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NAB convention  
replay

Special Report:  
The Gulf War  
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### **NAB CONVENTION REPLAY:**

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.

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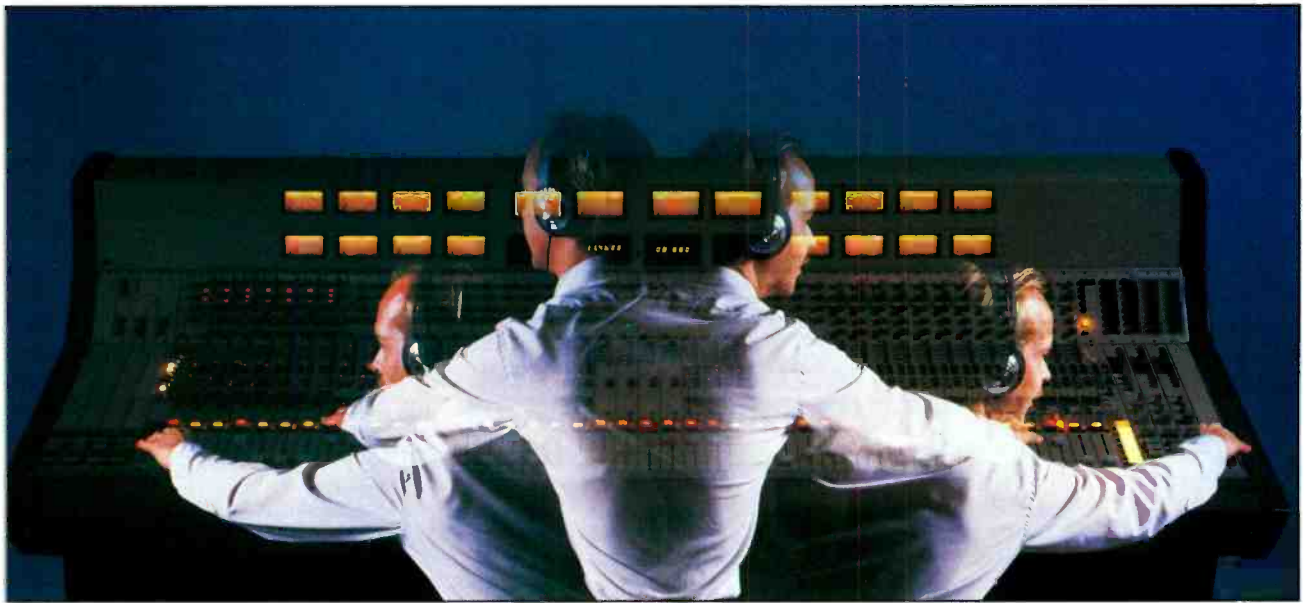
The Persian Gulf conflict showed the world what the combination of technology, ingenuity and courage can do on today's battlefields. And the world witnessed all of this through the wonders of modern broadcast technology. This BE Special Report is an industry exclusive story on the technology behind the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



**T**elevision 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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## *It's time for new directions in television audio.*

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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)
- indicate that licensees 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 re-

quirement 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 FAA—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 Gannett's USA Digital proposal. Eureka engineer George Plenge surprised some attendees by indicating that with 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.

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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 fowl. 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.



*Brad Dick*

**Brad Dick,**  
editor



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## 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.

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

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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.)

about 1.5Mbit/s bandwidth to pass a CD-quality audio signal. Traditional phone lines are often pressed to meet the needs of a 19.6kbit/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

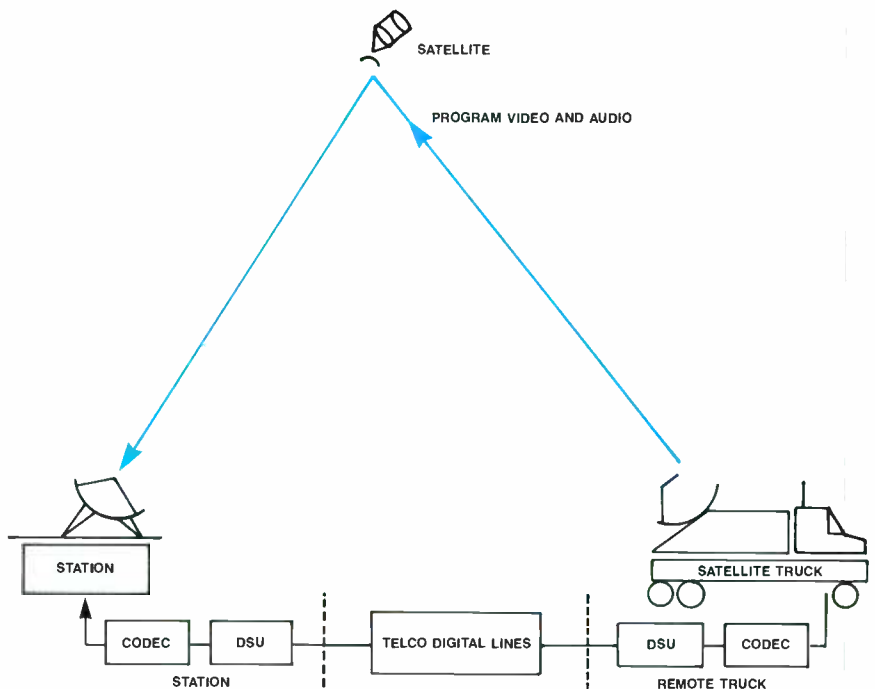


Figure 1. In a digital system, backup audio is digitized and then converted to telco standards in the digital service unit (DSU). The process is reversed in the station.

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.

There is one problem, however. It takes

a dial-up, or *switched*, basis. The advantage to this system is that charges are accumulated only when the connection is actually in progress.

Although it is available in approximately 400 cities, the Switched-56 service is only a stopgap measure. However, after much ballyhoo and a slow start, the telcos are finally ready to roll out the Integrated Services Digital Network (ISDN). This switched system will have two 64kbyte/s signals and a message channel per line.

Editor's note: For a thorough discussion of digital telephone standards, see "Remotes Revisited," BE, January 1991.

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## Applying vectors

Simple vectorial operations

By John Battison, P.E.

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.

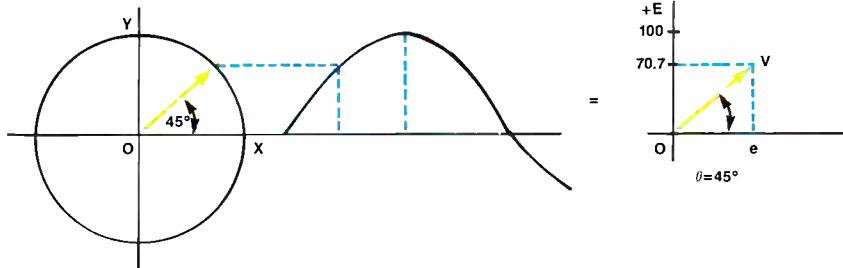


Figure 1. An instantaneous voltage in the phase circle and its equivalent vector form.

When vectors run in the same direction, they are "in phase" and can be added arithmetically by simple, linear addition. In this way, two vectors, each at  $90^\circ$  with magnitudes of 2 and 3 respectively, produce a resultant of 5 at  $90^\circ$ .

Conversely, vectors that run in different directions are "opposite in phase" and are added algebraically. If one vector is at  $80^\circ$  with a magnitude of 5, for example, and the other is at  $-260^\circ$  with a magnitude of  $-10$ , the resultant is 5 at  $-260^\circ$ , or  $5/-260^\circ$ .

Now this information can be put to use. Whenever feedback is applied, it involves vector addition or subtraction. In the case of the audio (negative) feedback circuit, the process typically used is the application of voltages, or currents, that are out of phase. These produce a resultant that is less than either of the two original vectors, and corresponds to the audio output of the circuit, which is, of course, at a similarly reduced level.

Conversely, when using positive feedback, the two inputs are in phase, and the resultant (output) is greater than either of the two original inputs. The early regenerative receivers used this principle.

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



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

result is zero. The vectors  $OX_L$  and  $OX_C$  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  $OI$  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  $OI$  and  $OV$  will diverge in azimuth angle.

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

ruler and 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  $45^\circ$ . Mathematically, the instantaneous voltage ( $e$ ) generated as an armature rotates — or a circuit oscillates — is given by  $e = E_{max} \sin \theta$ . Substituting,  $e = 100 \times 0.707 = 70.7V$  with a phase of  $45^\circ$ . Graphically, the line  $eV$  would measure 0.7 inches, and would show the approximate instantaneous voltage. Vector  $OV$  would show the  $45^\circ$  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 re-

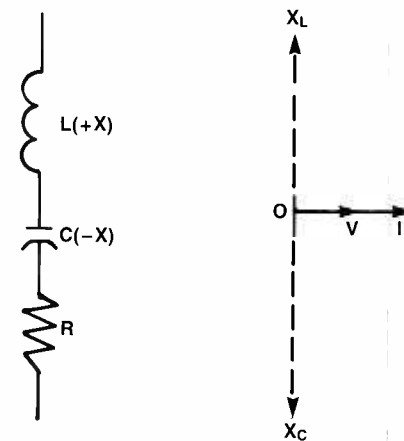


Figure 2. At resonance,  $OX_L = OX_C = 0$ . The current through  $R$  (denoted by vector  $OI$ ) produces a voltage drop across it, which equals the total voltage through the circuit, as shown by  $OV$ .  $OI$  and  $OV$  are coincident because the purely resistive load means voltage and current are in phase.

[{:(-:)]]

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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 P.O. Box 20450, Indianapolis, IN, 46220, or call Elberta 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 prolifera-

tion 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.

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



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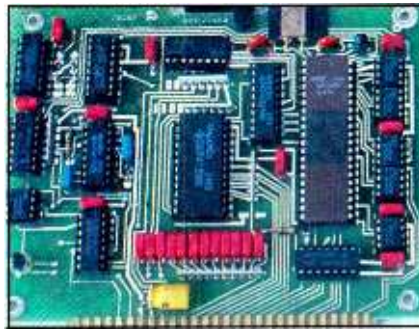
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## Building with microcontrollers

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.



put 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

sage 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 receiver

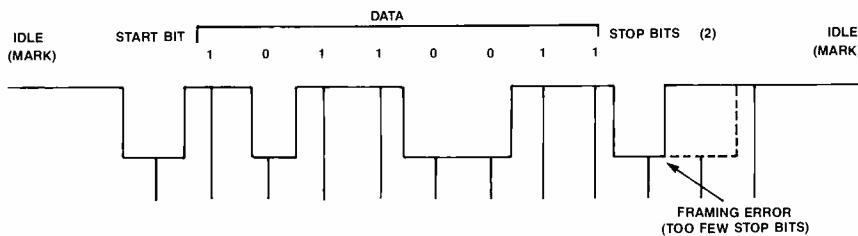


Figure 1. A framing error in which an incorrect stop bit will cause the receiving UART to issue an error signal. This will tell the transmitting UART to repeat the character.

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 T<sub>0</sub>'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 in-

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

8-bit databyte	No. of 1s	Even parity bit	Odd parity bit
1001 1001	4	0	1
1011 1001	5	1	0
0011 1111	6	0	1

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 mes-

sage counts the number of 1s in the received character, and then checks the transmitted parity bit to see if it matches the calculated parity bit. If it does, the character is accepted. If it doesn't, the receiving UART transmits an error indication. This procedure of sending and confirming characters is called *handshaking*. [:-:~:~:~]]]

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

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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.

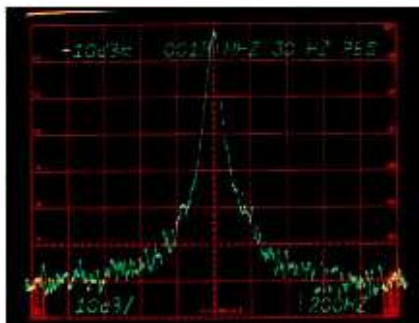
These alignments should be checked about every six months, or whenever the head drum is changed. They should be checked more often, however, on machines used in mastering environments, or on machines that are moved frequently.

### Typical DAT circuit adjustments

**Tracking voltage adjustment.** Typically, this adjustment must be set to 0V,  $\pm 2\text{mV}$  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.

**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 recom-

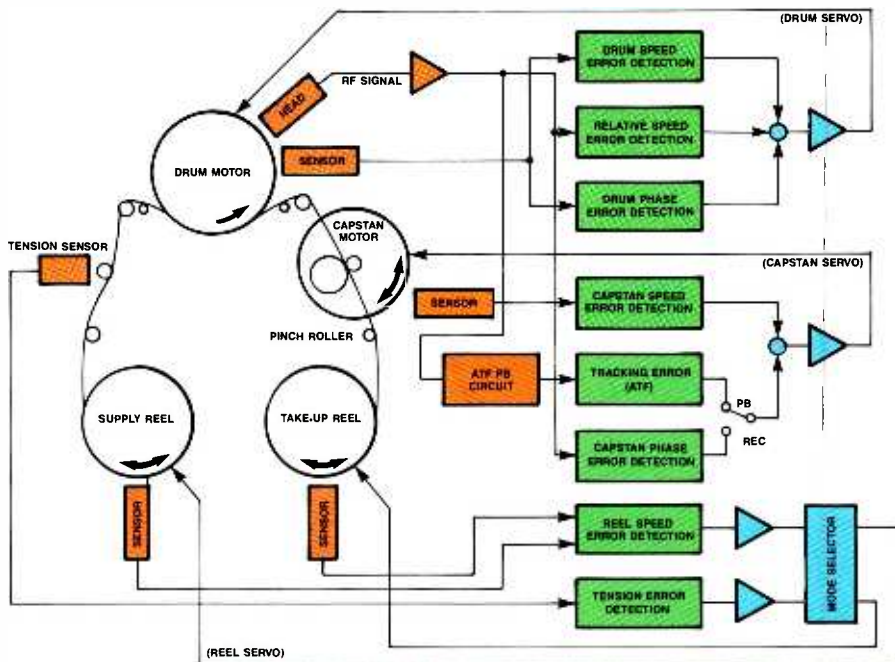


Figure 1. A DAT machine contains three separate servo systems: drum, capstan and reel table. Most of the alignments affect the capstan servo system. (Courtesy of Sony.)

**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 affect on the number of errors detected during playback, and is typically adjusted to yield the lowest error count.

mend 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.

Maddox is technical manager at Media Management Associates, Lynnwood, WA.

# OUTLOOK ON OPTICS

## 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.

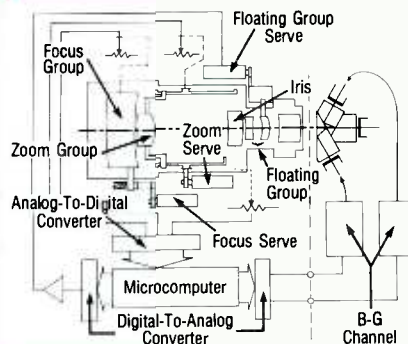
The floating group is a motorized lens system mounted behind the iris of the lens. The microprocessor-controlled system monitors zoom, focus, and iris position. The data is compared with stored values of field curvature, registration, and shading, and instructions are sent to the camera

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.

Many of the advances being made in HDTV research are already being transferred to today's broadcast lenses.



Floating group motorized lens system

# 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.

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

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### 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.

||:~:)))||

Perkinson is a senior member, the Calumet Group, Inc., Hammond, IN.



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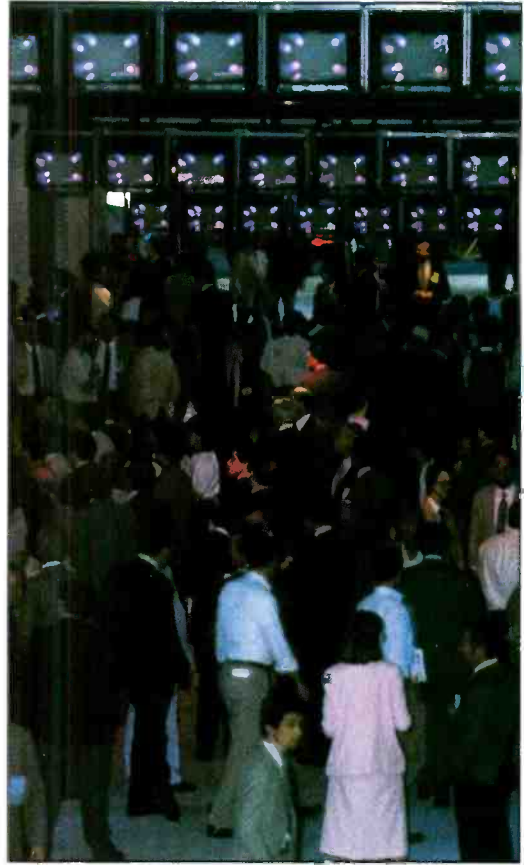


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# Perspective on the convention

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

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# NAB '91 in review

## A thumbnail sketch of the annual industry ritual.

By Skip Pizzi, technical editor

**B**roadcasting 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 four 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 in 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 compres-

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sion, lest some of the artifacts of the data compression that were formerly masked become audible. Therefore, advocates of this position recommend that all air-chain audio processing (EQ, compression, limiting) take place *on the station end* of a data-

ty and speed of various audio measurement devices.

- *Integrated automation:* The trend that has been percolating on the TV station side has also invaded radio. PC-based au-

compressed digital STL.

- *Recordable CD:* Stand-alone, write-once CD hardware made its debut, offering broadcasters yet another digital recording format for their audio programming. Up to 63 minutes of stereo audio (or 99 tracks) can be stored on a CD compatible with all standard players, with blank discs costing approximately \$40. A recording laser causes thermal changes to occur on these pre-grooved blank discs, thus changing the reflectivity of one of the disc's inner layers. Confidence replay is available during recording.

Once all the desired audio has been recorded on the disc (no erasure or record-over is possible), a table of contents (TOC) is added, acting like a computer disk's directory file. Thereafter, no further audio can be added to the disc. Audio from the disc can be replayed on a CD recorder prior to TOC recording, but the disc will not play back on a standard CD player without a TOC.

Write-once CDs have an expected life span of at least 10 years.

- *Data compression:* This year's show indicated that improvements and applications continue in radio and TV audio. Point-to-point audio transmission seemed to hold the most important advances. New audio data compression applications for remote acquisition via switched digital telco services, satellite distribution, and studio-to-transmitter linking in the 950MHz band were significant highlights.

- *Digital signal processing:* More applications for this powerful tool in digital audio manipulation were in evidence, showing why the term "digital op-amp" has begun to be applied to DSP chips. Simpler, faster and cheaper approaches to audio processing of all sorts have been DSP's strength for several years in the professional and (more recently) consumer sides of the industry. It will undoubtedly play a major role in the transmission and reception of any future digital radio system. An elegant scheme for variable sampling rate conversion through DSP was presented at the conference.

- *Audio test and measurement improvements:* As audio hardware improves, audio test equipment always has to stay one step ahead. This year's show saw that envelope pushed even further, with increases in accuracy, capability, portability-

tomation 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.

- *Integrated processing:* Included in the trend toward digital broadcast audio processing is the move back to a single-box audio processor, away from the previous vogue of a rack full of separate devices arranged serially, each providing a distinct function. The versatility and flexibility of DSP allows a wide variety of processes to be performed on a digital audio signal. Quality is preserved and cost is reduced by minimizing the number of A/D and D/A conversions, which adds to the attractiveness of a single-box approach. Finally, this method allows comprehensive control and display at an off-site location, providing the ultimate in tweaking: remote system adjustment in real time with a laptop computer and modem, attached to a cellular phone in a car.

### 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 switchers and other video pathways of 30MHz and higher bandwidths being widely advocated for any new facility designs or hardware purchases.

- *Transmission improvements:* Incremen-

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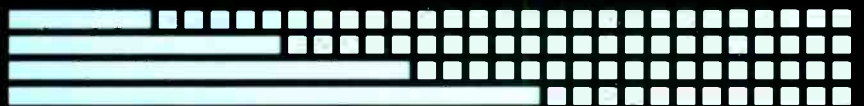
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tal improvements in transmitter efficiencies, primarily in the UHF domain, continued with a growing trend toward all solid-state. Digital transmission was also discussed theoretically, and a bit more was heard about ghost-canceling techniques.

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 as 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. Cus-

tomized 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 man-

ufacturers 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. But 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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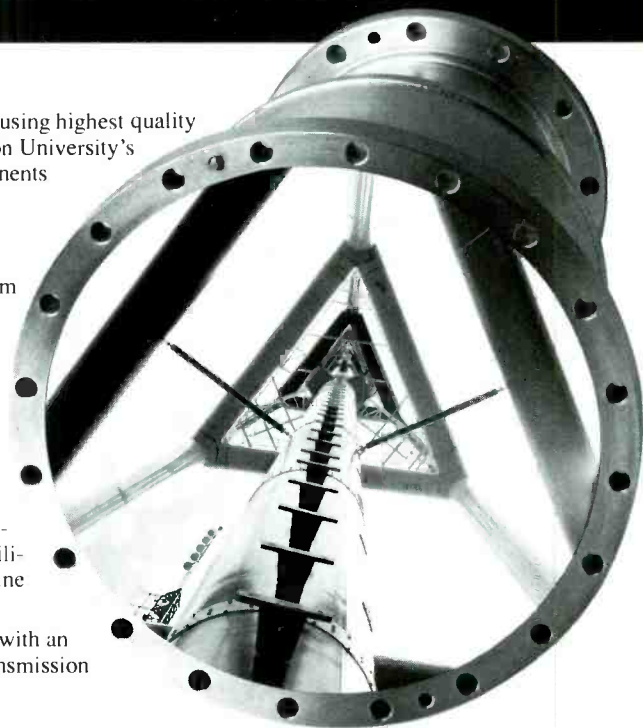
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nents. Of the two systems in hardware at the show, one was the well-known Eureka 147/DAB system from the European consortium, and the other was Acorn DAB from USA Digital Radio, a joint venture of Gannett, Stanford Research Institute (SRI)

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

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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 multichannel 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 94.9MHz) 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 for the Eureka system in the test (476-482MHz) was considerably lower than the L-band (1,500MHz) 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.

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 coding 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 DRB concepts making their first NAB appearance — all are terrestrial in-band systems — were those from Mercury Digital Communications (the *Multi-Frequency Modulation* or *MFM* system), American Digital Radio (the *ADR* system), Synetcom Digital (the *Digital FM-S* system) and a presently unnamed format from LinCom Corporation. (An in-depth analysis of all the DRB 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-

to-point delivery technologies were presented. Although some progress was shown, it seemed to feel that the reality in the U.S. broadcast

A new addition to the NHK Technology Exhibit got a glimpse into the world of R&D, with more than two stations of high-tech works presented in a World's Fair or "of-the-future" style. Among them were portable flat-panel smart antennas for DBS, tiny HDTV cameras, 3-D advances in recording and transmission capacities, and a digital player-piano (other musical instrument) that performs music live in the listener's home from 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 worthwhile wisdom, exhorting engineers to consider the needs and wishes of consumers when designing new services and hardware. 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 ergonomic 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 undergo, maintaining that tenet as an ultimate touchstone is always good advice.

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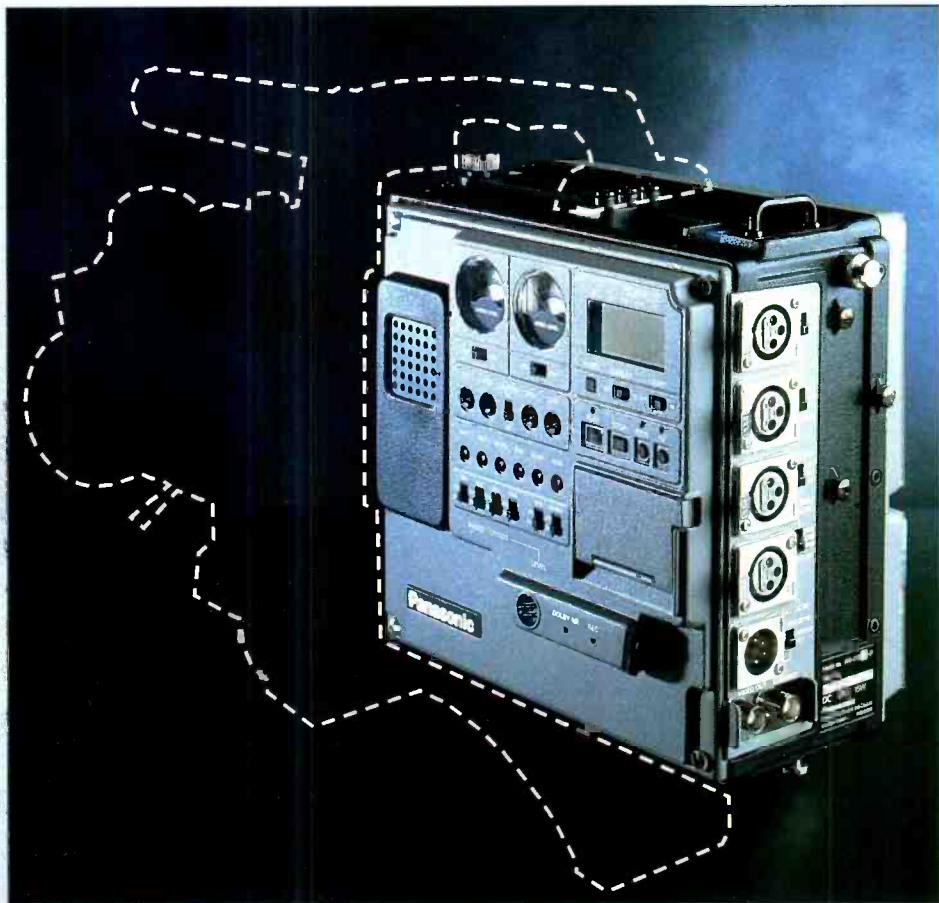
How do you obtain high quality and performance with today's tight budgets? Where do you get a video system that can deliver top quality video from acquisition to master tape? How do you reduce the appetite for archive and machine real estate? And what system do you choose for compatibility with other 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 pro-



AU-520 Portable Field Recorder with 90 minute cassette record capability.

vides 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



AU-410 Dockable Recorder mates with camcorder cameras of all the major brands.

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.

# ANSWERS TODAY'S VIDEO QUESTIONS.

## 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.



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

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

Each MII VTR is completely conversant with today's edit controllers, and is plug-compatible



AG-7750 S-VHS Recorder with Y/C 3.58 component I/O, time code, RS-422A and digital TBC assures maximum quality dubbing to and from MII.

with 3/4-inch VTR machines. Acquire in S-VHS or distribute in S-VHS at the highest quality

levels 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



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

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.

\*OPTION

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For more information call: 1-800-524-0864

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# The Pick Hits of NAB '91

**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 plied them with 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

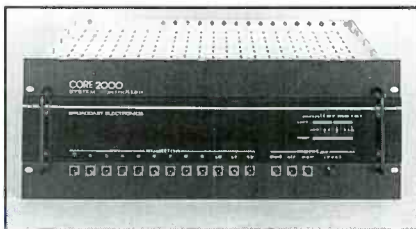
**Belar: *The Wizard FM modulation monitor***



The Wizard is a 1-rack-unit FM digital modulation monitor capable of displaying parameters on its 16-character alphanumeric

display. It features a numeric 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 100 $\mu$ s 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.



