadcast Electronics: CORE 2000 automation controller

This PC-based program automation controller features a user-friendly interface, employing English-language programming (song titles and spot names) rather than event numbers. The CORE 2000 can manage up to 36 sources, handling all conventional machine control interfaces, plus parallel- and serial/IR-controlled devices. It also allows for future control protocol updates. The controller also switches and provides VCA level control to all audio sources. It can operate in a live-assist mode, a semi-automated mode (part live-assist, part automated), a satellite mode or a fully automated mode. The system's memory is limited only by the size of its hard disk. Insertions and deletions are accommodated without reprogramming, and logs can be recalled from the hard disk for printing or on-screen review.

Eventide: VR240 DAT logger

More than 180 track hours of 3.5kHz audio can be recorded on a single 120-minute DAT cassette with this digital audio logger system. The VR240 is capable of monitoring up to 24 channels. From 7.5 hours of 24 channels to more than one week of mono audio can be recorded on each cassette. An optional second transport doubles unattended recording time. Silent periods on any channel are not recorded, ensuring that capacity is fully used. Channel I/Os are on telco-type 50-pin sockets. Monitor outputs include an internal speaker and 1/4-inch jacks for headphone and line outs, selectable to any combination of channels. An optional label printer prints start and stop times for cassettes. Recorded time/date data allows quick location for playback.
PANASONIC TAKES M.A.R.C. INTO THE DIGITAL AGE.

Panasonic won an Emmy for the M.A.R.C. Cassette Library System, but that didn’t keep us from improving it.

Panasonic’s M.A.R.C. now has:

- A multi-user, multi-tasking operating system (Santa Cruz Operation SCO Xenix);
- A new multi-user Data Base Management System (Informix);
- An interconnected Cassette Dub Station for quick and easy spot dubbing and program screening;
- Multi-element cassettes allowing program playback and multiple spots per tape with no change in software;
- Up to seven remote terminals to access M.A.R.C. application software via an Ethernet TCP/IP LAN.

With the new Panasonic Half-Inch Composite Digital VTRs, M.A.R.C. gives today’s demanding broadcaster unequalled quality, performance and reliability at a fiscally responsible price.

Cassette interchange is assured—across the room or across the country. The digital system’s new 8-14 channel-coding format with its edit guardband breakthrough, solves the problem of guardbandless recording associated with D-2. Advanced error correction/concealment techniques, full field data shuffle and four individually editable audio channels add up to outstanding performance.

Find out what many broadcasters already know: 40,000 spots a day prove Panasonic’s M.A.R.C. a winner, and real winners keep on getting better.

Panasonic
One Panasonic Way, Secaucus, NJ 07094.
For more details call: 1-800-524-0864

Circle (21) on Reply Card
The PT10FM/Digital 50 combines a solid-state 10kW FM transmitter and a digital exciter. The transmitter is fully solid-state, using parallel, low-voltage, hot-replaceable power amplifier modules. Wideband design eliminates tuning requirements, and a user-friendly display allows easy status reading and operation. Tolerance of ambient extremes, high SWR and power-line anomalies, plus a positive-pressure cooling system and the use of regulated, non-switching dual power supplies enhance reliability. The 50W exciter is the first to use a numerically controlled oscillator (NCO) for direct digital synthesis of the FM baseband with 18-bit (0.6Hz) resolution. Channel-selectable in 10kHz increments without tuning, it exhibits high immunity to interference and microphonics, and requires no linearity correction.

Moseley: DSP 6000 digital STL system

Digital STL transmission is now possible in the aural STL band with the DSP 6000 codec system, designed to mate with Moseley STL radios. Using APT x-100 data compression, it provides CD-quality stereo audio plus auxiliary channels in 500kHz bandwidth or less, with only 3.8ms delay. A 32kHz sampling rate is used, and a bit error rate of >10^-4 without loss of quality is quoted. Up to four program channels (AES/EBU digital I/O available) and two data channels can be accommodated. An optional digital stereo generator in the decoder delivers composite to an FM exciter. The system requires 25dB less gain than an analog STL, allowing reduction in antenna size. Received dynamic range remains at >90dB, regardless of CNR, down to the digital threshold.

Northeastern Communications Products: DRYGEN transmission line dryer

In lieu of gas cylinders, the DRYGEN system extracts nitrogen from room air to develop an inexhaustible supply to pressurize transmission lines. In addition to continuously supporting leaky lines, the delivery of N2 gas instead of desiccated air allows transmission lines to run at their maximum ratings. This is because of nitrogen's higher dielectric strength and dew point-lowering ability compared to dry air in most applications. Nitrogen also eliminates oxidation, so O-rings and connecting bolts will have extended lifespans. The risk of flashover fire is reduced because N2 is non-flammable. A passive permeation membrane separates naturally occurring nitrogen from the air by osmosis, with a compressor being the system's only moving part. No chemicals are used.

Orban: Optimod-FM 8200 audio processor

The Optimod-FM 8200 digital audio processor uses up to 12 Motorola DSP56001 chips in a structure that allows it to completely reconfigure itself in milliseconds. It can variably emulate a wideband limiter, a 2-band processor or an aggressive multiband device. Analog or AES/EBU I/Os are provided, along with two composite outputs from the built-in (analog) stereo generator. A real time clock allows automatic daypart processing, and programmable passwords provide security. Display and control are via a front-panel LCD screen with five softkeys, or — with optional software — on a remote PC. Thirty-two or 48kHz sampling frequencies are available. Up to 32 user presets may be stored, and special test tones and presets aid in alignment and proofs.

Pacific Recorders & Engineering: Productionmixer

Blending high-quality with increased cost-effectiveness, the Productionmixer provides advanced production capabilities in an ergonomic design. Up to 28 inputs (mic, stereo-line or multitrack I/O), and two program, one mono, two stereo send and two mix-minus outputs are supplied. Telephone recording is flexibly accommodated with a variety of special features. Input modules offer balanced insert points, dual input selection, 5-band parametric EQ, pre/post-fader send switching, pan and positional solo. Mic inputs include phantom power. Up to six remote machine controls can be fitted. A digital clock (ESE-slaveable) and event timer are included, as are stereo cue speakers and comprehensive control room and studio monitoring. Up to 30dB of headroom is quoted, with transformerless design.

Continued on page 42
1:45 Wednesday, having fun.
Your client cracks you up.
One hour into the session he
laughs, takes another bite of apple,
says..."this looks better than
the piece we did last week.
What's changed?"

You could tell him the only change
is your new Abekas A82 composite
digital switcher—its speed, digital
keyers, status monitor, digital
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and lots more.
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TV Pick Hits

Abekas: A51 digital effects system

True 3-D special effects at a conservative price are provided by the A51 effects system. The system does 3-D perspectives, translations and rotations about any axis. A 3-D corner pinning feature allows special effects in which a portion of video must follow certain actions within the frame. Effects are programmable to take various times to execute.

A powerful option is WARP. This allows users to bend and curve images into cylinders, circles, ellipses, twists, zigzags, bursts and flares, among others. The target framestore option enables trails, sparkles, smears, reveals and composites.

The full-bandwidth key channel enables users to manipulate key signals simultaneously with the input video. A light-source option allows users to include a range of spotlighting and gleams.

Avid Technology: 200-series Media Composer

The 200 series non-linear editing system takes advantage of the Macintosh platform and JPEG compression. System users work visually, moving pictures and sounds between storage bins with a mouse. The system records and plays on reusable phase-change optical disks. Up to two hours of video and audio is available per disc, with up to 12 hours instantly accessible per system.

JPEG compression gives editors image clarity greater than VHS tape. An audio waveform display system aids audio editing. Users can create graphics using various Macintosh application programs. After developing a sequence of images and sounds that meets their needs, users either create an edit decision list or render out true video output using the system's print-to-tape feature.

Magni: Magni Monitor

The Magni Monitor is a compact monitoring solution that eliminates the CRT. The base unit digitally samples the input video and produces a video signal that can be displayed on any standard picture monitor. Users can adjust the displays to their choice of color. Furthermore, users can program alarm limits that change the color of portions of the display that are out of parameter.

The system operates in NTSC, PAL or component analog modes (GBR, M-11, Betacam and SMPTE). Both waveform and vector monitoring versions are available. The vector version includes an SC/H display. The waveform version includes an interchannel timing feature. The remote unit attaches to the base by telephone jack or BNC connections. An optional LCD display is also available.

Digital F/X: Video F/X system

Supporting all popular tape formats, the Video F/X production system runs on any Macintosh II configured with 8Mb of RAM and at least a 200Mb hard drive (600Mb recommended). Editing facilities include logging, scripting and storyboarding. The system can make split audio edits and preview audio and video edits. The system also supports video mixing, fades and keying.

The system chassis contains the video and audio mixers and the tape machine control system. The 32-bit color frame buffer card provides the anti-aliased titles and graphics and performs keying functions. The system comes configured for one source and one record VTR. All ca-
"Why I'm Sold on the Odetics Cart Machine"

"We're an independent/Fox station, so we air lots of promotional spots in addition to the usual commercials. In all, that amounts to around 1,000 spots every day. We used to manually load everything. With so many spots being scheduled, incorrect numbers were bound to crop up. And numbers were sometimes mis-read in master control. Wrong commercials were being aired.

Now playlists are generated by our traffic computer, downloaded to the Cart Machine, and never touched by human hands. That's saved a lot of on-air spots for us. And that's what has absolutely sold us on the Odetics TCS2000.

My own job has sure been easier since the machine was installed. I'm seeing more efficient organization in master control. I don't worry anymore about losing material on air. And our master control engineers don't spend so much time handling carts now. We're able to take care of other engineering projects we never had time for before.

I've been happy with Odetics' service from the time we bought the machine. I particularly liked the way they shipped it in modules instead of sending the entire system pre-assembled. Two Odetics field service engineers put the modules together, installed software, and trained our operators. It was all done quickly and efficiently.

If you're thinking about buying a cart machine, feel free to give me a call at (206) 582-8613. I'll be happy to tell you personally what a difference the Odetics Cart Machine has made at KCPQ."

Larry Brandt, Chief Engineer
KCPQ-13 Seattle
You asked for it.

DTR-313 Time Code Reader /Generator
LTC Generator • VITC Generator • Wide Band LTC Reader
VITC Reader • Character inserter • Slave • Slave to time code in user bits
Auto Sync Sense SMPTE/EBU/655-24 • User bit manipulation • Color Frame
Full Front Panel Control • Serial Remote Control • Local Display
Upgradable • A.1 in one rack unit

GRAY built it.
Introducing the DTR-313. Eight fully upgradable standard configurations available. Custom configurations including component video available by special order. The DTR-313 is available NOW. Prices start at $285.00 list, including five-year parts and labor warranty.

The judges
BE wishes to thank the panel of well-known and respected experts who acted as Pick Hits judges this year. The judges were asked not to disclose their participation in Pick Hits during NAB. They are revealed here for the first time.

Television:
Karl Renwanz
Vice president, engineering and operations
WBHF-TV
Boston, MA
Doyle Thompson
Vice president, engineering
The Weather Channel
Atlanta, GA
Marvin Born
Director of engineering
WBNS-TV
Columbus, OH
Harry Goldberg
Chief engineer
WGRC
Stamford, CT

Radio:
John Battison
President
Battison and Associates
Loudenville, OH
John Huntley
Chief engineer
KCRW-FM
Santa Monica, CA
Christopher M. Durso
Chief engineer
KRES-FM
San Diego, CA
Margaret Bryant
Engineering manager
WMAQ
Chicago, IL
Marty Sacks
Chief engineer
WGAY/WWRC
Washington, DC

The rules
BE’s panel of judges followed these basic guidelines for the selection of Pick Hits products:

1. They must be new products not shown at a previous NAB. In cases where it is difficult to distinguish a new product from a modified old product, a new product is considered to be one with a new model number or designation.

2. They must have some positive impact on the everyday work of the user. The judges searched for equipment that would be used on a regular basis at a station. The equipment should provide a new solution to a common problem.

3. They must offer a substantial improvement in current technology. Although the equipment need not include unique circuit architecture, it should include some new ideas on applying current technology.

4. The product’s price must be within reach of the intended users. The judges sought products marketed to a wide spectrum of broadcasters.

5. The products must be available for purchase. Equipment must be displayed on the convention floor, be in (or nearly in) production and have delivery dates within the year. Products demonstrated in private showings do not qualify.
There's only one right choice. Yours.

Comark offers Klystrode-, ESC- and IOT-equipped UHF technology.

Why buy from a company that only sells vanilla when you can choose the flavor that suits you best? Now one company offers you the power of choice.

Comark, backed by the global resources of Thomson-CSF, offers the full range of leading-edge transmitter technologies—and the expertise to help you choose the one that will match your needs for power level, efficiency, specification compliance and reliability.

- **Klystrode**-equipped: Field-proven Klystrode air- or water-cooled transmitters have a simplified support system that needs no pulsers. Transmitters are available in stereo-compatible common amplification* or diplexed configurations. Output ranges from 10kW to 240kW.

- **IOT**-equipped: Inductive Output Tube transmitters are second-generation systems. Like their Klystrode cousins, water- and air-cooled transmitters are available in stereo-compatible common amplification* or diplexed configurations. Output ranges from 35kW to 240kW.

- **ESC**-equipped: Traditionally diplexed transmitters feature EEV Energy-Saving Collector (ESC) tube technology, which eliminates carbon coatings to promote long tube life. Available output ranges from 70kW to 280kW.

*All Comark common amplification transmitters contain a field-proven, patent-pending system that protects the stereo pilot frequency per FCC specification 73.682 (c)(3) and meets peak FM carrier deviation limitations.

With an ongoing commitment to innovation in TV transmission, only Comark has been recognized by the broadcast industry for outstanding engineering achievement in the development of advanced UHF technologies. So no matter what flavor you want, contact Comark at 800-688-3669.

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The scene resembled a movie. Blinding flashes of light from 1,000-pound bombs illuminated the city skyline against the black night. Red tracer shells from anti-aircraft cannon cut through the darkness, searching for unseen enemies. And somber news reporters recounted live the destruction they were witnessing.

Americans, sitting in front of their TV sets, watched the events in real time as the allied forces unleashed their massive power against the madman from Baghdad, Saddam Hussein. Although the images displayed on millions of televisions looked like a Hollywood movie, it wasn't. It was war.

Desert Shield
History has been full of military madmen. These men, such as Hitler, amassed military might under the guise of defense, and then used that power against their enemies or helpless bystanders. Such was the case with Saddam Hussein.

Despite his speeches, Hussein unleashed his battle-hardened army against the small country of Kuwait (approximately the size of New Jersey) on Aug. 2, 1990. The Iraq, 100,000-man army quickly crushed the ill-prepared Kuwaiti resistance. In a few hours, Iraqi had "annexed" an entire nation.

On Aug. 6, President Bush moved the first of more than 500,000 American troops into Saudi Arabia. These troops became the primary force in the operation known as Desert Shield. This force would ultimately involve more than 700,000 troops from 14 countries.

By late December, President Bush almost single-handedly pushed an ultimatum through the United Nations. The mandate ordered Hussein to get out of Kuwait by Jan. 15, or be prepared to suffer the consequences. Two days after the deadline, Bush delivered on his promise.
The video war
At 3 a.m. Jan. 17, 1991 (7 p.m. Jan. 16 in Washington), U.S. F-15 Eagles streaked across the night sky of Baghdad, dropping thousands of pounds of bombs on Iraqi military targets. Combined with Tomahawk cruise missiles and radar-evading F-117A Stealth fighters with laser-guided bombs, the destruction of Hussein's military empire began. More than 1,000 sorties were flown in the first 14 hours. These missions marked the beginning of the most powerful display of military might in history. Desert Shield had become Desert Storm. War had begun.

Prime time viewing
The reason the war had such an impact on the public was the fact that it began during prime time TV viewing. Baghdad is eight hours ahead of the U.S. Eastern time zone. When the war began in the middle of the night in Baghdad, it was early evening in the United States. Within an hour after the bombing began, American viewers huddled in front of their TV sets, watching in awe as the allied forces began to destroy Baghdad's military targets. Never before had a war been brought home live and in living color. Technology had made it possible for us to witness the destruction of a city — in real time.

Modern electronic technology was the key to the dramatic coverage of the Gulf War. Portable satellite uplinks, small and portable video and audio equipment gear, consumer-grade camcorders and even "sat-phones" made it feasible for news crews to bring viewers to the front lines. Armed with only the bare minimum, these professionals provided live coverage of a war. This had never before been possible.

Broadcast Engineering is proud to provide this behind-the-scenes glimpse at how news crews half a world away brought to the American public the destruction of Baghdad, the liberation of Kuwait and the victory of the allied forces.

Brad Dick, editor

Continued on page 54

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At Ampex, we engineer for
excellence, not expedience.

AT AMPEX, we don’t believe that “good enough” is good enough.

We never stop demanding more from our engineering, because we know you never stop demanding more from our products.

Take our VPR-300 and -200 Series recorders and our ACR-225 automated cassette system, for example. They are simply the best digital recorders in the world—partly because they are all built around the most advanced transport ever designed.

Why should that matter to you? Because the D2” composite digital format requires tighter tolerances than any other system in use today. Compared to Type C, D2 has a higher packing density, has a track pitch of just 39.1 micrometers (NTSC), and is segmented into six tracks per field rather than just one. This requires a tracking accuracy of only 6.4 micrometers over a range of -1X to +3X play speed.

That’s why we designed an entirely new scanner for our D2 machines. And we managed to do it with an effective wrap angle of less than 180 degrees, so only one pair of heads is on the tape at any time. And we need only four head pairs for record/play versus sixteen heads for D1.

To precisely handle all three D2 cassette sizes, we designed a unique vertical elevator and reel drive system.

To handle the tape gently yet be able to accelerate it to 60X play speed in less than one second (versus two to three for any other machine), we designed frictionless, air-lubricated tape guides.

To reduce tape wear, we designed a unique two-stage threading procedure that employs both co-planar and helical threading, putting the tape in contact with the heads only when you need it to be.

This threading path subjects the tape to no more than 1.5 degrees of twist per inch in compensating for the helical displacement, and generates the lowest possible tension and stress gradients.

All this was no accident, of course. This transport mechanism was over five years in development. And the production version in all our recorders is actually the sixth generation design.

You see, at Ampex, we recognize that when you buy a digital recorder, like our VPR-300, you’re not just making a purchase, you’re making an investment. An investment in your company’s future. And our job is to give you the highest possible return on that investment.

We invented video recorder technology. We’ve been a part of this industry from the very beginning. And we’re going to be a part of it long into the future. That’s why we never stop working to make our products better. And to make your job easier.
Broadcast technology broke new ground to bring the war home.

By Peter Hammar

Dusk was settling over Baghdad as the city lights illuminated the dark. Outside of the El Rashid Hotel, one news crew was scrambling to set up a video uplink to send the latest news of the Gulf crisis back home to the United States. As the reporter began his standup, with gas mask in hand, the sirens split the night air with a piercing wail.

"I was scared to death the first night. When the bombs went off, you'd see the flash and a few seconds later you'd feel the concussion, and it would shake your knees... But after a while, you sort of get used to it. By the third night, you didn't think about it much, which was good, because you'd drive yourself crazy. Everybody was very concerned with getting the story on the air and didn't dwell on the fact that this could get serious."

—Lenny Venezia of the NBC Baghdad crew

Broadcast technology in the midst of war

World War II. This was the first full-scale war to be covered in the age of electronic and satellite news-gathering (ENG and SNG), and much was learned — technically and journalistically — from the experience.

This was a difficult and challenging remote in many respects. The Persian Gulf area is approximately 4,065 air miles from the nearest U.S. point of entry, and is eight hours ahead of U.S. Eastern Standard Time.

Three types of coverage

Beyond the technical challenges, military and political considerations limited electronic reporting of the Gulf War. Iraqi leader Saddam Hussein was a regular CNN viewer. The U.S. military feared that if it allowed uncontrolled coverage of the war, the Iraqis could adjust their tactics according to what they saw on television. To protect themselves, the U.S. Department of Defense (DOD) and its allies set up the Joint Information Bureau (JIB) in Saudi Arabia to control broadcasters' access to the news and their newsrooms back home. Raw videotaped footage from "pool" reporters who were traveling with the military in the desert was physically carried by JIB couriers to editing rooms in Dhahran, Saudi Arabia, for limited satellite transmission to the United States. All transmissions were censored at least twice by the United States and coalition military representatives. Some videotaped pool reports on the fighting reached American TV screens hours or even days late, which made the coverage similar to that during the Vietnam War.

Electronic news organizations that covered the war included CNN, ABC, NBC, CBS, BBC, ITN, WTN, Visnews, NPR, AP and UPI. Not surprisingly, most news agencies — including all four American TV networks — took their coverage of the war beyond JIB-controlled output. They moved portable "flyaway" uplink dishes beyond the reach of military censors to get the rest of the story unilaterally, thus creating a second type of reportage from the Gulf. The dangers of unilateral coverage were great. Crews could fall into Iraqi hands, come under enemy or "friendly" fire, or be arrested by the allies for violating the pool coverage agreements their networks had made with the U.S. military.

A third type of Gulf War reportage consisted of a more traditional approach, with electronic journalists and big-name American anchors reporting live and on tape with "standups" (talking before a camera) from places recognized for their news interest and occasional danger, but not actually on the front lines. These sites included Dhahran in eastern Saudi Arabia, Riyadh in the Arabian interior, the Jordanian capital of Amman, and Tel Aviv in Israel. The live standup reporting before and during the war usually integrated videotaped clips from DOD media pools and some unilateral footage, which had to be cleared along with the scripts for the standups before the whole package could be uplinked to New York or Atlanta.

And so it began. One of the most extensive electronic and satellite news-gathering efforts in the history of broadcasting was launched on Aug. 2, 1990. That was the day Iraq invaded Kuwait, triggering the chain of events that led to the coalition attack on Iraq on Jan. 16, 1991. Broadcast engineers had to mobilize for high-quality, round-the-clock coverage of the largest military confrontation since
Only SIAT® lets you test audio quality during program time.

The SIAT Advantage Technical Characteristics

- 5-second stereo test includes frequency response, phase response, differential gain, THD, second harmonic distortion, crosstalk left, crosstalk right, terminated noise weighted, terminated noise RMS flat and channel transposition.*
- Go/no-go reports based on pre-set tolerances you program
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- Signal generators and receivers identified individually for network testing purposes
- Common-mode rejection: 60 dB (50 Hz - 20 kHz; V in=1 kV)
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*SIAT tests 10 different audio parameters, including intermodulation distortion.
Up to 10 parameters can be included in a 5-second test.

Without disturbing your audience.

Everyone knows it's not polite to interrupt. But the fact is, the need to test audio quality is most critical during key programming times. Which is precisely when testing for noise, distortion, crosstalk and more is most difficult and intrusive.

You have to contend with heavy carrier signal traffic. You have to risk disturbing—and losing—listeners and viewers.

Or, you have to settle for inaudible test systems that can't measure noise at program levels—and that fail to account for poor transient response or distortion caused by overload.

But now, there's SIAT®, the in-service audio testing solution from Schmid Telecommunication.

Only SIAT can test up to 10 critical parameters of your audio transmission in 5 seconds or less.

That's fast enough to test lines that are busy 24 hours a day.

Best of all, SIAT is fully automated and incredibly easy to use. Tests can be pre-programmed and conducted automatically. Or they can be triggered manually by pushing a single button. Tests can even be pre-recorded and aired with program material.

Give your audio the SIAT advantage. Call 1-800-955-9570 today for more information and a free SIAT video.
Preparations for war

The relatively slow build-up of coalition troop positions in Saudi Arabia in the summer and fall of 1990 gave TV news organizations time to put into place a wide array of equipment and people to run service the gear. News directors and their engineering departments correctly guessed that there was enough time before hostilities would erupt to assemble and field-test hundreds of bits and pieces once everything arrived on site. It had been 20 years since Vietnam, the networks' last large-scale war coverage. With cutbacks in personnel and equipment purchases, the networks had to "reinvent the wheel" in the Gulf. Hard economic times prevented broadcasters from fielding dozens of ENG and SNG teams on only a chance of war in the region. Broadcast engineering teams in Saudi Arabia and other parts of the Middle East experienced an inevitable "learning curve." Many wished they'd had the equipment and expertise at the beginning of the conflict that they had by the end.

Elliott Reed, ABC's ENG manager in New York, described his network's approach to Gulf War coverage. "The amount of equipment that we sent in, although large, did not equal what we have sent to other events. This war was not the type of event that warranted great transmission systems and many, many tape machines and a high level of communication. It was more of a news-gathering operation, sort of like a big bureau, where you have a lot of cameramen going out and shooting stories, with a few edit systems and a satellite to feed it back. It wasn't a complicated setup."

Getting network news people and equipment in and out of reporting sites, especially Dhahran, which had no direct flights, was complicated. The American networks had to fly people and supplies into the region via Dubai and other neighboring countries, and then convey the equipment, first by truck to Riyadh, and then on to Dhahran. (See Figure 1.)

The networks hedged their bets and improvised. Engineering teams consisted of a mix of battle-trained veterans, along with people who had never worked outside of the United States. The networks sent over a mix of technologies as well. Video uplinks ranged from small 1.8m portable flyways to truck-mounted dishes. Video recorder formats ranged from ancient U-matic, to the traditional Betacam and MII, to new 8mm and Hi8 camcorders. Most network ENG and SNG equipment, including generators and interconnects, had not been tested in their field configuration before shipment to the Middle East. Basics, such as vehicles and provisions for field teams, were scrounged from local sources. No one at the networks knew how much and what kind of access they would have to the news on the front if a shooting war started. News gathering improved over the course of the 6-week war, as broadcast engineers located the equipment they needed and taught themselves how to set up quickly and efficiently under difficult circumstances.

Getting equipment past customs officials presented a problem, especially early on. One tech with international experience said he had never been on location where there was no "local fixer" to help get gear into the country. Saudi Arabia is, to a large extent, still a closed society, and no American news organization had been able to establish a permanent presence and better local contacts. Some crews in Dhahran went without their baggage for several weeks. Once the Saudis and their American counterparts became better acquainted, the situation went more smoothly.

The Saudis also placed a security embargo on electronic equipment entering the country, allegedly fearing electrically detonated bombs and other devices. Flyway uplinks, many with almost two dozen travel cases, created a special problem getting past customs officials. Occasionally, officials thought that spare parts sent in for uplink repairs were a second uplink, which would require new import documents.

Network crews had to arrange locally for major supplies, such as cars, tires and large generators. This task was difficult because the coalition had bought or confiscated almost everything needed to wage war. Only small generators could be shipped from back home, and local hardware wasn't always the best. At first, the only generator the CBS crew in Dhahran could buy was a broken-down diesel that wouldn't maintain frequency. (The crew had to set the unit at 62Hz to come close to 60Hz under full load.)

Living conditions in Dhahran, Riyadh and Amman were tolerable for most broadcast personnel. Food and other essentials were trucked in to avoid airport closures. Water in Saudi Arabia was desalinated ocean water stored in huge tanks, which were surrounded by heavy anti-aircraft batteries and other protective weapons.

Maintenance

Equipment in the desert broadcast operations was continually covered with a light film of dust. But remarkably, most network maintenance techs did not blame their few equipment failures on it. Nevertheless, CNN sent several 240V air compressors to Dhahran, and a daily maintenance ritual of blowing sand and dust out of all the camcorders and other gear was established.

Temperature presented a worse problem. Spotlights and their ballasts blew because of rapid temperature changes as great as 40°F. The freezing nighttime desert temperatures caused batteries to die quickly, especially silver cells. Early in the campaign, a camcorder left in the sun for even a few minutes could fail from heat radiating off an asphalt surface of 150°F or more.

Inside prewar Iraq

Getting video uplinks into Baghdad dur-
INCREIBLE PERFORMANCE
The breakthrough Ceramic Armor Technology of Maxell Metal Tape provides dramatically improved stability, greater archival capabilities, lower bit error rates, and better head-to-tape contact in Betacam SP, D-2, HDTV and DAT.

HOW CERAMIC ARMOR WORKS ITS MAGIC
Because the ceramic armor layer is second only to diamond in hardness, overall particle strength is remarkably increased. And by adding this ceramic armor layer at the first stage of magnetic particle production, Maxell produces extremely strong needle-shaped particles free of deformation and breakage during processing. The ceramic layer also insures each particle's resistance to oxidation, and greatly improves the tape's surface durability.

PLUS
Our high-performance cross-linking binder system and extremely precise cassette mechanism, built to micron-level accuracy, assure stable tape travel during editing, repeated playbacks, and even in the severe environments of ENG and EFP. And a conductive back coating prevents static build-up which helps reduce dust and debris.

SEE FOR YOURSELF
In fact, Maxell Ceramic Armor Metal Tape is so advanced, you really have to see it for yourself to fully appreciate its unmatched performance and reliability. For an eye-opening demonstration, call your Maxell representative.
munication, which avoids the central switching office of the local phone company. The switching office was knocked out in Baghdad early on the first night of bombing.) Networks typically use 4-wires for general communication with their U.S. newsrooms, giving them an open line 24 hours a day. Either end can push a button and talk without going through normal telephone circuits and connection delays. These lines are sometimes used as back-ups to satellite audio or for interruptible foldback (IFB) communication during video uplinks.

Before the shooting war started, only CNN had been able to obtain a 4-wire connection between CNN Center in Atlanta and the El Rashid Hotel in Baghdad, where all Western correspondents, electronic and print, lived and worked. CNN had arranged with Jordan Radio and Television (JRTV) to establish a 4-wire connection from Amman to Atlanta (via copper, coax, terrestrial microwave and an INTELSAT transponder). JRTV then had its Iraqi contacts install a direct 4-wire line from CNN's hotel rooms in Baghdad to JRTV's studios in Amman, bypassing the Iraqi central telephone switching center.

Amman became one of the most important "windows to Baghdad" during the Gulf conflict. At first, Jordan's King Hussein remained neutral, but eventually he was pressured into leaning toward the Iraqis. As a result, Iraqi broadcast and telephone people would talk only to Jordanian broadcast engineers about technical arrangements. All the networks quickly established a presence in Amman and a working relationship with JRTV, although none was as successful as CNN.

Video and data satellite uplinks

Dhahran and Riyadh were the first major uplink sites in the Persian Gulf area. U.S. viewers watching correspondents do standup reports near the swimming pool at the Dhahran International Hotel became accustomed to seeing the blue-bubble changing rooms behind them. Out front on the grounds of the hotel, an "antenna forest" of dishes had sprouted.

To assure steady access to transponders, the networks coordinated their satellite use by prearranged purchases of bird time and kept lines of communication open among network uplink managers and satellite transponder vendors. The available satellites included those with fixed and variable orbits. Crews in the field with easily maneuverable portable dishes were sometimes assigned what one tech called "wobblets" — birds that have unstable "inclined" orbits because of orbital decay after exhausting their station-keeping fuel. These required dish re-tweaking every few minutes. The large uplinks in Dhahran and Riyadh, which were more difficult to steer, typically used the fully geostationary satellites. Satellites that were used were often far to the east or west of the Gulf, requiring the use of extremely low look angles. (See Figure 2.)

Phone lines through the Dhahran Hotel switchboard were limited, and most teleco lines were impossible to obtain. Most networks could get only two regular phone lines from the hotel, but 15 or more lines could be obtained by multiplexing and digitally compressing audio signals into a 19.2kbit/s subcarrier on the satellite's feed. This allowed network office phones in Dhahran to become off-premises extensions of their headquarters' telephone systems. Although modems could not be used with this system, networks were able to feed news computer data to Dhahran in this way.

Camcorder wars

Iraquis and coalition forces weren't the only combatants in the Gulf theater. Competing tape formats made one of the biggest technical stories of the war. Considerations for choosing equipment for desert duty included (in order) cost, weight, handiness of the unit and the recording media, and video/audio quality.

Given the large commitment by the U.S. networks to Betacam and MII, these two formats were the logical choice for Gulf War duty. For example, 95% of ABC footage was shot in Betacam. NBC shipped over some MII equipment, and was the only network to use that format.

Some NBC crews insisted on being able to "talk to" other formats, especially in pool feed situations where tapes were being exchanged among networks. For example, NBC went into Baghdad in mid-

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**Figure 2.** One network's SNG feed paths and satellites used to bring the story back to the United States.
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February with only the Betacam and 8mm formats, which their uplink partners WTN, Visnews, ABC, and CBS were all using. MII in the pools would have been a "unique substance in a sea of Betacam, 3/4-inch and 8/Hi8," according to one observer not associated with any of the networks.

The Gulf War, in regard to tape format, has been called "The 8mm War." Use of Hi8 and 8mm formats by TV networks for the first time helped increase the visibility of new, small ENG camcorders. Osten-
tively consumer formats, Hi8 and its prede-
cessor, standard 8mm, are entering the professional field just as U-matic did in 1972, when the market began to create a myriad of professional applications for a new technology. CBS News representa-

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[Image: Uplink dishes around the Dhahran International Hotel. Note the blue domes in the left background, the visual backdrop for most reports filed from the site. The domes are changing rooms for the hotel swimming pool. (Photographer: Brent Petersen, Capital Cities/ABC.)]
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and the camcorder itself. I’d be down on the ground and, even with a little Hi8 unit, I couldn’t get up unless I rolled over on my stomach. You couldn’t sit up. That’s how heavy everything was. We just couldn’t have carried more stuff.

Consumer 8mm and Hi8 units were readily available to non-camera people on site, so that if they saw something happen, they could grab a camera and immediately start shooting.

Disposability was another consideration. If chemicals had gotten on the camcorders or they had been wrecked in the field, it would have been less painful to throw away the $2,000 or $8,000 Hi8s than the $40,000 Betacams.

On the other hand, there were still some complaints about the 8mm and Hi8 hardware. The light tape transport occasionally led to tape tension problems, and some engineers felt that the 1-chip CCD units were not up to broadcast quality. Others complained that Hi8’s color-under technique did not yield chroma as rich and true as professional formats, with severe Y/C phase shift after several non-TBC’d generations.

The biggest complaints about the smaller and less-expensive 8mm camcorders were that they did not have the frame-accurate 8mm time code, removable lenses, 1/4-inch or XLR audio jacks, manual gain control and a good manual iris. Ideally, they also needed to handle bright contrasts like a 3-chip camera, and remain as small and lightweight as possible in 1-piece camcorder form.

As a result of the Persian Gulf experience, some local news operations have decided to use Hi8 exclusively. However, the networks say they will continue to limit the format to applications where light-weight and low cost are paramount.

Editing in the field
TV networks had access to so much satellite transponder time that they put on live reports whenever possible. Most news crews in the desert didn’t like to do editing in the field. Instead, they preferred to gather taped footage or do live shots and standups, and then let headquarters worry about editing it. Most serious editing was done in stateside newsrooms, using footage from unilateral and pool sources as well as standups from Dhahran and Riyadh. Pentagon pool members were forbidden to do any editing in the field. They were required to transmit only raw footage on the pool uplink.

The few unilateral SNG crews dashing around the desert had no time to edit their work, so they preferred to produce live segments for immediate uplinking on flyaways to the United States. In Dhahran, all four U.S. TV networks had Betacam SP field editing systems, which were used mostly for rough cuts. Any Hi8 and 8mm non-pool footage was usually bumped over to Betacam on-site for rough cutting and then transmission on the pool satellite, although raw Hi8 and 8mm was also fed directly.

Batteries and generators
ENG and SNG run on batteries and gasoline. Network planners had known that the 220V/50Hz mains power would be unreliable in the Middle East, especially in time of war. Therefore, provisions were made for backup generators. These became useful when a Scud missile or other alarm was sounded, because the Saudis would usually shut down mains supply at the first hint of attack.

Most operations ran on generator power because of the danger of power failures during broadcasts and editing sessions. Transportable AC generators also became essential, including up to 25kVA truck-mounted diesel units. One electric-start 5.5kVA gasoline generator was popular because of its silenced exhaust and sound-baffling engine hood. Because editing and uplinking were not constant, some crews tolerated the inconvenience of resetting equipment whenever the power went out and came back on. Gas supplies and maintenance for the generators, however, remained a problem throughout the crisis.

Meanwhile, camcorder battery life was affected by the wide swings in ambient temperature and varied with how often operators used their power zoom lenses. Crews typically took large numbers of extra batteries, sometimes three or four days worth, on the assumption that there would be times when they wouldn’t have a chance to recharge. As long as a generator was running, charging batteries in a hurry was no problem. Field technicians had enough AC fast-chargers to handle the hundreds of batteries eaten up in the field each day by ENG crews. When no generator was available, a few crews powered their AC chargers with 600W square wave DC-to-AC inverters driven from their vehicles’ batteries. The method was electrically inefficient but convenient if a crew lacked a DC-to-DC-converting charger.

SNG crews usually ran a generator to power an uplink, and could piggyback a few chargers. All uplinks required AC, and most drew approximately 4kW when operating, while INMARSAT telephone uplinks drew approximately 400W. Most SNG operations ran 4.5kVA to 6.5kVA generators 16-24 hours a day.

Shooters with the DOD pool out in the desert were the most dependent on batteries. These pool members, isolated from their network operations base in Dhahran for days at a time, drove military HMVs (Humvees), jeep-like vehicles with 24V systems. Most DC-to-DC battery chargers could take either 12V or 24V, which allowed pool members to charge them from their vehicles’ batteries if there was time. Otherwise, military couriers carried dead batteries back to Dhahran or other points, along with freshly shot footage on their way to the JIB for review. Recharged batteries came back with blank tape. When charged, solar chargers could pick up the charged batteries on their way back to the front.

Solar battery chargers also played an important role. NBC’s engineers were introduced to DC-to-DC solar chargers in Saudi Arabia by an Australian ENG crew. They quickly bought solar chargers from an Australian source and built mechanical devices to convert solar power to batteries, even though the Saudi sun was so intense that local solar systems were “sandwiched” under the 24V battery systems to get them through the night. A German company, INMARSAT, helped them with solar concentrators that could power their ENG systems.

When it was time to make a move, the SNG crew would simply hit the road with one or two store-bought solar panels. The solar panels would be mounted on the top of the camera van and connected to the ENG batteries or directly to the ENG.”
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The air war begins
As engineers assembled and tested their gear in and near their hotels in Dhahran and Riyadh, the first dramatic use of new, small ENG gear occurred in Baghdad on the night of Jan. 16. This was the night the coalition forces' began their aerial bombardment of the Iraqi capital and its suburbs. Using nightscopes, ABC captured the night bombing and Iraqi anti-aircraft fire. (See the related article, "Nightscopes," on page 72.) Other networks used the ABC footage, which was transmitted on a WTN uplink. Almost immediately thereafter, all video uplinks in Baghdad were cut off. The Iraqis shut down the WTN uplink just after Baghdad Television and electrical power were knocked out. Without their own satellite uplinks in Baghdad, the networks were left with no SNG.

Some of the most important coverage of the Gulf War on television then began as a kind of radio broadcast with pictures. CNN's Peter Arnett, John Holliman and Bernard Shaw began filing live audio-only reports via the CNN 4-wire from their hotel room in Baghdad. Viewers at home heard the reports while staring at the correspondents' photographs superimposed over a map of the Middle East. CNN had the line from Baghdad for just 17 hours into the war before allied bombs destroyed a part of the circuit. Prior to the loss of the line, some other correspondents had apparently pleaded with CNN for use of the 4-wire to file their stories, but the network elected not to share its last remaining connection to the outside world. The Iraqis then expelled all Western journalists except Arnett, evidently because of Baghdad's desire to keep CNN on the air from inside Iraq.

The satellite phone
Once fighting broke out and communications to Baghdad were cut off, correspondents and crews mistakenly feared that using the satellite telephone might attract U.S. missiles designed to home in on enemy radar and other facilities using similar frequencies. (The bombs were reportedly "smarter" than that.) Once allied bombing had knocked out the majority of Iraqi air defenses and the coalition could bomb Iraq more or less at will, Arnett was willing to restore contact with the outside using his INMARSAT satellite telephone. The unit remained the mainstay of his reportage from Baghdad until the middle of February, when American network SNG crews were allowed back into the Iraqi capital with video uplinks.

Arnett used a portable satellite telephone that weighed 75 pounds and fit in a single suitcase. The unit could beam his calls directly from the roof of the hotel to satellites on L-band frequencies. The phone's umbrella-like 1.2m folding dish led to its nickname "batphone." The phone used any of four communications satellites owned by INMARSAT, an international satellite-based mobile communications consortium in London. The batphone was simple to use. Just pop open the dish and aim it using a signal-strength meter, get a dial tone off one of the satellites and direct-dial the desired number anywhere...
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in the world. Calls to the United States were relayed to earth stations on the East and West coasts, where they were routed through regular commercial telephone lines to final state-side destinations. INMARSAT handled the billing the same way any long distance service does. Calls cost approximately $7 to $10 per minute. The ground stations were often clogged with calls at peak hours, taxing the system's capacity. Arnett and others reported often having to wait to get a dial tone.

The road to Baghdad

Western journalists were allowed to return to Iraq in the middle of February. Arrangements for the cross-country trip were made through Jordanian contacts. ABC, NBC and CBS all used a portable uplink in Baghdad supplied by WTN, while CNN brought in its own flyaway. Amman remained the source for food, gasoline and other supplies. Provisions were shared when necessary, although each network attempted to truck in its own supplies. All electricity was provided by the networks' gasoline generators.

The network crews traveling the Amman-to-Baghdad highway were worried that their convoys might be mistakenly attacked by coalition air forces, so they painted large red letters denoting their affiliation on the roofs of their trucks. Burned out shells of Jordanian and Iraqi trucks were scattered along the pitted 6-lane superhighway. Fortunately, most of the bomb damage was centered on the medial strip, so the network convoys were able to pass on the outer two lanes with fewer problems.

Everyone lived and worked at the El Rashid Hotel in downtown Baghdad, just as they had before the war. Although food was in reasonable supply, fresh water at the hotel ran for only an hour a day, between 5 and 6 p.m. Crews would race back to their rooms every afternoon to take ice cold showers (there was no running hot water) and do laundry in the bathtub. In a local Baghdad shop, one network engineer found five solar heaters designed to heat enough water for short, warm showers. He bought all five of them. Most American network staffers were surprised to find the weather so cold in Baghdad. The temperature inside the El Rashid was sometimes colder than the outside air. Occasionally, winter winds up to 90 mph chilled news crews who were trying to maintain uplink dishes.

Reporting from the Iraqi side subjected the networks to even more censorship than they had experienced in the Pentagon's JIB pools. The Iraqis provided the crews with government "minders," whose job it was to monitor the output of the reporters and control where they went and to whom they talked.

The networks' Baghdad operation represented "minimalist broadcasting." Typically, each network crew had only two engineers. Union technicians with strictly defined job descriptions found themselves handling everything from editing to live camera, and helping out wherever they could. The crews brought plenty of provisions but little equipment to minimize losses if they had to get out in a hurry.

When the fighting stopped in Kuwait and southern Iraq in early March, most Western news crews were again expelled from Baghdad. Most networks left behind a local Iraqi camerman to shoot 8mm footage and feed the video right off the camera through the British WTN uplink facility, which also remained behind.

Unilateral coverage and the liberation of Kuwait

The unilateral or independent news-gathering crews in the desert showed the same improvisational creativity and daring as those network crews who went back into Baghdad. All four U.S. TV networks used unilateral crews during the Gulf War. Working this way was risky. Only their base stations in Dhahran knew where they were, and that location fix was often vague. Unilateral crews could become targets of "friendly fire," because the U.S. military also never knew where they were. The crews were dressed in military-style desert fatigues and drove camouflage-colored vehicles with coalition markings, making them bona fide targets for the Iraqis. The U.S. military took a dim view of renegade ENG/SGN crews that broke from the pool system and operated unilaterally, fearing their reports would provide the enemy with valuable information. The military was also concerned about the safety of these crews. As a result, the JIB in Dhahran issued more than one warrant for the arrest of American electronic journalists and their crews.

Like some of their colleagues at other networks, one CBS crew devised an SNG reporting method based around a mobile uplink, using Swift "hit-and-run" tactics. While the reporter was getting the story in the area and preparing for the standup, two technicians unpacked the uplink from their pickup truck, set it up, shot and sent the standup in a few minutes, and then was able to make the feeds to New York look somewhat polished. With practice, the quality and speed improved to the point that the crew was able to start transmitting a live standup 30 minutes after the truck was stopped.

At first glance, a dedicated, modified 4-wheel drive SNG truck would seem to be the best vehicle for such a crew. But its high profile, weight and lack of ruggedness made it unsuitable for desert conditions. As one observer put it, "It's a lot easier to throw portable gear from a truck that's broken-down or stuck in the sand into another one than to try to cope with a big, heavy, dedicated ENG vehicle." Bob McKeown's CBS crew used three vehicles. Two generators, two bathtubs, the uplink, all the cables run, gas in 5-gallon cans and miscellaneous gear were loaded into a pickup truck and covered with a camouflage tarp. The crew rode in two Land Rovers filled with their cameras, tools, other gear, clothes, food and water.

The crew had to be careful about gas consumption while in the desert, because they had to carry what they needed. The 0.8 gallon-per-hour rate of the 4.5kVA generator served the crew's purposes well, because it ran the uplink and some other gear for up to 4 1/2 hours on one tank of gas. The engineers brought plenty of 110V power cable with them, because even with its muffler, the generator was still so noisy that the crew had to play a sand dune or other obstruction and run 50 feet or more of power cable to the uplink/standup site.

The crew used a bathtub for IFB, hitting the INMARSAT 338 relay satellite. The video uplink used an INTELSAT bird, which required a 7o look angle. In the desert, the crew sometimes had to dig a hole in the ground to pivot the dish up and down.

Challenges for radio coverage

Although the bulk of the audiences' attention was attracted by TV coverage from the Gulf, radio had its share of listeners and technical lessons. Although audio paths are generally more widely and quickly available from the field than those for video, the distances and economics involved still made radio's task difficult. Neil Conon of NPR (one of the journalists captured and held by retreating Iraqis after the cease-fire) recalled, "Some days it took us as long to file as it did to gather and prepare our reports," — an uncommon predicament for radio reporters.

Continued on page 70
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The narrowband audio quality of dial-up phone lines — often the only means of feeding available — was not as much of an encumbrance to radio as it was to TV audio, because listeners are more accustomed to telephonic sound quality on radio. However, wideband audio lines would have been helpful in many cases. For example, after Kuwait City's liberation (a "story-rich environment," as Conan put it), higher audio fidelity would have aided in bringing the true sound of the city's celebration back home.

Throughout the conflict, the only wideband audio circuit provided for radio crews' use was a single audio subcarrier on the pool video feed via satellite from Dharan, and even this was not always available. Therefore, the general method of filing for radio was a dial-up phone. However, at peak filing times, the phones in the Dharan Hotel were so clogged with reporters' calls that it could take up to 40 minutes to get a dial tone. Outside of Dharan, U.S. radio reporters had no way of feeding, unless they were lucky enough to find a working telephone. None of the radio crews had any unilateral feeding equipment.

Once inside Kuwait, U.S. radio crews had to beg for time on satellite phones carried by the print pool and BBC Radio. (Telephone service and electricity was out of order in Kuwait City for weeks after its liberation.) After several days, the Kuwait Ministry of Information set up three satellite phones in the capital for use on a first-come first-serve basis, for anyone who could pay the $40 per minute charge. Although the lines were generally tied up by Kuwaitis making personal calls, Neil Conan and fellow NPR reporter Deborah Amos were among the first to file from one of these phones. "Three news spots cost us $1,500," Conan recalled.

Danger in the desert:
The psychology of wartime ENG/SNG

Unless news-gathering becomes completely robotic, people will be involved in getting the job done. Although Gulf War network shooters and other crew members sometimes seemed to have "ice water in their veins," they naturally felt fear and frustration. They also experienced some changes in their beliefs about the people and the places they were covering for their networks. Crews who saw the shooting war said their fear subsided after a few days of exposure, although most admitted that they didn't get used to the fear, they just weren't dwelling on it as much.

But what they didn't know made them as nervous as what they did know: Could the Scuds home in on RF emissions from their SNG/ENG gear? Could they carry poisonous gas? Later, these fears were found to be groundless, but in the meantime, the stress was enormous. Crews also realized that running to the cellar of the hotel whenever the air raid sirens sounded was a mistake, because the building might collapse if it were hit by a Scud missile.

Media crews in combat zones sometimes report a sense of isolation from the rest of the world as they are caught in their own maelstrom. However, most American news crews felt informed about events in the Gulf War beyond what they were reporting, because of their regular radio contact with staffers in the rear areas of the war and with New York and Atlanta. Everyone listened to the BBC World Service and the Voice of America on shortwave radio. Crews in Amman, Dharan and Riyadh were able to receive CNN International on downlinks.

Gearing up for safety

Wartime safety gear, such as gas masks, can help inspire confidence. Rob Schafer of CBS said, "You sort of 'bond' with your gas mask after a while, something you keep with you all the time." Operating video editing gear while wearing a gas mask was a challenge. Those who wore eye glasses had to wear them outside of their masks. The newer masks that arrived later in the conflict had individual eye pieces in which prescription lenses could be inserted.

In addition to some overtime, travel and per diem costs, few network engineers during the Gulf conflict received "combat pay" or other special compensation for their sometimes dangerous work. NABET union technicians were reportedly earning approximately $3,000 per week, with 16-hour days. Some networks provided...
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Nightscopes

As the nighttime bombing on Baghdad commenced, the world witnessed live for the first time the awesome power of modern warfare. The dark, yet brilliantly lit, Baghdad skyline was streaked with the red tracers of anti-aircraft cannons and the fiery yellow of bomb blasts. TV viewers watched from front-row seats as the allies began the destruction of Saddam Hussein's military machine.

The secret of the dramatic images relayed in the early hours of the Baghdad bombing lies in the use of two technologies: nightscopes and 8mm camcorders. Combined, these two devices allowed news crews to relay to the world the massive destructive capability of modern air power.

How the nightscope works

Two types of nightscopes were used for most of the coverage, a Litton Industries M911A Modular Night Vision Unit and a monochrome infrared camera. The infrared imager is capable of producing an image in absolute darkness. Any light actually spoils the video. The Litton nightscope simply amplifies what light is present in the scene.

The M911A nightscope is an active device powered by a pair of AA batteries, with a lifespan of approximately 40 hours. The image at the scope's input generates photoelectrons on a photocathode. Next, these electrons are accelerated through an electric field of several thousand volts, then directed to a phosphor screen where they yield many more photons than contained in the original image.

This process must be accomplished without distorting the spatial and brightness relationships of the image. To do so, the camera's objective lens is used to focus the image on the nightscope's input photocathode. The electron multiplier, which follows, is composed of a thin, flat plate perforated by millions of tiny holes (a microchannel plate) and charged with a bias voltage.

The bias causes the electrons to be attracted toward the back of the plate. As they travel through the holes to get there, they strike the holes' inner walls and generate secondary electrons, which strike a phosphor screen (the screen is proximity-focused just behind the microchannel plate). A relay lens then couples the screen's output image to the camera body. (See Figure 1.)

An automatic brightness control circuit (ABC) is included to prevent damage to the output screen when a bright scene is viewed. Special night-vision camera lenses with lower f-stops and higher resolution are recommended. Also, if the camera's original objective lens is used, its auto-iris function should be defeated to avoid oscillation between the ABC and the camera's auto-iris.

Network choices

Although some nightscope footage was shot using special Betacam and M11 units, the four U.S. TV networks did most of their nocturnal videography using the nightscopes and 8mm camcorders.

Weight was one important reason for selecting 8mm camcorders. Nightscapes can weigh as much as 25 pounds and measure up to 18 inches long, making the 8mm camcorder/nightscope combination easier to use. "Who wants to lean out of a hotel window with 20 pounds or more of Betacam and a 25-pound nightscope?" replied one tech who explains why he used 8mm instead of Betacam.

CNN news photographer Kit Swartz carried what he called his 'Weeniecam;' an 8mm camcorder on which the nightscope could be placed with a C-mount between the lens and the body. The result was a 2-foot long lens supported by an approximately ¾-inch-deep threaded mount that was extremely delicate. Although Swartz constantly feared the unit would break, the contraption held together without any problems throughout his several weeks with DOD ENG pools. He says that next time he would like a more rugged unit for night work.

Independent Television News (ITN) used the more traditional monochrome infrared cameras. CBS used a camera modified by Israeli Television with a laser and a photo multiplier. Laser nightscopes may produce better pictures than traditional nightscopes, but they have one huge drawback: danger. One network engineer summed up his reservations about laser night vision. "I wouldn't have turned on a laser out there no matter what they paid me. With the night vision that [soldiers from] both sides had, a laser beam shows up like an arc welder." Using a laser nightscope could result in the electronic journalist becoming the target of what he was "shooting."

Figure 1. The nightscope is placed between the objective lens and the TV camera, coupled to the image plane of the camera by a relay lens.
CHOOSING A FIELD LENS

Field production lenses have a strenuous life. They're used in the rain, in the snow, in sand and surf, and anywhere else the action takes them. So when it's time to choose a field production lens, it pays to make an educated decision.

Field lens technology has come far in a very short time. Only a few years ago, 44:1 or 55:1 zoom lenses were unheard of. Today, they are commonplace.

Lenses for field production are designed for long distance shooting, and their Minimum Object Distance (MOD) is generally from 7 ft. to 9 ft. Focal lengths range from a wide angle of 9 mm to a telephoto of 525 mm. The 2X extender found on almost every field lens effectively doubles its focal length.

As with all broadcast lenses, it pays to explore more than just the minimum specifications. For example, if a field lens has a minimum focal length of 16.5 mm, it won't be as well suited for wide angle shots as a lens with a 10 mm minimum focal length. And a lens with a maximum aperture of f2.8 will be fine for outdoor work but less so in low-light situations.

Another important consideration when evaluating a field lens is “f” number versus focal length. Most field lenses have a maximum aperture of f1.4 or f1.6. However, at maximum focal length, the full aperture of the lens will be reduced, sometimes by as much as 50 percent. The phenomenon is a characteristic of all lenses and is called f-stop ramping, ramping, or f-drop.

However, not all lenses ramp at the same rate, and the difference can be very noticeable. A precipitous drop in aperture at a certain point will produce a sudden drop in video level, which is difficult to correct smoothly by adjusting the gain. A lens that reduces aperture more smoothly will be easier to offset and a better overall performer.

While their studio counterparts lead cushy lives by comparison, field production lenses must endure life in equipment trucks and other hostile environments. So the manufacturer's reputation for knowledgeable service and support is critical. The company should also support older lenses, since a field lens is a lasting investment.

Fujinon manufactures a wide array of lenses for field production. For more information, contact Fujinon at (201) 633-5600, or write Fujinon, 10 High Point Dr., Wayne, New Jersey 07470.
special life insurance policies for their crews during the war.

**Eye-opening experience**

The Middle East experience may have changed some engineers' attitudes about the region and its people. Crews in Jordan reported seeing the situation through Palestinian eyes, and although most reported that their political opinions about the Middle East did not greatly change, some said they understood both sides of the Arab-Israeli issue for the first time.

U.S. nationals who were members of crews going back into Baghdad after a month of U.S. and allied bombing found little hatred or resentment toward Americans. Most of the locals whom Americans came in contact with wanted to use the batphone to call their relatives in the United States and Europe. For humane and personal reasons, the crews often allowed the Iraqis to do this.

**Debriefing continues**

The Persian Gulf conflict showed what the combination of new technology, ingenuity and courage can do on today's battlefields. How the world witnessed this event was often the result of those same elements applied by broadcast personnel.

It is no surprise that the Gulf War will cause history books to be revised, but it may cause journalism texts to be amended as well. Referring to the growing technical capacity of today's broadcast news systems, veteran CBS News producer Burton Benjamin commented, "Creativity must keep up with technology." Considering that counsel, the technical prowess gained in the coverage of the Gulf War will keep journalists challenged for some time.

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Life in the pool

The main goal of a military press pool is to manage, contain and control the news. The old saying, "Loose lips sink ships," took on a new meaning in this televised Gulf War. Operational security means military censorship. The media were not allowed to give out information about specific abilities and sizes of military units and their movements. The DOD/military sources spoke only to the pool, not to any unilateral journalists and their crews. The DOD briefed the pool producer in the morning about what would likely happen that day. The pool producer then informed producers from the other networks.