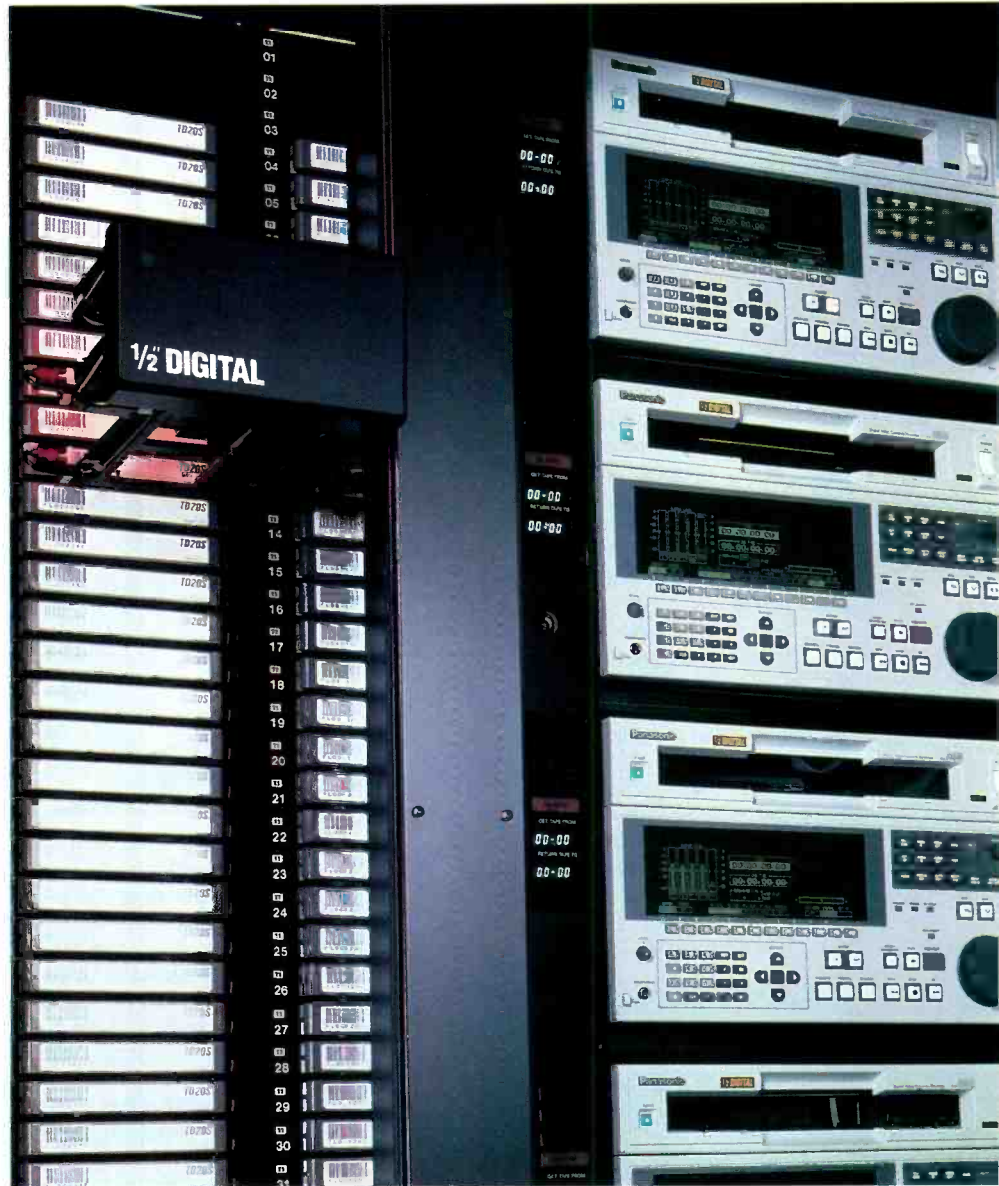
© NATAS

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

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For more details call: 1-800-524-0864

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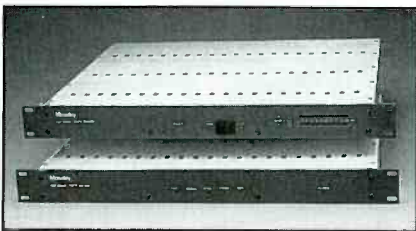
The marks Ethernet, Informix, SCO, Santa Cruz Operation and Xenix are the property of their respective owners.

**Harris: PT10FM/Digital 50 FM transmitter and exciter**



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

$>90$ dB, 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  $N_2$  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 bullets will have extended lifespans. The risk of flashover fire is reduced because  $N_2$  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 variously 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**

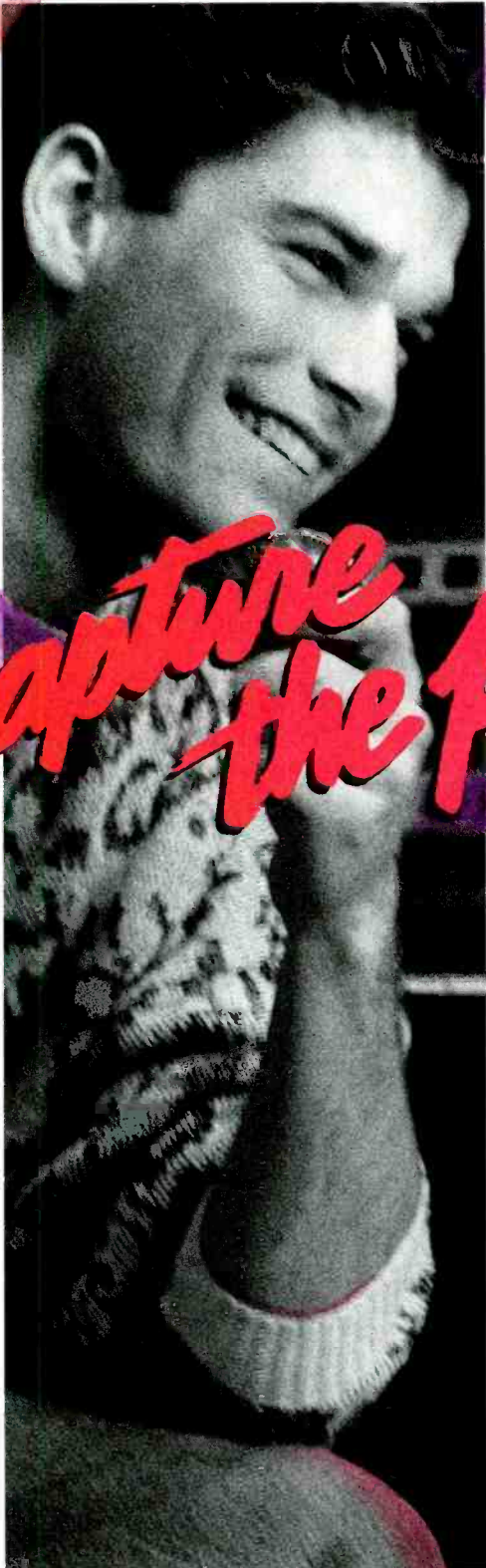


Blending high-quality with increased cost-effectiveness, the Productionmixer provides advanced production capabilities in an ergonomic design. Up to 28 inputs (mic, stereo-line or multitrack I/O), and two program, one mono, two stereo send and two mix-minus outputs are supplied. Telephone recording is flexibly accommodated with a variety of special features. Input modules offer balanced insert points, dual input selection, 3-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

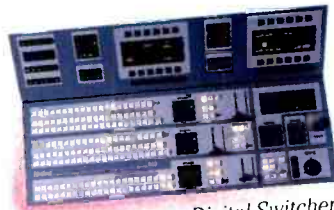




1:45 Wednesday, having fun.  
Your client cracks you up.  
One hour into the session he  
laughs, takes another bite of apple,  
says...“this looks better than  
the piece we did last week.  
What’s changed?”

*Capture the power*

You could tell him the only change  
is your new Abekas A82 composite  
digital switcher—its speed, digital  
keyers, status monitor, digital  
framestores, modular design—



*A82 Composite Digital Switcher*

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handling carts now. We’re able to take care of other engineering projects we never had time for before.

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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

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- **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.*

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**SPECIAL REPORT:**

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

# THE GULF WAR

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 a 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 "bat-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.

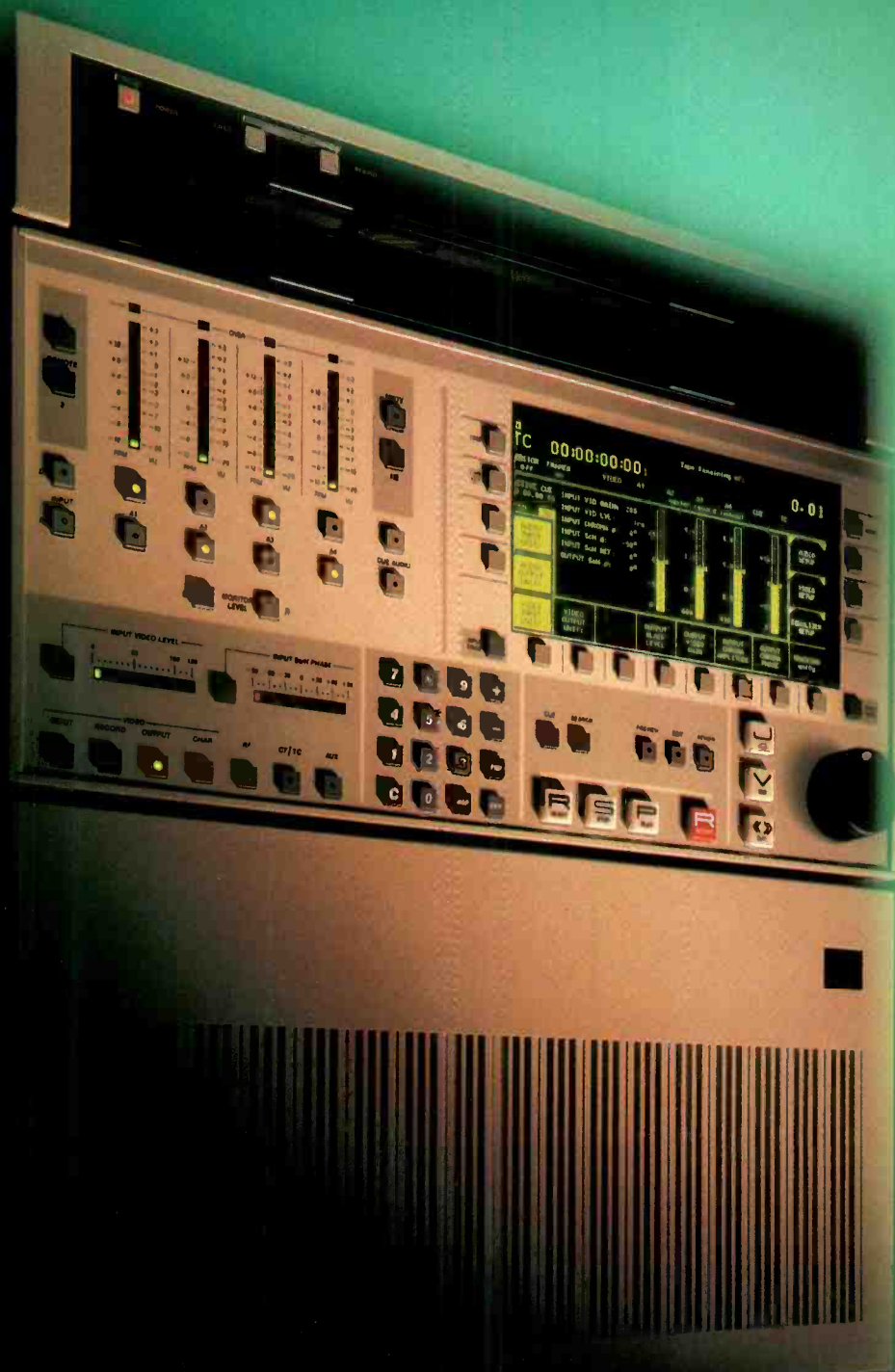
*Broadcast Engineering* is proud to provide this behind-the-scenes glimpse at how news crews half a world away brought to the American public the destruction of Baghdad, the liberation of Kuwait and the victory of the allied forces.



**Brad Dick,**  
editor

*Continued on page 51*

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AT AMPEX, we don't believe that "good enough" is good enough.

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# Broadcast technology in the midst of war

**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

---

**A**nd 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

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-gatherers — 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.



ABC correspondent Peter Jennings prepares for a standup during President Bush's visit to the troops during the Thanksgiving holiday. (Photographer: Brent Petersen, Capital Cities/ABC.)

Hammar is owner of Hammar Communications, San Carlos, CA.



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## 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 and

knew how much and what kind of access they would have to the news on the front if a shooting war started. Newsgathering improved over the course of the 6-week war, as broadcast engineers located the equipment they needed and taught them-

ware 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.)

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 convoy 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 flyaways to truck-mounted dishes. Video recorder formats ranged from ancient U-matics, 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

selfes 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. Flyaway 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 hard-

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-

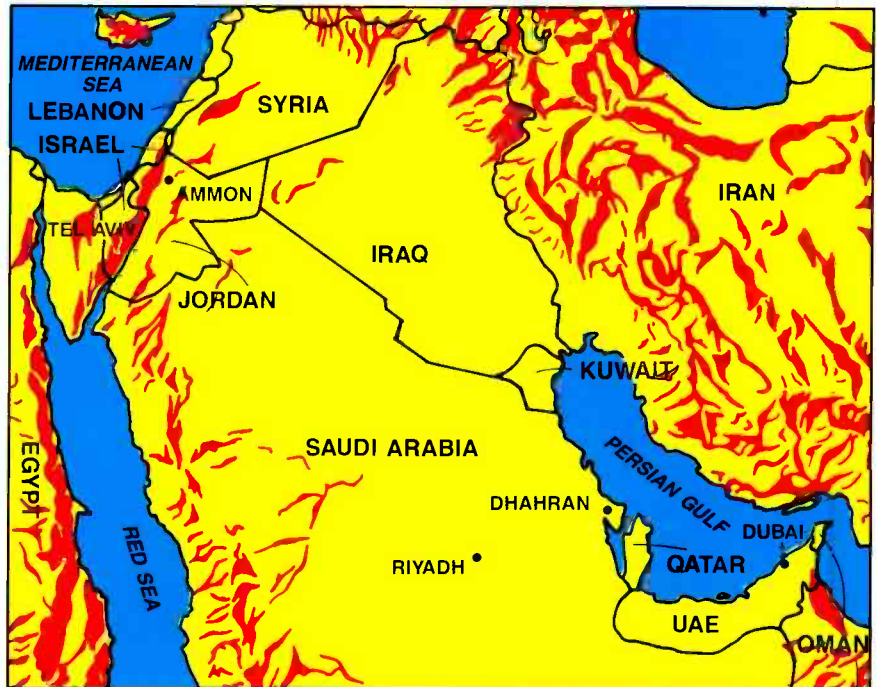


Figure 1. Map of the Persian Gulf area showing important sites in the conflict's coverage.

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ing the fall of 1990 was impossible. Arranging for dedicated 4-wire lines from Baghdad also proved impossible for all but one news organization. (A 4-wire is a private audio line with two leads in and two leads out for dedicated full-duplex com-

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

ing the use of extremely low look angles. (See Figure 2.)

Phone lines through the Dhahran Hotel switchboard were limited, and new telco lines were impossible to obtain. Most networks could get only two regular

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 backups 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

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 "wobblesats" — 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, requir-

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

Iraqis 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-

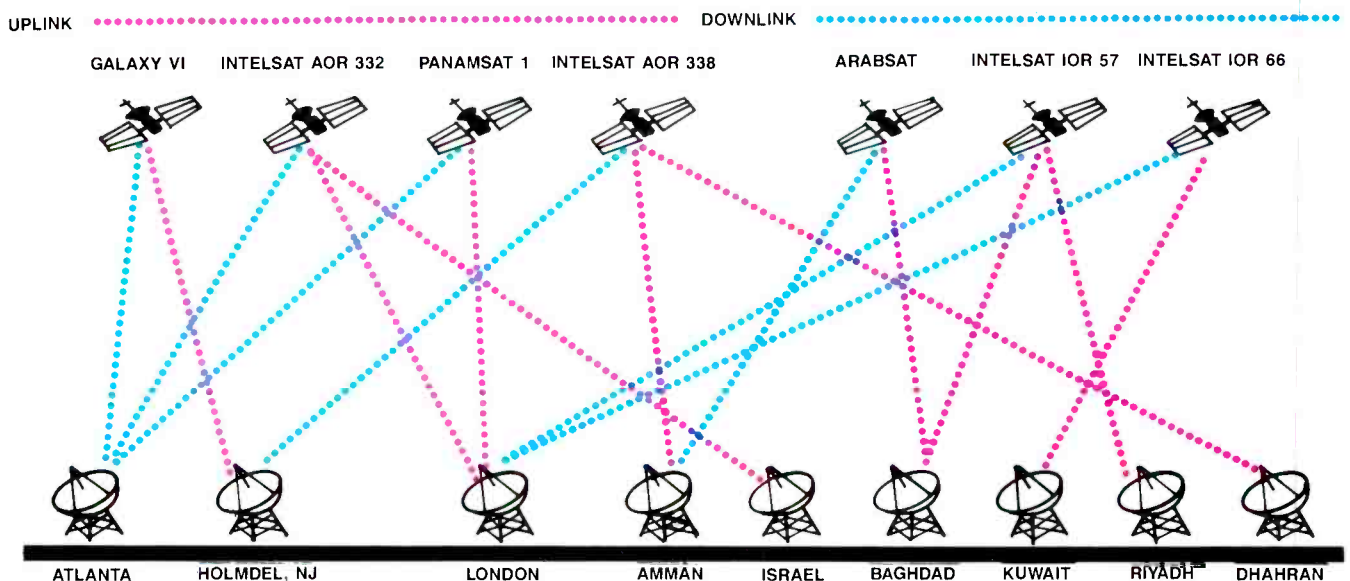


Figure 2. One network's SNG feed paths and satellites used to bring the story back to the United States.



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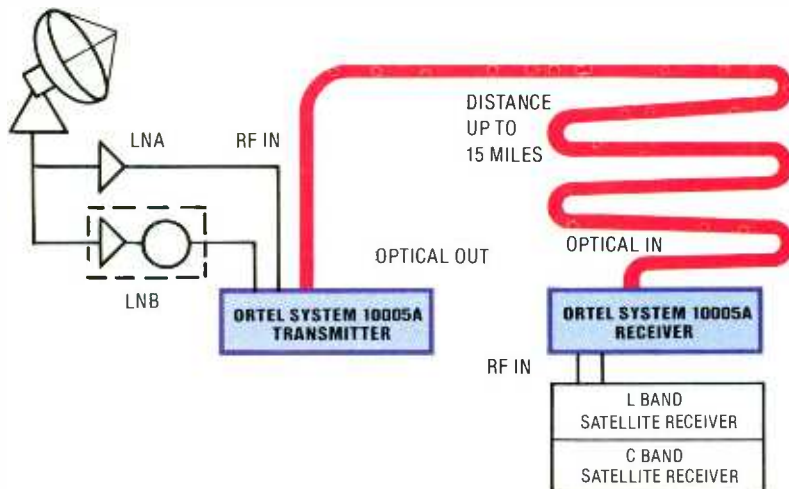
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February with only the Betacam and 8mm formats, which their uplink partners WTN, Visnews, ABC, and CBS were all using. MII in the pools would have been a "unique substance in a sea of Betacam, 3/4-inch and 8/Hi8," according to one observer not

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-

sibly consumer formats, Hi8 and its predecessor, 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-



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.)

tives said that considerations of "acceptable quality, low cost, light weight, convenience and battery life in outfitting a network camera crew" led to their increased use of 8mm and Hi8 during the Gulf campaign. The military had also told network executives sending cameramen to the JIB pools, "If they can't easily carry it, don't bring it." Because the camera people were also required to carry about a hundred cassettes and dozens of batteries, combined with a need for acceptable quality, some form of 8mm was the best choice.

Crews in the pools were outfitted with full chemical warfare suits, boots, hoods, goggles and gas masks. Kit Swartz, CNN cameraman and DOD pool member, recalled, "During the invasion, you had your winter clothes on, a full chemical suit, bullet-proof vest and a helmet, a web belt around your waist with all kinds of gear on it including two quarts of water, a fanny pack full of tapes and batteries,

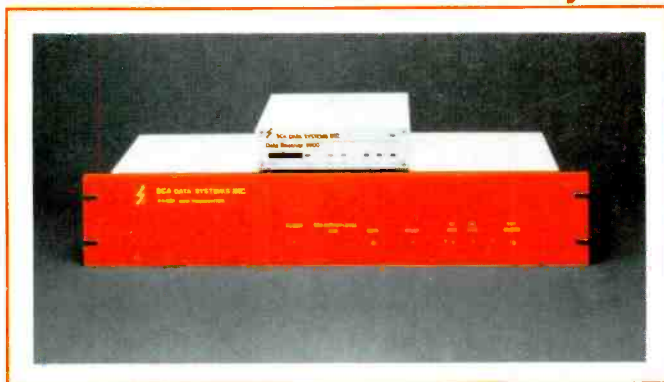
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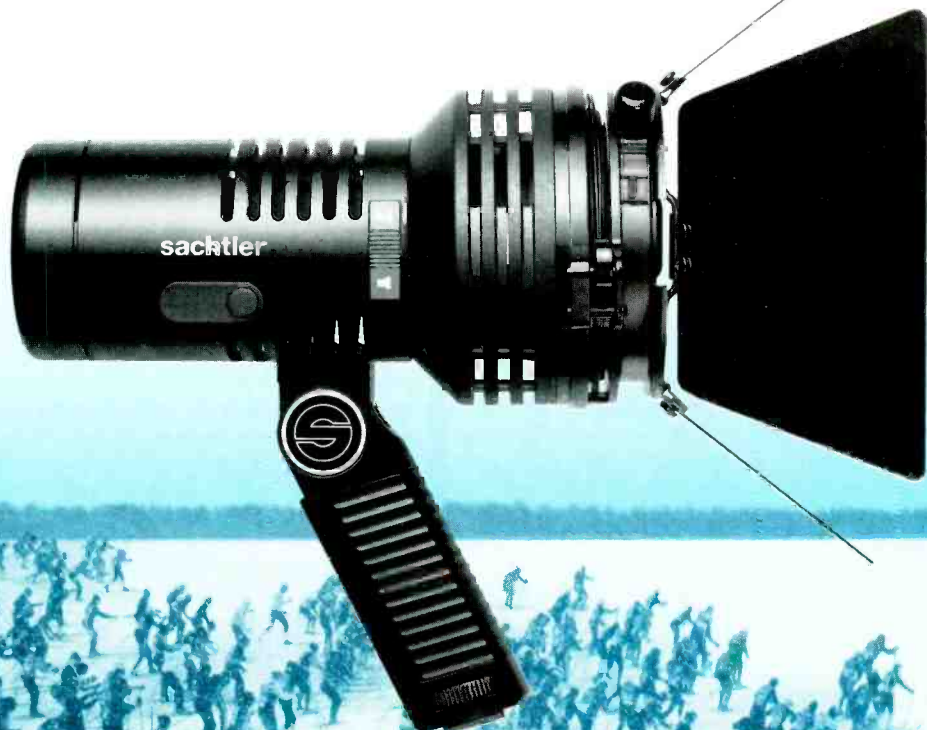
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and the camcorder itself. I'd be down on the ground and, even with a little Hi8 unit, I couldn't get up unless I rolled over on my stomach. You couldn't sit up. That's how heavy everything was. We just couldn't have carried more stuff."

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 lightweight 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 did not 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 flyways 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 alert 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 electri-

cally 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 for more shooting. Camera crews sometimes left their AC chargers at military checkpoints that had generators. As a courtesy, the soldiers there charged journalists' camera batteries, and then returning couriers picked 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



U.S. military helped an ABC crew move their uplink dishes through deep sand into position for a Good Morning America broadcast. The location was a forward base of the Seventh Cavalry in the northwestern Saudi Arabian desert. (Photographer: Brent Petersen, Capital Cities/ABC.)



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and electrical adapters for the units to trickle-charge any camcorder format's batteries. CBS News used solar chargers that put out approximately an amp per hour, which allowed them to charge a 4A battery in a little more than half a day, includ-

adapted throw-away-type lithium batteries that provided 32 hours running time for a Hi8 camcorder.

### The air war begins

As engineers assembled and tested their

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

ing time for tapering of the charge toward the end of the cycle.

Some techs experimented with adapting large Betacam batteries to Hi8 or 8mm use. The small-format camcorders drew so little power that shooters could get 80 to 90 minutes on one battery. CBS also

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

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.

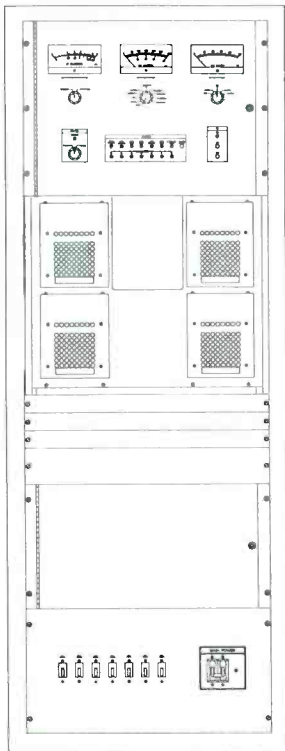
### The satellite phone

Once fighting broke out and communications to Baghdad were cut off, correspondents and crews mistakenly feared that using the satellite telephone uplinks 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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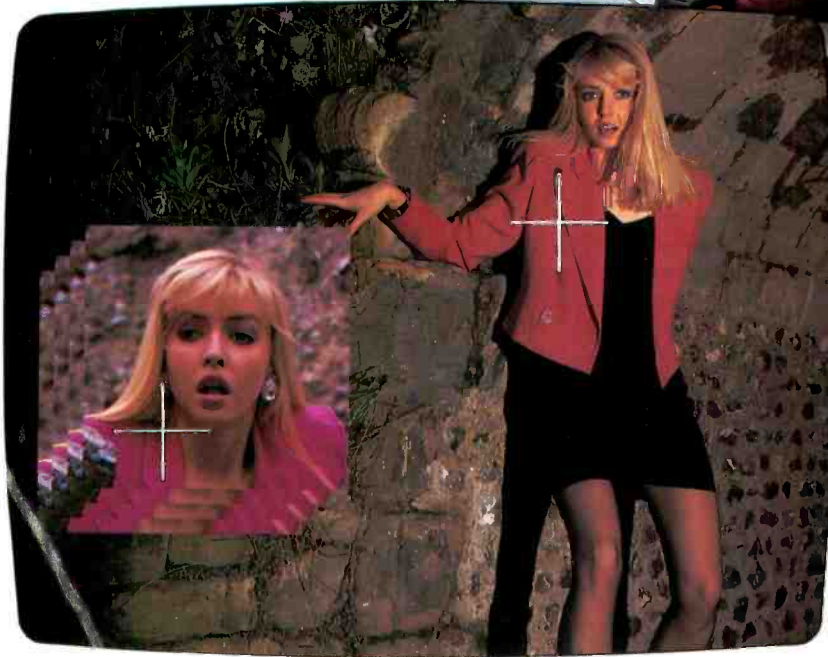
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in the world. Calls to the United States were relayed to earth stations on the East and West coasts, where they were routed through regular commercial telephone lines to final stateside destinations. INMARSAT handled the billing the same way

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 few 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 strict-



The ABC operations room in the Dhahran International Hotel. (Photographer: Brent Petersen, Capital Cities/ABC.)

ly 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 cameraman 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/SNG 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

tore it down and got out — all within an hour. This sort of approach is common to domestic TV ENG operations, but it had not been tried on a daily basis in a war zone in the middle of a desert. With two cameras and a small switcher, the crew

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 batphones, the uplink, all the cable runs, 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 4½ 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 place it behind a sand dune or other obstruction and run 50 feet or more of power cable to the uplink/standup site.