The TV pool leader is responsible for providing all needed equipment — from cameras and uplinks to microphone wind socks — and the personnel to run it. As a result, the pool leader has to field two complete sets of people and material, one for the pool and one for itself. The networks divide all pool costs into four equal shares. Profits from footage sold to broadcast networks outside the 4-member pool are also split four ways. Pool leadership is broken into two components, gathering and transmission.

The pool leader becomes a "non-entity," recording and then feeding video to the other networks and to its own news division. After Jan 1, ABC News was just another feed destination for the ABC-staffed pool crew. The producer and director of the pool accepted camera shot calls and other requests from all four feeds (for example, "When you have a chance, please give us a close-up of General Schwarzkopf on Camera 1," or, "The mike on the colonel sounds like it may be off-axis. Can you check that?"). The rules forbid any favoritism between the pool leaders and any of the participating networks. During an air raid alert in Dhahran, everyone went to the base except for an ABC news producer assigned to pool duty who went up on the roof and got some shots of an incoming Scud missile. What could have been an ABC exclusive was dutifully sent out via the pool to the other three networks.

All four networks shared exactly the same video and audio that was gathered by the pool from military and civilian sources, and then monitored and censored by the Joint Information Bureau (JIB). Going through military censorship took anywhere from 12 hours to three days.

Each of the four pool members ran a cable to the pool head end for clean audio and video, to which they could add their own graphics and correspondents' comments. Even at the transmission pool site, DOD/JIB censors were at work reviewing all footage before transmitting it, in case added graphics and comments violated information guidelines for that day.

At the stateside facilities of the pool leader, incoming pool transmissions from the Gulf were handled by a separate pool operation. The pool crew in Saudi told the stateside operation when a tape was ready to feed and who it was for (any pool member could feed via the uplink). The stateside pool facility then fed the signal to the intended network.

Working in the field with a military ENG pool

The 30 Pentagon-controlled network pool ENG crews on the battlefields were entirely camcorder-based. No uplinking with portable flyaways was permitted from the desert. Instead, journalists and their crews were escorted by military Public Affairs Officers to various points of interest selected by the JIB staff. The reporters were expected to write their stories and submit the scripts ("tracks") to the military. After script approval, correspondents could do their taped stories. Also, within the confines of the pool, camera people could shoot anything they saw. Reporters added voice notes to the tapes, as well as written instructions to identify the clips and their contents. The military then sent all the tapes in all formats — Betacam, MII, Hi8 and 8mm — by courier back to Dhahran, where the footage was reviewed by members of the JIB. Once the JIB cleared the tapes, they were taken to the pool uplink site, reviewed once more, and put up on the pool satellite.

Editing took place in newsrooms back home, with the openings and closings of any of the four network's correspondents edited out by the other three and re-voiced-over. The networks were also required to submit to the JIB footage shot by non-pool (unilateral) network cameramen. These tapes were either rejected or cleared, and returned to the networks for local editing and transmission on the pool uplink.

Editing pool footage in the field was forbidden. Because the transmission pools were required to feed every piece of (cleared) raw footage they received from the battlefield back to the United States, no matter what the quality, pool cameramen in the field were told to choose their shots carefully and not generate a lot of video garbage.

The original plan had anticipated more casualty evacuation from and re-supply to the front than actually occurred. Pool videotape and batteries were expected to be ferried back and forth on these runs. However, with so few of them, and the rapid speed of the front's advance during the short ground war, footage from the front got more and more dated as time went on. Eventually, the rear caught up in Kuwait City and the courier service for the pool resumed. The DOD/JIB disbanded the gathering and transmission pools after the first week of March, when the cease-fire went into effect.

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**Show of Shows: New from NAB '91**

by Carl Bentz, special projects editor

**Abekas Video Systems**

A66 video recorder: stores 50s at 525/60, 60s at 625/50; networking for playback times to 200s; per D1 CCIR 601: 4.2:2 spec; random access; rotoscope, retouch, on-air uses. Circle (501)

A82 enhancement: integrated recorder for A82 switcher; operated by switcher control panel; D2 recorder stores 50s video, key channel; network provides 200s recording. Circle (502)


A51 3D effects: corner pinning, frame/field freeze, component, composite I/O; 3-axis rotation, translation with variable perspective. Circle (504)

Training advisor: PC software emulates operation of A51 effects system. Circle (505)

**Accom**

4224 composite module: optimizes key signals to foreground video; single, multilayer compositing, linear, matte keys; can be stand-alone keyer with VTRs, disk recorders. Circle (506)

**Accu-Weather**

FeatureFone: turnkey voice response, information service; callers get data on 15 areas of interest available through a telephone; secondary access through Accu-Weather. Circle (507)

Spanish language: 150 graphics for Spanish weather, shows maps, satellite images, radar, lightning and jet stream graphics. Circle (508)

UltraGraphics 386A7: high resolution, PC-based weather graphics system; paint, overlay features; fast frame looping, wipes, autoplotting on maps; video capture windows. Circle (509)

**Accurate Sound Corporation**

AS-100: reel-to-reel audio transport. Circle (510)

AS-4000: cassette recorder, recorder. Circle (511)

**Acrydone**

TLU/100SE: 100W solid-state UHF transmitter, converter; conversion efficiency. Circle (512)

TRU/25KV: 30kW UHF transmitter; single-tetrode, multiplexed visual/aural; upgrade. Circle (513)

TLU/100T: 100W VHF transmitter; solid-state design. Circle (514)

TLU/1KS: 1kW solid-state in LPTV transmitter service; reduced power consumption. Circle (515)

TLU/1KACT: 1kW UHF transmitter for LPTV, 9017 retro in multiplexed operation. Circle (516)

**AD Telecommunications**

LC series: fiber-optic transmission system; one RS-232C short-haul video channel with four audio subcarriers; 70MHz IF interface for microwave and lightweight equipment. Circle (517)

**ADM Systems**

STV/24: teleproduction console. Circle (518)

RM1010: stereo source selector. Circle (519)

CH/27, CH/26: stereo, monaural audio distribution systems. Circle (520)

RM1040: bargraph metering system. Circle (521)

**Adrienne Electronics**

AEC-BOX50: Ampex-to-Sony serial protocol converter. Circle (522)

BOX-80: interface for parallel VTRs. Circle (523)

PC-VLTC card: LTC, VITC reader, generator on IBM PC board. Circle (524)

AEC-BOX30: LTC data inserter for serial control VTRs. Circle (525)

AEC-BOX2, BOX16: LTC, VITC readers; RS-232/-222, -422 input, output. Circle (526)

AEC-BOX25: VITC-to-1LC converter with RS-232/-222/-422 I/O. Circle (527)

**Advant Communications**

AVUL 455, AVUL 459: 49" height; 5" directional casters; belt secures load to table. Circle (528)

VP60: mobile video projector table. Circle (529)

PMOH22: overhead table, shelves. Circle (530)

**AEQ**

MP-10 mixer: 5-input portable; direct connection to dual studio mic, line, two-channel output, 8 inputs, 52dB reduction from triple filtering; motion control, 2x2 bidirectional, other systems. Circle (531)

IN/02 intercom: digital echo suppression; for external telco lines, 2-, 4-wire circuits. Circle (532)

TH-02 hybrid: fiber-matched telco interfaces, reduces distortion, parasitic, copy problems, 2x2, 1x1 hybrid; 0 to -10 dB. Circle (533)

**AER**

System-3000: digital multiple telephone hybrid; 8-line in full multiplex through integral min-max bus; control from dedicated console or personal computer. Circle (534)

**AEV Electronic Broadcast Equipment**

MMS 312, 412 mixers: S-24 channels with sliders; telephone module; tabletop design; EQ on channel modules. Circle (535)

BSM 622 mixer: rack-mount or drop-in; 18-input, two mono/4 hybrids; slider level, rotary pan/tilt controls; no EQ. Circle (536)

Exclusive FM: 10-band stereo processor; independently controls clipping, compression, limiting per band. Circle (537)

BSL 700: broadcast system processor: 3-stage package with absolute peak detector, preset threshold peak detector, limiting. Circle (538)

Digital Spot: 16-bit digital spot, jingle, effects management; program with PC, CRT display; memory capacity to 5 hours. Circle (539)

ITB-201: telephone hybrid; 2-line unit connects directly to audio mixer. Circle (540)

**Telereport 10**: portable telephone interface includes mono mic, line mixing; pulse/tone dial; Nicad battery. Circle (541)

**Elettronica PR series**

TV translators for UHF, VHF service; output power 1.5W. Circle (542)

Compact series: 1, 3-phase tube-type amplifiers from 750W to 2kW for FM. Circle (543)

ERDS 3100 encoder: for RDS transmissions on TV aural channels. Circle (544)

AURAD System 2: automatic "control booth" for radio automation; manage up to three different musical networks simultaneously. Circle (545)

WATC master clock: with timer, counter, outputs drive clocks; digital LED displays. Circle (546)

**A.F. Associates**

EPO Pan Bar: remote-control pan/tilt head slaves to manual pan bars with zoom, focus hand control; will permit all typical operations of the camera from a remote location. Circle (547)

**A.S. Associates**

Serco height modification: for Viniten Teal, Fulinor, Teen pedestals; retrofit equipment with zero pedestal height control. Circle (548)

EPO RoboPed software: On-air package learns, recreates complex camera movements with robotic attributes of pan/tilt, zoom focus, height, X-Y floor position; LINK, CONTINUOUS, mirror, build complex movements. Circle (549)

EPO Extended ARC: enhanced robotic camera operation; full CCU control for studio, ENG; 60V battery pack outputs, switched functions; audio, video, microphone, triggering, teleprompter, AN, JN, read-in, play-out, connected, interlocked; extended control unit for peripheral interfaces. Circle (550)

**AVS Sigma**: image correction, format interchange, synchronizer, preamp; 525-, 625-line, composite, component, RGB/YL/V, Y/C formats: 16dB noise reduction from triple filtering; motion adaptive processing. Circle (551)

**AVS**

MX-100: rack unit; RISC-design titler; dynamic, memory capacity to anti-aliased fonts; linear key, character set for 45 languages; 200 master type-face library; LogoComposer, Graduated Color, dual video standard, increased reliability. Circle (552)

**AVS Integrav**

Integrated digital mixer, 3D effects; FlexKey, four keys with level background compositing in one pass; 4.2:2.4 architecture; pesticides: 2x2/3x3/4x4 sizes; image effects: 3D effects with key channel. Circle (553)

**Afterglow**

D1 serial coders: Miranda SER-100 series products. Circle (554)

Telecine products: by Fosterdene, Video Engineering, Perfektion. Circle (555)

**Akal Professional/IMC**

DF-MMac, DDR-Mac: software allowing Macintosh SE/30 to access a D100 100MHz-optical disk recorder; FM-Mac emulates front operation of the recorder. Circle (556)

S1100: stereo sampler; digital output; compatible with SMPTE, Digital /F/X interface; 2 Mbyte RAM expands to 32 Mbytes; 18-bit D/A improves S/N dynamic range; DSP functions of reverber, chorus, pitch-shift; reads solid disk created for previous sampler products. Circle (557)

**AKG Acoustics**

Dx bX 4100: for noise reduction; 2-channel encoding, decoding circuitry. Circle (558)

Dx bX 363X noise gate: 2-channel for one stereo or two independent signals: threshold, hold, release rate controls; key input, engage, monitor, bypass; VCA with 1 linearity over 100dB gain change. Circle (559)

The 1991 NAB Engineering Conference and Technical Equipment Exhibition again broke all records with more than 51,000 total attendance. The number of exhibitors and the exhibit area prompted Broadcast Engineering to take an editorial staff of 13 to meet the commitments of press conferences and visits to each exhibitor's stand. Our primary goal was to collect information from each exhibitor regarding the new products introduced at this exhibition. What follows is a compilation of the data collected. Not every manufacturer had product information and some, who promised a demonstration of new features, failed to respond in a timely manner. Even so, we feel that this presentation will prove the most comprehensive post show coverage of NAB '91.
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So now you can have a universal synchronizer at down to earth prices.
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Was key, wipe effects module for the E-Pix nonlinear editing system.

AMX Corporation
AX-MSP/LCD; Mini SoftWire Panel, 16-character 2-line LCD shows devices, associated functions; 20 buttons access various functions.
AXCSPK speech card; digitized vocal response unit for ACCESS remote.
AXC-222 card; communicates among 255 devices for sound, speech, reinforcement, recording; in ACCESS system.
AXC-X10 card; device control module.
AXC-SMP SMPE interface; for SMPE-compatible devices to ACCESS remote control; synchronzation signal may be added when material is produced or during editing.
PRO-2000; Prodigy lightening dimmer.

Andrew Corporation
Dryline dehydrator; pressurization with membrane separation drying technology; permits settings of defaults, alarm thresholds; LCD displays programming, system status.

Type FSJ-50A: 1/4" flexible 0.664# line; operation to 20.4GHz, 31.2db/100 ft attenuation at 18GHz; min. bend radius of 1; use with N, SMA, TNC, BNC, HN, UHF connectors.
DIN connectors: male plugs, complying with T/16 DIN 47223 specification; for foam dielectric Helix cable in 1/8", 1/4", 1/2" diameters.
MACKLINE: high-power inner coaxial conductor absorbs expansions/extractions of flanges, metal sheeting, causes of flashover.
Alpine antennas; expanded line; low to medium power for translators, LFTV to 30kw; CP versions; wideband, multichannel operation.

VALU/Linkupslink: 75WHPA for 3.7, 4.6m antennas; video, 2-channel audio; accepts encryption devices, low-cost uplink package.

System upgrades: 4, 5 ports for dual reflector C, Ku-band antennas; prime focus for 4-port dual-band receive-only operation.

APC-300 steptrack controller: tracks satellites with signal from video receiver/AGC, and beamform receiver; SMARTTRACK constructs satellite position tables from steptrack operation.

APCSNKG, APC100: 2.4m SNV/SNV antenna, APC-100 controller; RS-422 interface; display for production truck installations.

8m earth station: C, Ku-band antenna; special main reflector, Gregorian subreflector; 59.4dbi gain at Ku; 52.6dbi at C-band; modular with large hub enclosure; motor drive systems.

Transportable electronics: complete package with antenna, RF, test equipment; adapts to 1.8m FlashPac, 3.7m Trifold antennas.

ASC-3000 controller: earth station control runs under Windows 3.0; includes automation, multi-level password protection; to five control console in a system.

FP187-277C; FlashPac antenna; 1.8m system; packaged in six "check-in" containers; C, X, Ku, Ku/C-band, CP linear polarizations.

Angenieux
15x lens; studio, OB 1/4", 1/2" CCd cameras; MOD of 0.5m; 68' wide angle; 1/4 for 1/2, 1 sol for 1/2; adapter for lightweight cameras.

Arri USA
Model ME 4510B: digital microwave analyzer; measures link delay, amplitude, phase, multipath, space divergence propagation delay.

Antenna Concepts
Blastor: high-gain UHF CP antenna; multistation system for eight 1kw channels; typical power rating 4kw per 4-element panel.

FM Tracker: omnidirectional broadband CP FM antenna; 3kw SAW option per bay.

Sizzler: UHF CP TV antenna; omnidirectional, protective, non-operiured radome; standard beam tilt, null fill; -6/15 dBd gain.

Antenna Technology
ProLine: satellite receivers, electronic; includes 1GHz switching system; LNA, LNB, LNC units; refurbished satellite earth stations.

Anton/Bauer
CMQ2 charger: 2-position sequenced 4-hour charge for Compact Magnum batteries or 8-hour charge of one full-size Logic Series.

ULTRALIGHT 2: compact built-in-the-camera lighting product.

Magnum quad NPCM: module expands Magnum Quad charger to 8-position system.

A.Nilv Cases
A.J.R. isolated rack: transport case for rack-mounted equipment; conforms to ATA standards; air space for proper ventilation.

Apex Systems Ltd.
320 Compiler enhanced: compressor, limiter, signal leveler; dual mono; stereo operation with Leveling or Compression/Leveling link; reference level select, leveling speed, peak limit defeat from front panel; analog control.

Digicoder: analog stem generator; RF output (parallel path digital modulation); stable, maximum separation; no processing delay.

Applied Memory Technology/AMT
7422 videodisc: digital component recorder; 100s capacity per CCIR601; parallel recording transfers data at 21Mbit/s; 525-, 625-line.

Applied Research & Technology
HD-31: 31-band, 1/2-octave graphic EQ; XLR, TRS, terminal block connections.

HD-15-band, 75-band channels, 5-octave graphic equalizer; TRS, terminal block I/O.

Stereo Master MDC2001: compressor, de-esser, expander, noise-gate, exciter, limiter; balanced XLR, TRS I/O; stereo auto-detect.

Arcor Engineering
DZ2202CLR: clear-jacket, audio cable.

Arrakis Systems
Systems 6, 12, 18: enhanced 12,000 series consoles, accessory items.

Artflex
Zeiss 65mm: T/1.3 prime lens.

Varicon contrast control system.

ARR 355: 35mm camera with microprocessor control unit.

Support system: 35mm/16mm camera and accessory package.

Compact HMI lights; 575W, 1.2kw. 2.5kW rating; single-ended lamp socket.

Softlight: 2kW, 1KW instruments.

Ballast: electronic; flicker-free.

ARTI
promp; promo-c: network media controllers with Arnet protocol; mcx-VITC capability, window dual character generator for time values, M/E I/O and visible timing markers.

Control Station: professional edit control for Macintosh-based video editing (Video Publisher A/B editing software, Arnet control).

ASACA Shibasu
CM3211H, CM3611H; 32", 36" line-in line-out HDTV color monitors; for 1,125-, 1,050-line interfaces, 525-line sequential scan.

TG70A6: programmable HDTV/NTSC test generator; composite, component, HDTV.

TG712: HDTV/NTSC/PAL generator.

TP18C6: HDTV zone plate generator.

TG71AX: digital test generator for NTSC, PAL, fully programmable.

CM291, CM1411N: 20", 14" HO color monitors; in-line dot CRT; automatic setup with five color temperature memories.

Associated Press/AP
AP NewsDesk: LAN version; news software for PC; text editing, read-time computation.

GraphicsBank: dail-up graphics service; wide range of high-resolution elements and finished images for TV.

A&T Network Systems
STF 620 SDQ: sound program transmission equipment with 2,048bit/s data rate.
...fills another hole in the switcher market.

You need to handle more than 10 inputs but don't want to give up the space or budget for a large 16 input switcher...

Ross has the solution. ...the compact, 16 input, reasonably priced, model RVS 216A.

- the production power of 6 more video inputs than any other compact switcher on the market today
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- Linear Downstream Keys
- a compact, cost effective package ... priced to fit your budget
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Ross Video Inc., P.O. Box 880, Ogdensburg, New York, U.S.A. 13669 0880

Circle (53) on Reply Card

www.americanradiohistory.com
Broadcast Engineering June 1991

ATI Audio Technologies

HD1000: headphone amp; balanced stereo line summed with mono mic; master level, individual output controls; expansion bus output. Circle (689)

PS92: Press Box DA; two/mic line inputs switch together or separately to eight balanced outputs; meter, XLR connectors provided. Circle (670)

Audio Accessories, Inc.

Data patch: RS-422 serial data distribution; 24-port with 12x1x2-out; 2-rack configuration with 48 ports permits 24x24 array. Circle (671)

RS-422: prewired patch bay for serial data distribution; 24x4x2-out vertical, horizontal paired 12x1x4; internal normalised. Circle (672)

Audio Animation

The MUSE: digital transfer console for CD mastering: 24 to 56 bit real time processing; precision level, EQ, dynamic rate controls. Circle (673)

Audio Developments

Model AD156: dual mic amplifier with EQ; 1RU panel, integral power supply. Circle (674)

Model AD151: dual compressor, limiter; independent controls per channel; stereo or mono switching; I/O metering. Circle (675)

Model AD152: compressor, limiter, mic pre-amp; RF shielded; combines functions of AD151, AD152 into one package. Circle (676)

Model AD153: 2x10-in audio DA; each output individually transformer balanced. Circle (677)

Audio Intervisual Design

COS-11BP: lavalier mic; battery pack for AA, 12-5Vdc phantom power; polyethylene sulfide diaphragm withstands high humidity. Circle (678)

Audio Kinetics Ltd.

MasterLink: console automation, transport synchronisation; retrotfits most consoles. Circle (679)

ES: 4x4 with expandable emergency automation module; integrates with Motionwork's systems interface, console automation, studio control from SSL, Neve, GML. Circle (680)

Audio Precision

F.A.S.T.: high-speed audio channel test system for network, short-interval on-air, general audio use; does FFT analysis; for System One. Circle (681)

Portable One: portable audio test set with twelve tests; comprehensive distortion, noise, phase, crosstalk measurements. Circle (682)

Audio Processing Technology

SCS100, SDS100: coder, decoder boards for apt-X audio data compression as OEM subassemblies; £245,000/£295,800. Circle (683)

ACE 100: digital audio expansion card for PCs; compresses 16-bit PCM audio 4:1; stores 30 minutes of stereo on 65MB/3 disk hard disk. Circle (684)

Audio Services Corporation

Wireless Boompole: van den Bergh boompole, Lectrosonics Pro-mini-H wireless mic. Circle (685)

Audio-Technica

Stereo production package: AT4462 mixer, AT8200P OnePoint N.Y, and AT894 mic. Circle (686)

AT 851u: uni-pole condenser mic; low-cut filter. Circle (687)

PS200: Pro Series II multi-circuit. Circle (688)

AT 804u: field omnidirectional mic; hand-held; smooth response, high output. Circle (689)

ATM77: mini cardioid condenser headset mic; attached to 3½" flexible gooseneck mounted on headband; BB battery or external 5V-52Vdc phantom power. Circle (690)

ATM 55: high-intensity clip-on mic. Circle (691)

CP8050 supply: 24Vdc power for single UniPoints 800, Artist, Pro mic inputs; wall power module; XLR connector plugs into console input; compatible with ModuComm 2-way system. Circle (692)

AT 825: single-point, field stereo mic; switched low-cut filter, windscreen, 2-way power; dual UniPoint mini condenser cardiod. Circle (693)

Auditionics

Model 800: on-air radio console. Circle (693)

DESTINY: on-air, production audio console; flexible digital control system. Circle (694)

Aurora Systems

AU/265: high-speed, 80486-based processor for Aurora Paint. Circle (695)

AU/300: third generation paint, animation software; hardware and software. Circle (696)

AU/280 Cadet: multiplane animation, switcher effects, color cycle animation from 2-D, 3-D graphics system; CCR 601 I/O, RGB and alpha channel outputs; icon menu, audio input; 230-422 computer control ports, cart 1; 40s stereo; eight spots per cart. Circle (697)

EMT-710: audio router with 16x16 to 32x32 configurations; high-level balanced I/O; operation by AU/280-422 interface; can be linked with BVS video router. Circle (698)

Autogram

Pacmaner S18: six mixing channels; five dual-input, one 8-input at 150mV, 20Vg or 500mV line; P&D conductive-plastic sliders, VCs. Circle (700)

AVCOM of VA

MVT-1000A: microwave video transmitter; used with PSR-1000A for broadcast, surveillance, security. Circle (701)

PSR-100A: portable surveillance receiver; compatible to MVT-1000A transmitter. Circle (702)

PSR-1500B: portable satellite terminal; for service with inmarsat narrowband audio in 1.5-1.5 GHz band; fits in attach case. Circle (703)

AVI Technology

Broadcast verification system: subsonic tone from master tape sensed by data receivers; verification device automatically returned to AVI mainframe for processing. Circle (704)

Avid Technology

Avid 200 series: non-linear editing, many features of 2000 series; differences are in slower processing speeds and lower image resolution. Circle (705)

Media Composer 2000: non-linear editing in full resolution video through JPEG compression; integrated digital audio digital audio full resolution output from disk directly to tape; graphics, titles; automatic time-code management. Circle (706)

MEDIAIDEO, MEDIA MATCH: logging, film-to-film matchback software. Circle (707)

Avalite Electronics

DJE 1080: 15-bit digital patch panels. Circle (708)

VSW 3250: modular VBI video switcher; in 8x1 or 16x1 forms. Circle (709)

TGE 3250: modular LTC/VITC time-code generator. Circle (710)

Axial Corporation

Axial On-Line: editing controller operates on PC or computer-based system. Circle (711)

B&K

A9/V: prec. 10mV to 1V/µV in 0.2% FS, ±0.2% linearity and ±2% noise. Circle (712)

B&K Controls

Model 4247: digital control for B&K BRVS, BARS routers; programmable remote channels, displays. Circle (713)

Norden: 2000 series: intelligent 2x2 scan monitor; 14"; 20" CRTs; auto kite bias stability; remote adjustment by single or MMRC multimonitor remote controller; light probe; PAL, NTSC, PAL/SECAM, Y¢/Y/BR-BY, RGB/s inputs. Circle (714)

HDM 2048, HDM 2081: 20", 32" high-definition video monitors; multi-format operation with auto setup. Circle (715)

BARCO-EMT

EMT 460, EMT 461: digital cartridge machines; -460 record, edit, copy, play modes; -461 playback only. RS-232/422 computer control ports; cart 1; 40s stereo; eight spots per cart. Circle (716)

EMT-710: audio router with 16x16 to 32x32 configurations; high-level balanced I/O, operation by AU/280-422 interface; can be linked with BVS video router. Circle (717)

Bartec

80386-based archive; single-user, network; works with non-Basys systems. Circle (718)

Caption 21: integrated closed-caption, prompting system; for scripted, recorded, live unscripted material; lower third keying. Circle (719)

MCA-100: broadcast master control automation; control library, fitting, still-stores, etc.; networking option links four MCS systems in multiple output channel operation. Circle (720)

RMS Resource management: for incoming, VCR scheduling, tape tracking. Circle (721)

NRA Jump Start

CMS machine control: for VCRs, titleers, stills-stores, recording cameras, video carts; references to equipment relocate as script is changed. Circle (722)

LaKart 200: multichannel automation; software controls 49 devices with Smart Machine Control. Circle (723)

Adjustable Video Delay; edit; on-screen features, conflict resolution. Circle (724)

ALS-500: multichannel automated library; format independent, 0-transport; adapts for any cassette size, cassette storage expandable. Circle (725)

Bas Manager 150, 200: master control automation systems. Circle (726)

BCC Associates

Amiga utilities: 5KECHO, TELBET for improved programming and operation of BCC-5000, CD-IR animation controllers. Circle (727)

Beaveronks

MoboTime 310: master clock, time signal receiver; four autonomous lines, four pulse types per line; operates analog, digital clocks. Circle (728)

BEEM

CET 3000: 1kW solid-state FM transmitter; four 2500W modules; front panel displays operating configuration, parameter measurements; redundant circuitry. Circle (729)

CET 3001: 5kW solid-state FM transmitter; four 3000W modules; redundant dimension reduces down time; front panel displays parameters, configuration. Circle (730)

CET RX/10 UHF/VHF FM receiver: 300-1000MHz; output power to 2W; RS-232 interface for frequency control and RF mute. Circle (731)

CET 3002: 5kW FM transmitter; solid-state with redundant modules reduce down time; front panel displays parameters, configuration. Circle (732)

CET TX/5000: 2kW FM transmitter; solid-state with redundant modules reduce down time; front panel displays parameters, configuration. Circle (733)

BNC Laboratories

The Wizard: digital FM modulation analyzer; links to PC for monitoring of your station or others at any time, graphic displays of various characteristics of the RF signal. Circle (734)

Belden

Type 8233A: triaxial RG-11/U cable; two separated shield on 14 AWG center conductor. Circle (735)

Type 1506A, 1506B; precision 75Ω video, data cable; 83% velocity factor; 0.235Ω and 0.193Ω; 4506 has Flarnarret jacket, Dubond foil tape with 85%. Circle (736)

Type 8234A: triaxial RG-59/U cable; two separated shields of bare braided copper, 20AWG copper-covered steel center conductor. Circle (737)

84 Broadcast Engineering June 1991
Auditronics 800.
Not just a new state-of-the-art.

A new state of mind.

To really understand the thinking that created the Auditronics 800 series, you'll need more than a new appreciation for the state-of-the-art. You'll need a different state of mind — an open one.