The crew used a batphone for *IFB*, hitting the INMARSAT 338 relay satellite. The video uplink used an INTELSAT bird, which required a 7° 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 Conan 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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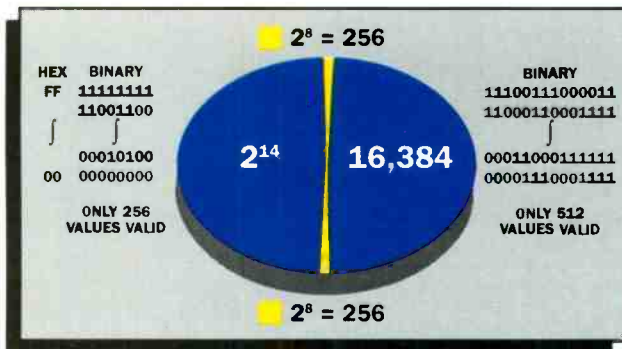
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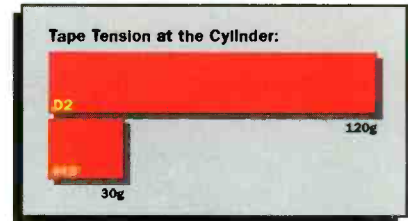
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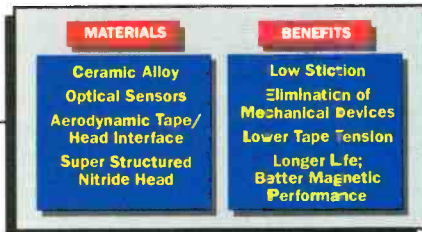
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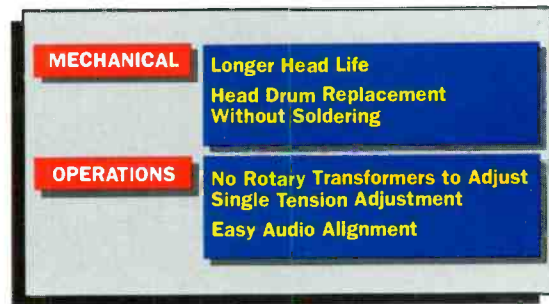
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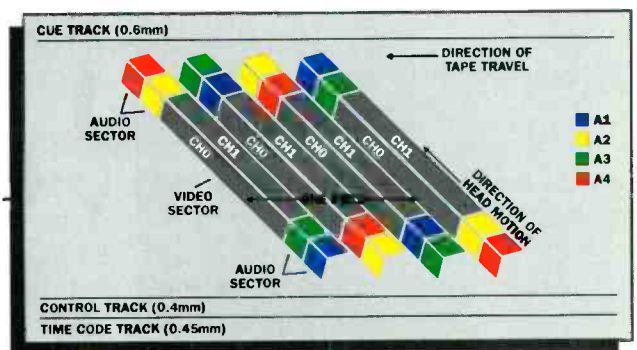
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The uplink dish used by the CBS SNG crew sits on the back of its pickup truck on Feb. 27, the morning after the liberation of Kuwait City. The look angle to the satellite was only 7°. (Photographer: Ed Jackson, CBS News.)

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 wide-band 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 Kuwaiti 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.

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, Dhahran and Riyadh were able to receive CNN International on downlinks.



The CBS staff in Dhahran, editing incoming video from their unilateral and pool crews in the field, were forced to wear gas masks while working during the many alerts. (Photographer: Quent Neufeld, CBS News.)

#### 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

#### 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 eyeglasses 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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# Nightscoopes

As the nighttime bombing on Baghdad commenced, the world witnessed live for the first time the awesome power of modern warfare. The dark, yet brightly 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: nightscoopes 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 nightscoopes 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 scope'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.

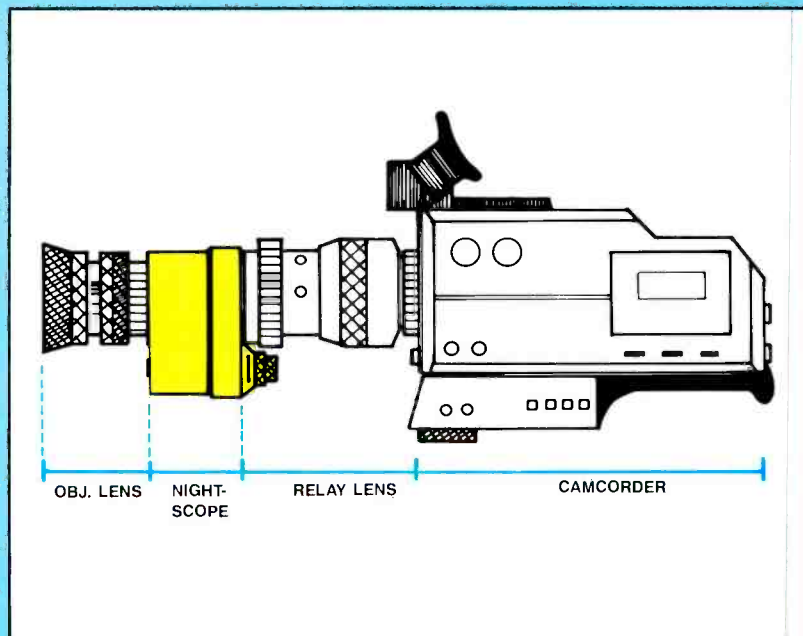
## Network choices

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

Weight was one important reason for selecting 8mm camcorders. Nightscoopes 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 when asked 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 1/4-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 nightscoopes may produce better pictures than traditional nightscoopes, 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.

# OUTLOOK ON OPTICS

## 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.

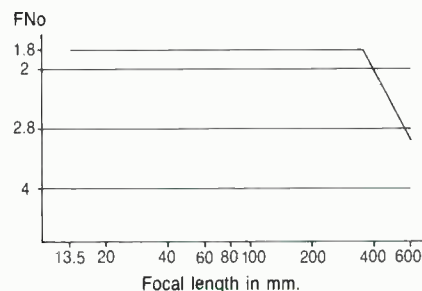
A lens that reduces aperture more smoothly will be easier to offset and a better overall performer.

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.

As with all broadcast lenses, it pays to explore more than minimum specifications.

The effect of ramping



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



American units coming in contact with one CBS unilateral crew were unaware of the military warrant for the arrest of its three engineers and reporter for violating DOD media pool rules. Meanwhile, the CBS techs offered U.S. soldiers free calls home, helping cement good relations. (Photographer: Ed Jackson, CBS News.)

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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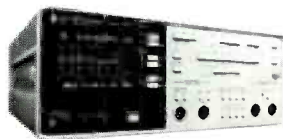
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## Life in the pool

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.



An ABC cameraman aboard the U.S. Seventh Fleet command ship USS Blue Ridge. (Photographer: Brent Petersen, Capital Cities/ABC.)

After the Grenada conflict in 1983, the Pentagon established "war pools" for all news media (television, radio, newspapers and magazines) because of the access problems experienced in covering that island's invasion. Pools are staffed by crews from participating organizations on a 3-month rotational basis (the TV pool members are CNN, ABC, NBC and CBS). CNN was the pool leader through December 1990. ABC took over on Jan. 1, 1991, two weeks before the war started. As the pool leader in the fourth quarter of 1990, when the crisis began, CNN had to establish uplinks in Dhahran and Riyadh for feeds back to the United States.

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 broadcasters 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 three 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 field directors (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 leader and any of the participating networks. During an air raid alert in Dhahran, everyone went to the basement 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

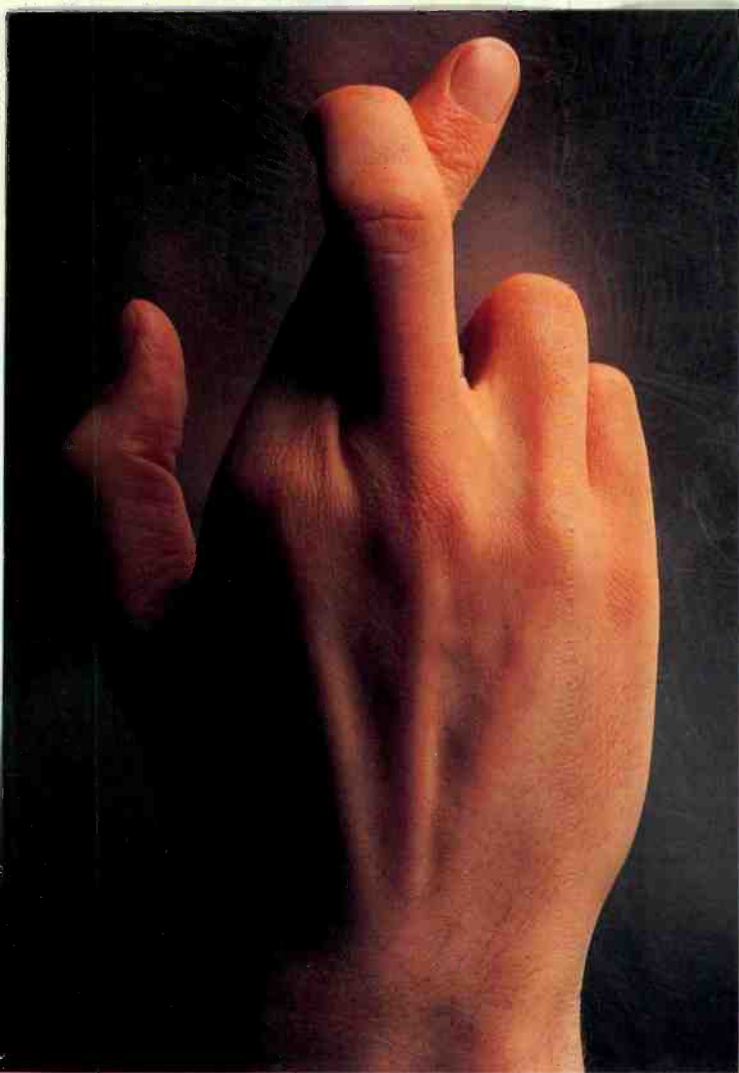
with portable flyaways was permitted from the desert. Instead, journalists and their crews were escorted by military Public Affairs Officers to various points of interest selected by the JIB staff. The reporters were expected to write their stories and submit the scripts ("tracks") to the military. After script approval, correspondents could do their taped standups. 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 resupply 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.

**Acknowledgment:** *Broadcast Engineering* and the author wish to thank the following people who generously contributed to this story with interviews, research, photographs and graphics: Jill Bernstein, CBS; Stacy Brady, NBC; Neil Conan, NPR; Tim Conway, NBC; Bill Headline, CNN; Ed Jackson, CBS; Jerry Lilly, CNN; Katherine McQuay, NBC; Steve Mendelsohn, ABC; Peter Murray, ABC; Quant Neufeld, CBS; Jim Paterson, CBS; Brent Petersen, ABC; John Perry, CBS; Tom Rapier, CBS; Elliott Reed, ABC; Sherry Rollins, ABC; Rob Schafer, CBS; Kit Swartz, CNN; Richard Tauber, CNN; Lenny Venezia, NBC; Judy White, CBS; and Liz Flynn, CNN.

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# Show of Shows: New from NAB '91

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 from the data collected. Not every manufacturer had product information, and some, who promised to send data immediately after the show, 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.

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)**  
**Interface series:** A25, A26 A/D converters; A27, A28 digital video encoder, decoder. **Circle (503)**  
**A51 3-D effects:** corner pinning, frame/field freeze; component, composite I/O; 3-axis rotation, translation with variable perspective. **Circle (504)**  
**Training software:** PC software emulates operation of A51 effects system. **Circle (505)**

## Accom

**#4224 compositing module:** optimizes key signals to foreground video; single-, multilayer compositing, linear, matte keyers; 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 by dial-up telephone; service updated 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 386AT:** 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, logger. **Circle (511)**

## Acrodyne

**TLU/100SE:** 100W solid-state UHF transmitter, translator; convection cooling. **Circle (512)**  
**TRU/25KV:** 30kW UHF transmitter; single-tetrode, multiplexed visual/aural; upgrade. **Circle (513)**  
**TLH/100T:** 100W VHF transmitter; solid-state design. **Circle (514)**  
**TLU/1KS:** 1kW solid-state in LPTV, translator service; reduced power consumption. **Circle (515)**  
**TLU/1KACT:** 1kW UHF transmitter for LPTV; 9017 tetrode in multiplexed operation. **Circle (516)**

## ADC Telecommunications

**LC series:** fiber-optic transmission system; one RS-250C short-haul video channel with four audio subcarriers; 70MHz IF interface for microwave and lightwave equipment. **Circle (517)**

## ADM Systems

**STV/24:** teleproduction console. **Circle (518)**  
**RM1010:** stereo source selector. **Circle (519)**  
**CH/27, CH/20:** stereo, monaural audio distribution systems. **Circle (520)**  
**RM1040:** bargraph metering system. **Circle (521)**

## Adrienne Electronics

**AEC-BOX-50:** 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-BOX-30:** LTC data inserter for serial control VTRs. **Circle (525)**  
**AEC-BOX-2, BOX-10:** LTC, VITC readers; RS-232, -422 input, output. **Circle (526)**  
**AEC-BOX-25:** VITC-to-LTC converter with RS-232/-422 I/O. **Circle (527)**

## Advance Products

**AVUL 458, AVUL 459:** 49" height; 5" directional casters; belt secures load to table. **Circle (528)**  
**VP6-30:** mobile video projector table. **Circle (529)**  
**PMOH29:** overhead table; shelves. **Circle (530)**

## Advent Communications

**LYNX vehicle:** vehicle-based SNG system; compact, flyaway. **Circle (531)**  
**Flyaway systems:** meets TDMA, CDMA, DAMA, PAMA, SCPC/MCPC requirements for video conferencing, telephone, data links; operation in Ku-, Ka-, X-, C- and DBS bands. **Circle (532)**  
**ARC 2000 controller:** for flyaway uplinks located in hostile environments; provides HPA control, redundancy, monitoring, fault indications; separation from uplink to 30m. **Circle (533)**  
**Monitoring package:** audio, video, test, monitor equipment in heavy-duty case; picture, vector, waveform monitors; test, ID source, audio/video switcher; cable EQ; audio tone, 4-channel PPM meter, speaker driver jack, headphones; power conditioning, heating, cooling. **Circle (534)**  
**TRANSAMPS:** Ku-band HPA with associated up-converter equipment; locates at uplink antenna; available for L-band cross-site systems permitting control of all parameters from a remote operator location. **Circle (535)**

## AEQ

**MP-10 mixer:** 5-input portable; direct connection to telco line; tone, pulse dialing on keypad; for dual 2-wire bidirectional, other systems. **Circle (536)**  
**IN-02 intercom:** digital echo suppression; for external telco lines, 2-, 4-wire circuits. **Circle (537)**  
**TH-02 hybrid:** single or dual digital telco interface; mix-minus bus for full multiplex. **Circle (538)**  
**System-3000:** digital multiple telephone hybrid; 8-line in full multiplex through integral mix-minus bus; control from dedicated console or personal computer. **Circle (539)**

## AEV Electronic Broadcast Equipment

**MMS 312, 412 mixers:** 8-24 channels with sliders; telephone module; tabletop design; EQ on channel modules. **Circle (540)**  
**BSM 622 mixer:** rack-mount or drop-in; 18-input, two telco hybrids; slider level, rotary pan controls; no EQ. **Circle (541)**  
**Exclusive FM:** 10-band stereo processor; independently controls clipping, compression, limiting per band. **Circle (542)**  
**BSL limiter:** broadcast stereo signal processor; 3-stage unit with absolute peak detector, preset threshold peak detection, limiting. **Circle (543)**  
**Digital Spot:** 16-bit digital spot, jingle, effects management; program with PC, CRT display; memory capacity to five hours. **Circle (544)**  
**ITB-201:** telephone hybrid; 2-line unit connects directly to audio mixer. **Circle (545)**  
**Telereport 10:** portable telephone interface includes mono mic, line mixing; pulse/tone dial; NiCad battery. **Circle (546)**  
**Eltronika PR series:** TV translators for UHF,

VHF service; output power 1-5W. **Circle (547)**  
**Compact series:** 1-, 3-phase tube-type amplifiers from 750W to 2kW for FM. **Circle (548)**  
**ERDS 3100 encoder:** for RDS transmissions on TV aural channels. **Circle (549)**  
**AURAD System 2:** automatic "control booth" for radio automation; manage up to three different musical networks simultaneously. **Circle (550)**  
**WATIC master clock:** with timer, counter; outputs drive slaves; digital LED displays. **Circle (551)**

## A.F. Associates

**EPO Pan Bar:** remote-control pan/tilt head slaves to manual pan bars with zoom, focus hand controls; permits all typical operations of the camera from a remote location. **Circle (552)**  
**EPO servo height modification:** for Vinten Teal, Fulmar, Tern pedestals; retrofit equipment with servo pedestal height control. **Circle (553)**  
**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 modes build complex movements. **Circle (554)**  
**EPO Extended ARC:** enhanced robotic camera operation; full CCU control for studio, ENG; 60 analog outputs, 72 switched functions can be grouped, interlocked; extended control unit for peripheral interfaces. **Circle (555)**  
**AVS Sigma:** image correction, format interchange, synchronizer, proc amp; 525-, 625-line, composite, component, RGB/YUV, Y/C formats; 16dB noise reduction from triple filtering; motion adaptive processing. **Circle (556)**  
**AVS Manuscript:** RISC-design titler; dynamic resizing of anti-aliased fonts; linear key, character set for 47 languages; 200 master type-face library; LogoComposer, Graduated Color; dual video standards. **Circle (557)**  
**AVS Integra:** integrated digital mixer, 3-D effects; FlexKey, four key levels with background composited in one pass; 4:2:2:4 architecture; perspective, advanced 3-D effects are options to standard 3-D effects with key channel. **Circle (558)**

## Afterglow

**D1 serial coders:** Miranda SER-100 series products. **Circle (559)**  
**Telecine products:** by Fosterdene, Video Engineering, Perfectone. **Circle (560)**

## Akal Professional/IMC

**DD-FMac, DD-QMac:** software allowing Macintosh SE/30 to access a DD1000 magneto-optical disk recorder; -FMac emulates front operating panel of the recorder. **Circle (561)**  
**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 reverb, chorus, pitch-shift; reads sound disks created for previous sampler products. **Circle (562)**

## AKG Acoustics

**dbx 140X:** for noise reduction; 2-channel encoding, decoding circuitry. **Circle (563)**  
**dbx 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 more than 100dB gain change. **Circle (564)**

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**KA 38 adapter:** quick mount for AKG mics to video, film cameras. **Circle (565)**

**C580E, D541E:** slimline gooseneck podium, conference mic; condenser, dynamic capsules; XLR connectors. **Circle (566)**

**Micromic C407:** miniature condenser lavalier mic; omnidirectional, vocal frequency response; 0.3" diameter, detachable tie pin, clip, removable windshield. **Circle (567)**

**K270HC, -HQ:** studio headset mics; condenser, dynamic capsules; sealed parabolic dual-driver headphones; boom activates mic on-off switch; model C410 has behind-the-head band. **Circle (568)**

**Orban FH-8200:** digital broadcast audio processor. **Circle (569)**

#### Alcatel

**TM 400 links:** transportable receivers, transmitters for video, sound channels, 34Mbit/s; 6, 7, 8, 10, 12, 13, 22GHz frequencies. **Circle (570)**

#### Alden Electronics

**LPATS:** lightning location, tracking plots cloud-to-ground strikes. **Circle (571)**

**WS5500:** weather workstation; display NEXRAD radar, weather chart images. **Circle (572)**

#### Alesis

**Model 3630:** compressor, limiter; 2-channel with hard/soft knees, gates; peak, RMS. **Circle (573)**

**ADAT recorder:** 8-track digital audio recorder expands to 128 tracks by syncing 16 units; uses S-VHS tape for 40 minutes per cassette. **Circle (574)**

**BRC accessory:** remote control and autolocator for ADAT. **Circle (575)**

**RA-100:** 100W stereo reference amp. **Circle (576)**

#### Alexander Batteries

**MZ3100 optimizer:** 3-station NiCad maintenance system charge, discharge, analyze, condition NiCad batteries. **Circle (577)**

**Model 7700-SP:** 14.4VDC ride-behind battery; gas gauge shows current capacity. **Circle (578)**

#### Allas Research

**Animator:** 3-D modeling software; rendering, animation, video integration; package includes Silicon Graphics Personal IRIS workstation; leasing programs available. **Circle (579)**

**PowerAnimator:** 3-D graphics, animation; parameter-based video integration; for Personal IRIS workstation; time line animation; field rendering is standard; VideoFramer machine control; Videomedia V-LAN interface. **Circle (580)**

#### Allen Avionics

**HDTV-series filters:** DIL devices for PC board mounting; EQ reduces amplitude, group delay; SIN  $\frac{1}{X}$  correction on post filters. **Circle (581)**

**Digistream III:** A/D, D/A parallel interface for data transmission, reception. **Circle (582)**

**ABW series:** brickwall filters; NTSC, PAL with 2-8.4MHz cutoff frequencies; various configurations; passband flatness 0.15dB to 4.2MHz; delay distortion to 3.9MHz is less than  $\pm 10$ ns. **Circle (583)**

#### Alpha Audio

**Acoustical Solutions:** audio booth. **Circle (584)**

#### Alpha Image

**Alpha-330N, -340N:** D2 ancillaries for conversion between parallel-serial, serial-parallel. **Circle (585)**

**Alpha-360, -370:** A/D, D/A converters; NTSC-to-D2, D2-to-NTSC capabilities. **Circle (586)**

**Alpha-500:** D1 component post-production editing suite with *Super Layers*; each layer contains linear keyers, mask controls, stores. **Circle (587)**

#### ALTA Group

**Y/C Pyxis 5.5:** 2-channel TBC; wideband composite, Y/C switcher; digital effects functions; luminance keyer, AFV mixer. **Circle (588)**

#### Altronic Research

**Model 9725, 9750:** 25kW, 50kW Uni-body RF dummy load systems. **Circle (589)**

#### AMCO Engineering

**FBX series:** equipment cabinets; low silhouette pedestal bases, sloped front, vertical frames; 19",

24" widths; writing surface options. **Circle (590)**

#### AMEK Consoles/TAC

**TAC B2:** video post-production console; three chassis for 8-28 inputs; discrete aux sends, individual input routing to four subgroups; stereo output; serial, parallel AFV interface; monitor for multiple 2-track ATRs. **Circle (591)**

**SR6000:** broadcast, teleproduction mixer; 40-input, routes to 8 subgroups, stereo output; overlapping VCA groups; 4-band swept, parametric mid-range EQ, swept pass filter. **Circle (592)**

**MEDIA console:** 32-bus; for film, post production; multiformat pan control includes Pan, Divergence, Surround. **Circle (593)**

**BC III:** mixer; TLA transformer-like amplifiers; 10 main, 4 aux buses; balanced I/O. **Circle (594)**

**B2520 console:** 24 multitrack buses, 24-, 32-, 48-track monitoring; 8 aux buses; 8 stereo subgroups; LED meter with ASIC control; additional routing, pan module per input. **Circle (595)**

#### American Broadcast Systems

**Micromat systems:** automated video cart playback equipment; features include 2-channel capability, Touch-Screen interface, record with delayed playback. **Circle (596)**

#### American Mobile Satellite

**StarDrive:** 2-way data communication; send, receive messages; vehicle location. **Circle (597)**

#### Ampex

**Accu-Mark:** audio recovery for D2 VTRs; improved audio clarity at still, slow speed playback for VPR-200, VPR-300 transports. **Circle (598)**

**ACR-225/MultiRun:** AMAC software runs two ACR-225s from single playlist; library list holds 20,000+ spots on-line; control 8 or 16 devices; AutoResolve conflict resolution. **Circle (599)**

**ADAPT:** digital layering connects to AVC Century, Vista and other switcher products; permits mixing of two D2 signals; four composite digital, six analog sources; layers any two sources for key, mix between backgrounds. **Circle (600)**

**ADO 100 upgrade:** 2-channel capability includes Warp Speed effects. **Circle (601)**

**AVC Century series:** new models AVC 215-P 2M/E 16-input; AVC 235-P 2M/E 32-input; AVC 335-P 3M/E 32-input; AVC 235-B 2M/E 32-input and AVC 335-B 3M/E 32-input; -P models for production, post; -B models for broadcast. **Circle (602)**

**ACE 25 enhancement:** internal video switcher; A/B bus with 23 wide patterns; 3-VTR control with three aux sources; extensive cut, wipe, dissolve, edge, border controls. **Circle (603)**

#### Ampex Recording Media

**#467 R-30, R46 cassettes:** 30-, 46-minute DAT in DATpak; unlabeled, bulk. **Circle (604)**

**Ampex 296:** heavy-duty 1" videotape for editing, multiple shuttle, still frame; improved backcoat reduces dropout; in molded shelf box. **Circle (605)**

**Ampex 289:** S-VHS master broadcast cassettes; 30-, 60-, 120-minute lengths. **Circle (606)**

**Professional accessories:** plastic, metal open reels; 1/4-1" reference tapes for digital audio recorders; library boxes; labeling. **Circle (607)**

#### AMS Industries/Neve

**LOGIC 2:** automated digital recording, mixer; configures to 128 mono input paths in 32-, 48-, 64-channel frames; 24 machine inputs for AES/EBU digital, audio ATRs; Quadstrip feature. **Circle (608)**

**AudioFile PLUS:** 16-output hard disk recorder, editor; 4-hour storage; enhanced screen features access extended capabilities of system; second software issue. **Circle (609)**

**ST 250:** stereo mic with control unit; adjusts to vertical or end-fire, X-Y or M-S format; mains, phantom or battery powered; 20Hz-20kHz with remote bass rolloff control. **Circle (610)**

#### Amtel Systems

**E-Trax:** 8-track non-linear 80386 workstation; provides random access with 2-hour storage on 760Mbyte disk. **Circle (611)**

**E-Pix Ver. 4:** expanded E-Trax interface, graphic edit point displays; 1-key, mouse commands; reduced menus; Keycode from 3/4" tape. **Circle (612)**

# A Master Station You'll Master in Minutes

SELECT  
PRESET

PROGRAM  
INTERRUPT

SELECT  
RELAY

PRIVATE  
TALK

SET IFB  
BUTTONS

SET ISO  
BUTTONS

LATCH  
DISABLE

BUTTON  
LOCK ON

BUTTON  
CHECK

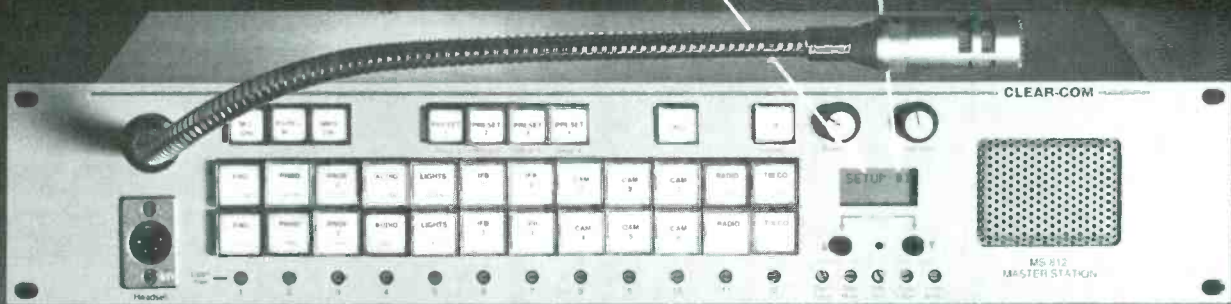
RENAME  
SETUP

PGA GOLF

ELECTION  
COVERAGE

DIRECTOR

PRODUCER



**Now what did I program this button to do?** Even if you've never used a master station before, sit down in front of the MS-812 and you'll set up a custom mix of over 30 features without ever reading a manual or picking up a screwdriver.