Begin with an idea: Perfection. Because when Auditronics' design engineers began development of the 800, there was only one rule — no shortcuts.

To their credit, they took this opportunity to create an entirely new console whose appearance is more suggestive of high-performance stealth technology than the flight deck of a vintage B-52.

And, the beauty of our new 800 is much more than skin deep. Because beneath its subdued charcoal exterior you'll find uncompromising component quality, and superior circuit design that clearly indicates a "no guts, no glory" mentality on the part of our design team.

In short, the Auditronics 800 is designed and built to incorporate the best of everything broadcasters say they need in on-air consoles today, while omitting needless bells and whistles. The results are astonishing — a high-performance console that clearly reflects not only a new state-of-the-art, but a new state of mind.

If this sounds like your idea of the perfect console for your station, we invite you to find out more about the Auditronics 800. Call 901-362-1350 today for complete information.

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Circle (54) on Reply Card

www.americanradiohistory.com
BNC-4A-2: channel portable mic pre-amp; ideal replacement for many R-DAT original pre-amps; 0.0009% THD at 40dB.

LOUDMOUTH: reporter control station; 1-mic, 4-line; Hi-cut tone; 4-way selector to record and main outputs; 0.0035% THD over 20Hz-20kHz; feeds telco circuit.

BRENTD: 250W amp for translators.

TV transmitter: 10W UHF; self-contained with modulator, for LPTV, 5/4" rack height.

BRADY: Call Screen Manager: provides director, talent screens through Telos 100 system; allows director to show caller's name, interests and give real time information to the talent; for IBM, compatibles; by Capstone Software Solutions.

UNITY 2000: digital FM processor combines AGC, low-frequency EQ, 4-band limiting, limiting, composite clipping, with stereo generator; preset for varaius 4 formats.

The Dividend: composite filter reduces upper composite spectrum noise; protects subcarriers, reduces multipath-related distortion; enhances modulation limit.

BRENTD Manufacturing
Mounting units: wall, ceiling, platform, yoke styles; VCR shell adjusts for front or top loading equipment.

Broadcast Electronics
AirTrack 90: mid-priced linear audio consoles; 6, 12, 18, 24 channels.

AVIODEV: Digital record, playback, direct output, storage for broadcast radio spots; supports four users, one recording, three requesting playbacks; accommodates 24 hours of stereo.

Core: 2000/4000 series: includes rack mount; live-assist; PC controller shows operator all information in English; supports auto announcer lines; character format operation; logs stored on hard disk for review or printout.

Broadcast Video Systems/BVS
Decoders: D-190 NTSC decoder featuring digital, adaptive comb filter, D1/DV dual standard, NTSC, PAL decoder.

ML400 keyer: multiuser unit; four simultaneous key inserts into program video, NTSC, PAL, versions.

TBC: 1100, 2100, 4000 series: includes 24-bit comb filter; combines 24-bit comb filter with 4-bit comb filter.

TBD: time, date, ID generator.

Broadcast Launches General Store
Automatic: telephone muting device.

DNF VTR remote: RS-422, -232, serial control; with JG; by DNF Industries.

R-TEC MC50, RS51e: remote keypad, machine controllers use DTMF tones on any line, to control almost any piece of equipment.

Briel & Kjær Instruments
APE: attachment: acoustic passive equalizer for series 4000 mics; special, directional equalizer diffractions sound field to change frequency and polarity response.

Bryston
Model TP-B: mono amp; USD -0.0009%; THD <0.01%; soft start circuit, 500W, 2812.

BTS
DDS-7 series: digital video serializers, deserializers, modular, racks hold four serializers, deserializers in any combination; switch between 5:10:1; 4:2:2 parallel input, 270Mbit/s serial output; works with 525, 625 video systems.

CP3000PLL: 16-channel switching router control switcher bridges.

SDR 400 serial digital router: for D1, D2 signals; standards independent; supports EDT, bit-compressed, HDTV standard; 16x32 can be mixed with other 16x32 routers.

FTS HS: high-sensitivity, non-smear CCD pickup; for LDK9 through LDK391 cameras; doubles sensitivity of previous chip.

BETacam models: BCB50 portable with 90-minute record times; BCB75 studio recorder, with video component serial digital I/O, analog or serial digital audio; four serial digital AV outputs, audio embedded in serial digital outputs.

LDK-9 studio CCD camera: FT-5 frame transfer CCD with 768-line resolution (560 pixels); 5000 lines, remote control, interfaced with LDK-9; LDK-910; dynamic white shading removes prismatic color artifacts at certain focal lengths; apertures; exposure filter feature.

FDL 90 telecine: advanced CCD with 1,300 active pixels per line (EDTV CCD scanner); 8.6MHz channels; image sizing feature permits 6% linear magnification; dual 2.5GHz LSI chips; used to interconnect digital grain reduction, color correction; 4:3 and 16:9 presentations; NTSC, PAL operation.

Berk Technology
AutoPilot: intelligent remote control for AR-16 multisite operation; point-and-shoot menu requires little computer knowledge.

Cablewave Systems/RF Systems
Bogner antenna: slot-arrays for low-medium, high-power UHF, VHF.

Calaway Antennas
CD 100, 1000: enhanced 4-VTR CE-100, options for user identification, 101-key keyboards.

TurboTracer: for CE-110, -210, -400 editors; expands EDL to 3,000 lines; 4-channel audio capability; runs on MSDOS computer.

Eye-to-Eye software upgrade for CE-100 editing systems; provides integrated preview switching.

CE-400: upgradable editing control; 9,999-line EDL in 80386-based computer.

CE-110: 4-VTR editing controller; ASCII or dedicated keyboard with VTR motion controller; eight programmable GPs, VTR speed triggers; List Management software.

CD-210 edit control: 8VTR on-line control; advanced list management; eight programmable GPs, expands to 16 machines.

Camlock Case
Titan series cases: Fiberglas laminate on ¾" plywood.

Rack system: home installation; 17" rack cases; for CCTV, audio equipment.

Ultimate series: extruded AL cases.

CamMate Systems
Black Magic extend: remote head with camera, pan/tilt control; for loads >200lbs; multicore cable for power, video, control.

Canale Cable
BCA-JX TR: converts DAT digital 1102 XLR-U to 750 BNC, low-line, long-loss path of serial digital audio data on coaxial cable.

Canon Broadcast
Canovision 8 L1: hi-band 8mm camcorder; 15x lens, digital effects, component level, interchangeable lenses mounting.

Canon J33a+11B: 33" internal focus lens; applicable to field production and ENG.

Carpel Video
Tape cleaners, inspectors: for large and small Betacam SP cassettes.

CBS Custom Business Systems
Software option: SCO Unix operating system for broadcast broadcasting, traffic/billing, music and other software.

InterACC: interactive accounting system for multistation, multidivision applications by modem; for better accessibility, faster analysis of business records.

CCA Electronics
FM200/A: 30W FM exciter at low cost.
There are many reasons to keep using your tried and tested tube cameras. Apart from being major investments in your studio line-up, there's the high resolution, low lag and exceptional picture quality you can achieve with them.

Of course, the best tube cameras depend on the best camera tubes. So you need to be assured of their continued availability.

**GOOD FOR YEARS TO COME.**

Philips has made a firm commitment to keep producing the Plumbicon range of camera tubes. With a reputation earned in the world's most popular cameras, they're sure to be in demand for many years to come.

So long as there's call for the high quality images Plumbicon tubes can provide, we'll continue to provide Plumbicon tubes.

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**Philips Components**
Broadcast Engineering  

**Chester Cable/Alcatel NA** 
**Video 20CL2:** video cable, 0.325" OD, solid-core, double-brad shield; PVC jacket; precision 75Ω; compatible with KS-299 connector. Circle (831) 
**EF audio series:** single, multipair jacketed cables; high tensile strength in smaller OD than previous PR, PJU series; shield is bonded to inner jacket; ripcord design simplifies stripping, termination preparation. 

**Chyron** 
**COD:** compact character generator; remote operation from a terminal; offers 1,500 master Bitstream platform library. Circle (833) 
**MAX:** dual-channel filter; compatible with InFi-Net system; full feature system; logo compose, video input, transform, and other features and options. Circle (834) 

**Cinema Products** 
**Steadicam EFP enhancement:** active matrix color display; for cameras to 24 lbs, options for NTSC, PAL. Circle (835) 
**ZBL lens drive:** silent motor operation; lightweight, powerful, guaranteed minimum backlash. Circle (836) 
**VIDIFLEX 35 camera:** integral video viewing system for Steadicam or other operations; 2-6fps speeds; interchangeable mount for PL, BNC, Panavision lenses; supports Steadicam, ARRI film magazines. Circle (837) 

**Cifver Digital** 
**CDI-328:** random-access digital audio recording system. Circle (838) 

**Circuit Research Labs** 
**Dayport Timer:** accessory for Audio Signature processor. Circle (839) 

**Clark & Associates Ltd** 
**VG-341:** TV/cable character generator. Circle (840) 

**Clear-Com Intercoms** 
**XP-10 Matrix Plus panel:** expands intercom with 10 more positions on an ICS-2000 digital user panel; 20-key version available. Circle (841) 
**IF-48:** multichannel modular camera interfaces; connects Clear-Com system to cameras and other 4-wire devices. Circle (842) 
**MS-812:** 12-channel, programmable parallel line station, solid audio, contact closures. Ifb. Circle (843) 
**ICS-60 Matrix Plus:** user station for digital intercom; six silent talk dual switching control buttons; talkback, mic, speaker, call keys; unshielded twisted pair wiring. Circle (844) 
**LFS series:** Matrix Plus mini stations. Circle (845) 

**CMC Technology** 
**Betacam SP:** upper drum refurbishing. Circle (846) 

**CMX Systems** 
**CASS-3:** audio editing system with new operating system: based on IBM and interfaces through Adams Smith, TimeLine. Circle (847) 
**CMX 3500:** replaces model 3100B with control for eight devices (7 VTRs), effects and audio switcher, GPI ports, previous 300, 3000 series upgrade to the 3500 system. Circle (848) 

**ColorGraphics Systems** 
**DP-4.2 server:** for LAN operation with designated PC as network file server. Circle (849) 
**100 Second DP/Mosaic:** extended DP/Mosaic digital video recorder with 100s storage of D1 information. Circle (850) 
**Version 6.4:** software upgrade for LiveLine 5, ArtStar 3D Plus graphics systems. Circle (851) 
**Software upgrade:** CP/MAX, DP/Mosaic and DP-4.2 systems; unified 3D animation, enhanced paint, 2-D interpolation and Morph Animator functions. Circle (852) 
**Maxframe:** video computer on VME boards in DP-4.2 video interface; speeds 3D and animation processes. Circle (853) 
**Macintosh, PC Utilities:** file import/export, conversion facilities. Circle (854)
paragon \par-e-, gän, -gen\ n
1: a fully digital transmission processor for all broadcast environments.
2: Featuring:
   No clipper, meaning no clipping artifacts; 4-band compressor and 4-band limiter; 10-band graphic EQ; 9" VGA touch-screen equipped video monitor; factory-loaded sound library; on-air A/B comparison. **User installable options** will include a AES/EBU digital I/O and Stereo Generator.
Multilingual Computer Engineering
pression doubles storage; Data reduction board: single station, ages
BCAM1.70, BCAMLAN: enhanced software Computer
control, through CUE
editing
Management,ing #1473 head.
LOG MASTER
Comprehensive based on 9
Model
COMLUX
Comark Communications/Phomson
in
9

EFP
CVNET
3-D, case. Circle
Out edit points; Plus
3681, -store operation.
for immediate
system: hard disk storage

-3100 EFP: with
 audio codec for paint, animation production

D-890 module.
and/or lamp transfer relay for steady-burning obstruction lighting: programmable. Circle (916)

CM 230: 3-capsule mic produces three indepen
dent channels; could be used with 9-bit battery
operation; 80kHz-15kHz response, 120dB SPL and
-56dB sensitivity. Circle (917)

Macro-Reference: monitor amp with toroidal power transformer; conversion cooling; output
device protection: drives loads as low as 1Ω: 760W/channel. Circle (918)

Cycle-Set
Satellite Shuttle: high-speed delivery of TV commercials, video by satellite from production centers in NYC, Los Angeles to 21 cities; 2-hour delivery. Circle (919)

Data Center Management
Hardware upgrades: newsroom automation using DEC hardware. Circle (920)

Datatak
D-850, D-851: 1-2 channel audio DAs for D-800
10x1 switches; six resistive analog inputs, balanced or unbalanced bridging input; output +28dBm across 600Ω. Circle (921)

D-872: RS-232/RS-422 communications converter modules; 12-Apr: mic or phantom or 9V battery
operation; 50kHz-15kHz response, 120dB SPL and
-56dB sensitivity. Circle (917)

D-890 series: digital audio modules; D-890DA with 1x6; D-891 AES/EBU 20-bit D/A converter with
regenerated output; D-892/85 AES/EBU 20-bit A/DA
converters: 64x64 architecture for Colacolor
transforms. Circle (923)

D-2400 switching system: A/V router for multi-
level audio, video; for 800 sources, 800 destina-
tions; 40MHz bandwidth video matrix; 116dB
dynamic range. Circle (924)

D-806 YDA: 10 outputs; 0.05dB at 8MHz, 25MHz
bandwidth; optional EQ plug-in; usable as subcar
rier DA. Circle (925)

D-2459, -2457: under-monitor, LED alphanumeric
The wonders of sound and vision found in nature are hard to reproduce. In fact, if anyone has come close it’s EEV.
Whatever your broadcast requirements, you’ll find EEV has the technology to match. High-efficiency UHF Television Klystrons from 5kW to 70kW for Television Transmitters. A range of Broadcast Tetrodes and Vacuum Capacitors for AM and FM transmitters, and Leddicon® camera tubes to fit virtually every broadcast color camera available today. Our experience is the key to technological leadership. Our manufacturing know-how ensures the highest quality and reliability. Above all, our professional dedication to our customers’ needs makes us the natural choice of broadcasters the world over.

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EEV Technology for the Broadcast Industry

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CANADA: EEV Canada Ltd., 67 Westmore Drive, Rexdale, Ontario M9V 3Y6. Telephone: (416) 745 9494. Telex: 06 9910363 Fax: (416) 745 0618
UK: EEV, Waterhouse Lane, Chelmsford, Essex CM1 2OU, England. Telephone: (0245) 493493. Telex: 99103 Fax: (0245) 492492

Subsidiary of the General Electric Company plc of England

Circle (59) on Reply Card

www.americanradiohistory.com
display of source ID for eight sources: RS-422 or control from D-2000, -2400 switchers -2457 10-destination alphanumeric display. Circle (926)
D-2422: RS-422 data routing switcher. Circle (927)
D-2454: desktop control for routers. Circle (928)
D-2421: stereo router, left-channel/right-channel reversal feature. Circle (929)

Dataworld

3" terrain data. Circle (930)

Expanded services: FM, LPTV detailed interference studies; coverage population density, terrain shadowing map services; received signal level maps. Circle (931)

DaVinci Systems

Resnaissance Hilres Kiloscope: secondary color correctness; multiple, variable width vectors with automatic centering for 1/4" accuracy. Circle (932)

Decision, Inc

Broadcast System III: Ver 6.0; traffic, commercial schedule, logging, sales prospect management; copy/co-op management, avails; Lotus-style menus, Decision Query System. Circle (933)

Dedotec

Dedolight 150: high-intensity light; 24Vdc, 250W lamp; optical focus; air-flow in housing cuts heat output. Circle (934)

Denny Manufacturing

Backgrounds, Props: photographic, studio backgrounds, props for portraiture, sets. Circle (935)

DENON

DN-7700R: CD cart recorder; uses ACD-17 optical discs for 63 minutes storage, recordings playable on DN-970 player; digital, analog I/O; master-slave link to 10 machines for duplication. Circle (936)

DHK Group

DIGICORDER: compact digital audio recorder, player includes "Audisk DAR"; 400 minute 15kHz stereo with 3.5" hard drive; random access and programmable; replaces all audio cartridge, reel machines. Circle (937)

Di-Technology

Model 5217: wideband routers; 16x16 matrix for 100MHz signals. Circle (938)

Matrix Manager: Unix OS for virtual matrix system; 8-character names; 32-level routing; multitasking in multi-user environment. Circle (939)

Model 5216: expandable 16x16 serial digital router for D1, D2 signals. Circle (940)

Series 3430: small matrix switchers, 16x2 video only, audio only; 16x1, 24x4 AFV; 30MHz video bandwidths. Circle (941)

Di/’Digital

MQ series: digital audio tape; cassette lengths 15-122 minutes; MicroFinity metal particle formulation. Circle (942)

Dielectric Communications

TCB antenna: cavity-backed, CP single, multistation antenna, for FM, mid-high band VHF; 3-panel array for omnidirectional pattern; special directional patterns available. Circle (943)

Control panel: universal switch controls one, two coaxial, waveguide switches at manned, remotely controlled transmitter installations. Circle (944)

Digital Arts

DGS/Silicon Graphics: software for Silicon Graphics Iris, Irisvision systems. Circle (945)

DGS V3.3: enhanced 3-D animation with Render Manager; interactive assignment of surface characteristics, shading parameters; modifies lighting and positioning. Circle (946)

DGS Paint: 3-D modeling in 32-bits; Truevision Vista frame buffer; digital compositing; NTSC, PAL I/O standards. Circle (947)

Digital Audio Research

SoundStation DSP enhancements: signal processor; segment-based capability for 4-band parameteric EQ, gain, pan control of all segments; processing attributes become tags to segments during editing, production process. Circle (948)

DASS 100 Interface: multifunction synthesizer, multidevice interface, signal processor; signals transferred among equipment in digital domain; sampling frequency converter, format converter, gain adjustment; test signal source. Circle (949)

SoundStation Options: 16 simultaneous output channels; eight track-hour storage. Circle (950)

Digital Audio Technologies

Stellae/StarLaser: studio R-DAT; dual transport; direct recording of two tapes; 44.1kHz, 48kHz can be used simultaneously; copy function, time code reference manipulation; PC-type editor; multi-track recording, playback. Circle (951)

Digital F/X

Video F/X 2.0: non-linear editing, optional A/B roll, PICS animation for desktop video system; support for additional tape decks. Circle (952)

Soft F/X: low-cost disk-assisted, video editing with Macintosh II; use as off-line editing system; final assembly on Video F/X system. Circle (953)

Filecon: imports graphics from Macintosh to Composium system. Circle (954)

Version 3.0: live-action compositing, rotoscoping; upgrade from 9336B to 9345E CPU. Circle (955)

Fantone color system: to calibrate video equipment with Fantone color palette. Circle (956)

Digital Microwave

Model DV70: digital video modulator, demodulator for satellite transmissions. Circle (957)

Model DV45: digital video, audio codec; rated for 45Mbps/s. Circle (958)

Digital Processing Systems

Series 5900: signal DAS. Circle (959)

DPS-295: sync/test signal generator. Circle (960)

PC plug-in: TBC-on-a-card; for Neutech Video Toaster and similar PC-based video production products. Circle (961)
We’ve Got A Screw Missing!

In fact we’re missing two, and it represents a significant design improvement in our famous A3F and A3M audio connector!

Introducing the NEW AA3 Series from Switchcraft with a sleek, new streamlined look. And...it's available in black too!

Now, anyone who assembles or uses this well-known and relied-on audio connector will appreciate the many benefits incorporated in the new AA3 series.

For example:
- Only 1 screw instead of 3 means quicker assembly time and lower costs.
- No need for a special tool
- Solder cups are repositioned for quicker, easier access
- Clamp remains with connector, no screws to contend with, and features a fold-down tab for ground to pin 1.
- New design permits easy exchange of flex relief for color coding if desired
- New insert “Greenie” is even more resistant to chipping and wear for longer connector life.
- And as always you can depend on the rugged all metal construction to pass the “stomp-on” test.

Get “real inside story” from your nearest Switchcraft source.

Switchcraft
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5555 N. Elston Avenue
Chicago, Illinois 60630
312-792-2700
FAX (312) 792-2129.

(and...the A3F and A3M Series are still available too!)
Garten Industries
660B series: degaussers for S-VHS, D1 media; 850 Oe from "Y"-coil, manual operation. Circle (1124)

GE American Communications
SATCOM C-4 service: replaces SATCOM R-1 transponders for program distribution, backhaul services. Circle (1125)

GE Lighting
Linear Halogen: uses infrared coating technology; coating passes visible light, reflects infrared back onto film to improve efficiency. 350W to 660W. Circle (1126)

HV lamps: high voltage stage, studio lighting designed for European market. Circle (1127)

Gefen Systems
CD-Sound music manager: access to 100 CDs online with NSM CD2100 changer. Circle (1128)

CDJ Mac Jukebox: entertainment sound management for CDs; NSM CD2101-AC changer; Macintosh compatible. Circle (1129)
SoundTouch music system: CD sound management by Sony, remote, Touch Screen control by IBM or Macintosh, Gefen interface. Circle (1130)
Background Music: packages in six different formats. Circle (1131)

Digiflacs: 10 sound effects categories in library by Ljudproduktion AB, Sweden. Circle (1132)

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Lazer: digital processor, clean stereo separation, limiting; generator creates left, right channels; controlled modulation limits; optical encoder converts analog to digital; expansion to processing chain available for future. Circle (1139)
PeopleLink A77: acoustical telco interface for boardroom audio conferencing; eliminates acoustic echo; central node for connection to other conferencing equipment. Circle (1140)

Gescam
4/4 OB: lightweight matte box; mounts to lens; 3/4 oz overall weight. Circle (1141)

GeoFocus: follow-focus; 3-speed forward and reverse. Circle (1142)

GeoEX: lightweight CR-39 resin filters; Matte box; 15 gram; improved color saturation, smoother gradations. Circle (1143)

GEPCO International
G724-M: 24 gauge multipair audio cable; each pair shielded with extra flexible jacket. Circle (1144)

Breakout Boxes: for remote field use; two models have 32-, 64-channel capacity. Circle (1145)

2121B: digital video 12/16 pair for extended distance connections. Circle (1146)

Getrix Images
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Venice videographics: paint, 2D animation effects; 3D synthesis; combines graphics with live images. Circle (1148)

GML, Inc.
Model 9100 HRT: HR topography, configurable, rack mount mixers; 12 modules per rack; direct in/out; 4 bus; 4 aux out per input. Circle (1149)

Moving Fader upgrades; lader status configurations; "Smart Start" starts mix without initial preset. Circle (1150)

Additive Grouping" group master effects save faders similar to VCA group. Circle (1150)


Grass Valley Group
MCF series: multichannel fiber optics with digital and other distribution equipment. Circle (1152)

VPE-241: mid-price edit control; extends VPE-141 system with four EDL bins, 8,004-line EDL; SWAP second floppy disk drive; software incudes 409 and TRACE. Circle (1153)

VPE-131 controller: edit with six device ports (four VTRs); full function keyboard, jogger, 100-line EDL, on-board disk drive; Super Edit software; for small online, offline suites. Circle (1154)

DPM-700 manipulator: 3-D effects, rotation, perspective. Circle (1155)

KeyLink: Key-Layer: functions from #110 switcher and DPM-100 effects system combine into video production system. Circle (1157)

Model 3000: production switcher, Dialog with composite digital processing; key inputs for all video inputs; layering capabilities. Circle (1158)

Model 200-2 enhancement: Peripheral Bus controls off-line switcher to be integrated into production system. Circle (1159)

Gray Engineering Labs
DTR-313: time-code reader, generator; SMPTE/ERU spec; independent LTC, VITC read, generate functions. Circle (1160)

Patching Equipment

Audio Patching
- Panels & Jacks
- Pre-Wired Audio Panels
- Patch Cords
- Available in both 1/4 & mini sizes

Video Patching
- Video Panels
- Video Panels & Jacks
- Patch Cords
- RGB Panels

RS-422 Patching
- One Rack-Unit, 24 Port (12 in, 12 out)
- Two Rack-Unit, 48 Port (24 in, 24 out)
- Interconnect Cables

If it's quality patching equipment you require, you've found the best source! Call or write for details.

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Broadcast Engineering June 1991

Circle (66) on Reply Card

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DYNAIR SYSTEMS HAVE SPECIAL ABILITIES TO DISTRIBUTE, SWITCH, CONTROL, AND GROW.

From low-cost DA's, HDTV and serial D2 routers and fiber links all the way to 1600x1280 graphics switching systems. Only DYNAIR meets your needs with a complete spectrum of products for routing and distribution.

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**DYNASTY.** A full line of central routers from NTSC through HDTV to high resolution. Vertical interval switching for every signal in your plant is provided by separate sync for each level.

**DYNA MITE.** Serial D2, video, audio and TC in a single, compact low-cost router. Flexible enough to operate with a multi-panel control system. Ideal for small system applications, its modular design can be expanded to DYNASTY.

**SERIES 400/1200 DISTRIBUTION.** From serial digital to HDTV to broadcast, a full line of fiber/coax distribution. They provide the industry's best differential phase/gain and signal-to-noise. At a cost of only $900 per link for building-to-building, on-location, or in-studio cable runs.

**MiniStar CONTROLS.** These flexible controls can be switched back and forth between single bus, multi bus or full X-Y control. They're easy to learn, computer controllable and offer destination locking and source restrictions. And the same control panel handles all DYNAIR switchers. So there is only one panel to learn. Only one panel to store for spares.

From dependable switchers to controls and links, DYNAIR systems offer you the complete solution: serial digital, HDTV, NTSC, PAL and high resolution graphics signals in both fiber and coax.

Whether you need a simple, low-cost solution or a large-scale integrated system, DYNAIR’s 33 years of proven reliability and precision performance make it the smart way to go. And the best way to grow.

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We've Got A Screw Missing!

In fact we're missing two, and it represents a significant design improvement in our famous A3F and A3M audio connector!

Introducing the NEW AA3 Series from Switchcraft with a sleek, new streamlined look. And... it's available in black too!

Now, anyone who assembles or uses this well-known and relied-on audio connector will appreciate the many benefits incorporated in the new AA3 series.

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- Only 1 screw instead of 3 means quicker assembly time and lower costs.
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- Solder cups are repositioned for quicker, easier access
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- New design permits easy exchange of flex relief for color coding if desired
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- And as always you can depend on the rugged all metal construction to pass the "stomp-on" test.

Get "real inside story" from your nearest Switchcraft source.

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A Raytheon Company
5555 N. Elston Avenue
Chicago, Illinois 60630
312-792-2700
FAX (312) 792-2129.

(and...the A3F and A3M Series are still available too!)
Digital Vision

DVNR 1000: 20dB noise reduction; suppression depends on picture, noise distribution; 4:2:2 format with 10-bit architecture; I/O for D1, RGB, YUV, PAL, NTSC.

DVC 1000: TBC, synchronizer for D1; 10-bit processing; format transcoding; composite, component upgrades; IBM-PC control available with serial ports.

DVCC, DP5500: TBC, synchronizer. (Circle 965)

Digital Devices

DataLift DL5, DL3: large screen projector supports; positions unused unit in ceiling; extends to 56" or optional 10'.

DN Labs

Dura-Flux lighting: flicker-free fluorescent; two tubes for 5,500 K lighting; SpectraFlux 99% reflectivity coating on fixture reflectors. (Circle 969)

Model F2520: 320W dimmable fluorescent with eight 40W lamps. (Circle 970)

6kW Par: standard 6kW AC par lamp. (Circle 971)

DC HDI 1000W, 5000W: 1xW, 5kW. (Circle 972)

Dolby Labs

Model 422: Dolby B, C, S-type reference encoder, decoder. (Circle 973)

DSP5500 DXT: digital STL at 950MHz; AC-2 audio coding; two audio, two auxiliary channels in bandwidth comparable to narrowband FM composite; analog L/R inputs. (Circle 974)

Domestic Corporation

KWYATT generator: mobile, standby power unit; 4-cycle, in-line 3-cylinder gasoline engine; negative ground starter; 4kW, 7kW models. (Circle 975)

Dorrough Electronics

Model VLM-1: video level monitor shows average, peak, sync as scaled arc on video screen; combine with two audio meters for modulation monitoring system. (Circle 976)

350kA-meters: console-mounted strobe indicators; dual elements in self-powered circuit, indicating the sum of the difference between the two. (Circle 977)

CVM-40: dynamic video level meter; displays average luminance, sync, peak luminance levels on LED array. (Circle 978)

Dove Systems

TechPro Memory controller: lighting control; memory interface "grabs" dimmer, sets desired level; AMX-192, DXM-512, analog in, AMX, DMX out; 252-cue memory; proportional transitions, multiple crossfades; 18-plee-on submasters. (Circle 979)

DT Electronics

SCX6244EFC IC: parallel multiplexer, demultiplexer; for 4:2:2 video in 625-, 525-line standards; conducts between digital Y/Cga 601, 27MHz parallellite interface format of CCR 565. (Circle 980)

Dunbar Computer Systems

30K Graphics Animator: hardware, software upgrade; extended hard drive; Magmovie keyframe animator, K-PNT paint, dual feature feature; linear keying. (Circle 981)

30K Weather system: weather data gathering, display; 30K Graphics Animator. (Circle 982)

Dwight Cadevich

VP 73: 10x10 video, audio router for duplication systems. (Circle 983)

Copymaster 350: computer-controlled quality control system. (Circle 984)

VS 34: dual processor duplicator control. (Circle 985)

VS 618: control panel matches functions of Panasonic AG-684 video recorder. (Circle 986)

DX Communications

DRC-101/R: data receiver, controller for integrated satellite reception using tiered node addressing. (Circle 987)

DYNAIR Electronics

Series 400 video: fiber transmission system; transmitter-receiver separations to 15km; low differential phase/gain, S/N ratio; compatible with NTSC system. (Circle 988)

Series 1200: serial digital fiber optics for D1; for distances to 1,300 feet; NTSC to 2,600 feet (PAL, 2,000 feet); modules integrate baseband, digital signal environments. (Circle 989)

Dyno Mite RGB: modular router with 10, 20, 30x10 matrices in 2RU. (Circle 990)

MP-2000: control: DYNASTY system multi-channel, VBI switching; source restrictions; multi PC control, salvos; panels connect by bus, home run with coax, fiber. (Circle 991)

MP-9200A: multilevel switcher with 8-Band, follow breakaway; VBI switching for multiple standards; ASIC technology. (Circle 992)

Dyno Mite Composite D2: modular serial router; 10-, 20-, 30x10 matrices in 2RU space; cards expand in/0, bandwidth characteristics of Dynasty system; supports digital, NTSC, PAL, SECAM, HDTV and graphics to 1280x1024 resolution. (Circle 993)

Series 3100: 6-output video, video EQ and pulse DAs. (Circle 994)

Series 450/460 HDTV: fiber transmission for RGB from camera or remote graphics workstations to destination, 1,500 feet away. (Circle 995)

Dyno Mite Camera: composite router for RGB HR; with integrated alphanumeric control; composite, key, audio, sync, TC follow, break, split. (Circle 996)

Dynatech NewStar

NewStar II: workstation software through LAN with open-system standard. (Circle 997)

Odesics interface: links NewStar, Odesics for on-line air news broadcast. (Circle 998)

Rolcall personnel scheduler: software tracks schedules, logging, reminders, vacations, labor agreements. (Circle 999)

Orion interface: create supers with Quanta Orion from NewStar II workstation. (Circle 1000)

Machine Control Units: interface controls radar, video, audio, source adaptive, graphics in the newsroom; also multimedia integration capabilities. (Circle 1001)

EarthWatch Communications

EarthWatch software: 3D landscape visualization of weather conditions. (Circle 1002)

Eastman Kodak

HDTV encoding technology: source adaptive encoding of 24-frame material to reduce data transmission requirements. (Circle 1003)

Photo CD: still-image manipulation features; consumer stores 100 Hi-Res images on interchangeable CDs; NTSC, PAL, SECAM, HDTV. (Circle 1004)

Ektographic Slide Video System: 450-line video output from transparencies; auto focus, tracking, color correction and white balance. (Circle 1005)

ECHOlab

BARO: object-oriented graphic layout on Macintosh with 50 fonts; connects to Tempest effects generator by YIQ-Key cables; disk files by SCSI link; RGB in, RGB/Y'Y''Q out. (Circle 1006)

Edifex Systems

Edifex II system: non-linear editing using Panasonic write-once MO discs; Script Mimic material organizer, disc capacity of one hour. (Circle 1007)

Optifex: digital re-recording system for rewriteable magneto-optical disks reduces storage requirements, costs. (Circle 1008)

Editing Machines Corporation

Empl-1 HD: EMC editing system with 676MByte disk for one hour, 17 minutes capacity with multitrack audio. (Circle 1009)

Enhanced Empl: 348MByte hard disk; C-cube video compression enhances resolution; VHeas image quality with doubled picture size; open architecture system. (Circle 1010)

EmPC: laptop version of EmC2 system; requires VGA compatibility. (Circle 1011)

EDX Engineering

FMSR, TVSR: redesigned PM/TV channel study programs; includes 3", 30" terrain elevation databases; extensive map drawing feature; conduct interference studies; plot protected and interference contours. (Circle 1012)

CDROM-3: 3-arc-second terrain elevation data on CD-ROM medium. (Circle 1013)

CVSoftware: calculates, plots field strength contours; exports elevation from USGS 3", 30" terrain database diskette or CD-ROM in 3" or 1 square degree formats. (Circle 1014)

EG Enterprises

VDR2: VBI data receiver (Circle 1015)

TVCD1000: VBI line-21 decoder. (Circle 1015)

EG&G Electro-Optics

FlashGuard 2000: medium-intensity beacon; narrow beam cuts operation cost; 3-lamp, 3-reflector design replaces Fresnel lens. (Circle 1017)

equipment

192/E electric column on Dino dolly. (Circle 1018)

Model 148 Shymote: extension unit for the Pi-colo crane series. (Circle 1020)

205 mini head: remote control camera head for lightweight cameras. (Circle 1020)

Dinky Dolly 156: portable 4-wheel steerable dolly unit. (Circle 1021)

Electric Image

EIAS for Macintosh: animation tools for film, video and PostScript 3 fonts; conversion to 3D models; 4-window display of objects in orthogonal, camera views. (Circle 1022)

Electric-Voice

RE8N/D: dynamic cardioid mic for recording, broadcast, reinforcement; 16-position EQ switch; N/DYM for high output, wide response; DYNADahmper isolation. (Circle 1023)

RE7N/D: cardioid dynamic mic; N/DYM, Variable D features for crisp high-end sound. (Circle 1024)

S-40 monitor: compact personal monitor with 5W, polypropylene woofer, 1 ferro-cooled soft-dome tweeter; rated for 180W. (Circle 1025)

ElectroGIG Nederland

ElectroGIG: 3D animation, design tools; for DEC hardware. (Circle 1026)

Electronics Research

Invisi-Shield: an electrically transparent antenna shield attached above antenna bays to protect against falling ice. (Circle 1027)

PE960 product eliminator: multi-station filter; constant impedance, high selectivity, wideband attenuation >20dB down at 960kHz. (Circle 1028)

960-6 module: medium power, constant impedance combiner; 25kW output without forced air cooling; minimum input separation of 900kHz; 120kW output; SPX-3: antenna tower sections. (Circle 1029)

1000 antennas: medium power FM panels; 50kW per level, 150kW per system. (Circle 1031)

Electrosonic Systems

PICBLOC III: videowall system. (Circle 1032)

ProCUBE: video projector system. (Circle 1033)

Elenos Broadcasting Equipment

RF-Diagnostic: telemetry, control system; reports data from remotely monitored amplifier to central IBM compatible, real-time graphics. (Circle 1034)

Emiche USA

PhantomP dolot: track, studio crabs wheel; manual hold, Phantom Mini or Phantom AT column for 660 pounds. (Circle 1035)

EMCE Broadcast Products

TST2000: frequency-agile design MMDS TV transmitter. (Circle 1036)

Solid-state transmitters: TTSD00E 50W UHF solid-state; TTU1000E 1kW UHF, TVC 20kW UHF. (Circle 1037)
Affordable Effects From FOR.A

MF-3000...special effects as easy as 1, 2, 3D.

MULTIFLEX gives you a complete array of clean, fluid 3D effects, including Z-axis spin, rotation and perspective, curve and twist, and more...and of course every popular 2D effect you can imagine.

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Programming Multiflex is a snap. The green and yellow panel-switch illuminations indicate active or standby for the next operation—a quick prompt to the next step. And its touch key operation plus a 3-axis joystick assure smooth performance with minimal button pushing.

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Select three independent inputs - background video, foreground video A and foreground video B- for Y/C 358 or composite sources. Program "coin flip" effects to show the same input on both sides. Choose to program effects sequences by setting up key frames or as continuous effects routines stored in non-volatile memory for instant recall.

Versatile performance from the TBC Masters.
Multiflex's built in Time Base Corrector ensures full bandwidth for composite video inputs and Y/C sources. Its full frame memory automatically phases sources to your system timing (even for non-synchronous VTRs), and provides freeze frame and field displays.

High performance, easy operation, affordable pricing from $14,500, three year warranty—
You can't make a wrong move with MULTIFLEX.
Garner Industries
680B series: degasser for SVHS, D1 media; 850 Oe from "V"-coil; manual operation. Circle (1124)

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SATCOM C-1 service: replaces SATCOM R-1 transponders for program distribution, backhaul services. Circle (1125)

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Background Music: packages in six different formats. Circle (1131)

DigItfects: 10 sound effects categories in library by Lizproduktion AB, Sweden. Circle (1132)

Gennam
GT4122, 4123 video multiplexers: two video inputs at 25MHz; one 30MHz control input; optimized for desktop video. Circle (1133)

GS4881, 4883 sync separators: 8-pin device with adaptive stripping at 50% slicing level; sync gating for noise immunity; composite, H/V sync out; scan rates to 130kHz. Circle (1134)

GY4102A fast SPDY toggle: 8-pin video toggle switch; 25-35ns switching; low diff gain; phase; channel isolation 85dB at 10MHz. Circle (1135)

GS9006 D2 cable equalizer: 8-pin package serves as automated EQ circuit for cables to 300m; ECL outputs. Circle (1136)

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MCF series: multichannel fiber optics with digital and other distribution equipment. Circle (1152)

VPE-24F: mid-price edit control; extends VPE-141I system with four EDL bins, 8,004 line EDL SWAP second floppy disk drive; software incudes 409 and TRACE. Circle (1153)

VPE-131 controller: edit with six device ports (four VTRs); full function keyboard, jogger, 1001-line EDL, on-board disk drive; Super Edit software; for small on-line, off-line suites. Circle (1154)

DPM-1000 manipulator: 3-D effects, rotational perspective. Circle (1155)

KeyLink, KeyLayer: functions from #110 switcher and DPM-100 effects system combine into video production system. Circle (1156)

Interface: links Dubner Graphics Factory, Kadenza, Kaleidoscope; 3-D animation, graphics; lets Kaleidoscope do manipulations. Circle (1157)

Model 2000: production switcher; analog with composite digital processing; key inputs for all video inputs; layering capabilities. Circle (1158)

Model 2002 enhancement: peripheral Bus; controls allows switcher to be integrated into a production system. Circle (1159)

Gray Engineering Labs
DTR-3138: time-code reader, generator; SMPE/EBU spec; independent LTC, VITC read, generate functions. Circle (1160)
DYNAIR SYSTEMS
HAVE SPECIAL ABILITIES TO
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From low-cost DA's, HDTV and serial D2 routers and fiber links all the way to 1600x1280 graphics switching systems. Only DYNAIR meets your needs with a complete spectrum of products for routing and distribution.

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Who makes the best ENG wireless microphone system?

The best mini-receiver . . .
The CR185 offers a six-pole helical resonator front-end, followed by narrowband crystal IF filtering at 21.4 MHz. This provides unmatched selectivity and sensitivity, and minimizes drop-outs and interference. A balanced, XLR output interfaces with any professional camcorder.

The best belt-pack transmitter . . .
The M185 is a highly refined belt-pack transmitter. It matches any input requirement and provides “phantom power” for almost any lavalier microphone via a standard 5 pin jack. The belt-clip is constructed of machined aluminum and steel parts, spring-tensioned for a secure fit on any belt or fabric. Audio level LEDs are provided on the control panel for accurate level adjustment.

The best “plug-on” transmitter . . .
The H185 introduces new flexibility to your ENG operations. It makes any hand-held or shotgun mic with an XLR connector wireless. The microphone body becomes part of the antenna circuit, forming a very efficient RF radiator. The audio input level is indicated by two LEDs next to the microphone coupler. These LEDs are clearly visible with the microphone attached for accurate level adjustment.

The best construction . . .
All external parts are constructed of machined aluminum for ruggedness and durability. Shock-mounted crystals are used in the IF filtering and oscillators for reliable operation. The transmitters and receiver are built for the real world of hard knocks.

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Circle (71) on Reply Card

www.americanradiohistory.com
Probe Lens: 19" long, 1" diameter; interchangeable lenses; adapts to all TV cameras. Circle (1243)
Mini-Probe lens: 15" long, 1/4" diameter, adapter; provides three different angles of view, internal light source. Circle (1244)
Mini-Mover tables: motion controlled for animation, reproduction, X-axis and Y-axis movement with microphone motor; use as a camera platform for different point-of-view effects. Circle (1245)

Inovonics
K550 Sentinel: program audio monitor/receiver; all-mode reception: presets for 24 AM, FM stations; supports NRSC-AM, C-QAM AM-Stereo, standard FM stereo, FMX stereo, and analog/digital SCA, RDS subcarriers. Circle (1246)

Integrated Switching Systems
Pathfinder: FO high-speed digital matrix switcher for HDTV, CATV, SONET signals; U/O modules convert optical to electrical and route signals to 1GHz GaAs crosspoint modules. Circle (1247)
CF/FC series: FO links for DI, D2 video with Pathfinder switcher to create complete fiber-optic serial digital video switching system. Circle (1246)

Intelligent Resources
VideoBahn: high-speed video bus with Macintosh NuBus; increases data transfer rates. Circle (1248)
Video Explorer: Macintosh video card permits blends between live, recorded, graphic images; 32-bit resolution with 24-bit color. Circle (1250)

Intelliprompt
Intelliprompt II+: IBM PC prompting system; supports advanced word processor features; pre-defined colors, fonts; style library enables speakers to have display character size of their choice with "read-ahead" feature. Circle (1251)

Intellivideo
Model IV-8: low-cost NTSC encoder; RGB, YCrCb inputs, optional digital delay comb filter, 20MHz luminance response; I-O modulation. Circle (1252)
IV-W: wideband NTSC encoder; digital modulation, comb filters reduce artifacts. Circle (1253)
Model IV-F: NTSC decoder; linear color demodulation with 8-pole, flat response filter. Circle (1254)

International Datacasting
SR250 receivers: BPSK SCPC digital audio, QPSK subcarrier audio reception; 256kbit/s-4:1 compression, 15kHz stereo, monaural. Circle (1255)
IDC/FM/AMQPSK: 9.5kHz asynchronous data rate on C/Ku-band main, sub-carrier frequency-agile, SAW filter, antenna peaking variable pitch tone, signal strength meter. Circle (1256)

International Tapetronics
Digiform: digital operating platform for on-air production; base unit includes software, digital signal processing, operates as digital-cart machine with live assist capability; hard disk storage; interface for satellite automation, traffic, billing, accounting software systems. Circle (1257)

Inraplex
System 4800 DDATLINK: discrete digital audio transmission for 15kHz stereo audio channel at T-T interface, for radio STL applications. Circle (1258)
System 4602 DDATLINK: discrete digital audio transmission link; 7.5kHz, 15kHz digital audio for satellite transmission requirements. Circle (1259)

IRIS Technologies
MX 3200VLR-B: 2x32 switcher for video and balanced audio control. Circle (1260)
MX 816, MX 168: 8x16 video/audio switcher with touch-sensitive control panel, also 16x8 digital router with control. Circle (1261)

ITS/Information Transmission
ITS-1236: 1kW solid-state transmitter; redesigned product; multilevel diagnostics for simplified maintenance. Circle (1262)
ITS-222A: 100W UHF translator, redesigned for improved performance; model ITS-220A (100W UHF transmitter. Circle (1263)
ITS-1610E, 657E: 20W, 50W wireless cable transmitter and amplifier. Circle (1264)

J & L Associates
3dbm Model 800: 10W-1kW solid-state transmitter, UHF or VHF, auto station ID; remote operation monitoring, for LPTV installations. Circle (1265)

J-Lab
CFS-I Field portable switcher: for component signals; 6-in, 2-out with 26-pin connectors; two BNC output groups; intermix M-II, Beta, EBU signal levels; component chroma keyer. Circle (1266)
Production switcher: portable field unit, 12VDC operation. Circle (1267)

James & Aster Music
CD libraries: eight CD collections; more than 5,000 selections; Classical collection includes Medieval, Renaissance selections. Circle (1268)

Jampco Antennas
Model JBBP: balanced penetrator; broadband design, side mount for FM, TV. Circle (1269)
Model JHD: UHF broadband parabolic antenna design. Circle (1270)

JBL Professional
Control SB Micro: personal system with sub-base response; dual chamber bypass design for response below 40Hz Circle (1271)
Control Micro: personal monitor speaker for on-console placement; single transducer with magnetic shielding, spring-loaded connectors for 12ga bare wire, dual banana connectors. Circle (1272)

Jefferson Pilot Data Services
Business software: Sales Management, Data...
Here's The Easy Way!  JVC's KM-D600U.
Kay Industries  
PHASEMASTER APW: portable rotary phase converter; develops 3-phase power from 230/460V 1-phase line; models 3K-5K.webK.

Keltic Florida  
H-40 TWT; VSAT HPA; input signal at any frequency within the operating band; 50-65W output via N connector; for C, X, Ku-band.

Kiogs Electronics  
TITE PAK series: serial digital video jackfield; 75Ω matched impedance; miniature self-normalizing jacks and 0.3" patch plugs.  

Kinetron Laboratories  
K-16/140 HP: log-periodic antenna.  

Laird Telemedia  
Asiatic Data: 1x5 video RF contactor.  

Isotonic Inductors  
AVE-1000: custom multicoaxial designs; for multiple antennas on an AM broadcast tower.

Kinco  
KINSPI10: impedance sensor by Kyoritsu Electrical Works; displays power VSWR, load resistance and reactance on LCD display for AM stations; measures true operating characteristics of a directional array.

Klark Teknik  
Midas XL8: live sound, reinforcement mixer; eight mute buttons, 18 x 2CV channels, 16 discrete 4-output assign to auto mutes, two VCA Grand Masters; VU meter bridge.

Knox Video/GML Grove  
MAP Graphics system; 20-module phantom power; transformerless.

Midas XL3: for complex mixdown operation.  

Klark Teknik  
Kintronic  
KCM-5000 jacks and phasing system.  

Kay Video  
vsAT HPA; live signal adds: 10 master trays, 90 slave machines or banks of machines; switching for multiple proper video and audio from master to slaves.

KX Pro: 2-channel video mixer; 32 inputs per channel; 256 crosspoint switching.

Leitch Video  
ViewGuard 3200: scrambling system; line dispersal with standard NTSC bandwidth provides video, digital audio signal security.  

Lexicon  
OPUS Ver 3.0: software features Autokin, CEPEX for multichannel operation, expansion and machine control functions.

Lightning Eliminators & Consultants  
SBL, SBT: Spline Ball terminator; Terminal; dissipation array concept reduces or prevents most lightning strikes; collects others.

Lightning Master  
Candelabrum Dissipator: four PP dissipator arrays with several mounting options.  

Lipper Smith  
Model CF3000-MK V: ultrasonic cleaner for motion picture film; reduces solvent costs; quick, efficient operation produces cleaner film; less solvent, fume leakage.

Lutec Video  
A 6000 Personal: PC promtter for use with personal computers.  

A 5301 Scrollbox Plus: electronic promtter; capable; on-air scripting; editing; separating; storing; prompting displays; field system permits interactive operation, in conjunction with IBM compatible computers; Prompt Track, Prompt Display, simple interface, film format.

A 4250 Shoebox: mini prompter weighs three lbs; 4" CRT readable to eight feet; CRT removable from mirror/hood assembly for handheld or desktop use.

A 4175 Displaybox: field, studio prompter; elecromagnetics panel operates on 12VD; power supply may be used as counterbalance; image readable to 20' distance.

LNR Communications  
ATIS-1: auto transmit ID system for C-band.  

LVE-14: Ku-band video exciter; ATIS option to change call sign, telco number; synthesized audio subcarriers; pre-emphasis switching.  

LYR-20: airborne digital satellite system.  

TAB-10: CD audio distribution.

Logitech  
Mixter: modular audio mixer for on-air and production use; versions available with 5, 8, 12 and 16 mixers; water resistance allows operation even when wet.

Louth Systems  
NEWSTRAK controls VTRS, still-stores, LMS systems; for random access or sequencing of playback equipment; material is indicated from networked running DOS.  

LVSERVICE: networked VTR server.

ARC: database archiving system.

Lowel-Light  
Tota-Shade: barndoor for Tota-Lights; clips onto fixture does not block ventilation.  


Bigfoot: converts scissor-mount, stud with 1/4-20 thread to hold lighting instruments.

Lycian Stage Lighting  
Follow spotlights: models include standard and long throw models with zooms; color booms; metal-halide lamps.

Lynn Greenberg Electronic  
LG 300 prompter: camera package with universal baseplate requires no heavy counter balanced.

www.americanradiohistory.com
**Less is More:**

- Display signals on standard picture monitor or compact LCD screens—no more special CRTs!

- Waveform or vector monitoring
- Remote control
- SC/H Phase indicators

- Display emulates CRT look and feel
- User-selectable colors and intensity levels

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Circle (73) on Reply Card

www.americanradiohistory.com
color monitor with reversed image; tilt-down mirror for lens cleaning, filter changes. Circle (1373) Telescroll PC: 80286 AT-compatible prompting software; full color, multiple fonts, word processing; quick, efficient operation. Circle (1374)

Lyon Lamb Video Animation
MiniVas-2 controller: animation control for single-frame recording, frame grabbing from computer graphics to video recorders. Circle (1375) RTCHD converter: produces NTSC/PAL video from HDTV; auto scan conversion from 14kHz to 89kHz, pan, zoom, scroll; 9:16 ratio converted to 3:4, letterbox or other variations. Circle (1376) ProVAS: complete video animation system with controller, encoder, RS-170A sync. Circle (1377)

Magin Systems
Magin Monitor: waveform, vector monitor for NTSC, PAL or component standards; remote control; waveform or picture monitor or LCD display unit; for RGB, MI, Beta, SMPTE component levels without additional adjustment. Circle (1378) VGA-Producer/PAL: encoder for VGA graphics to 890x660 resolution, 256-colors, PAL, remotely controllable transition features. Circle (1379) Model VSS310D: dual standard vectorscope with SC/H phase measurement mode. Circle (1380) 500 series enhancement: remote control panel; complete menu access to memory settings in 500-series waveform monitor. Circle (1381) Signal Creator enhancement: audio module; analog, digital audio, voice capture, sweep, zone plate options for programmable signal generator; outputs available for any current video signal format in analog or digital modes. Circle (1382) Software Version 4.0: for Magni 2015, 2021, permits signal module to be viewed from transfer window, switching of signals from channel to channel. (Available from Magni BBS) Circle (1383)

Main Frame Computer Graphics
INSCRIBER Newsroom: video titling environment from Image North Technologies; on-line character generator, transition effects, image/graphics loader with Targa or ATVista boards. Circle (1384)

Major Engineering
D2 storage: large capacity units for small D2 videocassettes, custom frames permit user sizes for particular requirements. Circle (1385)

Management Graphics
Solitaires TD: digital film recorder; with attribute control, computerized special effects found in motion pictures, commercials. Circle (1386) Solitaires TD: film recorder for slides, S80 or GP interface to Macintosh or IBM PC. Circle (1387)

Manhattan Production Music
MMP Library: 5-disc set with 995 effects in digital stereo. Circle (1388)

Mark Antennas/RSI
Parabolic antennas: for fixed service with FCC allocations in 932-935MHz, 941-944MHz bands; meets Multiple Address System rules of Part 94; for paired and unpaired frequencies; grid, solid, high and maximum high performance models, several sizes. Circle (1389)

Matco
MA-294 program enhancements: printer support of event list or events as executed; auto list updating; programmable monitor colors; outputs 13-24 on 12x1 systems are programmable for record or play only VTRs. Circle (1390) MA-206 updates: 8-channel capability accesses eight 700-event lists; printer support; auto list updating, saving, VTR channel, input assignments, reroll, default input, VTR cue code; displayed channel numbers. Circle (1391)

Matthews Studio Equipment
SPAGS spider bags: position cameras for those special shots without tripods, also convenient for protective packing equipment. Circle (1392)

Majestic Desert Dolly
108 phones microphones. Circle (1393) ITC support: series includes T/H 500, T/H 600, H700, 1600 for ENG, studio. Circle (1394) MC 88 crane. Circle (1395)

Maxell
TD-series: digital videocassette formulation for 1/2"; in all three cassette sizes. Circle (1396) B-series: videocassettes for Betacam SF, ceramic armor metal particle formulation. Circle (1397)

MC1
3004C: 3kW C-band TWT amplifier. Circle (1398) 10974: C-band linearizer for TWT amplifiers; covers 5.85-6.425GHz range for improved intermodulation performance. Circle (1399) 30002: Ku-band TWT amplifier, 300W unit for antenna mounting. Circle (1400)

Media Computing
LMMA: Library Management System Alternative; automation: based on PROtec console, links sources, traffic/billing; off-site control. Circle (1401)

MediaTouch Systems

Merlin Engineering Works
ME278-S synchronizer: digital processor corrects audio-to-video timing error resulting from video processing; corrects lip-sync and discrepancies which result after complex signal processing and manipulation. Circle (1401) (1402) ME-887/891: data encoder/decoder, 2.2Mbit/s rate encodes NRZ data to standard 525-525-line video in airborne applications. Circle (1403)

Introducing the Shure FP410: the "Hands Off" Mixer that Delivers Perfect Sound Automatically.

The new Shure FP410 is not just another pretty face. It's a whole new concept in portable mixing, one that forever solves the nagging problems of multiple open microphones. By automatically keeping unused microphones turned down, the FP410 dramatically improves your audio quality.

The secret: Shure IntelliMix — the patented operational concept behind the revolutionary FP410. It thoroughly shatters existing standards for portable mixer performance and ease of operation. Just set your levels and flip the switch to "Automatic." Shure IntelliMix does the rest.

I Its Noise Adaptive Threshold activates microphones for speech but not for constant room noise, such as air conditioning.

The secret: Shure IntelliMix — the patented operational concept behind the revolutionary FP410. It thoroughly shatters existing standards for portable mixer performance and ease of operation. Just set your levels and flip the switch to "Automatic." Shure IntelliMix does the rest.

I Its Noise Adaptive Threshold activates microphones for speech but not for constant room noise, such as air conditioning.
Forget It.

☐ Its MaxBus limits the number of activated microphones to one per talker.

☐ And its Last Mic Lock-On keeps the most recently activated microphone open until a newly activated microphone takes its place.

With Shure IntelliMix, you'll get a “seamless” mix that's as close to perfect as you'll find. Providing the cleanest, clearest sound you've ever heard from a portable mixer. And freeing you from the tedious task of turning microphones on and off.

For a closer look at the world’s first portable automatic mixer, call for more information including the article “Why Use An Automatic Mixer?”.

We think you'll agree: The Shure FP410 is automatically a classic.

Call 1-800-25-SHURE. The Sound Of The Professionals® Worldwide.

Micron Audio Products


Circle (1416)

SQN-3, SQN-4: location micro/line mixers, by SQN Electronics.

Circle (1417)

TX-113/513/516: wireless transmitters, -13/513 frequency switchable for three ranges of 1.2MHz; -516 seats among six frequencies. Circle (1418)

MDR-150/550: mini space diversity receiver; VHF, UHF versions.

Circle (1419)

TX-601: multichannel pocket transmitter; VHF, UHF versions.

Circle (1420)

Microtime

TBC option: 8-bit or 16-bit timebase correction to F5-8, FS-10 frame synchronizers: with or without advanced sync; NTSC, PAL available. Circle (1421)

UT-100: universal transcoder; used with impact equipment, providing freedom of signal formats for inputs and outputs.