Program the buttons for intercom, 8 IFB and up to 16 external ISO channels, 12 talks and listens, interruptible program feeds, relays and privacy. The "prompt" messages won't let you make a mistake. And the unique "button check" feature instantly confirms each function.

**Four complete setups...just check the window.** The MS-812 master station instantly recalls your preset configuration for any event. Not just a feature or two, but the whole setup. Think how easy it will be to rent your mobile truck or facility when it comes with a preprogrammed intercom.

**A front panel you'd know in the dark.**

The dual action controls are where you'd expect them to be, and they respond to the lightest touch. There's also an adjustable brightness control, visual/audible signaling and automatic headset detection...in fact, the MS-812 has all the features you want in a top-of-the-line master station, at a price you can afford.

**We haven't skimped on audio quality, either.** Clear-Com combines crystal-clear audio technology, the ruggedness of its belt packs and the advanced engineering of a party line intercom to produce the MS-812. The result is the most usable, flexible and reliable master station ever. Call us for complete specs today.

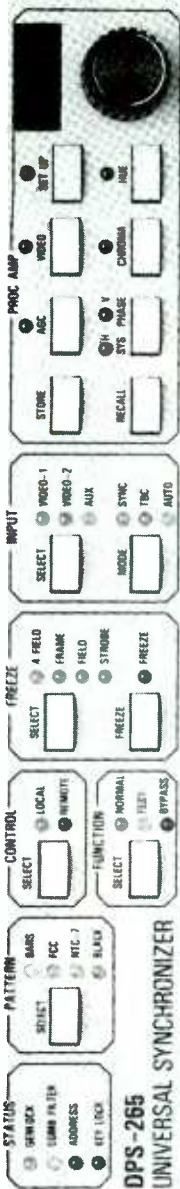
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Circle (51) on Reply Card

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# DPS-265

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So now you can have a universal synchronizer at down to earth prices. Like an earthy \$5,495.

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**MIDWEST**  
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Kentucky 41076  
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Circle (52) on Reply Card

**Fxs:** key, wipe effects module for the E-Pix non-linear editing system. Circle (613)

**AMX Corporation**  
**AX-MSP/LCD:** Mini SoftWire Panel, 16-character 2-line LCD shows devices, associated functions; 20 buttons access various functions. Circle (614)  
**AXC-SPE speech card:** digitized vocal response unit for ACCESS remoter. Circle (615)  
**AXC-422 card:** communicates among 255 devices for sound, speech reinforcement, recording; in ACCESS system. Circle (616)  
**AXC-X10 card:** device control module. Circle (617)  
**AXC-SMP SMPTE card:** interface for SMPTE-compatible devices to ACCESS remote control; synchronization signal may be added when material is produced or during editing. Circle (618)  
**PRO-2000:** Prodigy lighting dimmer. Circle (619)

**Andrew Corporation**  
**DryLine dehydrator:** pressurization with membrane separation drying technology; permits settings of defaults, alarm thresholds; LCD displays programming, system status. Circle (620)  
**Type FSJ1-50A:** 1/4" superflexible HELIAX 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. Circle (621)  
**DIN connectors:** male plugs, complying with 7/16 DIN 47223 specification; for foam dielectric Heliex cable in 1/2", 3/8", 1/4", 1 5/8" diameters. Circle (622)  
**MACXLine:** high-power inner coaxial conductor absorbs expansion, contraction of flanges to avoid metal shavings, causes of flashover. Circle (623)  
**Alpine antennas:** expanded line; low to medium power for translators, LPTV to 30kW; CP versions; wideband, multichannel operation. Circle (624)  
**VALULinkuplinks:** 75WHPA for 3.7m, 4.6m antennas; video, 2-channel audio; accepts encryption devices; low-cost uplink package. Circle (625)

**System upgrades:** 4-, 6-port feeds for dual reflector C-, Ku-band antennas; prime focus for 4-port dual-band receive-only operation. Circle (626)  
**APC-300 steptrack controller:** tracks satellites with signal from video receiver AGC and beacon receiver; SMARTTRACK constructs satellite position tables from steptrack operation. Circle (627)  
**APCSNGK, APC100:** 2.4m SNG/SNV antenna, APC-100 control; RS-422 interface; back-lit display for production truck installations. Circle (628)  
**8m earth station:** C-, Ku-band antenna; special main reflector, Gregorian subreflector; 59.4dBi gain at Ku-, 52.9dBi at C-band; modular with large hub enclosure; motor drive systems. Circle (629)  
**Transportable electronics:** complete package with antenna, RF, test equipment; adapts to 1.8m FlashPac, 3.7m TriFold antennas. Circle (630)  
**ASC-3000 controller:** earth station control runs under Windows 3.0; includes automation, multi-level password protection; to five control console in system. Circle (631)  
**FP18-TTC8 FlashPac antenna:** 1.8m system; packaged in six "check-in" containers; C-, X-, Ku-, C-/Ku-band; CP, linear polarizations. Circle (632)

**Angenieux**  
**15x lens:** for studio, OB 1/2", 3/8" CCD cameras; MOD of 0.5m; 68 1/2" wide angle; f/1.4 for 1/2", f/1.6 for 3/8"; adapter for lightweight cameras. Circle (633)

**Anritsu America**  
**Model ME 4510B:** digital microwave analyzer; measures link delay, amplitude characteristics, space diversity propagation delay. Circle (634)

**Antenna Concepts**  
**Blaster:** high-gain UHF CP antenna; multistation system for eight 1kW channels; typical power rating 4kW per 4-element panel. Circle (635)  
**FM Tracker:** omnidirectional broadband CP FM antenna; 3kW, 5kW option per bay. Circle (636)  
**Sizzler:** UHF CP TV antenna; omnidirectional; protective, non-pressurized radome; standard beam tilt, null fill; >6-15.6dB gain. Circle (637)

**Antenna Technology**  
**ProfLine:** satellite receivers, electronic; includes 1GHz switching system; LNA, LNB, LNC units; refurbished satellite earthstations. Circle (638)

**Anton/Bauer**  
**CMQ2 charger:** 2-position sequenced 4-hour charge for Compact Magnum batteries or 8-hour charge of one full-size Logic Series. Circle (639)  
**ULTRALIGHT 2:** compact built-into-the-camera lighting product. Circle (640)  
**Magnum QUAD NPCM:** module expands Magnum Quad charger to 8-position system. Circle (641)

**Anvil Cases**  
**A.I.R. isolated rack:** transport case for rack-mounted equipment; conforms to ATA standards; air space for proper ventilation. Circle (642)

**Aphex Systems Ltd.**  
**320 Compellor 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. Circle (643)  
**Digicoder:** analog stereo generator; PDPM (parallel path digital modulation); stable, maximum separation; no processing delay. Circle (644)

**Applied Memory Technology/AMT**  
**7422 videodisc:** digital component recorder; 100s capacity per CCIR 601; parallel recording transfers data at 21Mb/s; 525-, 625-line. Circle (645)

**Applied Research & Technology**  
**HD-31:** 31-band, 1/3-octave graphic EQ; XLR, TRS, terminal block connections. Circle (646)  
**HD-15:** 15-band dual-channel, 2/3-octave graphic equalizer; TRS, terminal block I/O. Circle (647)  
**Stereo Master MDC-2001:** compressor, de-esser, expander, noise-gate, exciter, limiter; balanced XLR, TRS I/O; stereo auto-detect. Circle (648)

**Arcor Engineering**  
**DZ2202CLR:** clear-jacket, audio cable. Circle (649)

**Arrakis Systems**  
**Systems 6, 12, 18:** enhanced 12,000 series consoles, accessory items. Circle (650)

**Arriflex**  
**Zeiss 65mm:** T/1.3 prime lens. Circle (651)  
**VariCon:** contrast control system. Circle (652)  
**ARRI 535:** 35mm camera with microprocessor control unit. Circle (653)  
**Support system:** 35mm/16mm camera and accessory package. Circle (654)  
**Compact HMI lights:** 575W, 1.2kW, 2.5kW rating; single-ended lamp socket. Circle (655)  
**Softlights:** 2kW, 1kW instruments. Circle (656)  
**Ballasts:** electronic; flicker-free. Circle (657)

**ART1**  
**pro:mc, pro:mc-v:** network media controllers with Arnet protocol; mc-v VITC capability, window dub character generator for time values, MIDI I/O and visible timing markers. Circle (658)  
**Control Station:** professional edit control for Macintosh-based video editing (Video Publisher A/B editing software, Arnet control). Circle (659)

**ASACA ShibaSoku**  
**CM321H, CM361H:** 32", 36" in-line gun HDTV color monitors; for 1,125-, 1,050-line interlace, 525-line sequential scan. Circle (660)  
**TG70A6:** programmable HDTV/NTSC test generator; composite, component, HDTV. Circle (661)  
**VS12CX:** NTSC/PAL sweep generator. Circle (662)  
**TP18C6:** HDTV zone plate generator. Circle (663)  
**TG71AX:** digital test generator for NTSC, PAL; fully programmable. Circle (664)  
**CM201N, CM141N:** 20", 14" HR color monitors; in-line dot CRT; automatic setup with five color temperature memories. Circle (665)

**Associated Press/AP**  
**AP NewsDesk:** LAN version; news software for PC; text editing, read-time computation. Circle (666)  
**GraphicsBank:** dial-up graphics service; wide range of high-resolution elements and finished images for TV. Circle (667)

**AT&T Network Systems**  
**5TF 620 SDQ:** sound program transmission equipment with 2,048kbit/s data rate. Circle (668)



# ROSS.



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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 . . .

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### ATI Audio Technologies

**HD1000:** headphone amp; balanced stereo line summed with mono mic; master level, individual output controls; expansion bus out. Circle (669)  
**PB2x8:** 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 patching:** RS-422 serial data distribution; 24-port with 12-inx12-out; 2-rack configuration with 48 ports permits 24x24 array. Circle (671)  
**RS-422:** prewired patch bay for serial data distribution; 24-inx24-out vertical, horizontal paired 12-inx12-out; internal normalled. 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 AD150:** dual mic amplifier with EQ; 1RU panel, integral power supply. Circle (674)  
**Model AD151:** dual compressor, limiter; independent controls per channel; stereo link 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:** 2-inx10-out audio DA; each output individually transformer balanced. Circle (677)

### Audio Intervisual Design

**COS-11BP:** lavalier mic; battery pack for AA, 12-52Vdc phantom power; polyphenylene sulfide diaphragm withstands high humidity. Circle (678)

### Audio Kinetics Ltd.

**MasterLink:** console automation, transport synchronization; retrofits most consoles. Circle (679)  
**ES.Lock 1.11:** emulator extends versatility of synchronizer module; integrates with Motionworker 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; 64x oversampling 1/2 device. Circle (683)  
**ACE 100:** digital audio expansion card for PCs; compresses 16-bit PCM audio 4:1; stores 30 minutes of stereo on 60MByte hard disk. Circle (684)

### Audio Services Corporation

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

### Audio-Technica

**Stereo production package:** AT4462 mixer, AT825 OnePoint X/Y and AT804 mics. Circle (686)  
**AT 851a:** uni-plate condenser mic; low-profile design. Circle (687)  
**AT 804:** field omnidirectional dynamic mic; handheld; smooth response, high output. Circle (688)  
**ATM71:** mini cardioid condenser headset mic; attached to 3/4" flexible gooseneck mounted on headband; AA battery or external 5V-52Vdc phantom power. Circle (689)  
**ATM 35:** high-intensity clip-on mic. Circle (690)  
**CP8508 supply:** 24Vdc power for single UniPoints 800, Artist, Pro mic inputs; wall power module; XLR connector plugs into console input; compatible with Modu-Comm 2-way system. Circle (691)  
**AT 825:** single-point, field stereo mic; switched low-cut filter, windscreens, 2-way power; dual Uni-Point mini condenser cardioid. Circle (692)

### Auditronics

**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 independent. Circle (696)  
**AU/280 Cadet:** multiplane animation, switcher effects, color cycle animation from 2-D, 3-D graphics system; CCIR 601 I/O, RGB and alpha channel outputs; icon menu. Circle (697)  
**3-D capability:** software provides new dimensional capabilities. Circle (698)  
**AU/250GT upgrade:** 33MHz CPU, Weitek co-processor; 8Mbyte RAM, 600MByte rewritable optical drive. Circle (699)

### Autogram

**Pacemaker 618:** six mixing channels; five dual-input, one 8-input at 150Ω mic, 20kΩ or 600Ω line; P&G conductive-plastic sliders, VCAs. Circle (700)

### AVCOM of VA

**MVT-1000A:** microwave video transmitter; used with PSR-1000A for broadcast, surveillance, security. Circle (701)  
**PSR-1000A:** portable surveillance receiver; companion to MVT-1000A transmitter. Circle (702)  
**PST-1500B:** portable satellite terminal; for service with Inmarsat narrowband audio in 1.53-1.55GHz band; fits in attaché case. Circle (703)

### AVI Technology

**Broadcast verification system:** subsonic tone from master tape sensed by data receivers; verification data 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 editing; high resolution output from disk directly to tape; graphics, titles; automatic time-code management. Circle (706)  
**MEDIALOG, MEDIAMATCH:** logging, film-to-tape-to-film matchback software. Circle (707)

### Avitel Electronics

**DJF 1080:** 10-bit digital patch panels. Circle (708)  
**VSW 3250:** modular VBI utility video switcher; in 8x1 or 16x1 forms. Circle (709)  
**TGE 3280:** modular LTC/VITC time-code generator. Circle (710)

### Axial Corporation

**Axial On-Line:** editing controller operates on PC/compatible computer system. Circle (711)

### BAF Communication

**Model 2.AAT:** trailer-mounted mobile satellite uplink; air-transportable. Circle (712)  
**CF-7000C:** expanded production satellite news vehicle. Circle (713)  
**CF-8000E:** 32-foot SNV vehicle; eight equipment racks. Circle (714)  
**ENG/EFPSD-22:** ENG/EFP medium production vehicle; 22-foot unit has four racks. Circle (715)

### BAL Components

**7650MAT:** stereo-mono converter. Circle (716)  
**DIGISTREAM 3:** parallel & serial interface meeting CCIR 656 specifications. Circle (717)  
**2880MAT:** 8x1 video matrix switch. Circle (718)  
**NanoDel series:** subminiature delay modules for HDTV applications. Circle (719)  
**Series 7:** submicro video filters meeting 4:2:2 specifications. Circle (720)  
**Synchrotimer:** frame synchronizer. Circle (721)  
**DIGICOMB DDN200:** digital comb filter decoder for NTSC. Circle (722)

### BARCO Industries

**Routing enhanced:** remote control for BARCO BVRS, BARS routers; programmable remote panels, displays. Circle (723)  
**CVM 2000 series:** intelligent grade 2 monitor; 14", 20" CRTs; auto kine bias stability; remote adjustment by single or MMRC multimonitor remote controller; light probe; PAL, NTSC, PAL/SECAM

decoders, Y/R-Y/B-Y, RGB/s inputs. Circle (724)  
**HDM 2048, HDM 2081:** 20", 32" high-definition video monitors; multiformat operation with auto setup. Circle (725)

### BARCO-EMT

**EMT 460, EMT 461:** digital cartridge machines; -460 record, edit, copy, play modes; -461 playback only; RS-232/-422 computer control ports; carts to 40s stereo; eight spots per cart. Circle (726)  
**EMT-710:** audio router with 16x16 to 32x32 configurations; high-level balanced I/O; operation by RS-232/-422 interface; can be linked with BVRS video router. Circle (727)

### BASYS

**Librarian:** 80386-based archive; single-user, network; works with non-Basys systems. Circle (728)  
**Caption 21:** integrated closed-caption, prompting system; for scripted, recorded, live unscripted material; lower-third keying. Circle (729)  
**MCA-100:** broadcast master control automation; controls library, titling, still-stores, etc.; networking option links four MCS systems in multiple output channel operation. Circle (730)  
**RMS resource management:** for incoming feeds, VCR scheduling, tape tracking. Circle (731)  
**NRA Jump Start:** Circle (732)  
**MCS machine control:** for VCRs, titlers, still-store, robotic camera, video carts; references to equipment relocate as script is changed. Circle (733)  
**LaKart-200:** multichannel automation; software controls 49 devices with Smart Machine Control interfaces; *Adjustable Network Delay*; edit/compile feature, conflict resolution. Circle (734)  
**ALS-500:** multichannel automated library; format independent, 6-transport; adapts for any cassette size; cassette storage expandable. Circle (735)  
**BasManager 150, 200:** master control automation systems. Circle (736)

### BCD Associates

**Amiga utilities:** 5KECHO, TELLBCD for improved programming and operation of BCD-5000, CD-IR animation controllers. Circle (737)

### Beaveronics

**MobaTime 310:** master clock, time signal receiver; four autonomous lines, four pulse types per line; operates analog, digital clocks. Circle (738)

### BEEM

**CTE S 1000:** 1kW solid-state FM transmitter; four 250W modules; front panel displays operating configuration, parameter measurements; redundant circuitry. Circle (739)  
**CTE VL30 exciter:** 30W output; 10kHz step tuning; RS-232 port for external control; in mono, stereo with MPX, SCA capability. Circle (740)  
**CTE TX02 FM transmitter:** 300-1,000MHz; output power to 2W; RS-232 interface for frequency control, RF mute. Circle (741)  
**CTE VL5000:** 5kW FM transmitter; solid-state with redundant modules reduce down time; front panel displays parameters, configuration. Circle (742)  
**CTE RX/10 UHF/VHF FM receiver:** tunes 300-1000MHz; multimeter shows signal strength, tuning center; 110/230VAC, external 24VDC; 45dB separation; SCA output optional. Circle (743)  
**CTE S22 exciter:** 2-20W FM meets FCC, CCIR requirements; for mono or stereo with MPX, SCA capabilities. Circle (744)

### Belar Electronics Lab

**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 (745)

### Belden

**Type 8233A:** triaxial RG-11/U cable; two separated shields on 14 AWG center conductor. Circle (746)  
**#1505A, #1506A:** precision 75Ω video, data cable; 83% velocity factor; 0.235"OD and 0.193"OD; 1506 has Flammarrest jacket; Duobond foil tape with 95% shield. Circle (747)  
**Type 8232A:** triaxial RG-59/U cable; two separated shields of bare braided copper, 20AWG copper-covered steel center conductor. Circle (748)  
**#1504:** 2-channel audio cable; zipcord construc-

# 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 ideal: 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 compo-

ner 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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*Quality with Reliability...Service with Integrity*

Circle (54) on Reply Card

tion; 22AWG, 19-stranded conductor. Circle (749)

### Benchner

**VP400 copy stand:** 25"x25" surface area; oversized camera mounting on steel shafts with Nylon rollers; 3,200'K quartz lighting. Circle (750)

### Benchmark Media Systems

**MIA-4x2:** 2-channel portable mic pre-amp; ideal replacement for many R-DAT original pre-amps; 0.0009% THD at 40dB. Circle (751)

**LOUDMOUTH:** reporter control station; 1-mic, 4-line, 1kHz tone; 6-way selector to record and main outputs; 0.0035% THD over 20Hz-20kHz; seizes, feeds telco circuit. Circle (752)

### BEXT

**PJ 250:** 250W amp for translators. Circle (753)

**TV transmitter:** 10W UHF; self-contained with modulator; for LPTV; 5 1/4" rack height. Circle (754)

**HPT series:** translators, boosters; 20W exciter; options include FM composite receiver, STL band receiver, stereo generator. Circle (755)

**LC STL series:** front-panel programming of composite aural STL; 6W output; >50dB stereo separation with low distortion. Circle (756)

### beyerdynamic

**MCE 50:** mini condenser lavalier. Circle (757)

**MC 742:** stereo condenser mic. Circle (758)

**HEM 561:** headworn hypercardioid condenser mic; XLR connector, for TS190 transmitter or boom mic without headband. Circle (759)

**M59:** large diaphragm mic, internal shock mount; dynamic, enhanced-field magnet for ENG, EFP; Macrolon element, hypercardioid; fast transient response, high output, sensitivity. Circle (760)

**170 series:** hand-held, body-pack lavalier, diversity wireless microphone systems. Circle (761)

**VHS wireless systems:** SEM186, S186, TS190 bodypack mic/transmitters; NE 185.10/185.11 receivers. Circle (762)

### Blue Feather

**MagicScroll:** icon-driven Macintosh teleprompter by Magic Teleprompting; Nubus video card, RGB-to-NTSC monochrome adapter, Mactivator hardware key. Circle (763)

**Camera-mounted display:** 12" unit weighs 19 lbs; 9" monitor for portable use. Circle (764)

**Executive Display:** prompter display for public speaking; 15" monitor in base; mirror supported by adjustable vertical pole. Circle (765)

### BMS

**BMR-40KP, BMT-40GP:** 40GHz link; frequency agile with synthesized reference. Circle (766)

**TBR-series:** Circle (767)

### Bogen Photo

**Code 3181, 3182:** tripod with tandem upper, single lower legs, AL or black anodized; 75mm claw-ball leveller, spiked feet; 9 lbs. Circle (768)

**Code 3190, 3193:** pro cine/video tripod; spiked feet; for loads >22 lbs; 100mm claw-ball leveller, tandem AL legs; AL, black anodized finish; spreader available. Circle (769)

**Mini-Pro tripod:** AL or black anodized; camera shots from 5" to 23 3/4"; 100mm claw-ball leveller, tandem legs, quick-flip lever locks; spreaders available. Circle (770)

**Monitor holder:** enamelled aluminum; 7"x11 1/2" plate holds small monitor; retainer straps; fittings for attachment to small tripods. Circle (771)

### Brabury/Porta-Pattern (BPI)

**HVI300 series:** videoscope waveform, vector in-picture display; for standard CRT or LCD displays; time sharing for transparent or inserted displays; from Hamlet Video. Circle (772)

**HVI608:** Hamlet Video "out-of-gamut" indicator for YUV/RGB shows acceptability of graphics system with other equipment; aural, visual alarms; for graphics, transmission, VTR areas. Circle (773)

**MATCHCAM alignment system:** use with HVI304 component videoscope; setup vector values from illuminated test chart are stored on data cards; for comparison of camera vs. standard; setup difference displays as color fringe; accurate setup shows as white dots; from Hamlet. Circle (774)

**HVI502 stereo scope:** Hamlet Video linear/polar in-picture color display for audio measurements; PPM, VU responses; L/R, M/S, Sum/Difference; in composite, component or Y/C modes. Circle (775)

**Monitor options:** component inputs for GPM-37 color monitor; Y/C, Y/Cb, serial/parallel digital inputs; sound-in-syncs detection. Circle (776)

### Bradley Broadcast Sales

**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. Circle (777)

**UNITY 2000:** digital FM processor combines AGC, low-frequency EQ, 4-band leveling, limiting, composite clipping; with stereo generator; presets for various formats. Circle (778)

**The Dividend:** composite filter reduces upper composite spectrum noise; protects subcarriers, reduces multipath-related distortion; enhances modulation limit. Circle (779)

### Bretford Manufacturing

**Mounting units:** wall, ceiling platform, yoke styles; VCR shelf adjusts for front or top-loading equipment. Circle (780)

### Broadcast Automation

**ShiftChange:** interface for 360 Systems Digi-Cart, satellite delivery systems; direct starts of liner carts; maintains 16 announcers with six liners for each. Circle (781)

### Broadcast Electronics

**AirTrak 90:** mid-priced linear audio consoles; 6, 12, 18, 24 channels. Circle (782)

**AUDIOVAULT:** digital record, playback, inventory storage for broadcast radio spots; supports four users, one recording, three requesting playbacks; accommodates 28 hours of stereo. Circle (783)

**Core 2000:** radio automation control; includes live-assist; PC controller shows operator all information in English; supports auto announcer liner changes, satellite format operation; logs stored on hard disk for review or printout. Circle (784)

### Broadcast Video Systems/BVS

**Decoders:** D-100 NTSC decoder featuring digital, adaptive comb filter; D-101 dual standard NTSC, PAL decoder. Circle (785)

**ML400 keyer:** multilayer unit; four simultaneous key inserts into program video; NTSC, PAL versions. Circle (786)

**TDT-200:** time, date, ID generator. Circle (787)

### Broadcasters General Store

**Automute:** telephone muting device. Circle (788)

**DNF VTR remote:** RS-422, -232, MIDI serial controllers with JOG; by DNF Industries. Circle (789)

**R-TEC MC50, RK50:** remote keypad, machine controllers use DTMF tones on any link to control almost any piece of equipment. Circle (790)

### Brüel & Kjær Instruments

**APE attachment:** acoustic passive equalizer for series 4000 mics; special, directional equalizer diffracts sound field to change frequency and polar response. Circle (791)