Circle (1422)

CAY IMPACT: component analog effects, image transformer; 13.5MHz 4:2:2:4 sampling; permits flying keys with luminance bandwidth key channel; three component inputs; Y/Cg or RGB and two composite outputs.

Circle (1423)

IMPACT enhancements: Defocus option with 256 levels of defocus effects takes edge off of sharp pictures; optional key channel with zoned defocus; Version 1.2 with Show One/Show Many screens; VTR emulation; shot-box mode; target grid for precision image positioning; 3-D axis indicators; diagnostic tests.

Circle (1424)

IMPACT series 2, 3: variable image transformers; full upgrade capability from series 2, 3, 4. image manipulation functions increase with lower series number, flexible 3D object library, object control; 3-input, multi-GPI, VTR emulation; NTSC or PAL available.

Circle (1425)

Microwave Networks

RAMACS: radio alarm management and control system; for MicroNet 4000 series radios; conducts system analysis from PC via modem. Circle (1426)

MVR-1000: microwave radio systems for 2.13GHz STL operation; manufactured under license from Rockwell International. Circle (1427)

Integrated network management: 481S/801S radios in 1GHz, 1.8GHz, 2.3GHz service; any site in the network can be monitored from any other point; integrated BER test generator. Circle (1428)

Microwave Radio

ProStar272B: portable ENG transmitter; low cost product; operation on 2GHz. Circle (1429)

DigisPro series: digital audio subcarrier system above video space for two to four channels; 90dB dynamic range similar to CD quality; Analog, digital I/O, peam program metering. Circle (1430)

Midwest Communications

ProPoint32: paint/graphics system. Circle (1431)

Miller Fluid Heads

Model 332 System 10: for cameras to 10Ibs; Junior Fluid Head, quick release plate, Junior Tripod with elevator column, pan handle. Circle (1432)

Model 105: 20 series Il fluid head; for corporate, industrial cameras to 20 lbs; lightweight, die-cast alloy unit weighing 4 lbs; quick release 60mm sliding platform for center-of-gravity adjustment; compatible with 75mm ball levelling tripods or other adapters. Circle (1433)

Model 403: Miller 2-stage tripod, spreader; 15.7'-62' height range; leg-angle locks. Circle (1434)

Miller Tripods Canada

Cadox battery analyzers: Cadox C4000, C2000 4-position systems; rejuvenation of Nicad batteries; doubles as fast charger; allows individual charging programs for each battery. Circle (1435)

Minolta

CA-110 LCD analyzer: color measuring instrument assists in setting accurate white balance for
color LCD TV and computer display panels. RS port permits use in computerized adjustment, inspection system. Circle (1436) 
CA-100 CRT analyzer: for objective white-balance adjustment for CRT with any phosphor characteristics. Circle (1437) 
Miralite Satellite Communications 7900 LNB: certificated < 0.1 dB Ku-band unit; if the unit fails within 24 months, it will be replaced with 2 new units. Circle (1438) 
SpaceLine: for digital telephone services between any two points in the world. Circle (1439) 
Miranda Technologies 
SEL-521: 1/2" selector switching; for D1, D2, DX signal types. Circle (1440) 
SEL-511XSD: D2, DX selector; 5.1, 10.1 switching matrices. Circle (1441) 
SER 1000, SER 1000D: parallel-to-serial, serial-to-parallel decoding for D1. Circle (1442) 
Mitsubishi Electric Sales 
LVP-601HD: 60" rear projection monitor for HDTV, EDTV, 9" projection tubes with f/1.2 lens, liquid optical coupling, 16:9 aspect ratio. Circle (1444) 
SMR-301H: 26" Step Scan monitor, receiver. Circle (1445) 
VS-1202: video projector; 1200-line resolution with 700 lumen peak brightness. 9:16mm glass lens; optional ceiling mount; supports NTSC, PAL. Circle (1446) 
XC-3310C, T715C monitors: 31", 35" displays accepts TTL, analog, TV video, CGA, EGA, VGA, PS/2, and Macintosh II sources. Circle (1447) 
LVP-1201HD: 120" video projector for HDTV uses 9" tubes, 600 lumen peak brightness. Circle (1448) 
HD-20: 1/5" VCR for HDTV recording, 63-minute cassettes. Circle (1449) 
SCT-M361HD: direct-view 36" HDTV video monitor. Circle (1450) 
CP-110U: video printer tracks 15-36kHz horizontal scan, compatible with Macintosh II, IBM VGA, S-VHS and other inputs. 16.7 million colors, aperture compensation detail control. Circle (1451) 
CP-210U: large format color video printer; 256 gradations of yellow, magenta and cyan for 16.7 million colors in near photo quality images, 6"x8" or 4.1 quad prints. Circle (1452) 
HS-MS2: multistandard VCR supports NTSC, PAL, SECAM. Circle (1453) 
BV-2000 Diamond Pro: S-VHS VCR, RS-232C interface for computer and editing control, SMPTE time code compatibility, color, interconnection controls, flying erase heads. Circle (1454) 
Mobile-Cam Products 
Extended Van: 1991 Chevrolet vehicle with 14" wheelbase. 454in³ V8 engine, 3-speed automatic transmission. Circle (1455) 
Production One MCP: 6M P-Cutaway chassis, 175" wheelbase, 16-ft studio enclosure, V8 engine, 6L4H-F automatic transmission. Circle (1456) 
Modulation Sciences 
VMate control: with TKE VM700A includes PAL support; connects via RS-232 with setups stored in non-volatile memory; more than 40 video signal parameters may be programmed. Circle (1457) 
Mod/Mixer DeMod: retrocard provides synthesized front-end design. 1mW-1W RF input; use with RF sampling port; remote control interface or modem links to studio; 2D, 3D graphic presentation of modulation data. Circle (1458) 
Montage Group 
Montage HDTV Picture Processor: non-linear editing with 80386/486 CPU. Intel DVI chips, digital compression and hard/optical disk storage; VGA screen shows full-motion video in NTSC. PAL or VGA monitors with 24-, 25-, 30-frame rates; 1/5, 1/6 NTSC or PAL. VTRs for work tapes, random access capability. Circle (1459) 
Moseley Associates 
FT3300: Circle (1460) 
CDQ 2000: for transmission of digital audio on video STLs, reduces audio-video crosstalk and audio-before-video threshold. Circle [1461] 
DSP 6000: digital STL system based on encoder and decoder devices used with PCL 6000 or PCL 686 transmitter/receiver systems; optional integrated digital stereo generator. Circle (1462) 
Musicode 56/64 codec: for transmission of music on 56kbit/s lines or 64kbit/s ISDN/ISDN lines; G722 encoding; operation possible at 48kbit/s, remote control, editing, data storage. Circle (1463) 
Digimux: programable program multiplexer; applicable when multiple audio feeds are backhauled to the studio via one satellite channel. Circle (1464) 
MYAT 
Step reducers: RF components include 1/4"-N, 3/8"-N interconnects introduce VSWR of 1.02:1 or better to 800MHz. Circle (1465) 
M2B-Gray 
MCP-48: mobile command post vehicle, custom packages for video production, public service organizations, etc. Circle (1466) 
SuperProjector: from Philips VidiWall, large-scale display using multiple screens. Circle (1467) 
Nady Systems 
501VR enhancements: hand-held, latticeless transmitter, top-of-the-line mic unit; receiver with balanced audio output. Circle (1468) 
1200 VHF: wireless mic system; hand-held mic ball sleeve, modular plug snaps onto mic casting permitting quick changes; mic elements include Shure SM-58, EV NDVM 75 and NDVM 357. Circle (1469) 
Model 151VR: wireless mic for camcorders; permits mic placement 250 feet from camcorder; compensating for noise reduction with 110dB dynamic range. Circle (1470) 
Model MCM-400: portable camcorder mic mixer; includes narrator headset for voice-overs.
SYSTEL - 3000
DIGITAL MULTI-HYBRID TELEPHONE SYSTEM

- Digital signal processed hybrid system.
- Microprocessor controlled via standard RS-232 or RS-422 interface.
- Up to eight telephone lines in full multiplex communication, by way of the internal MIX-MINUS buss structure.
- No preliminary adjustment or line measurement is required; simply connect it and work!
- Easy to use: the control module can be either a small dedicated console or a standard PC or compatible.
- Line functions and controls are independent for each input module; the technician’s job is made easier than ever, even in the software version.
- The switching section handles up to eight telephones, plus the control telephone and the studio telephone.

- Each input module includes:
  - Superb 60dB sidetone rejection.
  - 128 step digital adaptive filter.
  - 24 bit coefficients.
  - 16 bit sigma-delta A/D converters.
  - Switched-capacitor anti-aliasing filter, with 80dB rejection.
  - Line inputs safety protected against line transients and discharges, according to CCITT regulations.
- Some of the functions included on the digital processed section are:
  - Digital AGC included in the self-adaptive filter.
  - Doubletalk detection, without influence in the adaptive procedure.
  - Noise reduction procedure, using a white noise generator applied in the digital domain.
  - Noise free line switching, using stand-by signal timing.
  - Supervisory function of line status, with detection of dialing tones and signalling (busy line, disconnection, etc.)
Nagra

Nagra Recorder: 4-track digital audio on 7" reel of 1/2" tape; AES/EBU I/O specifications; rotary head recording. Circle (1472)

Nalpak Video Sales

TP 1460: extra large TuffPak, designed for grip equipment. Circle (1473)

Neopak Video Sales

RP series: molded rack cases. Circle (1474)

National Transcommunications

NTL 1000 upconverter: processes 525/625 interlaced signals to sequential/progressive scan format or 1250/1050 interlaced type. Circle (1475)

ET noise reducer: non-linear pre-emphasis method reduces noise and interference without typical drawbacks; an option on MAC-family specs; incorporated in HD-MAC for 4.5dB noise improvement. Circle (1476)

OFDM technology: orthogonal frequency division multiplexing; transmits digital visual, aural and data to home within existing analog signals; no interference from existing analog TV sharing the transmitter. Circle (1477)

Spectre: permits some UHF channels to be used for transmission of all-digital TV services; combines digital modulation with bit-rate reduction techniques. Circle (1478)

Nationwide Tower Company

E18, E24, E36, E48: guyed towers; solid rod construction. Circle (1479)

Neautel

AMPFET FM: solid-state FM transmitters; 4kW and 7kW ratings; modular construction with 1kW modules for redundancy, 65% efficiency; 20W or greater drive needed. Circle (1480)

NEC

VUES On-line system: combines VSR-11 solid-state recorder with VUES editing system for complete video production processing; Macintosh workstation computer, DTW-102 wipe generator; D2 I/O with two VTR inputs; also analog video I/O facilities. Circle (1481)

Nemal Electronics International

ENG series: multiple audio, video cable combinations for ENG operations. Circle (1482)

Neoteck

Elite: multitrack recording console; based on application-specific hybrid ICs; two paths in each input module for interchangeability; 32-bus design with 32- to 64-channel capability. Circle (1483)

Elan: multitrack recording mixer in frame sizes from 32-40 input positions. Circle (1484)

Essence: mixer for multitrack effects layout, ADR and Foley recording. Circle (1485)

Encore: film re-recording, film-style post production mixer; 4-band EQ per input module; solo has post- and in-place modes. Circle (1486)

Neutrik USA

NJ3 FH16: molded phone jack for TR, TRS plugs; per EIA RS-453, PC-board mount. Circle (1487)

Model A-7: audio measurement set. Circle (1488)

New

VR Stereo module: controls source from a single module, for effects returns, tape/disc, other line-level signals on VR series consoles. Circle (1489)

Orion 2000, 2000E: on-air, production, audio-for-video mixers; software-based; all digital control with analog electronics connected via FO link. Circle (1490)

Mitsubishi X-86E: 2-channel PWM digital audio master, editing recorder; auto cross-fade editing with selectable timing. Circle (1491)

Series 44: broadcast console; stereo compressor, limiter; faster-start logic starts machine only if output path exists. Circle (1492)

HRCA: high-resolution A/D, D/A converter; link between analog audio consoles and 20-bit digital recorder; includes sync, interface, DC processing and digital reediting functions. Circle (1493)

AMG Audiofile Plus: hard disk digital audio editing, recording system. Circle (1494)

AMS Logic 2: digital large-format audio mixing console. Circle (1495)

New England Digital

SoundBroid: film-style interface; manipulates sound from screen-based cuesheet; off-line version spots effects, dialog, Foley items from Apple Macintosh; project management. Circle (1496)

Midinet: 8-port MIDI processor, expandable 8-in/8-out, serves 128 MIDI devices. Circle (1497)

DSP option: 32-bit path with 24-bit resolution for mixing, signal processing functions. Circle (1498)

Newmaker Systems

System updates: interface for Chyron character generators; tape library software; remote workstations, machine control subsystem. Circle (1499)

Neutrade

Standalone Video Toaster: desktop video production "studio" using Commodore Amiga MS8800 CPU; title, effects, switching, animation, paint, still store, frame buffering. Circle (1500)

Nikon

S9-5.5B TV Nikkor: zoom lens; high magnification with high MTF curve, extra-long extender; 5x zoom ratio for wide-angle system. Circle (1501)

Norpak

TTX6X0: receivers; expanded teletext reception with VCR, integral teletext receiver. Circle (1502)

... because you can’t always trust your ears.

The Sentinel is a Station Monitor Receiver with all-mode reception: NRSC AM/AM-Stereo, FM/FM’-Stereo and SCA. But what’s more important, The Sentinel has built-in diagnostics that measure and display 12 separate parameters of the program audio signal.

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The pure digital video domain of the AJ-D310 — (the world’s first composite digital camera/recorder) — can help you meet demands that no one has ever met before. Only Panasonic’s 1/2-inch composite digital format can give you the same digital recording on your shoulder that you use in the most sophisticated digital posting suite. That’s one key reason why Panasonic’s Half-Inch Composite Digital is the official video recording system for the production of the 1992 Olympic Games and the choice of other leading broadcasters here and abroad.

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With this software, you can have simultaneous control of up to 32 machines per computer port. A touch of the mouse and you can search to Absolute Time on one machine, two machines, or all of your machines and be frame accurate. A tap or two on the keyboard and you can have over 237,000 cue points on a two-hour tape.

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Circle (82) on Reply Card

Northeastern Communications Concepts
NCP-DRYGEN: nitrogen generating system supplies dry air for transmission lines. Circle (1503)

Nova Systems
Nova 950: transcoding multiformat TBC, enhancement, noise reduction, black stretch; 8x1 input selection from component, Y/C, composite inputs, outputs; wideband processing used for all component formats; RGB option. Circle (1504)
Nova 9200SP: wideband Y/C TBC; includes effects, 4x1 switcher; supports all composite inputs including U-matic SP. Circle (1505)
NOVA Sync series: four synchronizer models; wideband TBC and freeze features. Circle (1506)
Nova 8 series: models 800, 810 full-frame TBC's, for servo, non-servo VCR's; corrects all formats with infinite window; 810 includes subcarrier feedback for U-matic SP; Y/C 3.58 input provides wideband 5.5MHz bandwidth for S-VHS, HIlk. Circle (1507)

NSM
CD 2101 AC: CD jukebox; -1s CD access time; RS-232 control triggers 16 systems from the same host PC; cassette holds 50 CDs for quick changing; Phillips CD transport unit. Circle (1508)

NUCOMM
PS series: control unit for ENG van and fixed rack-mounted applications. Circle (1509)
Model PFS, FX2: portable or mobile ENG transmitter, receivers. Circle (1510)
PA series: mast-mount power amplifiers covering 2-7GHz bands. Circle (1511)
BLK/DR series: block downconverters; input of 6.7GHz, 12-13GHz converted to 2GHz. Circle (1512)
CER series: frequency-locked central receivers for 2GHz, 2.5GHz, 6-7GHz, 13GHz. Circle (1513)

Numark
PPD
CM1912, 1975: pre-amplifier; 6in, stereo; 1975 has sample with memory banks; repeats turntable start controls; for DJ, clubs. Circle (1514)
CD5020, 6020: dual-transport CD player systems; 6020 permits programming of 24 selections per disc with uninterrupted playback; BEAT SYNC automatic synchronized mixing. Circle (1515)
SA3200: 300W per channel power amp; 106dB S/N and 0.035% THD. Circle (1516)

nVision
NV44/48 rate converter; for AES, EBU, SPDIIF, SDIF II formats; all sampling frequencies. Circle (1517)
NV3512A: digital routing switcher with 512x512 matrix in one rack. Circle (1518)
NV3664A: digital routing switcher with 64x64 matrix in five rack units. Circle (1519)

Nytron Electronics
PE-1 Pan & Zoom: provides rolls, lifts, positioning, controlled acceleration for effects; 250 program slots presettable for multiple effects display times; composite video outputs for VHS/S-VHS or other tape formats. Circle (1520)
FADE-1 Fade Between: adapter for VSS-1, VSS-2 slide scanners; offers fast cut or fade between slide presentations; remote control enables timing of slide changes. Circle (1521)

O'Connor Engineering Labs
Model SSB: tripod transport dolly, 4" wheels for smooth travel, supports 350 lbs. Circle (1522)
Model 25-75 prototype: fluid head for larger cameras to 80 lbs. Circle (1523)
Model 5-15: fluid head for cameras to 20 lbs; adjustable counter balance. Circle (1524)

O+L+P Partnership
Lightworks Editor: on/off-line, film/video-style editing; C-cube video compression; magnetic disk storage to 100 minutes image with sound, expands to 20 hours; 5-hour backup tapes. Circle (1525)

Odetics Broadcast
TLC2400: time-lapse broadcast logger; 240-hour capacity. Circle (1526)
Report Plus: software defines information format of user-defined cart machine reports; accesses all information in the database. Circle (1527)
BTM system: Break-Tape-Manager supports six VTR's; auto switch to break tape for local insertion; accommodates common, subregional program-
FCC Requires The Use of Category A Antennas For STL/Broadcast

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Circle (83) on Reply Card
**Pioneer**

**M&K FlexiPatch** - 69 miniature jacks wired to 56-way EDAC connectors; normalized, halfnormal, parallel and other configurations "rewired" within minded.

**PES A America**

**CG4723** - anti-aliased title with graphic plane; internal architecture of 4:4:4 with RGB, YPbPr, or CCIR656-I/0; vector templates for instantaneous resizing; graphic plane option is 32-bit per pixel with dedicated 32-bit graphics processing; digital keyer, frame grab.

**BETACAM**

**DG5250, DG4220** - 20 test generators; both units usable for digital and analog applications; -S220 for D1 parallel 25 frames; S220 for D2 serial; supports 525-, 625-line standards.

**BM4400** - grade 1 video monitors; precision displays with auto setup function; 14", 20" diagonals; PAL, NTSC, COLOR, CCTV, C phosphors; RGB, YPbPr, P component; decode PAL, NTSC, CCIR656 inputs; control for 64 units from a single control point.

**BETACAM**

**MIA used** - 20" format; 32-bit video bandwidth for HDVT or RGB and standards composite; 16-22 format; 422A color monitor, 3-line input; optional decoders for PAL, NTSC, and IFCC656 inputs; remote control 64 units from a single control point.

**BETACAM**

**MIA used** - with 70MHz video bandwidth for HDVT or RGB and standards composite; 16-22 format; 422A color monitor, 3-line input; optional decoders for PAL, NTSC, and IFCC656 inputs; remote control 64 units from a single control point.

**BETACAM**

**MIA used** - with 70MHz video bandwidth for HDVT or RGB and standards composite; 16-22 format; 422A color monitor, 3-line input; optional decoders for PAL, NTSC, and IFCC656 inputs; remote control 64 units from a single control point.

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tics, intelligent status display. Circle (1608)
PM 5664: component, composite video waveform monitor; STAR displays timing, amplitude errors; vector, parade, overlay display mode. DIFF shows algebraic subtraction; menu-driven. Circle (1609)
PM 5665: NICAM stereo encoder using two independent channels; may be used for single monaural channel. Circle (1610)
PM 5644 generator: color pattern source; RGB, YCgCr format for NTSC, PAL or SECAM, optional text/clock driven by station LTC or 1 Hz signal; programmable logo pattern option. Circle (1611)

**Picture Conversion**

Imageman Retrieval System: keyword-indexed database; identifies and retrieves images stored on analog videodisc devices. Circle (1612)
Briefcase Video: create, present graphics pictures; merge pre-existing graphics, charts and visuals for electronic presentations. Circle (1613)
Showcase Presentation System: IBM-compatible PC for video presentations; show scripts stored on disk as DOS ASCII files. Circle (1614)

**Pioneer Communications**

Rewritable Videodisc Recorder: random access, frame-by-frame editing; instant replay without shuttle, jog, 54,000 images; Simultaneous erasure, record; records audio on video for dubbing; CAV format for 30 minutes storage; PCM audio, 1.41 MHz video bandwidth. Circle (1615)
RMV2000 CUBE: video projection cube monitor, multivideo processor for large screen systems, videowall displays. Circle (1616)

**Plateau Digital Technology**

PVM-1073: video multimeter; LCD with back-lighted EL; 2-channel display of vector, waveform, SC/H phase, system timing measurements; handheld unit Nicad batteries. Circle (1617)

Prime Image

CleanCut/EFX: A/S switcher, integral TBC, sync generator; inputs including TBC correction; optional S-video I/O with transcoding. Circle (1618)
access Library: electronic still-store, composite, Y/3.S; Y/R/B-Y, RGB I/O; 4:2:2 sampling with TBC functions; sequence generate, recall features are programmable. Circle (1619)
6.5 series (95/S10): 4-band synchronizers for PAL; with, without effects; YUV, S-VHS, composite I/O on -6510; -6550 is composite PAL. Circle (1620)
RGB option: enhanced HR600+ and 7.5MHz series TBCs, RGB input, output capability. Circle (1621)

Production Garden Library

100, 200 series: broadcast and "AV" production music libraries. Circle (1622)

**Professional Sound Corporation**

PAM42 mixer: portable mixer with balanced inputs, outputs, tape return; inputs 3, 4 for stereo channel with channel 4 as gain control; one cell battery pack: by TFE of England. Circle (1623)
MilliMic: mini lavaliere microphone; omnidirectional characteristics; 126dB SPL with 40Hz-16kHz response. Circle (1624)
Seeport mixer: portable mixer; 8-input, four aux sends/returns, external EQ; PFM, VU metering; communication by SEEM Audio A/S. Circle (1625)

Propel Systems

Audio Prophet: hard disk recorder; 10-track editing, simultaneous play/record; doubles as heart of a digital radio automation control. Circle (1626)

Q-TV

Portable VDA: 2-in-4-out; without power, provides A-B switch with automatic cut through to output 1. Circle (1627)
Vidibox II: 4" hand-held flat-display monitor; integral video display amplifier. Circle (1628)
AC video DA: 100MHz bandwidth; compatible for HDTV, 1x6 format. Circle (1629)

**QV**

Model 710: digital stereo generator; 65dB separation with 0.05% distortion, -86dB noise level; TDS numeric digital signal processing; oversampled FIR filters; Q-Chain connects directly to CAT-Link digital STL/TSL; separate inputs for right, left, composite digital signals. Circle (1630)

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- Tubular side bar type cable rack.
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Circle (86) on Reply Card

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June 1991 Broadcast Engineering 117

www.americanradiohistory.com
QSI Systems
Model 800 inserter: portable image inserter, logo generator; 768x480-pixel resolution image processor from monochrome and reprographic CMOS IC device; adjustable matte level; TTL mirror output of image as key; overlap capability with RS-170/A source.
Circle (1531)
PC 864: portable ID labels for camera feeds; identifies field equipment in VBI or subcarrier of pictures.
Circle (1532)
Model 1500 modem: off-air/CATV/MTS stereo; 155-channel tuner, auto retuning of last channel used when switched between broadcast, cable, and monochrome, stereo, SAP; 1,280/1,200 baud rate; external power.
Circle (1533)
Model 8600: image generator, inserter; captures picture from a camera or file; overlay with an RS-170/A source; produces TTL output of image for video key; adjustable matte level; EFP programmer for burn CMOS ICs for use in portable 800 inserter units.
Circle (1534)

Quality Video Supply
Wilson video furniture: Tuffy II consoles for commercial, industrial, retail and classroom video tables.
Circle (1535)

Quanta
Delta series: new versions of Delta 1 character generator; LX version at reduced cost with complete compatibility with other Delta systems; LE entry level unit includes single frame buffer designed for YUV and encoded output with key signals; internal downstream keyer; LX upgrades to SE model.
Circle (1536)
Orion SE: low-price version of Orion character generator for full-screen use with 1MB storage on HD floppy disk; underlining, borders, shadows; YC output for S-VHS systems.
Circle (1537)
Video Touch-Up: software for Delta series free-form text, image generators; permits modification of images; hue, luminance, saturation changes; tone-down camera flare. etc.
Circle (1538)
TAA A CCI accessory: telephone arrangement includes Channel Messages design; multiple agencies can use touch-tone telephone to initiate emergency message crawl over all cable program channels.
Circle (1539)

Quantel
Paintbox Junior: self-contained graphics system, the fundamental power of Paintbox System for the constraints of smaller budgets.
Circle (1540)
Presenter option: facility for Paintbox HD, permits live sequencing on-air, as well as compilation and editing of image sequences.
Circle (1541)
Paladin enhancement: options include Dynamic Collage for multilayer graphics effects in a single pass.
Circle (1542)
Cypher enhancement: options include rendered fonts created on Paintbox and transferred to Cypher for use with any typeface; interactive computer control provides override of local Cypher control functions.
Circle (1543)

QuickSet International
Mercury QYTH/S: tripod with cam-fluid head for small hands; compatible with all tripod heads; height range 35-71", or 19" without spreader; capacity of 40 lbs; black or silver finish on tripod.
Circle (1544)
R-Columbia Products
TR-470/R-160 long-range VHF/UHF wireless F/B ENG dual-muff headphones; usable for 2-mile range with full-range voice audio on VHF; receive F/B on VHF in one ear, monitor UHF channel in other ear.
Circle (1545)

Radiation Systems Inc./RSL
#5010: Step Track software.
Circle (1560)
Model 240KV: 2.4 m transportable earth station antenna; meets US, Intelsat, Eutelsat sideloobe spec; optical monitor; control, support; contacts C-X, Ku-band operation.
Circle (1561)
Model 240 AT: air-transportable mobile unit for Domsat, Intelsat, DSCS on C-, X-, Ku-bands for voice, data, teleconferencing.
Circle (1562)

Radio Design Labs
ACM-2: synchronous automatic AM noise monitor; maximizes loudness; color separation; reduces carrier cross talk on FM transmissions.
Circle (1563)
Stickon series: ST-1A/M audio line amp; ST-5HI stereo line amp; ST-MKXMics-to-line level mixer; ST-GCA2 gain control amp; ST-PIH stereo phono pre-amp; ST-ACR audio-controlled relay; ST-MP22 mic phantom adapter.
Circle (1564)

Radio Systems
RS-75 DB: based on Sony UTC-75s; balanced XLR audio, auto cue-to-cue, last-forward to cue, cue-to-tape insertion; SKIP ID subcode data bit initiates special cueing functions.
Circle (1565)
Circle (1566)

Ramsa Audio/Panasonic
Tool Kit: decoder software for SV-3900; unit now with serial remote control of all functions and programming modes; 9-pin serial can be switched for ES-bus or P-2 protocol.
Circle (1567)
SV-3760: Pro-DAT: digital audio recorder with front-panel shuttle wheel to control 0.5-15x speed range; 44.1/48 kHz sampling; fade-in/out functions; XLR balanced connectors.
Circle (1568)

Rank Brimar
Mark III assembly: enhanced telecine tube; pack with tube, optics and conversion cradle system for MSA telecine, avoids internal interchange, and flare.
Circle (1569)

Rank Cintel
DIVA: Designer's integrated Video Animation; with draw, animate and cel layering; Clips Stores library: view of individual layers.
Circle (1570)

RF Instruments
RE 530 series: RDS products, including RES21 stereo coder for stereo multiplex with port for RDS/VRF signal inputs; RES11/RES33 RDS coders; generates wide band stereo format to be transmitted via RDS subcarrier 5531 with full control panel; 5533 space-saver unit; RES53 RDS generator for system tests; RES31 RDS decoder for monitoring system performance.
Circle (1561)