### Bryston

**Model 7B-PRO:** mono amp; IMD <0.0009%, THD <0.01%; soft start circuit; 500W, 2-8Ω. Circle (792)

### BTS

**DDS-7 series:** digital video serializers, deserializers; modular, racks hold four serializers, deserializers in any combination; switch between 8-, 10-bit; 4:2:2 parallel input, 270Mbit/s serial output; works with 525, 625 video systems. Circle (793)

**CP-3000PL:** 16-category routing switcher control panel; for party-line systems. Circle (794)

**SDR 400 serial digital router:** for D1, D2 signals; standards independent; supports EDTV, bit-compressed HDTV standard; 16x32 can be mixed with other BTS routers. Circle (795)

**FT-5 HS:** high-sensitivity, non-smear CCD pickup; for LDK9 through LDK391 cameras; doubles sensitivity of previous chip. Circle (796)

**Betacam models:** BCB50 portable with 90-minute

record times; BCB D75 studio recorder, with video component serial digital I/O, analog or serial digital audio; four serial digital A/V outputs, audio embedded in serial digital outputs. Circle (797)

**D2 line:** models DCR28, DCR20; direct control of all primary functions; feature digital audio crossfading for smooth sound transitions in audio insert editing. Circle (798)

**LDK-9 studio CCD camera:** FT-5 frame transfer CCDs; >700-line resolution (806 pixels/line); 9000 ser. remote control, intermixed with LDK-91, LDK-910; dynamic white shading removes prismatic color artifacts at certain focal lengths, apertures; 8-position filter feature. Circle (799)

**FDL 90 telecine:** advanced CCD with 1,300 active pixels per line (EDTV CCD scanner); 8.6MHz channels; image sizing feature permits 0% linear magnification; dual 4:4:4 framestores with interfacing to interconnect digital grain reduction, color correction; 4:3 and 16:9 presentations; NTSC, PAL operation. Circle (800)

### Burk Technology

**AutoPilot:** intelligent remote control for ARC-16 multisite operation; point-and-shoot menu requires little computer knowledge. Circle (801)

### Cablewave Systems/RF Systems

**Bogner TV antennas:** slot-arrays for low-, medium-, high-power UHF, VHF. Circle (802)

### Calaway Editing

**CD 100A, 100D:** enhanced 4-VTR CE-100; options for custom, "101-key" keyboards. Circle (803)

**TurboTrace+:** for CE-110, -210, -400 editors; expands EDL to 3,000 lines; 4-channel audio capability; runs on MS-DOS computer. Circle (804)

**E-to-E Preview:** software upgrade for CE videotape editing systems; provides integrated preview switching. Circle (805)

**CE-400:** upgradable editing control; 9,999-line EDL in 80386 machine. Circle (806)

**CE-110:** 4-VTR editing controller; ASCII or dedicated keyboard with VTR motion controller; eight programmable GPUs, VTR speed triggers; List Management software. Circle (807)

**CD-210 edit control:** 8-VTR on-line control; advanced list management; eight programmable GPUs, expands to 16 machines. Circle (808)

### Calzone Case

**Titan series cases:** Fiberglas laminate on 3/8" plywood. Circle (809)

**Studio series:** home installation rack-mount cases; for CCTV, audio equipment. Circle (810)

**Ultra Series:** extruded AL cases. Circle (811)

### CamMate Systems

**Black Magic boom extension:** remote head with camera, pan/tilt control; for loads <200lbs; multi-core cable for power, video, control. Circle (812)

### Canare Cable

**BCJ-XJ-TR:** converts DAT digital 110Ω XLR-I/O to 75Ω BNC; long-line, low-loss path of serial digital audio data on coaxial cable. Circle (813)

### Canon Broadcast

**Canovision 8 L1:** hi-band 8mm camcorder; 15x lens, digital effects, manual stereo record level; interchangeable lenses mounting. Circle (814)

**Canon J33ax11B IAS:** 33" internal focus lens; applicable to field production and ENG. Circle (815)

### Carpel Video

**Tape cleaners, inspectors:** for large and small Betacam SP cassettes. Circle (816)

### CBSI Custom Business Systems

**Software option:** SCO Unit V operating system for broadcast accounting, traffic/billing, music and other software. Circle (817)

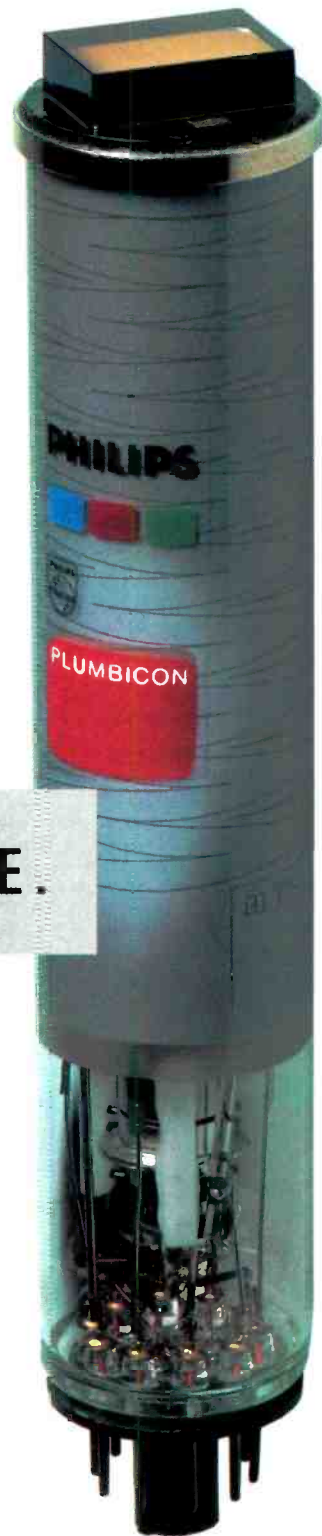
**InterACCT:** interactive accounting system for multistation, multidivision applications by modem; for better accessibility, faster analysis of business records. Circle (818)

### CCA Electronics

**FM20G/A:** 30W FM exciter at low cost. Circle (819)

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.

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# Philips Components



# PHILIPS

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### CEL Electronics

**P171 encoder:** 4:2:2 digital input to PAL or NTSC composite output; processing in digital domain; adaptive comb filtering reduces cross-color, cross-luminance. **Circle (820)**

**P180STAND:** 4-field, 4-line interpolation; bi-directional standards converter; temporal, spatial filtering; NTSC, PAL composite, component Y/C/I/O; U-matic dub input; CCIR-601/RP-125; SECAM input, optional output; 2-channel audio delay compensation. **Circle (821)**

**TetraPLUS-50:** enhanced TetraPLUS standards converter; 58 test patterns including zone plate, multiburst, SMPTE bars; 525-/625-line, component, composite NTSC, PAL, SECAM. **Circle (822)**

**TetraPLUS-44 enhancements:** bidirectional standards converter for NTSC, PAL, SECAM; 4-input switcher; composite, U-matic dub in; components, Y/C/I/O; 4-field temporal filter; 4-8 line spatial filter; noise reduction, chroma enhancement, correction; upgradable to TetraPLUS-50. **Circle (823)**

**Myriad<sup>2</sup>:** 3-D digital effects manipulation; maps image onto solids of any type; includes library of solids. **Circle (824)**

### Central Dynamics

**Stage\*1 upgrade:** encoder for D1 to NTSC/PAL; integral genlocking sync generator. **Circle (825)**

### Central Tower

**Model SS-STX:** self-supporting, solid truss leg tower; heights 500 feet and greater. **Circle (826)**

### Channelmatic

**ASP-100A:** auto schedule processing software; standard in Adcart PC systems. **Circle (827)**

**Model 600A:** CompuEdit A/V compiler-editor using V:base relational database; for simultaneous, multiple spot reel compilation. **Circle (828)**

**Model NSS/CCU:** network share switcher and channel control unit. **Circle (829)**

**Random Access:** auto error detection for Adcart SCU-1A/-2A system controls. **Circle (830)**

### Chester Cable/Alcatel NA

**Video 20CL2:** video cable; 0.325" OD, solid-core, double-braid shield; PVC jacket; precision 75Ω; compatible with KC-59-299 connector. **Circle (831)**

**EF audio series:** single, multipair jacketed cables; high tensile strength in smaller OD than previous PR, PRJ series; shield is bonded to inner jacket; ripcord design simplifies stripping, termination preparation. **Circle (832)**

### Chyron

**CODI:** compact character generator; remote operation from a terminal; offers 1,500 master Bitstream typeface library. **Circle (833)**

**MAX!>:** dual-channel titler; compatible with iNFIT! 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; 2-60fps speeds; interchangeable mount for PL, BNCR, Panavision lenses; supports Steadimag, ARRI film magazines. **Circle (837)**

### Cipher Digital

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

### Circuit Research Labs

**Daypart 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-4B:** multichannel modular camera interfaces; connects Clear-Com system to cameras and other 4-wire devices. **Circle (842)**

**MS-812:** 12-channel, programmable party-line station, split audio, contact closures, IFB. **Circle (843)**

**ICS-60 Matrix Plus:** user station for digital intercom; six listen/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-1:** 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

**DP4:2:2 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 update for LiveLine 5, Art-Star 3D Plus graphics systems. **Circle (851)**

**Software upgrade:** CP/MAX, DP/Mosaic and DP4:2:2 systems; unified 3-D animation, enhanced paint, 2-D interpolation and Morph Animator functions. **Circle (852)**

**MaxFrame:** video computer on VME boards in DP4:2:2 video interface; speeds 3-D and animation processes. **Circle (853)**

**Macintosh, PC Utilities:** file import/export, conversion facilities. **Circle (854)**

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# BCAM

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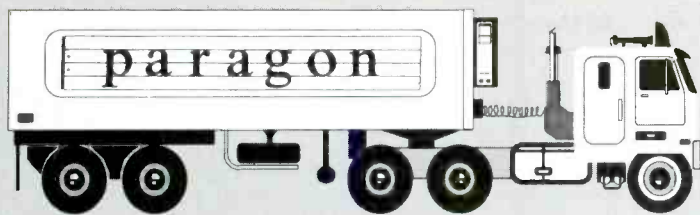
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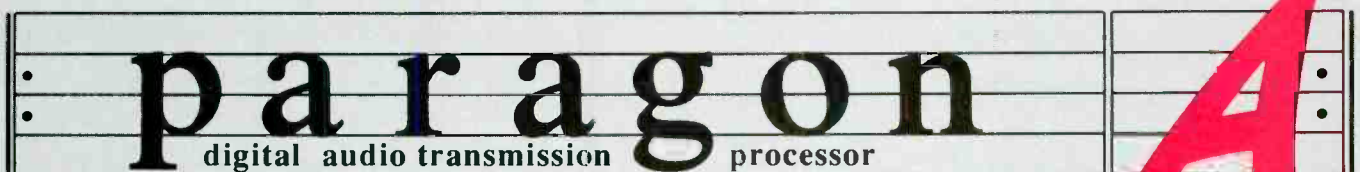
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artifacts; 4-band compressor and 4-band limiter; 10-band graphic EQ; 9" VGA touch-screen equipped video monitor; factory-loaded sound library; on-air A/B comparison. *User installable options* will include a AES/EBU digital I/O and Stereo Generator.



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**AUDIO  
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**Video Workbench:** video clip module for DP 4:2:2, D/MOSAIC; filmstrip view of In, Out edit points; transition, manipulation effects; extract line drawing animation from video footage. **Circle (855)**  
**68040 upgrade:** CPU processor for LiveLine 5 and ArtStar 3-D Plus systems. **Circle (856)**  
**Protean Paint:** 2-D in-betweening software for animation; full color, integrated single-frame recording. **Circle (857)**  
**DP/MAX:** DP4:2:2 paint, animation production system with 100s DP/Mosaic, MaxFrame video computer. **Circle (858)**  
**Version 5.1:** update for DP 4:2:2, DP/MOSAIC, including 3-D, Morph modules. **Circle (859)**

#### Columbine Systems

**Master Control Automation:** operate without operator intervention; master control, routing switching, multiplay, single cart decks, 1" transports, titler, still-store operation. **Circle (860)**  
**Columbine Sales:** automation package links master control for immediate feedback of commercials aired. **Circle (861)**  
**News/Production:** extends automation with interface to news, production; includes closed captioning and teleprompting. **Circle (862)**

#### Comark Communications/Thomson-CSF

**ESC equipped system:** UHF TV transmitter; powers from 60kW to 280kW, water-cooled diplexed amplification; uses suppressed collector ESC device by EEV; solid-state control logic; European safety specifications. **Circle (863)**  
**IOT equipped system:** UHF TV transmitter rated to 240kW; diplexed, common amplification with air and water cooling; EEV Inductive Output Tube in power amplification stage. **Circle (864)**

#### COMLUX

**Model 3681, 3682:** 1.55 Gigabyte/s fiber optic terminal pair. **Circle (865)**  
**Model 3081, 3082:** audio codec for 8-channel, 16-bit operation. **Circle (866)**  
**Model 3903/3904:** digital video codec; 2-channel, 9-bit with 8.5MHz sampling. **Circle (867)**

#### Commodore Business Machines

**RGB AmiLink:** multimedia video editing system based on Amiga PC. **Circle (868)**

#### Comprehensive Video Supply

**MM-3100 EFP mixer:** 3-input, 1-output, balanced; flat frequency response; AC or DC power; Cordura carrying case. **Circle (869)**  
**LOG MASTER upgrade:** expanded database capability; frame grab, V-LAN features. **Circle (870)**  
**Bilora tripods:** camera, lighting support; featuring #1473 head. **Circle (871)**  
**ListMaster:** EDL software, integrates list cleaning, management, tracing, translation. **Circle (872)**  
**Edit Master MAC:** CV Technologies full-featured editing package, for Macintosh; optional control knob, CVNET rackmount. **Circle (873)**  
**CUTTER:** cuts-only edit controller; with keyboard, two CVNET interfaces, master controller card, software, cables. **Circle (874)**  
**CUE MASTER upgrade:** teleprompter; handheld control, through-the-lens monitor. **Circle (875)**

#### Compuprompter

**VGA prompting:** software for Compuprompter systems with monitor enhancement. **Circle (876)**

#### Computer Assisted Technologies

**BCAM 1.70, BCAM LAN:** enhanced software packages track maintenance requirements; upgraded single station, LAN versions; Parts Inventory, Hints, Contacts, Shift Log features. **Circle (877)**

#### Computer Concepts

**Data reduction board:** for DCS system; apt-X 100 co-processor expands DCS machine; 4:1 data compression doubles storage; 32kHz sampling; 2M-Bytes storage/minute of audio. **Circle (878)**  
**Digital Commercial System:** hard disk storage of commercials, liners, jingles; for live, satellite-fed stations; "instant access" for on-air. **Circle (879)**

#### Computer Engineering Associates

**Multilingual prompting:** 9-language prompting

on single-screen; simultaneous split-screen editing in two languages. **Circle (880)**

**Multiprompter:** three separate scripts on three prompting monitors simultaneously. **Circle (881)**

**Machine control interface:** for Chyron Super-Scribe titler. **Circle (882)**

**Rundown module:** variable auto script timing, user-defined displays, automation computation of back, elapsed, cumulative timing. **Circle (883)**

#### Computer Prompting

**CPC-500 Plus:** closed-captioning system with time code. **Circle (884)**

**CPC-1000N:** prompting, closed-captions interface to electronic newsrooms. **Circle (885)**

**CPC-1000D:** flat screen teleprompter display has weight of 8 lbs. **Circle (886)**

#### Comrex

**DXP, DXR:** digital audio codec; 7.5kHz full duplex audio; 56 or 64kb/s data in ISDN, switched 56 telco, fractional T1, satellite links; DXP portable ac-powered unit; DXR rack mount. **Circle (887)**

#### Comsat World Systems

**High-speed data:** 56kbit mobile data services for high-quality audio by satellite from transportable terminals; also for transmission of slow-scan video, photo transmission. **Circle (888)**

#### ComStream

**DT4000 terminal:** multirate digital earth station; complete Ku-band TR antenna, radio transceiver, remote control equipment. **Circle (889)**  
**CDA 201 card:** digital audio compression by 4:1 for earth stations. **Circle (890)**  
**DBR401 receiver:** receive-only earth station; antenna, LNB and receiver electronics. **Circle (891)**

#### Comtech

**EC6 controller:** stores 64 satellite locations in removable Program Pak; operates all Comtech motorized antenna systems. **Circle (892)**

#### ComTek

**Model MRC-82:** miniature wireless microphone receiver; attaches to camera. **Circle (893)**

#### Comwave

**SBSA-10:** 10W frequency agile TV transmitter for ITFS, wireless cable at 2-2.7GHz; separate aural, visual amplification. **Circle (894)**  
**SB4x10:** 4-channel transmitter for ITFS, wireless cable; 1-10W output at 2-2.7GHz; independent channel controls. **Circle (895)**  
**SB050B:** 50W TV transmitter for ITFS, wireless cable service at 2-2.7GHz. **Circle (896)**

#### Concept Productions

**DAF system:** digital audio equipment replaces standard tape cartridges; 330 minutes storage with expansion options; features audio overlap; traffic system interface. **Circle (897)**

#### Concept W Systems

**PDC-240 PowerPlex option:** includes power for camera, viewfinder, camera adapter with Complex bidirectional signals on one coax. **Circle (898)**  
**CP-201A:** universal camera adapter, control unit; noise reduction on mic/line for greater dynamic range; Plus Port camera adaptor, balanced audio I/O. **Circle (899)**  
**RVS-230:** 4x return video VBI switcher; genlock to camera on one single coaxial line. **Circle (900)**

#### Conifer

**QL-1010A:** 31-channel block downconvert; improved IF, channel-handling. **Circle (901)**  
**Model PA-1033:** low noise microwave pre-amp; enhances fringe reception; additional gain when needed on long cable runs; mounts directly to most downconverters. **Circle (902)**

#### Connectronics

**One-Piece:** audio adaptor plugs; spring-loaded terminals paired with XLR, TRS, RCA, BNC and Bantam connectors. **Circle (903)**

#### Consultronics Limited

**PG3000:** stereo audio generator companion to

PC3000 analyzer. **Circle (904)**  
**SIAT:** short interval audio test sequence for 5s on-air testing of audio circuits. **Circle (905)**

#### Continental Electronics

**Model 817B:** 60kW FM transmitter; established PS, RF, IPA stages, 802A exciter; dual cavity amplifier operates into external combiner. **Circle (906)**

#### Control Concepts

**SUPERTRAC:** active track surge suppression protects against surges, low-level voltage transients; includes UL497A phone/modem protection; six models cover 7.5A to 15A. **Circle (907)**  
**Isolatron series enhancements:** power protection for AM/FM, TV facilities. **Circle (908)**

#### Corporate Communications

**Triton A/D:** controller for Copernicus 4x4 or Sunburst II analog processors. **Circle (909)**  
**Copernicus 4x:** multiformat processor for D1 10-bit signals; 4:4:4 architecture for Color Space Transform processing. **Circle (910)**

#### Corporate Computer Systems

**Micro 15K:** audio codec with analog bandwidth to 15kHz. **Circle (911)**  
**Micro 66R:** audio codec with dual rate capability of 56kbps and 64kbps. **Circle (912)**  
**MICRO66i digital audio terminal:** codec for international service using 7.5kHz ADPCM audio transmission. **Circle (913)**

#### Cortana

**Stati-Cat components:** arrays reduce damage from static, lightning; CN-1 Crow's Nest; Stati-Cat SC-1; Stati-Kitty SC3 for reduced noise in receive antennas; Stati-Tomcats SC-4 where larger units are required. **Circle (914)**

#### Critical Communications

**Integrator 1000:** 6-input IFB; transformer-balanced circuitry distributes inputs as assigned to four outputs. **Circle (915)**

#### Crouse-Hinds Airport Lighting

**TLR-70020:** serves as lamp failure alarm relay for one or two flashing beacons; serves as alarm and/or lamp transfer relay for steady-burning obstruction lighting; programmable. **Circle (916)**

#### Crown International

**CM 230:** 3-capsule mic produces three independent outputs; 12-48Vdc phantom or 9V battery operation; 80Hz-15kHz response, 120dB SPL and -56dB sensitivity. **Circle (917)**  
**Macro-Reference:** monitor amp with toroidal power transformer; convection cooling; output device protection; drives loads as low as 1Ω; 760W/channel. **Circle (918)**

#### Cycle-Sat

**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)**

#### Datelek

**D-850, D-851:** 1-, 2-channel audio DAs for D-800 10x1 switchers; six resistive split outputs, balanced or unbalanced bridging input; output to -28dBm across 600Ω. **Circle (921)**  
**D-872:** RS-232/RS-422 communications converter module. **Circle (922)**  
**D-890 series:** digital audio modules; D-890 DA with 1x6; D-891 AES/EBU 20-bit D/A converter with regenerated output; D-892 AES/EBU 20-bit A/D converter. **Circle (923)**  
**D-2400 switching system:** A/V router for multi-level audio, video; for 800 sources, 800 destinations; 40MHz bandwidth video matrix; 116dB audio dynamic range. **Circle (924)**  
**D-806 VDA:** 10 outputs, 0.05dB to 8MHz, 25MHz bandwidth; optional EQ plug-in; usable as subcarrier DA. **Circle (925)**  
**D-2459, -2457:** under-monitor, LED alphanumeric





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display of source ID for eight sources; RS-422 or control from D-2000, -2400 switchers -245710-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**

**Renaissance HiRes Kilovector:** secondary color corrector; multiple, variable width vectors with automatic centering for 1/3 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 backdrops, 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-Tech**

**Model 5217:** wideband routers; 16x16 matrix for 100MHz signals. **Circle (938)**  
**Matrix Manager:** Unix OS for virtual matrix system; 6-character names; 32-level routing; multi-tasking in multi-user environment. **Circle (939)**  
**Model 5216:** expandable 16x16 serial digital router for D1, D2 signals. **Circle (940)**  
**Series 5430:** small matrix switchers, 16x2 video only, audio only; 16x1, 24x4 AFV; 30MHz video bandwidths. **Circle (941)**

**DIC//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 enhancement:** signal processor; segment-based capability for 4-band para-

metric EQ, gain, pan control of all segments; processing attributes become tags to segments during editing, production process. **Circle (948)**  
**DASS 100 interface:** multifunction synchronizer, multidevice interface, signal processor; signals transferred among equipment in digital domain; sampling frequency converter, format converter, gain adjustment; test signal source. **Circle (949)**  
**SoundStation II options:** 16 simultaneous output channels; eight track-hour storage. **Circle (950)**

**Digital Audio Technologies**

**Stellavox/Stellamaster:** 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; multitrack 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 Compositum system. **Circle (954)**  
**Version 3.0:** live-action compositing, rotoscoping; upgrade from 80386 to 80486 CPU. **Circle (955)**  
**Pantone color system:** to calibrate video equipment with Pantone 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 9500:** signal DAs. **Circle (959)**  
**DPS-285:** sync/test signal generator. **Circle (960)**  
**PC plug-in:** TBC-on-a-card; for Newtek Video Toaster and similar PC-based video production products. **Circle (961)**



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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.

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### Garner Industries

**680B series:** degausser for S-VHS, D1 media; 850 Oe from "V"-coil; manual operation. Circle (1124)

### GE American Communications

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

### GE Lighting

**Linear Halogen-IR:** uses infrared coating technology; coating passes visible light, reflects infrared back onto filament for improved 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:** accesses 100 CDs on-line with NSM CD2100 changer. Circle (1128)

**CD.J. 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)

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

### Gennum

**GT4122, 4123 video multipliers:** 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 SPDT 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)

### Gentner Electronics

**DAWN:** digital audio workstation network; recording, control, playback with LAN interconnection without using audio tape. Circle (1137)

**PRIZM:** 4-band digital processor; change of 20 operating parameters by front-panel switches; connects to Lazer through FO cable. Circle (1138)

**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 ATI:** acoustical telco interface for boardroom audio conferencing; eliminates acoustic echo; central node for connection to other conferencing equipment. Circle (1140)

### Geocam

**4/4.2 OB:** lightweight matte box; mounts to lens; 12oz overall weight. Circle (1141)

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

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

### GEPCO International

**GA724-M:** 24ga 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 12½-pair for extended distance connections. Circle (1146)

### Getris Images

**Venice production system:** three 4:2:2 inputs, 4:0:0 linear key; 4:2:2 output with linear key; includes Abekas A60 control; provides software with automatic adjustment of video l/Circle (1147)

**Venice videographics:** paint, 2-D animation, effects; 3-D 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:** fader status configurations; "Smart Start" starts mix without initial preset; "Additive Grouping" group master affects save faders similar to VCA group. Circle (1150)

**FVP-2000:** film, video post software for moving fader automation with Razor Blade EDL editing feature. Circle (1151)

### 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 includes 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-700 manipulator:** 3-D effects, rotation, perspective. Circle (1155)

**Key-Link, Key-Layer:** 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 3000:** production switcher; analog with composite digital processing; key inputs for all video inputs; layering capabilities. Circle (1158)

**Model 200-2 enhancement:** Peripheral Bus; control allows switcher to be integrated into a production system. Circle (1159)

### Gray Engineering Labs

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

# Patching Equipment

## Audio Patching

- Panels & Jacks
- Pre-Wired Audio Panels
- Patch Cords
- Available in both ¼ & Mini Sizes



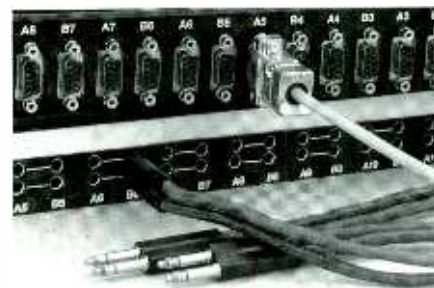
## Video Patching

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- Video Panels & Jacks
- Patch Cords
- RGB Panels



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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!