Ressortek
Video utilities: Lx4 VDA with cable equalization; VC-2 video level-controlled switch with alarm functions.
Circle (1571)

Register Data Systems
System control: billing system; single, multi-user, interface for most automation systems with electronic log transvers.
Circle (1563)
System Seven: multi-user general ledger package including sales, traffic, billing, accounts receivable/payable and payroll.
Circle (1564)

Research Technology Int'l/RTI
TapeChek 490: videotape cleaner, inspector for MLI, cleans, polishes; requires about two minutes per 90 minute cassette.
Circle (1565)
TapeChek Pro Line 4100: supports Betacam/SP cassettes; vacuum-assisted wiping tissue; precision dual sapphire burnishing system.
Circle (1566)
TapeChek D-21: dual dropout counter on D1, D2, other digital media; hard-copy record of dropouts between 1/16, cumulative dropout from two counters; adjust dropout depth from 1 to 24dB.
Circle (1567)

RF Technology
146Bi Omni: wireless cable, MMDS antenna; 50W capability; weighs 10 pounds.
Circle (1568)

D series: compact portable transmitters for 1.8-15.6GHz; dual audio. AC power supplies, wideband, frequency-agile; high output.
Circle (1669)
RF-1383C transmitter: miniature, DC power; dual audio; frequency-agile and wideband operation; audio bypass capability.
Circle (1670)
MM series: multi-miniature transmitters for surveillance, AVL activities; 3W minimum output; two audio channels.
Circle (1671)
Flashback 7 adds 7GHz band operation to Live news car ENG link, previously limited to 2.2-5.5GHz; 10W output power.
Circle (1672)
LPS: portable transmitters, receivers operating at 3.5GHz.
Circle (1673)
VML system: transportable microwave covering 1.7-2.4GHz range; for common carrier and emergency link replacement.
Circle (1674)
Sil filters: Faraday Technology video filters in line packaged; Gaussian to near CIR 601 characteristics; selected cut-off from 1-30MHz with 1.4 cut-off rate; 8ft drop band and wideband operation.
Circle (1675)
Faraday Step filters: sharp filtering characteristics for separation of video from multiple audio subcarriers, stereo sound and multilingual transmissions.
Circle (1676)

RGB Sales & Marketing
MediaLink/FM: PC video editor, graphic user interface, advanced machine control; electronic patchbay feature; for IBM PC.
Circle (1677)
AmLink/Cl: multimedia editing with consumer-industrial equipment; retains features and graphic interface of AmLink.
Circle (1678)
AmLink/TV: multimedia editing for AmLink combined with NewTek VideoToaster; includes anima,
tion, paint, titling functions.
Circle (1679)
AmLink/V: video editor, advanced machine control; graphic interface on Amiga PC; 16 VTRs, any format/manufacturer; 32 devices in serial-parallel network; electronic patchbay.
Circle (1680)

RGB Spectrum
RGB/Videolink 1450AX: computer video scan converter translates H-sync rates from 21.5-40kHz; NTSC, PAL, RGB, S-Video and Betacam DK outputs; linear keyer.
Circle (1691)
RGB/View 2605: video windowing system with integral TV tuner; supports workstations to 1280x1024 pixels.
Circle (1692)
XTV software: provides multimedia capabilities for RGB/View video windowing workstations using X-Windows.
Circle (1683)
RGB/Videolink 1600U: converts hi-res computer graphics to recordable video.
Circle (1684)

Richardson Electronics
NE-347: kV HUF transmitting tube.
Circle (1604)

RH Div/Portland
907TC: PC toaster intercom speaker. Circle (1685)
Voyager PB-2000: portable PA; wireless mic receives wired mic input.
Circle (1686)

Robe & Schwarz
SG series: test generator offering 30 baseband signals; 12-bit accuracy on all signals; available for NTSC (SGMF), PAL (SGFP), SECAM (SGSF) and D-A/AS/SSC machine control.
Circle (1687)
EMF TV demodulator: analyses signals on NTSC, PAL, HVC, CATV frequencies.
Circle (1689)
DMDC.03, DMDC.05: test RDS decoders for monitoring of RDS signals; 05 includes phase, level measurements; values displayed on LCD panels.
Circle (1690)
DMC.16: RDS data codeber EBU 3244-E; develops 5kHz signal for FM subcarrier transmission; software upgradeable.
Circle (1691)

Roland Audio/Video
SN-550: digital noise eliminator cuts noise in frequencies containing the original sound; reduced side effects of expansion; hum cancellation circuit.
Circle (1692)
DM-84 recorder: multitrack hard disk music production system; 24-bit digital mixing; analog AES, EBU digital I/O; master, slave to SMPTE, MTC, MIDI, 48kHz, 44.1kHz, 32kHz.
Circle (1693)
RSS processor: Roland Space Sound; 3D effects from 2-D system; sound localized in 360° horizon-
SBX-1000: MIDI cueing box with SMPTE/MIDI event generator, reader, synchronizer; sequencer controls external MIDI division; stores for tempo data for 32 songs, editing features.

Rosco
Coloroll scroll: selected color filters installed in the 3-24 frames; operates by DMX-512, AMX-192, 0-10VDC analog, other protocol.

Ross Video
Model 630: live, on-air switcher, 30-input, two 4-bus multilevel effects, DSK: DVE control; RGB, component, encoded chroma key: extended effects memory.

Sachler
Model 575DL: lightweight, daylight lighting product; for studio, location.

SOLD Magnetics
ATR-100 heads: metal or ferrite construction heads for Ampex ATR-100, -102, -104 audio recorders; NAB and DIN formats, most with SelfSync available.

Samson Technologies
Concert Series II: VHS wireless mic with true diversity in CR-3X receiver, belt pack and HT-3 hand-held transmitters available.

SBC Technologies
SAGE I: alert system, preprogrammable for various conditions; broadcasts encrypted data, control signals on FM subcarrier.

SCA Data Systems
RDST-3: RD controller, generator; develops station ID for real time messaging and paging; phase locks to 19kHz pilot.

Scala Electronic
950MHz antennas; full line of parabolic antennas for 950MHz STL and ICR links.

Schmidt Telecommunication
RESCO: network monitoring, control system; fully automatic; fault-tolerant, surveillance functions on Ethernet, leased lines, switched telco, packet-switched, ISDN network; monitoring of analog, digital parameters; full redundancy.

Scientific Atlanta
Vector Quantisation: video compression system; compatible with TDM, PDM.


Model 8860: indoor antenna tracking control; higher tracking resolution with less antenna positioning motor wear; AdapTrack software learns satellite characteristics.

Integrated receiver decoder: combines B-MAC, compression technologies.

Dichronic feed: for ES antennas.

Sennheiser Electric
MO-422: dynamic cardioid microphone; rugged design withstands rough treatment; spring suspension of element attenuates handling, mechanical noise pickup.

MKH 50 F48: supercardioid RF condenser microphone.

MKE 300: short shotgun mic; for ENG/EFP broadcast, audio/visual; integral shoe assembly permits mounting on camera; narrow supercardioid pattern limits pickup to sound field corresponding to scene seen by lens; integral battery for operation to 200 hours.

BF 530: dynamic microphone; supercardioid pattern for recording; adjustable inlet basket permits

Sennheiser's dedication to state-of-the-art technology, coupled with quality engineering, earned our microphones an Academy Award®. Sennheiser continues to set the standard in the industry, this time with the MKH 60 and MKH 70, our newest shotgun microphones. They display all the ruggedness that you need in audio production and the reliability that Sennheiser has become famous for.

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Circle (68) on Reply Card
personalization for talent to meet unique styles and requirements.

HD 450: low-impedance, open-air headphones for home, portable use; radial bead diaphragm; neodymium magnetic design with aluminum voice coils for low-mass design.

SSECOM

In-series line: audio transformers, pads exhibiting high isolation characteristics.

Hand-held test equipment: series of audio generation, testing and maintenance products in 3.6x1.1" packages.

Hand-held series: audio test instruments for professionals.

Isolator series: in-line audio transformers, pads in various shell configurations.

Audio-Trans: combines audio transmitter, operates with electronic circuitry; input, output distortion less than 0.005%; available as plug-in modules; two classes include line and mic level units; encapsulated with 0.1-5.1" grid centers.

Field Pro series: audio utility boxes; mic splitter, combiner, active, passive direct boxes, A/V distribution amplifiers, telco interfaces, audio mixers.

SG Communications

Strobe Light division: complete tower strobe lighting service.

Tower-Guard: complete tower maintenance program.

Sherriff Systems

Pro Video VGA:失利 software.

Shively Labs

2500 series: FM bandpass filters.

Shook Electronics USA

MOD-2027KI: Ku-band mobile production vehicle; combines Ku uplink with a small formal production facility; capacity for four cameras and four Betacam VCRs.

Shore Brothers

Model VF46: Video Production series; hand-held omnidirectional mic; windscreen, stand adapter; neodymium magnet for high output; scratch, chip, resistance black polychrome finish.

Model FP410: 4-channel mixer; portable; Intelligent noise-adaptive threshold to activate circuitry in combination with constant noise level.

bus circuit limits activated mics to current speaker, last mic lock-ons current mic on until another mic is activated.

Siemens Components

VHF TV Pass: cavity power amplifiers based on RS 2022/L, RS2028C L, tetrodes with power ratings of 51 kV, 50 kW in aural, aural/vs dual channel audio service.

Sierra Automated Systems

AXC-8: 8-character alphanumeric X-Y panel for SAS-32000 switchers.

ANC-8: 8-character alphanumeric panel for SAS-32000 series switchers.

GPS-8: 8-character alphanumeric panel; stores, indexes, displays programmed switcher, relay sequences.

CPI-80: 8-character alphanumeric panel installs in audio consoles for audio routing.

Sierra Video Systems

Model 161: video with stereo audio routing systems, 16x1 matrix.

Model 82: 8x2 video, stereo router.

Models 44, 44C: 4x4 video, stereo audio router; operated via serial control; standard video or components.

Series 32-32: 8x8 crossover matrix switcher; inputs 32x32 for audio, video, sync, time code, machine control; RS485 2-wire parole-line keypads; PC software control.

Sigma Electronics

DEC1-B: decoder for NTSC/S-VHS to RGB signal format.

#2185: 8x8 audio/video router.

TSG-2000: portable test signal generator; AC/DC operation.

SLI-2000: signal line identifier; designed for remote station checkout.

Signature Music Library

Signature Select: pick only those items desired from the Signature library.

Siro Sistemi Radio svl

Channelcombiner: for transmission by two 40kW UHF transmitters from one antenna.

LPI combined: sound, vision combiner; for 10kW UHF self-standa-TV transmitters.

SISCO Satellite Information

Newsroom editor: Electronic test system.

Machine control, Archive system.

Skotli

TCT-421: VTC-LTC translator; dual-standard for 525-line NTSC, 625-line PAL, SECAM, CCIR.

TCG-333: VTC-LTC generator, reader, inserter. PAL, PAL compatible; character inserter, color field ID, code translations.

TCGS-35 TKF film-to-tape transfer equipment offers KEYCODE, reading capability.

SkyPages: satellite relayed messages to five minutes length; allows people to be in "constant" touch with office.

Snell & Wilcox

PRISM decoder: digital PAL, NTSC decoding uses 4-field, multtap vertical/temporal filtering for D2, composite inputs to CCR 656 digital, RGB/YUV analog outputs for NTSC, PAL-/M- N standards; wideband processing.

ATLANIS series: standards conversion; advanced Motion Processing; supports the six world standards. component, composite (O). Model 3 upgrade to Model 6 for all features.

Optimatte

Creative Environment V2.1: 3D animation; channel 2-3D, 4-textures; reflectivity mapping; metamorphosis function curves; texture definition libraries.

Solid State Logic

SL 5000G: production version of SL 5000 console; for TV, radio production, on-air; flexible routing, multiple inputs; audio output for NTSC, PAL M-S standards.

SoundNet: digital audio/video network system; multiple ScreenScreen systems share and copy work; central database of audio, off-line back-up, restore functions; slave mode offered, 36-channel playback.

Sound Ideas Library: available on VORM optical disk or four 8mm Exabyte tapes; over 11 hours of digital audio/motion, sound effects for ScreenSound audio/video system.


Ultimation: Ultimate Automation modules - dedicated VCSYstem, dedicated moving fader system or combination of both; extends G series equipment; dual signal path circuitry enhances automation capabilities.

Sony

EV-9000A: H8 recorder, separated Y/C input, output connectors; improved tape tension regulation; integral chroma noise reduction; time-code generator, reader. Link to U-Matic SP equipment through optional remote interface.

CDP-2700: CD player, AES/EBU, EBU-3585 II digital outputs; fader/stap/control, stop rapid, start auto with function; 12.7% variable speed playback; accepts captive versions.

BK1L serial interfaces: BKM-2020SP component, BK-2020SS digital serial outputs; permits BVM 13", 18" monitors to be used for D1 view; not required for PHM-3600 169 aspect ratio 800-line displays.

PCM2700: pro DAT; 44.1kHz. 48kHz sampling; 4-channel design, confidence monitoring; alternate subcode, absolute TC recording.

860 series UHF: PLL synthesized wireless mic; multichannel operation in 798-868MHz; high stability; 94-channel selection, tone-squelch, companding.

DVR-20, 28: D2 models providing 94-, 268-print recording times; -20kHz, mono/multi; -28 supports all sizes; resolves digital audio tracks at slow speeds with crossfade capability; Multi-Loop test simulates multiple generations; ASDU audio digital signal processor.

SP 2000 series: PVW-2800 editor, recorder; PVW-2600 player; PVV-1 camcorder transport; players integrate TBC and time-code capability; digital filter/buffer separates luminance from chroma in composite mode.

HyperHAD technology: enhanced image sensor based on hole accumulated diode technology; increased sensitivity, low noise, high resolution; available for all camera models.

RVP-4000: rear screen projector, stackable cubic type for videwalls; multiple scan recognition of NTSC, PAL, SECAM, CCIR; NTSC-4.3 inputs as well as HDTV and computer sources.

PHM-3600 monitor: 16:9 aspect ratio on 36" diagonal CRT.

DVC diversity data SP VCR with 90-minute capacity; portable unit for field editing; reduced power needs; 200 minutes recording from single BP-90A battery.

DVR-2100 cost-effective D1 VTR with dynamic switching; supports all three cassette sizes; reduced size and power requirements; playback speeds from -1x to 2x.

DVCX-107: camera: 1-chip produces 470-color images from 9 kHz at F:1.2 maximum sensitivity; electronic shutter; for surveillance, educational, telecommunications systems: electronic exposure control.

DVCX-927: camera: 3-CCD using H8 sensors; increased chroma sensitivity, enhanced detail, 700-line resolution; 80dB S/N, 5:1 sensitivity; recording output configured for UV-Matic/SP, H8A, SVHS; standard output for VBS, Y/C (3-video output), original RGB; 8-speed shutter.

FSR 200A receiver: 24-channel preset tuner with memory, subcarrier audio; 10-key tuning; signal strength indicator; unit permits addressability; data output for remote control of associated peripheral equipment.

RVP-6000 projector: 60" diagonal, rear-screen, integrated audio, multiscreen, optically-coupled lenses, CRTs; single-mirror reduces light loss; freenel, 0.6mm pitch hextangular screen structured viewing angles.

GVM-1305TS: 13” with two VHS cans; Scan sweep, touchscreen control; composite video, Y/C, analog/TV input; 0.25mm dot pitch optimized for graphics, video images.

DVCX-02: 2-serial interface (CON-SET camera: 2x digital output, 4-channel audio on single coaxial; audio pitch correction (BDK-110), time compression, expansion ratio of 1.5%, play speed.

DVC-2000 software version 3; for DVCX-10, 18-animating editing for graphics; edits of constant duration or film with 2-field/3-field sequences; pre-read control; auto audio mute in still mode.

PHM-1900: SVHS VCRs; professional menu, mono, stereo HiFi VCRs; minimized jitter; digital track; high-speed rewind; Rapid Access transport, auto repeat; Double Aximath 4-head.

DVS/10: digital color corrector; includes direct editor control.


DVCX-151 camera: single-chip RGB HAD CCD, 460-line resolution; sensitivity of 25 x at F:1.4; electronic shutter.


DDS: digital stereo audio delay; 3-band shelving; peaking, digital panpot; 16-bit oversampling; high density Linear Conversion DA (1786).

LMS software: BZC-2100 multi-spot feature, conflict avoidance; for transmission simultaneously with on-line tape preparation; BZC-3090 compilations, generates sequences for parts commercial reals.

DVCX-537: HyperHAD IT CCD camera, 2000 lx at 1/8, 1/10s with PVV-1, EV-9000 H8 VCRs; adapt-
ters support other options.

Circle (1788)

PCM-7000 series: professional time-code DAT recorders; editing systems; PCM-7050, -7030, -7010 with -7300 controller.

Circle (1789)

KSP-8000: digital video sound processor; components D1, D2 VTRs; 48kHz sampling.

Circle (1790)

DVS-8000/8000C: component digital switcher, 24-input, eight external keys, 2.5 mix-effect banks, linear keyers, two background generators, link to DME for 1-panel operation.

Circle (1791)

BVW-D75: Betacam-SP analog component editing VCR, 4:2:2 serial digital I/O, four digital audio channels; range of interconnection capabilities with other equipment.

Circle (1792)

Editor updates: softwa"
Strand Lighting
*Manitx MX*: 12, 24, 48-channel 2-scene present ladders; MIDI in, through, out and sound-to-light interfaces.

*Quartet 650*: 650W spotlights; 22/40" variable profile; 25" fixed profile; Fresnel and prism convex spot instruments.

*Sirio Bambarino HMI/MSR*: daylight (fresnel); 2.5kW lamp produces equivalent of 10kW daylight corrected from tungsten.

Studer Revox
*D920 mixer*: digital audio console with all input or output channels on common processing bus; seven digital, 1 analog inputs; 2 digital, 3 analog stereo outputs; level control, EQ modules available.

*Studer 963*: analog mixer; noiseless FET switching; proprietary input stage for mono and stereo with or without EQ; to 56 inputs, 8 submasters, 4 masters.

*Studer A807-4 TC*: center-track time code 4-channel audio console in 1/4" design.

*A728 controller*: CD player controller operates three A727 CD players; EBUS networking; cue wheel for frame accuracy.

*DT40 DCR*: professional CD recorder using stage optical media; 100% compatible with standard compact disc format; dynamic range to 98dB; integrated P2 editor builds table of contents with track numbers, running times.

*Model C221*: professional CD player from Revox line; 1-bit format for total linearity, error correction; minimal crossover distortion.

*Magneto-Optical drive*: 540MB byte removable file storage; permits instant import of sound files into Dyaxis system.

*DTY system*: 2-way compact monitor; self-powered; electronic circuitry corrects group delay, achieves accurate reproduction in a range of listening environments.

*MacMix 3.2*: software for Dyaxis; version 3.2 includes Snapshot digital processing presets multiple EQ/gain settings referenced by SMPTE time code; improved screen graphics.

*Digital hybrid*: telephone interface with dual digital signal processors, FIR filtering; consistent reliability in on-air operation.

Studio Technologies
*IFB Plus series*: for talent cueing at local and remote locations; wide range of features; simple installation.

*Switchcraft*;

Mark 2900/CT: full duplex wireless headset; operates at 900MHz.

*Data transceiver*: wireless system for RS-232 data on 900MHz frequencies.

*Barcode system*: barcode reader for Mark 2900 transmitter for data transmissions.

*Switchcraft*;

4/RA jacks*: standard phone jack for PCB mounting.

*PQ connectors*: series ST and RA types for printed circuit board mounting.

*Derivator*: power supply for PCB mounting type.

*Mini-Din*: miniature connectors, plug, & jack per Ger-

man-European standard types.

*SWR Inc.*

FM 10, FM3: high-, medium-power circularly polarized FM antennas; ±1dB circularity; copper radiating elements.

FMX-S: medium-high power circularly polarized FM antenna; available $10 to $25.00.

*LPTV*: type antennas.

*Symbols/Graphics Div.*

XL workstation: D1 input, output, render to NTSC, PAL, HDTV; combines PaintA nurtion, XL Animation in unified graphics environment; 4-4-4 internal processing; 2-D, 3-D elements; supports D1 tape, disk and computer system imports; exports key signals with images.

*High Definition PaintAmation*: operates at all currently proposed and defined high-definition TV resolutions; serves NTSC and PAL.

**Syntrex**

*Model 528*: voice processor combines deessing, compression, expansion; transformerless balanced input, including 48VDC phantom power- ing; THD rated at 0.025%.

*Model 564*: audio processor; quad gate/expand system.

**Systems Wireless**

T-677, T-650, R-662: UHF wireless microphone system by Vega.

Clear-Com products:

MS-812 programmable master station; IC-60/100 Multi-Plus intercom stations; XP-10/20 Multi Plus expansion panels; CC-2 party line interface.

T-871 transmitter: wireless mic operates with any Lectrosonics receiver.

**Wireless systems**: UHF system series from Lectrosonics.

Tamron Industries

AF17-70mm: lens; F/3.5-4.5 aperture.

AF70-210mm: lens; F/4-5.6 aperture.

Fotovix Editor II: peripheral to Fotovix for cropping, color correction, and other features; extremely high image manipulations.

Tannoy North America

PS-88 audio console: near field reference speaker; low response to 30Hz; 100W amplifier corrects 12dB/octave roll-off of woofers in sealed enclosures; high, low-impedance inputs on ¼" or RCA connectors.

*Studio monitor series*: reference monitors; different material technology; DMT Systems 10, 12, 15, 215 isolate moving, vibrating components from cabinet to reduce vibrations.

Tape Automation America

Program Evaluator: monitors, tracks quality of recorded programs; reports on measured parameters for quality control.

Tascam

424 PortaStudio: 4-track cassette recorder, dbx noise reduction; 3¾ips, ½ips, ¼ips speeds; separate EQ per track including mic/line inputs; assign inputs 8: 2 cue bus for listening without recording of effects, reverb.

M-3700 mixer: enhanced M-3500 series; VCA automation; 24; 32-channel frames; dynamic level control, signal routing, SMPTE TC generator, reader; disk drive stores control data; 8-group busses, four effects returns, six aux sends.

Model 485 PortaStudio: eight mono/2 stereo input mixer; channel mixers, mic/line inputs for channels 1-2; line inputs on channels 3-8; tape cue mix; 2-band EQ, effects sends, four group outputs; dbx noise reduction.

BR-20: 4-track audio recorder; 48kHz, balanced XLR; shuttle control with combination of EDIT, FFWD/REW with Quick Cue; dissimilar tape reel feature; fader start activation.

CD-307: CD player; withstands rigorous of broadcast and production environments.

M-2500 series: 16, 24-channel mixers; 8-bus recording, auto mute from MIDI commands; in-line stereo monitor; 3-band, 2-knob EQ; pre-fade listen, mute, assign switches.

Dolby Noise Reduction: option (with dbx type) on MSR-16/D and MSR-24/T audio recorders; 10dB reduction at low frequencies, increasing to 23dB at higher frequencies through staggered-action compressors.

BR-22: 2-track recorder; center-track time code with servo motors for transport control with
gentle tape handling; 1/8" machines are effective in audio-for-video applications. Circle (1963)

**TEAC**

CR-310, 320: communications recorders; 10-, 20-channel single-deck recorders; T-180 VHS cassette for 24-hour recording; time-date system permits location of any event by time-date. Circle (1965)

LV-256SCR: full-motion sequential color recorder; wideband design; frame accurate control includes external host capability; free of color distortion and typical playback artifacts. Circle (1966)

LV-231SCR: sequential color RGB recorder; wide bandwidth than conventional recorders for more resolution. Quests. Databarker software Kodak Ek-

tographic Side Video System; 18,000 slides with <1 worst-case access. Circle (1967)

**Tektronix/Lighting Innovations**

**Echelon:** memory lighting console; macros, softkeys; relative intensity modification. Circle (1968)

em•one: control module, expands flexibility of dimmer control; blends AMX-192, DMX-512 protocols into DMX-512 data stream; records 96 cues for access from front panel. Circle (1969)

**MD-285E modular dimmers:** quad 1 kW, dual 2 kW, 6 kW and 12 kW modules; 9-10V analog, AMX-192, DMX-512 protocol controls. Circle (1970)

**MTR 9600:** on-location dimmer. Circle (1971)

**Balcor**

Balcor Backgrounds: hand painted Circle (1972)

Balcor Zoom: 5000W halogen unit Circle (1973)

Balcor-Flux-Line: dimmable lights, variation of 10% of power gives 50° drop in color temperature; 200W lamp equal to 2KW halogen. Circle (1974)

**Tektronix**

1730D monitor: digital waveform display; serial digital input; eye measurement; displays jitter, amplitude, rise time vs. calibrated time axis, an-

alog input can be paraded side-by-side with parallel or serial digital signal. Circle (1975)

**VIT 100:** NTSC VITS inserter for satellite uplinks. CATV headends, ENG/EFP systems, transmitters. 12-bit accuracy on VITS, fulldiurnal signals; source ID signal compatible with VM700A; supports FCC composite. NT/C7 composite, V/S, multiburst, bars. 9600. Circle (1976)

**VITS-2000:** full-field VITS inserter; text generator with full-field, VBI messages, automated measurement setup with VM700A; 8-field signal insertion sequence for BTA ghost canceller reference; multiple inputs for external signals. Circle (1977)

**TSG-422 Opt 1:** three serial digital, two parallel component, two analog black burst outputs; proposed error detection, handling signal included in the serial digital outputs, which can drive a 300m length of single coaxial cable. Circle (1978)

**1700F07:** utility drawer for accessory storage; YPbPr in side-by-side rack adapter. Circle (1979)

**TSG-130 Multiformat:** low-cost generator; output in NTSC; Y-C; Y/R-Y/B-Y for Betacam, MII, CTDM formats; stereo audio output; 10-bit resolution; Opt 1 includes MII level tests; Opt 2 provides a black burst source. Circle (1980)

**SPG-1000 HDTV sync generator:** multiformat signal source supports HDTV production environment; master, slave capability for different input, output formats; picture monitor test signals in RGB, YPbPr. Circle (1981)

**VM700A measurement set:** D2 test signal source; comprehensive set of signals in 10-bit composite digital and analog forms; Opt 1G for measuring routing of white, black, 27 pulse echo, per German White Paper requirements. Opt 1, 11 dual standard set for NTSC, PAL, Opt 20 Teletext signal quality measurements. Opt 30 component measurements with Lightwing, Hordie signal forms; Opt 30 REMOR remote graphics program for near real-time display of VM700A screen on PC. Circle (1982)

**S20UT10 software:** permits 271X spectrum analyzer to converse with MS-DOS PCs through GPIB; automates test and measurement routines; storage, cataloging of waveform displays and data from TEK 2710, 2712 analyzers. Circle (1983)

Steve Colby and Bill McNamara of World Monitor, Boston

With Dolby SR we get the dependable, high-quality audio that fast-breaking news stories deserve.

“Our London, Tokyo, and Washington bureaus each have only 10 minutes a day to send us their raw footage and feature stories. That brief window allows no margin for error when it comes to audio quality.

“Before Dolby SR, our transmission headroom was so limited that to avoid clipping, we lowered our send levels and suffered lots of noise. With Dolby SR, we get a dramatic improvement in S/N. Plus, SR's anti-saturation feature lets us go back to normal send levels without worrying about the high-frequency peaks, such as speech syllables, that used to crash the feed.

“The line-up of the system was quickly mastered by field editors and transmission engineers alike. Dolby SR is a snap to use.”

Bill McNamara, Director of Transmission Services
Steve Colby, Senior Audio Engineer

World Monitor is a television presentation of the Christian Science Monitor

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344 Great Park Road, London, SWK, England, 01-908-4477-0200 Tele 908-0247 TeleFax 01-908-4478

Dolby and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation. ©1983 Dolby Laboratories.
The first automated mixer that was composed, not improvised.

If you'd rather mix than mess around with a bunch of outboard boxes, we suggest a serious look at the new M-3700 Series from Tascam.

The M-3700 Series is a professional-quality mixing console with a perfect memory of its fader settings. A console whose automation isn't a pain in the pots. And whose under $14,000 suggested retail price isn't either.