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

**DPS-295:** TBC/framestore. Circle (962)  
**DPS-2200:** TBC/synchronizer. Circle (963)  
**DPS-375:** PAL TBC/framestore. Circle (964)

#### 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. Circle (965)  
**DVFS 1000:** TBC, synchronizer for D1; 10-bit processing; format transcoding; composite, component upgrades; IBM-PC control available with serial port. Circle (966)  
**DVCC 1000:** D1 color corrector; 10-bit processing; 525-, 625-line signals; master saturation, hue controls; luminance, red, green, blue corrected with black, gamma, gain; 6-6 vector secondary correction of hue saturation, luminance; component, composite interface upgrades. Circle (967)

#### Display Devices

**DataLift DL2, DL3:** large screen projector supports; positions unused unit in ceiling; extends to 5'6" or optional 10'. Circle (968)

#### DN Labs

**Dura-Flux lighting:** flicker-free fluorescent; two tubes for 5,500°K lighting; Spectra-Flux 99% reflectivity coating on fixture reflectors. Circle (969)  
**Model F320W:** 320W dimmable fluorescent with eight 40W lamps. Circle (970)  
**6kW Par:** standard 6kW AC par lamp. Circle (971)  
**DC HDI 1000W, 5000W:** 1kW, 5kW. Circle (972)

#### Dolby Labs

**Model 422:** Dolby B-, C-, S-type reference encoder, decoder. Circle (973)  
**DP5500 DSTL:** digital STL at 950MHz; AC-2 audio coding; two audio, two auxiliary channels in bandwidth comparable to narrowband FM composite; analog L/R inputs, outputs. 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)  
**380-A meters:** console-mounted stereo indicators; dual elements in self-powered circuit; L+R and Sum-Difference modes. 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; mouse interface "grabs" dimmer, sets desired level; AMX-192, DMX-512, analog in; AMX, DMX out; 252-cue memory; proportional patches, multiple crossfades; 18 pile-on submasters. Circle (979)

#### DT Electronics

**SCX6244EFC IC:** parallel multiplexer, demultiplexer; for 4:2:2 video in 625-, 525-line standards; converts between digital YCrCb 601, 27MHz parallel interface format of CCIR 565. Circle (980)

#### Dubner Computer Systems

**30-K Graphics Animator:** hardware, software upgrade; expanded hard drive; Magmove keyframe animator; K-PNT paint, dual user feature; linear keying. Circle (981)  
**30-K Weather system:** weather data gathering, display; 30-K Graphics Animator. Circle (982)

#### Dwight Cavendish

**VP 738:** 10x10 video, audio router for duplication systems. Circle (983)  
**Copymaster 350:** computer-controlled quality control system. Circle (984)  
**VS 617:** 5-group 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 System 1200. Circle (988)  
**Series 1200:** serial digital fiber optics for D1; for distances to 1,300 feet; composite NTSC to 2,600 feet (PAL, 2,000 feet); modules integrate baseband, digital signal environments. Circle (989)  
**Dyna Mite RGB:** modular router with 10, 20, 30x10 matrices in 2RU. Circle (990)  
**MP-9200D control:** DYNASTY system multistandard, VBI switching; source restrictions; multi PC control, salvos; panels connect by bus, home run with coax, fiber. Circle (991)  
**MP-9230A router:** multilevel switcher with 8-level control, follow, breakaway; VBI switching for multiple standards; ASIC technology. Circle (992)  
**Dyna Mite Composite D2:** modular serial router; 10-, 20-, 30x10 matrix in 2RU space; cards expand I/O, 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)  
**Dyna Mite HDTV:** compact router for RGB HR graphics; 2RU 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 standards. Circle (997)  
**Odetics interface:** links NewStar, Odetics for on-air news playback. Circle (998)  
**Rollcall personnel scheduler:** software tracks schedules, logging, reminders, vacation, labor agreements. Circle (999)  
**Orion interface:** create supers with Quanta Orion from NewStar II workstation. Circle (1000)  
**Machine Control Units:** interface controls Chyron 4100/4200, Super Scribe, BTS Vidifont titling systems in the newsroom; also multimedia integration capabilities. Circle (1001)

#### EarthWatch Communications

**EarthWatch software:** 3-D 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-store; manipulation features; scanner stores 100 Hi-Res images on interchangeable CDs; NTSC, PAL, SECAM, HDTV. Circle (1004)  
**Ektagraphic Slide Video System:** 450-line video output from transparencies; auto focus, tracking, color correction and white balance. Circle (1005)

#### ECHOLab

**BARD:** 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/YIQ out. Circle (1006)

#### Ediflex Systems

**Ediflex II system:** non-linear editing using Panasonic write-once MO discs; Script Mimic material organizer; disc capacity of one hour. Circle (1007)  
**Optiflex:** digital re-recording system for rewritable magneto-optical disks reduces storage requirements, costs. Circle (1008)

#### Editing Machines Corporation

**Emc1-HD:** EMC editing system with 676Mbyte disk for one hour, 17 minutes capacity with multitrack audio. Circle (1009)  
**Enhanced Emc1:** 348Mbyte hard disk; C-cube video compression enhances resolution; VHless image quality with doubled picture size; open architecture system. Circle (1010)

**EmcPC:** laptop version of Emc2 system; requires VGA compatibility. Circle (1011)

#### EDX Engineering

**FMSR, TVSR:** redesigned FM/TV channel study programs; includes 3", 30" terrain elevation databases; extensive map drawing feature; conduct interference studies; plot protected and interference contours. Circle (1012)  
**CD-ROM-3:** 3 arc-second terrain elevation data on CD-ROM medium. Circle (1013)  
**CVR software:** calculates, plots field strength contours; extracts elevation from USGS 3", 30" terrain database diskette or CD-ROM in 3" or 1 square degree formats. Circle (1014)

#### EEG Enterprises

**VDR-2:** VBI data receiver. Circle (1015)  
**TVCD100:** VBI line-21 decoder. Circle (1016)

#### EG&G Electro-Optics

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

#### egripment

**192/E:** electric column on Dino dolly. Circle (1018)  
**Model 148 Skymote:** extension unit for the Piccolo crane series. Circle (1019)  
**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; imports PostScript Type 1 fonts, conversion to 3-D models; 4-window display of objects in orthogonal, camera views. Circle (1022)

#### Electro-Voice

**RE38N/D:** dynamic cardioid mic for recording, broadcast, reinforcement; 16-position EQ switch; N/DYM for high output, wide response; DynaDamp vibration isolation. Circle (1023)  
**RE27N/D:** cardioid dynamic mic; N/DYM, Variable D features for crisp high-end sound. Circle (1024)  
**S-40 monitor:** compact personal monitor with 5/4" polypropylene woofer, 1" ferro-cooled soft-dome tweeter; rated for 160W. Circle (1025)

#### ElectroGIG Nederland

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

#### Electronics Research

**InvisiShield:** an electrically transparent antenna shield attaches above antenna bays to protect against falling ice. Circle (1027)  
**PE960-6 product eliminator:** multistation filter; constant impedance, high selectivity; sideband attenuation >20dB down at  $\pm 800$ kHz. Circle (1028)  
**960-6 module:** medium power, constant impedance combiner; 25kW/input without forced air cooling; minimum input separation of 800kHz; 120kW output. Circle (1029)  
**SP-XA:** antenna tower sections. Circle (1030)  
**1090 antennas:** medium power FM panels; 60kW 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)

#### Elmech USA

**Phantom dolly:** track, studio crab wheels; manual hoist, Phantom Mini or Phantom AT column for 660 pounds. Circle (1035)

#### EMCEE Broadcast Products

**TTS20HS:** frequency-agile design MMDS TV transmitter. Circle (1036)  
**Solid-state transmitters:** TTU50EE 50W UHF solid-state; TTU1000EE 1kW UHF; TTV1000EE 1kW VHF. Circle (1037)





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## *MF-3000...special effects as easy as 1, 2, 3D.*

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Circle (63) on Reply Card

### Garner Industries

**680B series:** degausser for S-VHS, D1 media; 850 Oe from "V"-coil; manual operation. **Circle (1124)**

### GE American Communications

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

### GE Lighting

**Linear Halogen-IR:** uses infrared coating technology; coating passes visible light, reflects infrared back onto filament for improved 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:** accesses 100 CDs on-line with NSM CD2100 changer. **Circle (1128)**

**CD-J. 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)**

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

### Gennum

**GT4122, 4123 video multipliers:** 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 SPDT 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)**

### Gentner Electronics

**DAWN:** digital audio workstation network; recording, control, playback with LAN interconnection without using audio tape. **Circle (1137)**

**PRIZM:** 4-band digital processor; change of 20 operating parameters by front-panel switches; connects to Lazer through FO cable. **Circle (1138)**

**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 ATI:** acoustical telco interface for boardroom audio conferencing; eliminates acoustical echo; central node for connection to other conferencing equipment. **Circle (1140)**

### Geocam

**4/4.2 OB:** lightweight matte box; mounts to lens; 12oz overall weight. **Circle (1141)**

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

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

### GEPCO International

**GA724-M:** 24ga 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 $\frac{1}{2}$ -pair for extended distance connections. **Circle (1146)**

### Getris Images

**Venice production system:** three 4:2:2 inputs, 4:0:0 linear key; 4:2:2 output with linear key; includes Abekas A60 control; provides software with automatic adjustment of video I/C **Circle (1147)**

**Venice videographics:** paint, 2-D animation, effects; 3-D 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:** fader status configurations; "Smart Start" starts mix without initial preset; "Additive Grouping" group master affects save faders similar to VCA group. **Circle (1150)**

**FVP-2000:** film, video post software for moving fader automation with *Razor Blade* EDL editing feature. **Circle (1151)**

### 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 includes *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-700 manipulator:** 3-D effects, rotation, perspective. **Circle (1155)**

**Key-Link, Key-Layer:** 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 3000:** production switcher; analog with composite digital processing; key inputs for all video inputs; layering capabilities. **Circle (1158)**

**Model 200-2 enhancement:** Peripheral Bus; control allows switcher to be integrated into a production system. **Circle (1159)**

### Gray Engineering Labs

**DTR-313:** time-code reader, generator; SMPTE/EBU 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



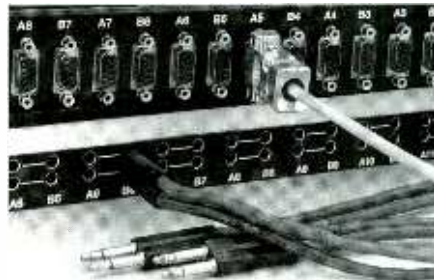
## Video Patching

- 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



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**audio-line**

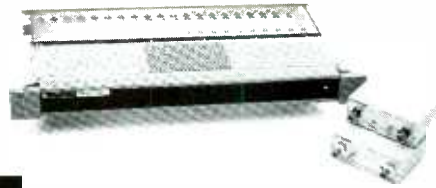
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Circle (68) on Reply Card

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bution. 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.

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Circle (69) on Reply Card

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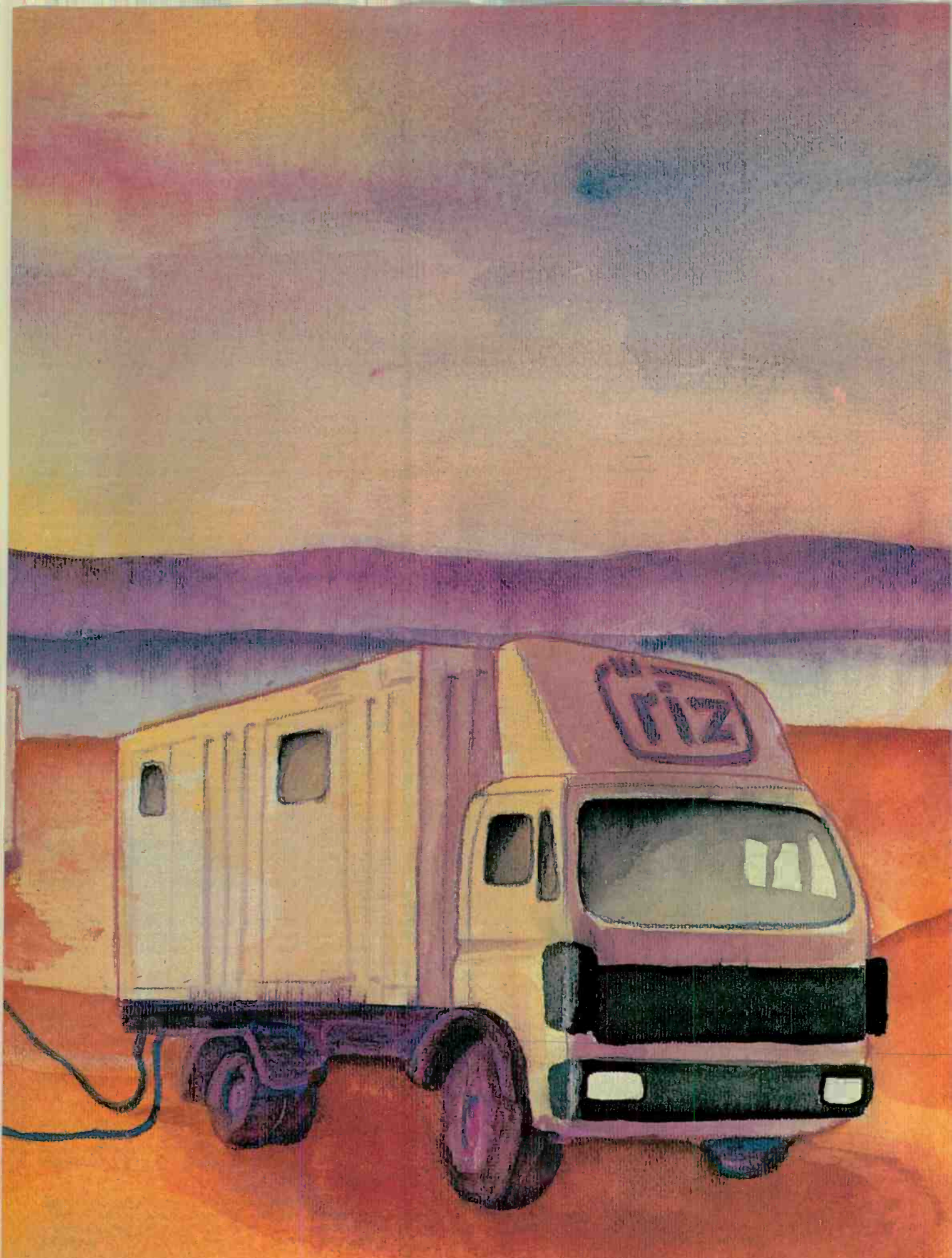
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Circle (70) on Reply Card

**VR-321:** dual standard, safe title/action reticle generator; set size, position; crosshair, crosshatch, key capability; store/recall functions. Circle (1161)  
**FDG-345:** film data generator tach-locks to telecine to produce VITC film data. Circle (1162)

#### Grunder & Associates

**Feral C-100:** synchronizer/TBC, full-frame S-VHS, composite signals; serial control. Circle (1163)  
**YEM CVS-980:** autolock scan converter; covers scan frequencies from PCs to workstations; zoom capability; 24-bit architecture, 16-step flicker elimination; produces NTSC, PAL video format for taping. Circle (1164)  
**YEM CVS-970:** 24-bit down converter changes high-resolution computer graphics to HDTV or 30kHz sequential, interlace scans. Circle (1165)  
**DTC 1504:** standards converter, from Video International; 4-field, 4-line motion interpolation, noise reduction, 4:2:2 processing. Circle (1166)  
**YEM CVS-960:** autolock scan converter; for high resolution, interlaced workstation in CAD/CAM, simulator, medical products. Circle (1167)  
**Feral 6119, 6119YC:** 6-input switcher; composite, separated Y/C; 3-bus architecture; genlock, colorizer, auto transitions with GPI, linear keying, auto preview; 12 wipe patterns. Circle (1168)

#### Hallikainen & Friends

**DRC-200:** digital remote control; CRT, logging; link to remote site on dial-up, voice grade, digital circuits. Circle (1169)

#### Harris Allied Broadcast Eqpt.

**PFT enclosures:** full range of racks using tab and slot alignment for quick assembly; complete line of accessories. Circle (1170)  
**Pro Announcer 500:** speech processor; balanced input from mic to line level; 3-section boost/cut EQ; compression, symmetrical correction; product by Air Corp. Circle (1171)  
**Paragon:** Audio Animation digital FM processor; no clipping; touch-screen control. Circle (1172)  
**PMD222 recorder:** Marantz cassette transport; balanced XLR connectors; dual, variable speed; audible cue; 3-head; record limiting. Circle (1173)  
**DIGILINK:** by Arrakis Systems; digital audio recorder; 16-bit audio, 0.008% THD, >85dB S/N ratio; models cover 150-minutes to 600-minutes stereo capacity. Circle (1174)  
**VT240 logger:** DAT supports 180 hours with 24-channel recording on single DAT cartridge; integral UPS power supply. Circle (1175)  
**Audiometrics CD-10:** CD cart machine; Autolock avoids removal of CD during play; EOM indicator gives 5-35s early warning of end of cut; reduced start lag time. Circle (1176)  
**Acura Line:** antenna couplings; 1-100kW; full Tee-network for series-fed towers tuning. Circle (1177)  
**GATES FIVE A:** frequency-agile 5kW AM transmitter; PDM modulation; solid-state PA. Circle (1178)  
**UTV-1000:** 1kW UHF transmitter; models from 100W to 10kW level. Circle (1179)  
**UTV-10T:** 10W UHF translator; 100W, 400W, 750W, 1kW models available. Circle (1180)  
**Platinum PTSFM, PT10FM:** 5kW, 10kW solid-state FM transmitters; power levels of 2kW, 3.5kW, 6kW, 7kW; positive air cooling. Circle (1181)  
**ADH2 dehydrator:** automatic, rack-mount system by Environmental Technologies to pressurize transmission lines. Circle (1182)  
**Navigator series:** UHF TV transmitters; solid-state; from 400W to 1kW. Circle (1183)  
**HT 500FM:** 500W FM transmitter; solid-state, frequency-agile, containerized packages. Circle (1184)  
**Digital 50 exciter:** 18-bit digital, 0.6Hz resolution; 10kHz tuning by numerically controlled oscillator; no output retuning; 50W output. Circle (1185)  
**Series 1800:** C/Ku-band stereo satellite receiver by Wegener for network radio; two tuned audio demodulators; 600Ω outputs. Circle (1186)  
**SatCue 500:** Network cue switcher; programmable for 15 stop-sets; compatible with studio equipment through relay interface; by Colorado Magnetics. Circle (1187)

#### Harrison by GLW

**SeriesTen B:** automated mixer; save, recall features in total dynamic, instantaneous snapshot modes; software revised for enhanced mix-merge

utilities to bring variations from multiple passes of a mix process into alternate mixes. Circle (1188)  
**ARS-9 router:** switcher expands to 256-in×256-out; transformerless, differential connections; direct connection to SeriesTen B console for control in multiroom facilities. Circle (1189)

#### HDTV Holland

**HDTV production:** full production services in 1125/60 format. Circle (1190)

#### HEDCO

**HD-16<sup>plus</sup> switcher:** 30MHz bandwidth 16-in×1-out; local, remote control; can be linked with existing 16x routers; comes with its own protocol; expansion to 256x1 available. Circle (1191)  
**RCP-NXY:** numeric X-Y display, control for ×16 or smaller matrices. Circle (1192)  
**Pro-Bel HD:** digital video router passes multiple digital standards; 16×16 to 256×256. Circle (1193)  
**16x series enhancement:** expansion frames for 32×32 with input, output frames. Circle (1194)  
**Pro-Bel HD series:** digital audio router per AES/EBU spec; meets 44.1kHz, 48kHz sampling rates; 64×64 to 256×256 matrices. Circle (1195)

#### Hitachi Denshi

**H4318 Harpicon:** high-sensitivity tube; 10x sensitivity of Saticon; 18mm image format. Circle (1196)  
**FR10B1-ZAB:** compact 10GHz microwave link system. Circle (1197)  
**FP-C10F:** FIT-CCD ENG camera; 720-line resolution; 400,000-pixel array. Circle (1198)  
**FP-C10:** IT-CCD ENG camera; 360,000-pixel MicroLens array; 680-line resolution. Circle (1199)  
**Z-One-A camera:** dockable ENG camera; IT CCDs; 750-line resolution and 60dB S/N ratio. Circle (1200)  
**SK-F3S:** EFP camera with MicroLens FIT CCD; 400,000-pixel array; 6-speed shutter. Circle (1201)  
**CU-F300 CCU:** triax, multicore cameras; CP-F300, RU-F300 remote control panels. Circle (1202)  
**SK-F350:** FIT CCD field/studio camera; 450,000-pixel array; RGB triax cable. Circle (1203)  
**SK-F60 camera:** IT-CCD for studio; 700-line resolution with 62dB S/N; RGB triax, composite triax, multicore cable. Circle (1204)  
**SK-H50:** 3-Harpicon camera; 30x sensitivity over conventional cameras; 700-line resolution with 57dB S/N. Circle (1205)  
**HV-C10:** 722×584 pixel array from MicroLens CCD devices; 700-line resolution; field, frame storage capability. Circle (1206)  
**SK-F300S:** FIT-CCD studio camera; MicroLens CCD yields 400,000-pixel array; RGB triax. Circle (1207)  
**SK-F750 upgrade:** studio camera using FIT CCDs; 450,000-pixel array. Circle (1208)  
**HV-1200:** HDTV VTR; 1.88Mbits/s data rate with 74.25MHz, 8-bit sampling; 30MHz luminance bandwidth; 8-channel PCM audio; 96-minute capacity with 14" reel. Circle (1209)  
**VL-S110 VCR:** S-VHS field recorder player; integral TBC, chroma noise reduction; split screen confidence playback. Circle (1210)  
**HR-C10, -C20:** field acquisition Hi8 dockable recorder, desktop deck; AFM, PCM. Circle (1211)  
**VL-D500 recorder:** D2 digital composite video recorder; 60x shuttle speed with viewable pictures, variable playback. Circle (1212)  
**CM-151, -211:** in-line CRT color monitors; 2H comb filter; composite, RGB, Y/C YCrCb inputs; 15", 21" diagonal screens. Circle (1213)

#### Holiday Industries

**HI-3624 ELF:** magnetic field meter; RMS detector; 100dB dynamic range from 0.2mGauss to 20Gauss; portable 9VDC operation. Circle (1214)  
**HI-3012 field strength meter:** isotropic broadband, meets ANSI exposure limitations; includes electric and magnetic field probes. Circle (1215)

#### Horita

**CSG-50:** color bar source; full-field, split-field, black-burst. Circle (1216)  
**VLT-50:** palm-size, time-code VITC to LTC translator; uses external LTC, if VITC fails. Circle (1217)  
**RLT-50:** Hi8 to LTC translator. Circle (1218)  
**TRG-50PC, PCLOG:** time-code reader, generator, inserter; PC software for logging. Circle (1219)  
**SCT-50:** serial control titler; adds titles or captions to NTSC video. Circle (1220)

#### Hughey & Phillips

**KG225:** Type W strobe; medium-intensity unit requires only 120VAC power line to be run up the tower. Circle (1221)

#### IDB Communications

**Flyaway Phones:** satellite terminal housed in suitcase; 56kbps simplex with voice-grade return; service through Inmarsat system. Circle (1222)

#### I-DEN Videotronics

**IP-450:** multistandard converter for NTSC, PAL/M, SECAM; component, S-VHS, RGB signal forms; 8-bit Y/C processing in 4:2:2 format. Circle (1223)  
**IVW-400:** video wall; one input, four RGB outputs; for 2×2, 1×4, 4×1 matrices; integrated motion interpolation; picture freeze feature. Circle (1224)

#### Ikegami Electronics

**LK-33 camera:** 3-D system; uses dual sensing system with six 1/2" CCDs. Circle (1225)  
**HL-57 camera:** 10-bit digital processing with ASIC devices; FIT CCDs produce 750-line resolution; 62dB S/N; digital parameter control settings may be stored in ROM; compatible with all HL-55/-55A accessories. Circle (1226)  
**IMR-810:** multicamera system for surveillance records all cameras simultaneously; any camera can be played back individually; eight color, B/W inputs; RS-232 control. Circle (1227)  
**MKC-301:** compact CCD camera for special purposes; 600-line resolution; 2000 lx at f/5.6; separate CCU provides RGB, Y/C out; freeze-frame, shutter speed control. Circle (1228)  
**ICD-840 camera:** 1-chip color system; 1/2" format produces 460-line resolution; RGB, Y/C outputs; electronic shutter; designed for special purpose and surveillance. Circle (1229)  
**HL-V57 camera:** 1-piece camera/recorder with 10-bit digital processing; FIT CCD gives 400,000-pixel array; 1/2" digital composite recorder; 50-minute capacity; four PCM audio channels; backspace edit; 48Vdc phantom mic power. Circle (1230)  
**HCV camera/VTR:** 1-piece S-VHS-C camcorder; 750-line resolution; 2000 lx sensitivity at f/5.6; 400,000-pixel array; electronic shutter; 14.3lb total operating weight. Circle (1231)  
**TFF-1320:** digital frame store; photomagnetic disk cartridges; two drives store 600 images on double-sided cartridges. Circle (1232)  
**20 series monitors:** 14", 20" sizes; NTSC, PAL-M, PAL-B available; auto setup with probe; 700-line resolution; D1, D2 input options. Circle (1233)  
**MVS-911:** Multi-Visual Information System; 9-way image splitting to display nine NTSC color or B/W signals; 4x zoom, freeze-frame features; real time color processing. Circle (1234)  
**PM454 monitors:** four 4.5" CRT monitors produce 500-line images. Circle (1235)  
**TPP-800:** video projector system. Circle (1236)  
**TM20-30 monitor:** 900-line resolution 30" CRT; NTSC, PAL-B or PAL-M; D1 or D2 input options; auto setup with probe. Circle (1237)

#### ILC Technology

**DSB-575W ballast:** for Daymax, other metal halide lamp types; flicker-free in a reduced size from typical magnetic ballasts. Circle (1238)

#### Image Video

**ADA-2001:** audio distribution housed in ADA-2000 frame; jumpers configure for 1-in×3-out stereo, 1-in×6-out single channel or 1-in in×6-summed mono out. Circle (1239)  
**3000 series:** frame (VDA-3000) with VDA-3001 wideband video, PDA-3003 pulse; video module option for sync restoration, backporch clamp and AC/DC coupling. Circle (1240)

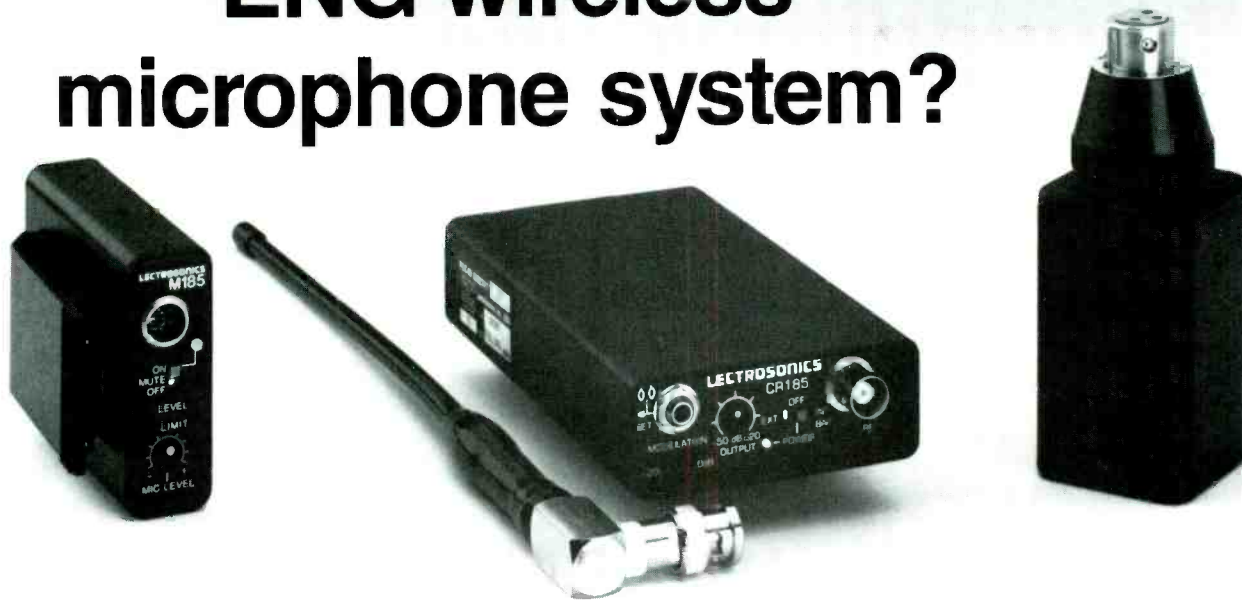
#### Industrial Acoustics/IAC

**Accu-Tone 2000:** studio, control room; Triphonic Diffuser panels, Noise-Lock double-glazed windows, Acousti-Flote floor, Tranquil-Aire ventilation for enhanced sound control. Circle (1241)

#### Innovision Optics

**Mini-jib arm:** portable camera support for tabletop; 63 lb unit breaks to two parts for transport; precision for close-up photography; for loads to 100 lbs; 7' vertical range. Circle (1242)

# Who makes the best ENG wireless microphone system?



## The best mini-receiver . . .

The CR185 offers a six-pole helical resonator front-end, followed by narrow-band crystal IF filtering at 21.4 MHz. This provides unmatched selectivity and sensitivity, and minimizes drop-outs and interference. A balanced, XLR output interfaces with any professional camcorder.

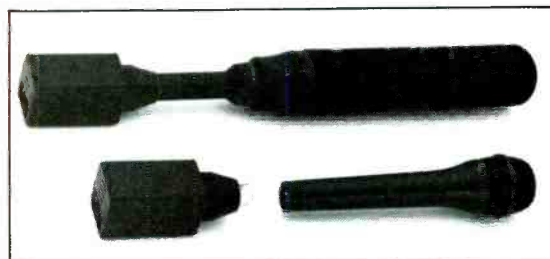


## The best belt-pack transmitter . . .

The M185 is a highly refined belt-pack transmitter. It matches any input requirement and provides "phantom power" for almost any lavalier microphone via a standard 5 pin jack. The belt-clip is constructed of machined aluminum and steel parts, spring-tensioned for a secure fit on any belt or fabric. Audio level LEDs are provided on the control panel for accurate level adjustment.

## The best "plug-on" transmitter . . .

The H185 introduces new flexibility to your ENG operations. It makes any hand-held or shotgun mic with an XLR connector wireless. The microphone body becomes part of the antenna circuit, forming a very efficient RF radiator. The audio input level is indicated by two LEDs next to the microphone coupler. These LEDs are clearly visible with the microphone attached for accurate level adjustment.



## The best construction . . .

All external parts are constructed of machined aluminum for ruggedness and durability. Shock-mounted crystals are used in the IF filtering and oscillators for reliable operation. The transmitters and receiver are built for the real world of hard knocks.

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**Probe Lens:** 19" long, 1" diameter; interchangeable lenses; adapts to all TV cameras. Circle (1243)  
**Mini-Probe lens:** 15" long, 3/4" diameter; adapter; provides three different angles of view, internal light source. Circle (1244)  
**Mini-Mover tables:** motion controlled for animation; rotation, X-axis and Y-axis movement with microstep motor.; use as a camera platform for different point-of-view effects. Circle (1245)

#### Inovonics

**#550 Sentinel:** program audio monitor/receiver; all-mode reception; presets for 24 AM, FM stations; supports NRSC-AM, C-QUAM 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; I/O modules convert optical to electrical and route signals to 1GHz GaAs crosspoint modules. Circle (1247)  
**CF/FC series:** FO links for D1, D2 video with Pathfinder switcher to create complete fiber-optic serial digital video switching system. Circle (1248)

#### Intelligent Resources

**VideoBahn:** high-speed video bus with Macintosh NuBus; increases data transfer rates. Circle (1249)  
**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; predefined colors, fonts; style library enables speakers to have display character size of their choice with "read-ahead" feature. Circle (1251)

#### Intelvideo

**Model IV-8:** low-cost NTSC encoder; RGB, YCrCb

inputs; optional digital delay comb filter; 20MHz luminance response; I-Q modulation. Circle (1252)  
**IV-6W:** wideband NTSC encoder; digital modulation, comb filters reduce artifacts. Circle (1253)  
**Model IV-7:** 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/FM receiver:** 9.6kbit/s asynchronous data rate on C/Ku-band; main, sub-carrier frequency-agile; SAW filter; antenna peaking uses 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)

#### Intraplex

**System 4800 DDATLINK:** discrete digital audio transmission for 15kHz stereo audio channel at T-1 interface; for radio STL applications. Circle (1258)  
**System 4802 DDATLINK:** discrete digital audio transmission link; 7.5kHz, 15kHz digital audio for satellite transmission requirements. Circle (1259)

#### IRIS Technologies

**MX 3200VLR-B:** 22x32 switcher for video and balanced audio control. Circle (1260)  
**MX 816, MX 168:** 8x16 video/audio switcher with touch-sensitive screen control system; also 16x8 router with control. Circle (1261)

#### ITS/Information Transmission

**ITS-1230:** 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-1 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)

#### Jampro Antennas

**Model JBBP:** balanced penetrator; broadband design, side mount for FM, TV. Circle (1269)  
**Model JHD:** UHF broadband panel 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 One Way To Deal With Post Production Effects...





Retrieval, Credit Management. Circle (1273)

#### JEM-FAB

**Model One:** D-Patch panel, for RS-422 protocol in distribution, machine control. Circle (1274)

#### J.N.S. Electronics

**FRAME options:** TG.1002 generator, TD.1003 detector verifies presence of true in-phase stereo; TS.1006 removal module extracts output from TG.1002 in network systems. Circle (1275)

**8000 series additions:** peak program meter and VU level meter, LM.8121; FM monitoring receiver module, RFM.8180; mic/line amp module, ML.8014; all fit 8000 "FRAME" rack housings. Circle (1276)

**8310B audio router:** 10 stereo inputs to one stereo output; 10Hz-20kHz response <0.1dB with <0.005% distortion and <-120dB S/N; 30kΩ bridging inputs; Hi-Z, 600Ω output; additional chassis used to expand inputs to 100. Circle (1277)

#### JVC

**RM-P300U, RM-P900U:** adaptors for multicore, triax remote control of KY-35U, KY-90U cameras; -P300U for multicore to 300 feet; -P900U triax to 1.5km; base station included; Y/C-358, component, composite out; compatible with RM-LP821U RC panel unit. Circle (1278)

**KR-M840U recorder:** MII editing unit with integral LTC/VITC time code and 32-line TBC; digital component processing circuitry. Circle (1279)

**DS-LC9000U:** digital parametric controller and EQ unit; FIR filters provide 54 EQ points with an emulation of analog EQ capability. Circle (1280)

**KR-M545U player:** auto-tracking for feeder in editing system; component, composite, Y/C out; four audio channels; piezo-electric head mounts for slow motion, still, 2x playback; TBC, LTC/VITC reader; reference video generator. Circle (1281)

**BR-3700U:** VHS recorder, player; for point-of-sale promotions, demos; 8-event programming; switched AC receptacle for automatic power con-

trol for monitor; DA-4 heads; automatic playback as soon as cassette is inserted. Circle (1282)

**BR-3900U:** VHS recorder, player; Oval-Cut, Double Azimuth (DA-4) video heads; 2x play speed search with intelligible audio; daisy-chaining of machines for logging, surveillance applications. Circle (1283)

**KR-M240U:** MII docking recorder; integral LTC, VITC generator with jam-sync function on backspace editing; 2 frame accuracy in backspace edit use; 20-minute recording capacity for KY series cameras. Circle (1284)

**BR-S605U S-VHS VTR:** open architecture; slots for plug-in peripherals, such as 9-pin, 45-pin and 33-pin control facilities for specific applications; external sync input; two Hi-Fi, two linear audio channels; Dolby noise reduction. Circle (1285)

**DS-DT900N deck:** full-feature, digital audio tape recorder, player; reads, writes SMPTE time code in subcode area for synchronization; fully compliant with IEC spec for DAT synchronization; XLR and AES/EBS I/O; 45-, 9-pin control. Circle (1286)

**BR-S822U recorder:** S-VHS editing machine; 47dB S/N; optional plug-in TBC, time code, Y/C-688 dub modules; accepts full size and -C 20-minute cassettes; digital Y/C separation, DOC, luminance comb filtering. Circle (1287)

**KR-M440U portable:** VHS recorder for ENG/EFP; 90-minute record capacity; LTC/VITC generator; jam-sync for backspace edits; accepts component, composite, Y/C-3.58 inputs; luminance and audio confidence playback heads. Circle (1288)

**BR-S747U duplicator:** S-VHS system with three transports in single cabinet; automatic loading; supports SP, EP speeds; records 8-, 16-digit ID codes on control track to assist in finding problems with duplicated cassettes. Circle (1289)

**RM-G860U A/B roll editor:** 45-pin, 9-pin connectors match numerous VTRs; assembly, insert, V/A split edits; two GPI outputs for switcher, audio mixer, TC, CTL-track reference. Circle (1290)

**KM-D600U:** digital switcher with effects generator and dual independent TBCs; Y/C and composite

video; paint, mosaic, strobe, freeze, slide, compress, inverse video features; GPI port for editor control. Circle (1291)

**KM-E300U:** border generator for KM-3000U, 1600U and -D600U effects generators; input for camera or VTR; adds borders, shadows, outline effects; two matte generators. Circle (1292)

**TM-900SU monitor:** data-grade CRT in 9" monitor; includes signal processing for resolution of 310 lines; underscan, pulse cross, blue only features; 12VDC and 110VAC power. Circle (1293)

**TM-3151SU monitor:** 31" full square CRT in monitor, receiver; integral MTS/SAP decoder, spatial enhancement circuit for monaural programs; S-VHS input; audio and video line inputs, line and audio output; 180-channel cable-ready tuner; wireless remote control. Circle (1294)

#### K&H Products

**Rain Slickers:** protective cover-ups for camcorders. Circle (1295)

**SACK PACK:** general purpose production case; in three sizes. Circle (1296)

**Shoulder Case:** lightly padded case for Sony BVW 200, 300, 400 cameras. Circle (1297)

**Audio Cases:** line of storage, transport containers for sound production products. Circle (1298)

#### Kahn Communications

**Model RF-02:** AM stereo monitor, decoder; for Kahn/Hazeltine stereo; permits alignment of Kahn exciters without spectrum analyzer. Circle (1299)

#### Karl Heitz

**Model 280:** fluid head with 90° side tilt, quick release for cameras to 12 lbs. Circle (1300)

**Model 180:** fluid head with 90° side tilt, quick release for cameras to 10 lbs. Circle (1301)

#### Kavouras

**RADAC DBS:** real-time weather data by C-band DBS satellite at 280kbit/s data rate. Circle (1302)

## Here's The Easy Way! JVC's KM-D600U.



Imagine combining the most useful features of a DVE, a special effects generator, a chroma keyer and two TBCs ... all in one product. That's precisely what JVC has done with the KM-D600U.

Best of all, it's so simple to set-up and operate, you'll be using it 15 minutes after you open the box. Call 1-800-JVC-5825 or write JVC PROFESSIONAL PRODUCTS COMPANY, 41 Slater Ct., Elmwood Park, NJ 07407

Circle (72) on Reply Card

**JVC**  
PROFESSIONAL

### Kay Industries

**PHASEMASTER APW:** portable rotary phase converter; develops 3-phase power from 230VAC 1-phase line; models 3kW-38kW. Circle (1303)

### Keltec 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. Circle (1304)

### Kings Electronics

**TITE PAK series:** serial digital video jackfield; 75Ω matched impedance; miniature self-normalizing jacks and 0.3" patch plugs. Circle (1305)

**KCM-5000 series:** cable management; permits identification, organization of video cables on BNC breakaway panels, other jackfields. Circle (1306)

### Kintronic Laboratories

**KTL-LPA-100:** HF log-periodic antenna. Circle (1307)

**RTL40-20-2HV:** HV RF contactor. Circle (1308)

**Isolation inductors:** custom multicoaxial designs; for multiple antennas on an AM broadcast tower. Circle (1309)

**KIM-3301:** 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. Circle (1310)

### Klark Teknik

**Midas XL3:** live sound, reinforcement mixer; eight mute groups, VCA masters; 18 discrete sends; 16 outputs assign to auto mutes, two VCA Grand Masters; VU meter bridge. Circle (1311)

**MILAB LSR-2000:** condenser mic for live sound; 133dB dynamic SPL before saturation; 12-52V phantom power; transformerless. Circle (1312)

**Midas XL88:** matrix mixer for multiple line-level outputs; stand-alone 8-channel unit; each channel module has input, direct output, matrix output; 20-segment LED meter per channel; balanced inputs, outputs; units stack for larger number of matrix outputs. Circle (1313)

**DN 735 recorder:** solid-state audio for video editing system; software extends RAM to 175s stereo; RS-422 control; synchronizes playback with other devices via external SMPTE TC. Circle (1314)

**DDA DMR-12 console:** 3-input modules for one mic, two lines drive eight aux buses in 24-track design system. Circle (1315)

**DDA DCM 224V:** video post-production console; 24 routing buses, four stereo sub-groups with additional routing facilities; permits 104 line inputs for complex mixdown operation. Circle (1316)

### Knox Video/GML Grove

**imagr PRO:** integrated Map Graphics system; 7-font selection; 1920x480 pixel bit map; upgradable to imagr 1, 11 systems. Circle (1317)

**Studio 40:** desktop system with post-production functions; high-resolution, multifont character generator; keyer; fader; 2-input switcher with audio-follow; S-VHS, Hi8 and composite compatible. Circle (1318)

### Koto Luminous

**Di-Lites:** metal halogen/argon lamps. Circle (1319)

### Kramer Electronics

**SEG-1000 Pro-Editor:** composite, S-Video editing processing, audio, video mixing, effects; composite-to-S bidirectional conversion. Circle (1320)

**WM-305 DA:** multiconfigurations for 1x15, 1x10, 1x5 modes for audio and video. Circle (1321)

**VS-401, -601, -801:** 4-, 6-, 8-input VBI video switchers; stereo audio; bus connectors for cascading for matrix expansion. Circle (1322)

### Laird Telemedia

**Model 1590:** upgrade converts #1500 character generator to a Legend system. Circle (1323)

**CKM-4:** multilayer video keyers generate four layers, stacked in any order. Circle (1324)

**Legend Fonts:** collection of 600 alias-controlled type faces for Legend series; apparent resolution of 19ns. Circle (1325)

### Laser Pacific Media

**PAL Spectra System:** laser disc-based editing sys-

tem adapted for PAL standard; supports 1" tape, D1, D2 and proposed digital formats. Circle (1326)

### LDL Communications/Larcan

**HDTV antennas:** broad-band panel radiator design. Circle (1327)

**SIT series:** quickly erected masts. Circle (1328)

### Leader Instruments

**Model 435B:** high-resolution video source; monoscope patterns at 1,000-line resolution, color bars, crosshatch, pulse-bar; for use in RF/VCR circuit diagnostics. Circle (1329)

**Model 5100:** component waveform monitor; auto switching between NTSC, PAL, HDTV 1125/60; 4-channel output RGB transcoded from YCrCb; 4-channel overlay, 3-channel parade displays, "shark-fin" timing indication. Circle (1330)

**Model 3100D:** analog/digital oscilloscope; separate 4k memories for display, reference; storage for four waveforms; expansion of stored waveforms by 100x. Circle (1331)

**Model 5835:** stereo audio monitor; analyzes, displays phase relationships through Lissajous patterns. Circle (1332)

**Model 300:** logic analyzer, digital storage oscilloscope and digital multimeter functions; standard storage of 20 waveforms can be expanded to 80 with optional IC card. Circle (1333)

### Leightronix

**LGX-DUB:** PC-based duplication control; for 10 master transports, 80 slave machines or banks of machines; switching to route proper video and audio from master to slaves. Circle (1334)

**LGXP232TC:** machine control interface with SMPTE time-code reader; PC controls VHS, S-VHS transports for multimedia, desktop video and remote control via RS-232 serial port; 32 interfaces connect to single port. Circle (1335)

**PRO-16:** event controller; 16x4 video and stereo audio; supports control of 16 tape machines; PC-based event manager software. Circle (1336)

**C-VOICE:** control video equipment through a tone-type telco interface; includes password protection; generated voice guides operator through setup and control procedures. Circle (1337)

### Leitch Video

**ViewGuard 3200:** scrambling system; line dispersal with standard NTSC bandwidth provides video, digital audio signal security. Circle (1338)

**ACD-5100 series:** quiet studio timer, clock display; self-setting; sweep, step second displays; configures to generate time code. Circle (1339)

**UDT-5701 timer:** 2-channel up/down timer; IRU package; 5 GPI in, 4 GPI out; RS-232, -422 port; remote access to any function; interface for stopwatch-style operation; 20 programmable instant access presents. Circle (1340)

**1302CC:** time-code corrector, converter module; for use with SPG-1302N sync generator; doubles as master time-code generator. Circle (1341)

**DSF-3120 Gateaway option:** Film Transfer utilities; improves accuracy, speed of color balance; comparison wipes, windows, cut-paste, pixel value determination features. Circle (1342)

**DFS-3002 synchronizer:** full-frame synchronizer; inputs and outputs in analog NTSC or D2 formats; 10-bit processing for analog, 8-/10-bit in D2 form; 4-field memory; comb filter for freeze-field, freeze-frame. Circle (1343)

**D2 DigiPeek:** provides 1Vp-p analog video output; monitors D2 signals. Circle (1344)

**DigiBus 6000:** modular, handling of several digital and analog formats in one frame. Circle (1345)

**TSG/CTG-1510P:** PAL standard test packages; TSG source of PAL signals with precision SC/H phase; CTG source of components, including RGB, color difference, 2-wire. Circle (1346)

**SPG-1500P:** PAL master sync generator; IRU package with no warm-up, high-stability oscillator; high SC/H phase stability; test signal options available in SPG-1510P. Circle (1347)

### Leonetti Company

**Sunray 2500:** 2.5kW lighting head; overlapping ring design for efficient cooling; Philips/Osram single-ended HMI lamps with Mogul bipost; anodized in high-heat finish. Circle (1348)

**4-Way Power Box:** 20A power distribution for stage, studio; with pin connectors, standard pin or full stage paddle plug; *Max Loc* non-metallic cord grip is water-tight; also unterminated and 20A indicating fuses types. Circle (1349)

**Arri-3 Video Assist:** combination 8mm videorecorder, 8" color monitor; case, two one-hour tapes, Arriflex 35-3 body, rotating video door, controls, magazines, lenses, cables. Circle (1350)

### Lexicon

**OPUS Ver 3.0:** software features Automix, CPEX time compression, expansion and machine control functions. Circle (1351)

**LFI-100:** digital audio format interface. Circle (1352)

### Lightning Eliminators & Consultants

**SBI, SBT:** Spline Ball Ionizer, Terminal; dissipation array concept reduces or prevents most lightning strikes, collects others. Circle (1353)

### Lightning Master

**Candelabrum Dissipator:** four PP dissipator arrays with several mounting options. Circle (1354)

**Ground Mast Dissipator:** two PP-15 dissipators on bracket for 3" diameter masts. Circle (1355)

### Lipsner-Smith

**Model CF3000-MK V:** ultrasonic cleaner for motion picture film; reduces solvent costs; quick, efficient operation produces cleaner film; less solvent, fume leakage. Circle (1356)

### Listec Video

**A-6000 Personal:** PC prompter for use with personal computers. Circle (1357)

**A-5501 Scrollbox-Plus:** electronic prompter; capability, on-air script editing; separate editing, prompting displays; field system permits interactive operation, in conjunction with IBM compatible computers; Prompt Track, Prompt Display, simple interface, file formats. Circle (1358)

**A-4250 Shoebox:** mini prompter weighs three lbs; 4" CRT readable to eight feet; CRT removable from mirror/hood assembly for hand-held or desktop direct viewing. Circle (1359)

**A-4175 Displaybox:** field, studio prompter; electroluminescent panel operates on 12VDC; power supply may be used as counterbalance; image readable at 20' distance. Circle (1360)

### LNR Communications

**ATIS-1:** auto transmit ID system for C-band, Ku-band uplink equipment. Circle (1361)

**LVE-14:** Ku-band video exciter; ATIS option to change call sign, telco number; synthesized audio subcarriers; pre-emphasis switching. Circle (1362)

**DSA-10:** digital satellite audio system. Circle (1363)

**TAB-10:** CD audio distribution. Circle (1364)

### Logitek

**Mariner:** Modular audio mixer for on-air and production use; versions available with 5, 8, 12 and 18 mixers; water resistance allows operation even when wet. Circle (1365)

### Louth Systems

**NEWSTRAK:** controls VTRS, still-stores, LMS systems; for random access or sequencing of playback material; indicated from networked PC running DOS. Circle (1366)

**VTRSERVE:** networked VTR server. Circle (1367)

**ARC:** databased archiving system. Circle (1368)

### Lowel-Light

**Tota-Shade:** barndoor for Tota-Lights; clips onto fixture does not block ventilation. Circle (1369)

**Blips, Hollywood Strip:** light and shadow control devices. Circle (1370)

**Big-foot:** converts scissor-mount, stud with 1/4-20 thread to hold lighting instruments. Circle (1371)

### Lycian Stage Lighting

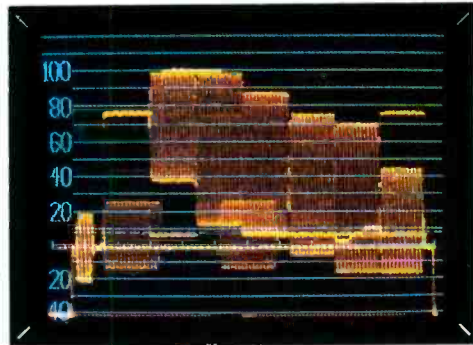
**Follow spotlights:** models including standard and long throw models with zooms; color booms; metal-halide lamps. Circle (1372)

### Lynn Greenberg Electronic

**LG 300 prompter:** camera package with universal baseplate requires no heavy counter balance; 13"

**Less is More:**

## Magni Monitor

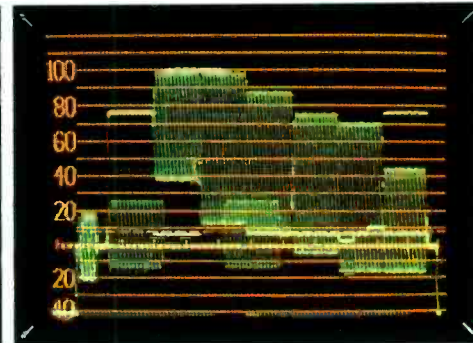
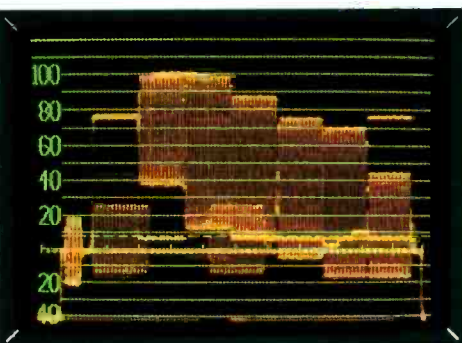
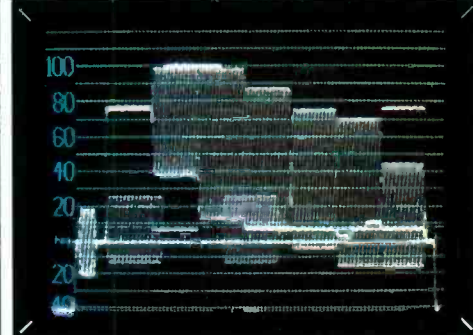
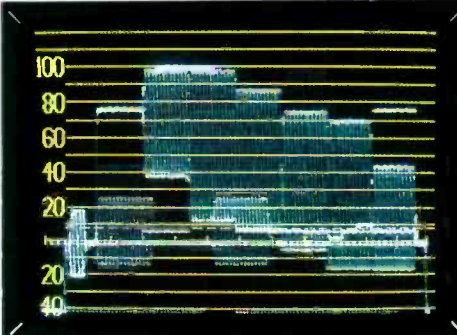


- Display signals on standard picture monitor or compact LCD screens — no more special CRTs!

- Waveform or vector monitoring
- Remote control
- SC/H Phase indicators



- Display emulates CRT look and feel
- User-selectable colors and intensity levels



**Base price\***

**\$995**

\*Includes Magni Monitor base and remote units.



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Circle (73) on Reply Card

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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)  
**RTC-HD 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)

**Magni Systems**

**Magni Monitor:** waveform, vector monitor for NTSC, PAL or component standards; remote control; waveform on picture monitor or LCD display unit; for RGB, Mil, Beta, SMPTE component levels without additional adjustment. Circle (1378)  
**VGA-Producer/PAL:** encoder for VGA graphics to 800x600 resolution, 256-colors; PAL; remotely controllable transition features. Circle (1379)  
**Model VS531DS:** dual standard vectorscope with SC/H phase measurement mode. Circle (1380)  
**500 series enhancement:** remote control panel; complete 1-button 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 AT/Vista boards. Circle (1384)

**Major Engineering**

**D2 storage:** large capacity units for small D2 videocassettes; custom frames permit sizes for particular requirements. Circle (1385)

**Management Graphics**

**Solitaire<sub>3</sub> TD:** digital film recorder; with attribute control, computerized special effects found in motion pictures, commercials. Circle (1386)  
**Solitaire<sub>4</sub> TD:** film recorder for slides; SCSI or GPI interface to Macintosh or IBM PC. Circle (1387)

**Manhattan Production Music**

**MPM library:** 5-disc set with 495 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-204 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 cued code; displayed channel numbers. Circle (1391)

**Matthews Studio Equipment**

**SPAGS spacer bags:** position cameras for those special shots without tripods; also convenient for

protective packing equipment.

**Mojave Desert Dolly.**

**ITE support:** series includes T/H 500, T/H 600, H700, H800 for ENG, studio. Circle (1392)  
**MC 88 crane.** Circle (1393)  
**Circle (1394)**  
**Circle (1395)**

**Maxell**

**TD-series:** digital videocassette formulation for 1/2"; in all three cassette sizes. Circle (1396)  
**B-series:** videocassettes for Betacam SP; ceramic armor metal particle formulation. Circle (1397)

**MCL**

**30004:** 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**

**LMSA:** Library Management System Alternative; automation; based on PROtec console; links sources, traffic/billing; off-site control. Circle (1401)

**MediaTouch Systems**

**AutoPLAY:** satellite automation system; integrate satellite program sources with local cutaways stored on MIDAS workstation. Circle (1402)  
**MIDAS:** multi-user digital audio system; 80386/486 PC supports record, edit, playback, archive; electronic newsroom OpLOG and OmniPLAY access; Novell LAN networking. Circle (1403)

**Merlin Engineering Works**

**ME-278-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 (1404)  
**ME-981/991:** data encoder/decoder; 2.2Mbit/s rate encodes NRZ data to standard 525-, 625-line video in airborne applications. Circle (1405)



**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.

**Set It And**

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.