Ours is the only automated console that provides you with both snapshot automation (to recall any pre-set levels or switch positions stored as "scenes") and dynamic automation (to recall levels and switch positions locked to real-time locations).

The M-3700 also features an onboard disk drive; SMPTE timecode generator/reader; write/update mode; choice of 24- or 32-channel configuration; and the ability to automate the main, monitor and aux send mutes, and EQ ON/OFF for each channel. Without outboard computer screens, wires, mouses or the usual added-on hassles.

From us, you'll get a compact, familiar-looking system that'll help you create the mix you want. And precisely recall any previous mix, so you can tweak some channels without affecting others. All without wasting your valuable time or talent.

The musician-friendly M-3700 Series automated mixing console. Now waiting to wow you at your nearest Tascam dealer.

TASCAM
©1990 TEAC America, Inc., 7733 Telegraph Road, Montebello, CA 90640 213/726-0303
Circle (94) on Reply Card

MagmaByte LCD: liquid crystal projection system; 2007 connects to NTSC source. 2002 has VHS player; integrated amp, speaker; no technical convergence adjustments except focus. Circa (1971)
Model PS15: TW intercom power supply, for 30 user stations: one 24-32VDC channel and one with no voltage potential. Circa (1972)
Telos Systems
Telos One-M: 2- to 4-wire intercom interface links two systems; each has single-channel full-duplex operation; digital signal processing. Circa (1973)
Tentel
TQ-300M: motorized dial torque gauge for measurements on Betacam systems; replaces dummy reel and spring scale measurements; calibrated in gN-cm with 10gm-cm increments, adapter fits all Betacam spindles. Circa (1974)
T244S-LSCB: Teletometer tension gauge; measures tension for MI, 7-40g range with single gram increments; SLC style probes. Circa (1975)
TFT
Model 9100: frequency-synthesized STL transmitter; direct computer modulation at IF VCO for improved S/N, distortion, stereo. Circa (1976)
Model 9107: frequency-synthesized STL receiver; 55dB stereo separation; 80dB S/N. 0.1% THD; pulse counting discriminator for baseband demodulation. Circa (1977)
The Express Group
Theatre Service & Supply
EDI DMX Isolator: 150VDC isolation with optical isolation device; LED indicates incoming DMX-512 signals; 5-pin XLR connector. Circa (1979)
TheatRon Broadcast
TTV 1645 Sportcam: ENG portable camera with...
THX 898 Primicon: 1" camera tube for HDTV; Primicon photoconductor, electron:alic: deflection, integrated magnetic focus coils; bias light; 4,000 transfer at 700 TVL; limiting resolution greater than 4,000 pixels per line. Circle (1980)

Thomson Video Equipment
Colorado upgrade: 4:2:2 color corrector, multi-channel system with individual channel processing capabilities. Circle (1983)
1250 monitor: 16.9 aspect ratio, accepts 4:3 images, zoom capability expands image, removing blank sides or letter-box effects. Circle (1985)

Thomson LCT
Terrestrial networking: system management for multi-channel, multi-link relay TV transmitter plant; microwave interlinking. Circle (1986)

3M Magnetic Media
Hi8 MP: videocassette material. Circle (1987)
TapeCare: storage boxes. Circle (1988)
# 996: analog audio mastering tape; operating level of +20dB, 73 dB S/N for tape only; bias compatible with #226 media. Circle (1989)

Time Logic
APD-200/E: software enhancements to automatic tape control system; time zone, prime-time program delays; automated copying; scheduled, unattended functions. Circle (1990)

Lynx System Supervisor
enhanced with interface for Neve audio consoles. Circle (1991)

Console control unit: keyboard on console for machine control of six transports. Circle (1942)

Software updates: V-500 for all Lynx modules; Lynx Keyboard Control Unit; Lynx System Supervisor. Circle (1943)

3M Century
Digital Commercial System: hard disk record and playback; stereo storage with minimum of 2hr capacity. Circle (1944)

Tory Controls
CLK-22 time displays: operate with DQSB-6 serial code drive. Circle (1945)
STW-S: timer, up-down counter. Circle (1946)

Toshiba Consumer Products
TFS-300: HDTV digital frame store, 72-frame capability. Circle (1947)
TSC-100: Hi8 video camcorder; 1/4" CCDs, 700TVL, 413,000-pixel array; 14W drain allows batteries to record up to two hours. Circle (1948)
T5W-100HD: analog HDTV switcher. Circle (1949)
PS005RT: 50" rear-screen type projector for HDTV applications. Circle (1951)
HC-1600U: color video printer; dye sublimation thermal transfer process; 203-DPI resolution; put 16 images on single page; RS-232 control; RGB in, S-video in/out. Circle (1952)

HY-8900: 1/3" analog VCR for HDTV. Circle (1953)
PZ2100, FSHD100: HDTV monitors; 21", 30", 34" CRT diagonals. Circle (1954)

Toshiba Information Systems
HSC-100: HDTV camera; CCD sensors with 2-million pixel array; 16:9 aspect with f/5.6 sensitivity at 2,000 lx; 52dB S/N ratio. Circle (1955)
HPE-1000: video effects system for HDTV; 3-D manipulations. Circle (1956)
HSW-1900: HDTV digital video switcher; full-feature component system. Circle (1957)
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EVO-9800
CDI-825 SONY-TO-LTC TRANSLATOR
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Designed for the Sony EVO-9800/50  □ Produces SMPTe Time Code from Sony Protocol  □ Provides LTC for dubbing to other formats  □ Bi-Directional  □ Interpolates Time Code in search and wind modes  □ Used with editors that need time code and serial data  □ Works with or without an editor  □ Selectable compensation for “on-time” display

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Circle (95) on Reply Card

total Spectrum Mfg.
SportsFocuser option: calibrates to near and far points, calculates proper focus settings for intermediate positions.
ACP-4000: field production system; automatic control panel; portable; touch-screen user interface; SportsFocuser software.
AutoCam ACP-8000S: 80486 CPU; multipedestal collision avoidance; camera CCU control; VGA, graphics; pedestal repositioning software.
Battery power kit: four standard ENG camera batteries operate AutoCam pedestal at remote location.
Manual Control Box option: mounts on camera pan bar to permit change of the AutoCam unit to local, manual control.

Circle (93) on Reply Card

TouchVision
D/Vision: PC software for random access editing with compressed video; incorporates Intel DVI processor; open architecture.

Circle (94) on Reply Card

TRF Music
TRF Custom: original music for special production requirements.
DAT format: classical releases.

Circle (95) on Reply Card

Trompe¯er Electronics
BNC, TNC plugs, jacks: straight, right-angle plugs, cable racks, patch plugs for cable types 724, 728, 734A, 735A, K1224L2; splices available for 728,735 and 734A-735A interfaces.
UPLRNs connector: right-angle BNC connector; 75Ω, 50Ω; to 4GHz.

Circle (96) on Reply Card

TTC/Television Technology
XLS-1000MU: 1kW UHF transmitter; complete, redundant solid-state design; configurable for translator service.

Circle (97) on Reply Card

TV Answer
Video data service: wireless viewer response system; selection from multi-choice menu screens transmitted by originator via set-top unit through cellular site or satellite link.

Circle (98) on Reply Card

Ultimatte
System-6 ITA: Interface-to-Anything ties System-6 to editing control: routers to load files from System-6, to synchronize switching of cameras.
Disk drive: Link disk stores, loads System-6 settings, time-code data; 3.5” drive connects to system by RS-232; Link permits files to be stored by PC via RS-232 and transported between computer and Ultimatte-6 disk drive.
Smartstore: screen correction; if no clean frame of backing color exists, Frame Builder memorizes backing areas revealed to build clean frame.
System-6 transcoder: 2-channel bidirectional system; permits use of compositing system with any component recorder.
PC Remote with GPI: IBM/compatible PC emulates System-6 remote control; serves any menu or key.
System-6 High Definition: video compositing for 1125/60 and 1250/50; programmable for other HDTV parameters; includes screen correction feature of standard systems.

Circle (99) on Reply Card

Union Connector
2H+G/C: 208V stage pin connectors; current range 60-100A.
polybox: main switch panels - company switch with 3.5” output.

Circle (100) on Reply Card

Unique Business Systems
RentTrace V3.3f: enhanced rental, tracks equipment availability.

Circle (101) on Reply Card

United Ad Label
Label stock: new design tape labels.
Labels Unlimited 3.5f: software for custom label printing.

Circle (102) on Reply Card

United Media
Update Package: for UMI 400 series edit controllers; Hard Marks with Back Timing Slow Motion control; VITC/LTC/TIMER sets current time-code position to current timer location.

Circle (103) on Reply Card

Utah Scientific
DVS-2/32: serial digital router for D1, D2 signals; may operate with AVS, DVS-1 or stand-alone routers; 32-32 matrix.
Model 112: production switcher; one mix-effects switcher with program/preset bus; menu configuration for two mix/effects; four linear keyers for memory effects systems; interface to all Utah Scientific routers.

Circle (104) on Reply Card

Vacuum Tube Logic
Model CR3A: studio condenser mic; European styling with cardioid polar characteristic; high-pass filter, -10dB pad.

Circle (105) on Reply Card

Reference D/A converter: 20-bit resolution digital input; analog output; digitally designed interstage filters; mic preamp.

Circle (106) on Reply Card

Manley MONOBLOCKS: audio power amps; tube designs from 50W to 1kW ratings.

Circle (107) on Reply Card

Vantage Lighting
Ken-Rad DTY: 10kW halogen lamp.

Circle (108) on Reply Card

Vatek
Unityworkstation: 8-input composite, component inputs; D1 option; combines digital switching, video effects, entry picture storage for multilayering, montage effects, multifORMAT/4, editing control feature.

Circle (109) on Reply Card

output: 470-line resolution; shutter to Viasup; 1/2" CCD provides 420,000-pixel array; sensitive to 15 lx at f/1.6.

Circle (110) on Reply Card

www.americanradiohistory.com
VEAM/Liton Systems
F.O.M.S: fiber-optic mic snake; electronics, for audio signals to 1km without crosstalk or RF; option permits 2-way operation. Circle (1991)

Vega/Mark IV
QPlus: wireless intercom upgraded for 40% greater range. Circle (1992)

600 series wireless: T-677 bodypack transmitter, R-662 true diversity receiver, UHF line-of-site operation to 1.700 feet; 108ft/s N. Circle (1993)

T680 transmitter: UHF wireless mic from 600 series UHF systems, 150W RxF covers range to 1,700 feet; internal dipole antenna; DYNEX III processing. Circle (1994)


VG Electronics
VGE 10760/ND: RDS encoder; generates RDS sub-carrier to inject into stereo coder or FM exciter; supports most RDS features; upgrade software available to extend RDS services, available with or without integral display. Circle (1999)

VGs California
Nigel B Furniture: modular furniture for production facilities; racks, consoles permit changes to configurations; Quadracontrol chair with back support; diffused work lights. Circle (1997)

VGV
PAC A/D, PAC D/A: NTSC, PAL to 8-bit digital at 4x4f, 16-bit conversion to NTSC/PAL. Circle (1996)

DX120: composite digital mixer; 4x multilevel mix/effects, key priority, memory, 16/32-bit processing; serial editor interface. Circle (1999)

DX 30: composite digital mixer; 16/32-bit internal architecture; 3x in/out, 10 key inputs, all for 10-bit parallel, serial. Circle (2000)

Video Accessory Corp.


XB/VDA: 120MHz bandwidth DA; 1:1 output, two are unity gain; can be used to distribute VCR channel R/L signals. Circle (2005)

Video Associates Labs

MicroKey/Genlock: sends signals from MicroKey/A: Y output to video source. Circle (2007)

MicroKey/A: adds digital signal to images from PC; popular graphics packages or video recordable computer to video conversion. Circle (2008)

Video Band Pro
Key West Magic Dolly: transportable dolly for curved, straight-section tracks; collapsible, easy to assemble, quickly; loads to 250 pounds. Circle (2009)

Video Central
Optex image enhancer: for low-level lighting; fits between camera and taking lens; adapters for different camera lens mountings. Circle (2010)

Optex underwater housing: designed for Toshiba IK-M30P miniature camera. Circle (2011)

Video Design Pro
Autodesk 3D Studio: for VDCAD/AuCAD, create 3-D still images, animations of studio facilities, designs, other graphic presentations. Circle (2012)

Video International Development
Model DTC 1504: 4-field, 4-line standard converger system; low-cost design. Circle (2013)

VideoLab Para Technologies
LCX-108 Logichron: time-code processor; simultaneous LTC, VITC reed, generation functions, new approach to LTC reading demodulates code not readable by standard methods. Circle (2014)

Videomagnetics
CDS-3500 degaussers: belt system for erasure of all tape formats in cassettes less than 5" wide: 3.75s time for standard oxides, 8s time for metal particle tape, achieves RF/RFI erase. Circle (2015)

Videomedia SED
SuperMICRON: A/B/Ext editing controller with switcher control; list management; variable speed control. Circle (2016)

PACE: V-LAN Professional Animation Control Engine; interface between 31 devices and V-LAN control system. Circle (2017)

Auto-PICT: animation software for Macintosh; displays PICT, PICS tiles; permits mixture of file types in edit list format. Circle (2018)


VXL modules: enhanced transport control modules; combines V-LANT, V-LANR features; downloadable device drivers, slow motion; for IBM, Macintosh. Circle (2021)

nITLE: interactive title for still, motion images; by Xaos tools and Silicon Graphics; full character control, character animation. Circle (2022)

V-LANx: expanded V-LAN system; time-code router, generator, downloadable VTR drivers, rack-mounted package. Circle (2023)

Videotek
TV710: combination waveform monitor, vector-scope instruments; facilities include cursors, line selection, SC1 phase measurements; four composite inputs; picture mode display; 34 node rotates color bar signal on X-Y-BY axes to show all dimensions of video signal. Circle (2024)

TV-720: enhanced TV-710 for component analog, composite video, displays two component images. Circle (2025)

Today, a wireless system doesn't have to be expensive to be the best. It just has to be Nady.

We know how it is. You've been using the same system tested wireless system for years. Sure, it costs much more today than it did 10 years ago (even though it is basically the same system), but why change, right?

Well—have you noticed that while the price of your wireless has been going up, the price of wireless from other manufacturers has been going down? With this in mind, you've got to ask yourself: Am I getting the best product performance at the best price from my wireless?

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Ready to re-think which brand of wireless to order? With Nady, you'll not only enjoy superior performance, but with the money you save on your next wireless systems, you can get that new camera you've been trying to work into your budget. For more information, contact:

NADY SYSTEMS, INC.
6701 Bay Street
Emeryville, CA 94608
415/652-2411
FAX 415/652-5075

The Best Performance and Price in Wireless

Circle (97) on Reply Card

June 1991 Broadcast Engineering 127
and two composite, one component and five composite or eight composite inputs.

TVM-730R adds Auto Measure graphics and text-on-screen readouts of measurements to TVM-710 package; special 3.4 display mode.

BTG-100: hand-held portable SMPTE color bar generator; 8x clock rate used for generation of test signals.

Prodigy C: component analog video production switcher.

**Videseence**

Color Wall illuminator: high intensity, seamless ionic light.

Portable Lighting: small ionic light equivalent to 750W tungsten.

**Vinten Broadcast**

Vision CV-5 Corporate: professional tripod; single-stage, black anodized aluminum; spreader, pan/tilt head, pan bar, clamp.

TurboSlefi: control panel in travel case, power supply, two full-servo heads; for manual remote or automated control of two cameras; memory for eight shots per camera.

MicroSlefi option: graphics tablet operator interface.

MTC 206: Microslefi Touch Control; 33MHz PC-based unit; VGA monitor; for simplified multicamera automation setup, operation.

Vision LT series: tripods of carbon fiber; 20% weight reduction; available separately or packaged with pan/tilt head, telescoping pan bar, spreader and travel bag.

**Vitek Electronics**

Sound-in-sync: dual-channel sound encoder, decoder; rugged algorithm withstands poor quality link conditions; option for V3020/3021 ACLE encoder, decoder units.

**Vector VMC**

near transparent conversion with Vector V4401 standard converter; VMC Vector Motion Compensation detects moving objects, generates compensating signals for reconstruction of moving images with correct spatial positioning.

GM6004, GM6005: digital, analog-faced clock displays; -6004 can be positioned anywhere on screen; -6005 permits custom-design hands; 4:2:2:2 product with internal frame store to position clock over backgrounds.

V4391: frame synchronizer; component, composite, Y/C; D1; TBC mode; freeze, grab; corrects video, chroma gain, black level, chroma/luma delay.

GM7500 series: color monitors; tri-stimulus analyzer for auto alignment; assignable inputs for multiple analog, digital component, component signals; 14", 20" CRTs; automatic and manual input standards selection.

ARRAY routers: serial digital switchers; configures for D1, D2, DX; Ethernet control; matrices to 64x64 in 15RU; expands to 256x256; software for mixed standards (525-625) operation.

**Vortex Communications**

Intelligent Timecode Clock: integral clock power by battery if external signal fails; auto correction when drive returns; silent models, various faces, hands, movement choices; may also connect to pulse clock.

**VYVX**

Switched FO network: demonstrations of FO TV transmission network; remote switching capability.

**Waveframe**

Removeable Optical: removable, erasable disk media.

DSFX digital mixing: provides 24-bit digital mixing in a 10x6 mixer card; patchable, cascaddable EQ, with MUX control.

MDI-32: multichannel interface for AudioFrame offering high-definition digital audio.

**Wavefront Technologies**

Advanced Visualizer: 3-D graphics, animation; enhanced rendering, modeling.

Data Visualizer: interactive, multidimensional data analysis.

HP support: Visualizer, Data Visualizer for HP Apollo 9000 Series 700 RISC workstations running UX 8.0 operating system.

**Weathernews America**

PLUS: 3-D graphics for forecast period, transmitted to the station's graphics workstation provided by Weathernews America.

**Wegener Communications**

Series 2900 decoders: encryption using Videocipher II Plus.

**Wheatstone Broadcast Group**

TV-600S: TV production console; Bus Minus IFR; event computer directs router, on-board switcher; optional S-selector override; two master output, two mono outputs for SAP, mono sum output; VCA group masters.

**Wheeler-lex**

Auto tie-wrap: secures cable bundles with hand-held unit containing reel of bulk tie-wrap.

**Whirlwind**

MIXS-5B: broadcast mixer; 4-channel unit operates from AC or DC.

**Wilton Engineering**

Wilmot: remote control unit, operator; optional S-selector overbridge; two master output, two mono outputs for SAP, mono sum output; VCA group masters.

**Wegener Communications**

Series 40: production consoles.

**Wegener Communications**

SP-12: model P-12: power amplifier, rated 12W stereo for headphones.

Continued on page 133
GEPCO SINGLE BREAKOUT BOX

GEPCO breakout boxes exhibit our distinctive attention to high quality, durability and ease of use. They're ideal for remote field applications because of the specific design features providing protection and portability.

A standard single width Breakout Box is available with feed thru multi-pin connectors on each end for additional system capacity. Single boxes are available with up to 32 channel capability.

Single boxes are 4.5 inches high by 5.25 inches wide.

Contact Gepco sales dept for New Gepco G-4 Custom Designed Product Catalog.

GEPCO SIDE-BY-SIDE BREAKOUT BOX

GEPCO breakout boxes exhibit our distinctive attention to high quality, durability and ease of use. They're ideal for remote field applications because of the specific design features providing protection and portability.

A side-by-side double width Breakout Box is available with feed thru multi-pin connectors on each end for additional system capacity. Double boxes are available with up to 64 channel capability. Double boxes are 4.5 inches high by 10.25 inches wide.

Contact Gepco sales dept for New Gepco G-4 Custom Designed Product Catalog.

ANDREW

The new Andrew 8-meter class earth station antenna has the versatility to operate individually at C band or Ku band or to operate together at C band and Ku band.

TOSHIBA

The IK-M40A micro-miniature camera features Toshiba’s 1/2-inch, 420,000 pixel CCD image sensor chip assures the finest image and color resolution.

Highlights include over 360 lines of horizontal resolution; a fast electronic shutter with eight speeds up to 1/10,000-second; Y/C video output terminal; auto-tracking white balance adjustment; genlock capability for external sync; minimum illumination of 10 lux (f/1.6) and cable length up to 30 meters.

TOSHIBA

IK-M31

Toshiba’s IK-M31 offers an auto-iris 1/2-inch CCD image sensor, 7.5mm miniature auto-iris lens and a minimum illumination of a 15 lux (f/2 lens).

The IK-M31 microminiature color camera features Toshiba’s 1/2-inch, 300,000-pixel CCD image sensor chip.

Highlights include over 360 lines of horizontal resolution; a fast 1/1000-second electronic shutter; automatic tracking white balance which adjusts continuously to lighting conditions for best color fidelity.
DUAL FREQUENCY ANTENNA
Mark Antennas Division has developed a dual frequency 8 foot category A standard (FCC part 74) antenna covering 6.825-7.125 and 12.7-13.25 GHz. The antenna mid band gain at 6.9 GHz is 42.4 dBi and at 13 GHz is 46.0 dBi. This antenna is ideal when there is limited mounting space on the tower.

Radiation Systems, Inc.
Mark Antennas Division
P.O. Box 1548
Des Plaines, Illinois 60017
Tel. 708-296-9420
Fax: 708-635-7946

Circle (108) on Reply Card

MICROWAVE ISOCOUPLERS
Mark Antennas Division offers a line of microwave isocouplers for use on A.M. towers. These units allow a microwave dish to be installed and operated on an RF excited (up to 50kw) A.M. tower and provide adequate isolation and insulation between the "hot" tower and the microwave radio.
- Return loss 26 dB or better.
- Insertion loss 6 dB.
- Dimensions 15L x 8H x 8W.
- Frequencies 7, 11 or 13 GHz.
- Connectors-Waveguide Flanges.
- Protection Spark Gap.

Radiation Systems, Inc.
Mark Antennas Division
P.O. Box 1548
Des Plaines, Illinois 60017
Tel. 708-296-9420
Fax: 708-635-7946

Circle (109) on Reply Card

FUJINON 16X LENS OFFERS IMPROVED HANDLING
Fujinon has redesigned the servo and grip of the A16x9.5ERM so that it perfectly fits the right hand. The servo has also been beveled so the operator has unrestricted finger movement. The aperture indicator is also easy to see without moving away from the shooting position. The A16x9.5ERM weighs only 3.19 lb. The A16x9.5ERM has a maximum aperture of f/1.8 from 9.5 to 124 mm and f/2.2 at 152 mm, and focuses down to 3.1 ft.

For more information, contact John Webb at Fujinon:
(210) 633-5600

Circle (110) on Reply Card

FUJINON PAN-AND-TILT HEAD PROVIDES SOLID CONTROL IN COMPACT SIZE
Fujinon's new CPT-10 is a miniature pan and tilt head that is extremely well suited to applications such as teleconferencing and security where size is an important consideration. The CPT-10 has a pan range of 300 deg., tilt range of 95 deg., pan speed of 15 deg./sec., and stopping accuracy of ±0.1 min. It can accommodate any camera/lens combination weighing up to 2.6 lb., requires 15 VDC power supply and weighs 4.4 lb.

For more information, contact John Webb at Fujinon:
(210) 633-5600

Circle (111) on Reply Card

RS-422 PATCHING SYSTEM
RS-422 Serial Data Pre-wired Patching System was introduced by Audio Accessories, Inc. of Marlow, NH. Two models are available—a 24-port one-rack unit (12 in, 12 out); a 48-port two-rack unit (24 in, 24 out).

For more information, contact:
Audio Accessories, Inc.
Mill Street
Marlow, N.H. 03456
603-446-3335

Circle (112) on Reply Card

FUJINON 20X STUDIO LENS FEATURES IMPROVED PERFORMANCE
Fujinon has announced an enhanced version of its A20x75ERM 75-inch studio production lens that delivers improved optical performance, and a reduction in minimum object distance from 2.48 ft. to 1.85 ft. Maximum aperture of f/1.4 remains constant from 7 mm to 124 mm, and varies only to f/1.7 at 140 mm. Every function can be accessed without removing the shroud. Standard features include a built-in 2x extender and LED display of focal length and aperture. The A20x75ERM can deploy its extender from the lens position, or via a remote demand unit or short box.

For more information, contact John Webb at Fujinon.
(210) 633-5600

Circle (113) on Reply Card

FUJINON ENHANCES WORLD'S BEST-SELLING ENG EFP LENS
Fujinon has made dramatic improvements in its A14x8.5ERM Pegasus III ENG/EFP lens. The lens has been beveled so the operator can focus with unrestricted finger movement from the closest distance to infinity. The design of the A14x8.5ERM has also been streamlined, so that it weighs only 2.8 lb. The A14x8.5ERM has a maximum aperture of f/1.7 from 8.5 to 100 mm and f/2.0 to 119 mm, and focuses down to 2.6 ft. Standard features include macro capability, a built-in 2x extender, weatherized construction, and servo zoom.

For more information, contact John Webb at Fujinon.
(210) 633-5600

Circle (114) on Reply Card

FUJINON 55X FIELD LENS COMBINES LONG ZOOM, CLOSE-UP FOCUSING, AND FASTEST APERTURE
Fujinon has enhanced its A55x5.9 field production zoom lens to make it better suited to shooting confined areas such as stadium press boxes. Fujinon produced this performance by incorporating an exclusive feature called the Rotary MODifier, located in the extender turret. The Rotary MODifier reduces the MOD from 7.8 ft. to less than 1 ft. by flipping a switch. The A55x5.9 has a minimum focal length of 9.5 mm, maximum focal length of 525 mm, and maximum aperture of f/1.4 to 1.8 to 253 mm and f/2.9 at 525 mm. Features include built-in 2x extender, and LED display of focal length and aperture.

For more information, contact John Webb at Fujinon.
(210) 633-5600

Circle (115) on Reply Card
DX120
The DX120 is a Digital single M/E production switcher with 2 identical keys. Small but extremely POWERFUL. Featuring KEY PRIORITY, EZMEM, FILL-FORCED BACKGROUND, and much, much more. The DX120 offers QUALITY, PERFORMANCE, and a price you can’t refuse beginning at $19,995!

Video Gainesville
3700 N.E. 53rd Ave.
Gainesville, Florida 32609
Phone: 904-372-0270
Fax: 904-378-5320

Circle (116) on Reply Card

DX300
The DX300 is the most powerful DIGITAL PRODUCTION SWITCHER in daily use worldwide. More quality keying power and the UNIQUE Infinity Shadow Generator, along with numerous other one-of-a-kind features makes the DX300 the PROVEN State-Of-The-Art!

Video Gainesville
3700 N.E. 53rd Ave.
Gainesville, Florida 32609
Phone: 904-372-0270
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July...

AUDIO TECHNOLOGY UPDATE

One of the newest challenges to the broadcaster is digital transmission. In a surprise move, the Europeans have launched a campaign to implement their proposed digital broadcasting system in the United States. The EBU/Eureka 147 system of digital audio broadcasting represents a challenge and an opportunity for American broadcasters.

- Measurements in the Digital Domain

Because of the increased use of digital audio, testing equipment performance becomes a more complex task. It is no longer simply a matter of hooking an analog meter to the recorder and measuring distortion. As the equipment stores the data in digital format, different types of tests must be completed to ensure proper equipment performance.

- Disasters: Preparing for the Inevitable

The recent hurricanes and earthquakes have emphasized the importance of being prepared for a natural disaster. Fortunately, preparing adequately for such phenomena requires special planning and knowledge.

August...

VIDEO TECHNOLOGY SPECIAL REPORT

- Comparing the Options in Advanced TV Systems

Engineers need to understand the basics behind some of the proposed advanced TV systems. This article looks closely at the theory and technology involved in some of the proposed systems. Understanding these systems is the first step to being able to make knowledgeable choices in advanced TV equipment. A related article will compare the formats for HDTV audio systems.

- Standards Conversion

Converting between different types of video signals is neither easy nor impossible. BE takes a look at the processes available to convert your signal to one that your neighbor can use.

- Connecting PC Video to NTSC

Many broadcast stations and post houses are looking for ways to get the high-quality images from their PC onto their video recorders and broadcast chains. The process is not as simple as it might appear. Editors draw on their experiences in video graphics and PCs to lead a path to successfully moving images from the PC to professional video.
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June 1991 Broadcast Engineering 135

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