□ Its Noise Adaptive Threshold activates microphones for speech but not for constant room noise, such as air conditioning.

### Meyer Sound Laboratories

**VX-1:** stereo EQ; 2-channel processor with Virtual Crossover; controls two frequency breakpoints, separate gain settings for low-, mid-, high-frequency bands. Circle (1406)

**Model 833:** studio reference monitor; 15" LF driver in vented enclosure; 40x80" HF horn, driver; internal crossover; for 250-400W amps. Circle (1407)

**CP-10 equalizer:** complementary phase parametric system; 2-channel with 5-band EQ; individual high-, low-cut filters. Circle (1408)

**MS1000A:** stereo power amplifier; FET output stages provide 1.2kW sine wave burst power; ISO input circuit. Circle (1409)

**HD-1:** high definition audio monitor; 32Hz-22kHz response; 8" cone LF driver, dome tweeter in vented cabinet; includes amplifier with MOSFET output stages. Circle (1410)

### Micro Communications

**UHF doublet antennas:** broadband transmission system for multiplexed UHF TV applications; omni- or directional patterns; VSWR <1.10 in 470-800MHz; 12dB gain; power handling to 2.5kW per panel; radomes for icing regions. Circle (1411)

**All-band panel antennas:** two models cover channels 7-13, 14-69; with power dividers and multichannel combiners, permits up to 10 channels from one antenna; by SIRA. Circle (1412)

### Microdyne

**CSD-SDU:** portable spectrum display for earth station installation, alignment, system checkout; for 950-1,459MHz L-band; LCD graphics screen; for C-, Ku-band dish alignment and L-band network setup, maintenance. Circle (1413)

**CSD-BQX:** C-/Ku-band uplink exciter; modulation section for NTSC, PAL, Intelsat, B-MAC, VC-1B and VC-2 signals. Circle (1414)

**CSD-BQR 1:** satellite video receiver meets RS-250B, NTC-7 spec; for L-, S-, C-, Ku-bands with LNB; full remote RS-232/422 interface. Circle (1415)

### Micron Audio Products

**MR-120/520, MDR-150/550:** miniature wireless receiver. Circle (1416)

**SQN-3, SQN-4:** location mic/line mixers, by SQN Electronics. Circle (1417)

**TX-113/513/516:** wireless transmitters; -113/-513 frequency switchable for three ranges of 1.2MHz; -516 selects 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 10-bit timebase correction to FS-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)

**CAV IMPACT:** component analog effects, image transformer; 13.5MHz 4:2:2:4 sampling; permits flying keys with luminance bandwidth key channel; three component inputs; YCrCb 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:** 4DS1/8DS1 radios in 15GHz, 18GHz, 23GHz service; any site in the network can be monitored from any other point; integrated BER test generator. Circle (1428)

### Microwave Radio

**ProStar 2T2UB:** portable ENG transmitter; low cost product; operation on 2GHz. Circle (1429)

**DigiPro series:** digital audio subcarrier system above-video space for two to four channel; 90dB dynamic range similar to CD quality; Analog, digital I/O; peam program metering. Circle (1430)

### Midwest Communications

**ProPaint 32:** paint/graphics system. Circle (1431)

### Miller Fluid Heads

**Model 332 System 10:** for cameras to 10 lbs; Junior Fluid Head, quick release plate, Junior Tripod with elevator column, pan handle. Circle (1432)

**Model 105:** 20 series II 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

**Cadex battery analyzers:** Cadex 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



FP410 Mixer shown actual size.

# Forget It.

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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 characteristic; shows chromaticity coordinates, luminance, correlated color temperature. Circle (1437)

**Miralite Satellite Communications**

**7900 LNB:** certified <1.0dB 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-522:** 10x2 selector switching; for D1, D2, DX signal types. Circle (1440)

**SEL-511-XD2:** D2, DX selector; 5x1, 10x1 switching matrices. Circle (1441)

**SER-100E, SER-100D:** parallel-to-serial encoding, serial-to-parallel decoding for D1. Circle (1442)

**DDH-512, DDH-524:** dual and quad distribution amplifiers: 1-input, 5-output. Circle (1443)

**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-2601R:** 26" Step Scan monitor, receiver; Macintosh II, VGA compatibility. Circle (1445)

**VS-1202:** video projector; 800-line resolution with 700 lumen peak brightness; 9-element glass lens; optional ceiling mount; supports NTSC, PAL, SECAM. Circle (1446)

**XC-3310C, 3715C monitors:** 31", 35" displays accept TTL, analog, TV video; CGA, EGA, PGA, PS/2 and Macintosh II sources. Circle (1447)

**LVP-1201HD:** 120"E video projector for HDTV uses 9" tubes, 600 lumen peak brightness. Circle (1448)

**HD-20:** 1/2" VCR for HDTV recording; 63-minute cassettes. Circle (1449)

**SCT-M361HD:** direct-view 36" HDTV video

monitor.

**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, tint correction controls; flying erase heads. Circle (1454)

**Mobile-Cam Products**

**Extended Van:** 1991 Chevrolet vehicle with 146" wheelbase; 454in<sup>3</sup> V-8 engine, 3-speed automatic transmission. Circle (1455)

**Production One M-CP:** 6M P-Cutaway chassis; 178" wheelbase, 16-ft studio enclosure, V-8 engine, 4L80-E automatic transmission. Circle (1456)

**Modulation Sciences**

**VMate control:** with TEK 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)

**ModMinder DeMod:** retrofit card; provides synthesized front-end design, 1mW-1W RF input; use with RF sampling port; remote control interface or modem links to studio; 2-D, 3-D graphic presentation of modulation data. Circle (1458)

**Montage Group**

**Montage III 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; 1/2", 3/4" NTSC or PAL VTRs for work tapes; random access capability. Circle (1459)

**Moseley Associates**

**FTI-3000:** 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 606 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 DSO/ISDN lines; G722 encoding; operation possible at 48kbit/s; remote control, editing, data storage. Circle (1463)

**DigiMax:** programmable program multiplexer; applicable when multiple audio feeds are backhauled to the studio via one satellite channel. Circle (1464)

**MYAT**

**Step reducers:** RF components include 4 1/4"-N, 3 1/8"-N interim connectors introduce VSWR of 1.02:1 or better to 800MHz. Circle (1465)

**MZB-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)

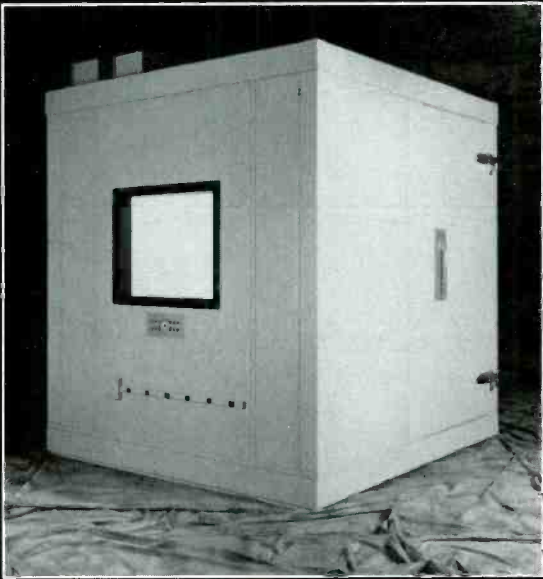
**Nady Systems**

**501VR enhancements:** hand-held, lavalier wireless 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 NDYM 757 and NDYM 357. Circle (1469)


**Model 151 VR:** 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;



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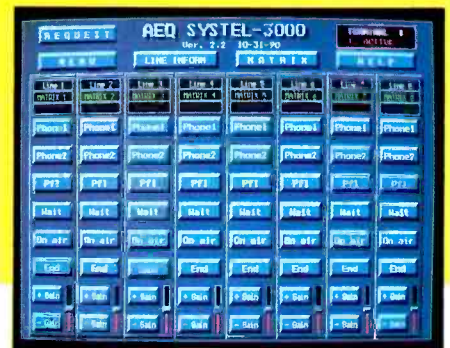
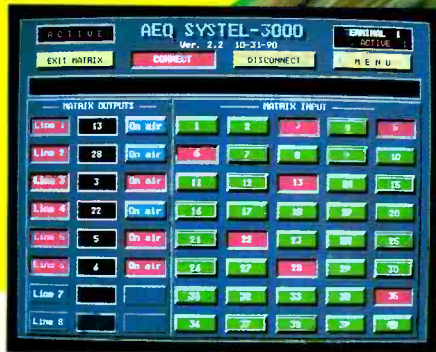
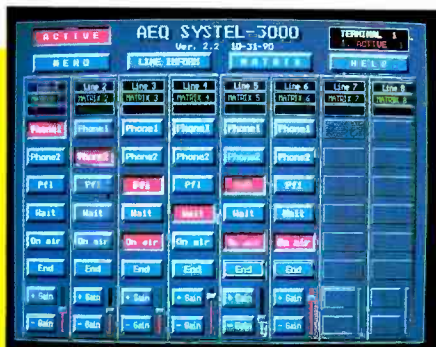
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- Microprocessor controlled via standard RS-232 or RS-422 interface.
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- Easy to use: the control module can be either a small dedicated console or a standard PC or compatible.
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- 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 antialiasing 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.)



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2 3/4" x 4" x 3/4" unit clips to user's belt or camcorder strap. Circle (1471)

#### Nagra

**Nagra D recorder:** 4-track digital audio on 7" reel of 1/4" 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)  
**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)

**E7 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)

#### Nautil

**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)

#### Neotek

**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-input capability. Circle (1483)

**Elan:** multitrack recording mixer in frame sizes from 32-40 input positions. Circle (1484)

**Essence:** mixer for multitrack effects layup, ADR and Foley recording. Circle (1485)

**Encore:** film re-recording, film-style post production mixer; 4-band EQ per input module; solo has post-, pre- and in-place modes. Circle (1486)

#### Neutrik USA

**NJ3 FDH6:** molded phone jack for TR, TRS plugs; per EIA RS-453; PC-board mount. Circle (1487)

**Model A-7:** audio measurement set. Circle (1488)

#### Neve

**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; ReMem snapshot memory. 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; fader-start logic starts machine only if output path exists. Circle (1492)

**HRC-1:** high-resolution A/D, D/A converter; link between analog audio consoles and 20-bit digital recorder; includes sync, interface, DC processing and digital redithering functions. Circle (1493)

**AMS 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

**SoundDroid:** 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 x 8-out; serves 128 MIDI devices. Circle (1497)

**DSP option:** 32-bit path with 24-bit resolution for mixing, signal processing functions. Circle (1498)

#### NewsMaker Systems

**System updates:** interface for Chyron character generators; tape library software; remote workstations; machine control subsystem. Circle (1499)

#### NewTek

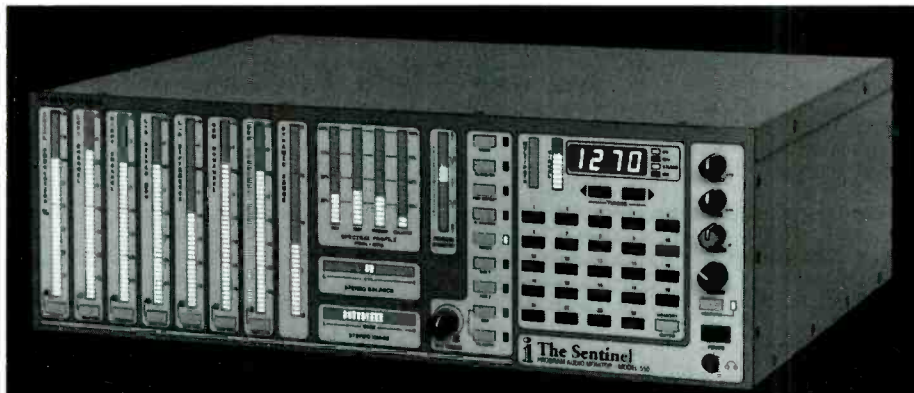
**Standalone Video Toaster:** desktop video production "studio" using Commodore Amiga M68000 CPU; titler, effects, switching, animation, paint, still store, frame buffering. Circle (1500)

#### Nikon

**S9x5.5B TV Nikkor:** zoom lens; high magnification with high MFT curve; extra-long extender; 9x zoom ratio for wide-angle system. Circle (1501)

#### Norpak

**TTX6X0 receivers:** expanded teletext reception with VCR, integral teletext receiver. Circle (1502)



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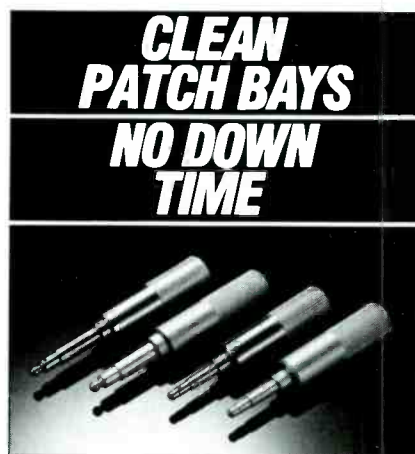


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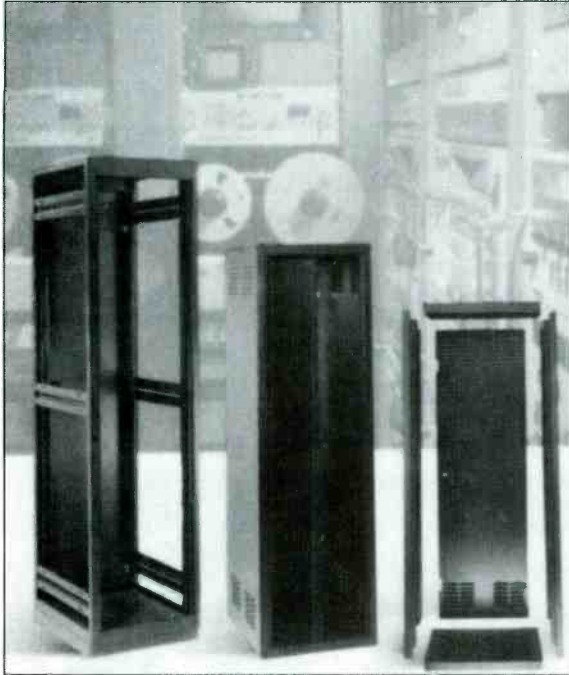
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**Northeastern Communications Concepts**  
**NCP-DRYGEN:** nitrogen generating system supplies dry air for transmission lines. Circle (1503)

### Nova Systems

**Nova 950:** transcoding multiformat TBC; enhancement, noise reduction, black stretch; 4x1 input selection from component, Y/C, composite inputs, outputs; wideband processing used for all component formats; RGB option. Circle (1504)

**Nova 920SP:** wideband Y/C TBC; includes effects, 4x1 switcher; supports all composite inputs including U-matic SP. Circle (1505)

**NOVASync series:** four synchronizer models; wideband TBC and freeze features. Circle (1506)

**Nova 8 series:** models 800, 810 full-frame TBCs; for servo, non-servo VCRs; 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, Hi8. 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; Philips CD transport unit. Circle (1508)

### NUCOMM

**PS series:** control unit for ENG van and fixed rack-mounted applications. Circle (1509)

**Model PT3, RX3:** portable or mobile ENG transmitter, receivers. Circle (1510)

**PA series:** mast-mount power amplifiers covering 2-7GHz bands. Circle (1511)

**BLKDN series:** block downconverters; input of 6-7GHz, 12-13GHz converted to 2GHz. Circle (1512)

**CER series:** frequency-agile central receivers for 2GHz, 2.5GHz, 6-7GHz, 13GHz. Circle (1513)

### Numark PPD

**CM1912, 1975:** pre-amp mixers; 6-in, stereo out; -1975 has sampler with memory banks; remote 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

**NV4448 rate converter:** for AES, EBU, SPDIF, SDIF II formats; all sampling frequencies. Circle (1517)

**NV3512A:** digital routing switcher with 512x512 matrix in one rack. Circle (1518)

**NV3064A:** digital routing switcher with 64x64 matrix in five rack units. Circle (1519)

### Nytone Electronics

**PZ-1 Pan & Zoom:** provides rolls, flips, 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 53B:** 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-E 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

**TLC-2400:** 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 VTRs; auto switch to break tape for local insertion; accommodates common, subregional program-

ming needs; As-Run logs. **Circle (1528)**  
**Reel Protection:** automates placement of spots or programs on tape reels; system handles recording procedures. **Circle (1529)**  
**TCS90:** format-independent library management; simultaneous use of different cassette sizes; system configures for 110 large cassettes, mix of 70 large/40 small, 30 large/130 small. **Circle (1530)**

#### Omicron Video

**#330:** D1 component VDA. **Circle (1531)**  
**#558:** D1, D2 parallel 5x4 router. **Circle (1532)**  
**#887:** HDTV component VDA. **Circle (1533)**

#### OpAmp Labs

**VA-8:** 1-in, 8-out press feed; for video, audio; in 10"x12"x5" Halliburton AL case. **Circle (1534)**  
**MS/8x8/VSA:** stereo audio, video router; interlocked lighted push-button switches; 8MHz video, 20kHz audio responses. **Circle (1535)**

#### Optical Media Int'l

**MNI CD Express:** one-time CD mastering from DAT source; basic audio processing; sample rate conversion; disk replication services. **Circle (1536)**

#### Optima Electronic Packaging Systems

**Optima Form<sup>4</sup>:** equipment racks per EMI/RFI specifications; extruded aluminum. **Circle (1537)**  
**Optima Form<sup>3</sup>:** equipment cases. **Circle (1538)**

#### Options International

**Maddox DVDA:** 8-inx6-out distribution, routing system for D1 signals; 32x32 D1/audio system also available. **Circle (1539)**

**Kinesis enhancement:** permits special effects available on MkIII telecines; includes rotation, XY de-strobe, focus pull, aspect ratio and ripple effects. **Circle (1540)**

**BIB video format converters:** for analog-to-D1 or D1 serial and D1 forms to analog. **Circle (1541)**

#### Ortel

**System 1000TVRO FL link:** three systems covering 950-1450MHz, 3.7-4.2GHz and those two spectra combined; permits an antenna to be 15km from satellite receiver. **Circle (1542)**

#### Otari

**DDR-10 recorder:** digital audio recorder, editor; Apogee filters, Digidesign software; active balanced I/O; AES/EBU, S/PDIF digital I/O; MIDI in, out, thru ports; 345Mbyte 30-minute digital stereo audio storage at 44.1kHz sampling. **Circle (1543)**

**Series 54 console:** from Sound Workshop; 24-bus, dual-path mixer modified for cinema and multi-channel video post production. **Circle (1544)**

**Model Q-700:** video reference reproducer; quality control checker for pancake and videocassette duplication systems; selectable NTSC settings support SP, LP, EP speeds. **Circle (1545)**

**DTR-900-II:** second generation PD format recorder; internal matrix addressed by remote control assigns any input to any track; 8x oversampled A/D converters; 32-track units linkable for 64-track with DC-105 synchronizer, CD-146 dual machine remote controller. **Circle (1546)**

**MTR 90 series III:** 16-, 24-channel recorders; 2" media width; simplified threading; internal chase synchronizer; servo-lock tracks master over 0.2-2.5x playback speed range. **Circle (1547)**

**PREMIERE:** feature film, TV post-production audio console; extensive console accommodates an unlimited number of input modules; permits three or more engineer positions. **Circle (1548)**

**MX-5050 series:** B-III, BQ-III 1/4" 2-, 4-track recorders; extended frequency response; improved S/N; compact upright housing; *Mark IV* configures for tabletop or console machine. **Circle (1549)**

**TMD-MMR updates:** separate luminance, chroma inputs for Thermal Magnetic Duplication Mirror Master Recorder; improved audio linearity, reduced distortion. **Circle (1550)**

#### Pacific Radio

**UCP cutouts:** modules with precut openings for XLR, BNC, Neutrik, Elco multipin, MIDI and other standard connectors. **Circle (1551)**

**BGW Systems line:** rack panels, fans, accessories; termination panels; rack drawers. **Circle (1552)**

#### Pacific Recorders/Engineering

**Production mixer:** for broadcast production and operations; all inputs include 3-band EQ; communications, slate functions; pre/post switching on two stereo send buses; two stereo effects returns; stereo cue, in-place solo. **Circle (1553)**

**LS-5, LS-10, LS-20:** audio line switcher systems in 5-input/4-output, 10-input/2-output and 20-input/2-output configurations. **Circle (1554)**

#### Paco Electronics

**DP series additions:** NiCad batteries, DP-10A 12V 2.3Ah; DP-1340S 13.2V 4.4Ah. **Circle (1555)**

#### Paltex

**Aston Wallet Two:** expanded still store; 1Gb magneto-optical drive for on-line capacity for 420 frame images with associated keys; removable drive stores additional 42 images. **Circle (1556)**

**Model 1250:** HDTV-compatible titler, character generator by Aston. **Circle (1557)**

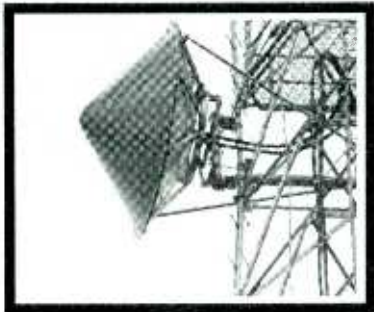
**FOUNTAIN:** fonts-on-demand for Aston Caption and Aston 4 titlers. **Circle (1558)**

**Weircliffe BTE-200S:** degausser; reduced electromagnetic radiation outside active erasure zone; 1,000 Oe level for most media. **Circle (1559)**

**DYAD<sup>1</sup>:** digital component video mixer/keyer for D1; linear key, mix to key, full-screen mix and cropping facilities. **Circle (1560)**

**Europa:** editor with E-CLIPs; multiple EDL segments may be edited, merged into one 7,000-line list; high-speed EDL processing sorts in <9s; three models for 4, 6 and 8 of 16 VTRs. **Circle (1561)**

**ECS-85:** edit control for 2-6 RS-422 VTRs, switcher;



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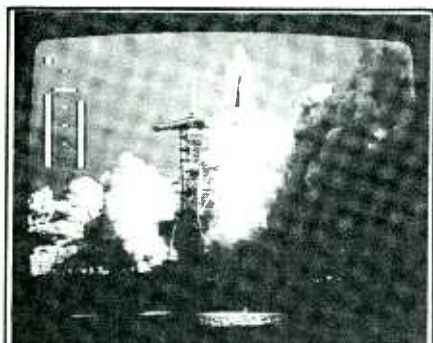
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Circle (85) on Reply Card

register capture for A/B-roll models; 1,000-line EDL; integral time-code generator, reader for each VTR; 32 function cells per event; unit permits expansion. Circle (1562)

**Abner II:** low-cost A/B roll editor; EDL, auto-assembly capabilities; interformat, intermanufacturer; 50-event EDL; LTC time-code readers for all VTRs. Circle (1563)

### Panasonic

**WV-F700 camera:** digital processing with IT CCDs for 750-line resolution; 2,000 lx at f/8, 7 lx at f/1.7; electronic shutter; docks to S-VHS, MII, Betacam SP recorders; accessories for coaxial, multicore cable; camera control box option. Circle (1564)

**CT-3190VY:** 31" color monitor, receiver; 500-line resolution with S-VHS input; flat square, data-grade CRT; full-function remote control with learn capability; surround sound feature. Circle (1565)

**WJ-MX 15:** audio, video mixer. Circle (1566)

**AU-520:** portable MII VTR. Circle (1567)

**AU-62, -63, -65:** MII format studio players; -63 includes auto-tracking feature. Circle (1568)

**HDTV products:** TH-HD700K 70" HD projector; TH-H50050" projector; TH-36HD1 36" receiver; TH-H320 32", TH-2020HD 20" monitors; 1/2" videotape recorder; optical disc recorder for still pictures; CCD compact HD camera. Circle (1569)

**Big9:** multi-video projection system; nine 43" cube video projectors; integrated auto source switching control, A-V switcher; 1,000-line RGB horizontal resolution, 800-line NTSC; 10 display patterns; extends to 12-screen system. Circle (1570)

**BT-H1350Y:** 13" color monitor, receiver; 0.31mm dot pitch for 500-line resolution on S-VHS input; flat square, data-grade CRT, SMPTE Type C phosphor; full-function remote control, learn capability; surround sound feature; NTSC 3.58/4.43, PAL, SECAM. Circle (1571)

**BT-1360Y monitor:** S-VHS compatible; 425-line resolution; 525-line NTSC. Circle (1572)

**BT-S1370Y monitor:** multistandard product with 420-line resolution in NTSC, PAL, SECAM, NTSC-M; S-VHS and composite inputs, outputs; RCA audio inputs, outputs; 2-line unit uses 8-pin video connector on line B. Circle (1573)

**AG-A770 editor:** multievent for cuts only; 128-line EDL; RS-422 serial, parallel control; TC, CTL modes for S-VHS, MII VTRs and players. Circle (1574)

**AG-7350, -7150:** S-VHS recorder, player; parallel, optional serial control; jog/shuttle modes; two HiFi and two linear audio channels. Circle (1575)

**AG-7650:** S-VHS source player for editing, dubbing; integral TBC; two stereo, two linear audio channels; field freeze; optional time-code generator, reader; serial interface available. Circle (1576)

**AG-7750 S-VHS:** Hi-Fi editing VCR; integral TBC; digital noise reduction; RS-422A serial interface; capstan servo, full-loading stop, high-speed search to 32x normal speed with viewable pictures; 400-line resolution from laminated amorphous heads. Circle (1577)

**AQ-225 camera:** three FIT CCDs produce 750-line resolution with 2,000 lx at f/8, 600% dynamic range; permits 2,400m FO cable with power or 10,000m FO cable with camera operates from local power; output in component, composite or serial digital composite forms. Circle (1578)

**AJ-D310 camcorder:** 1/2" digital system; weighing less than 19 lbs; supports 34-, 50-, 64-minute cassettes; includes all AQ-20 features with 1/3" FIT CCDs with 750-line resolution; VTR section includes four PCM audio channels. Circle (1579)

**AJ-D320:** 1/2" portable digital VTR. Circle (1580)

**AJ-D350 recorder:** 1/2" studio recorder; 8-14 channel coding produces 2.5x more packing density than D2; 15% pitch correction in 0.1% increments; AT confidence head; four digital audio tracks with 100dB dynamic range; for three cassette sizes to 245-minute capacity. Circle (1581)

**TAP-20 adapter:** for AQ-20 camera; coax, triax cable to base station instead of multicore; bidirectional, passes power, gen-lock, return video, tally, complete camera control. Circle (1582)

**M.A.R.C. enhancement:** single, multiple event per cassette features. Circle (1583)

**Digital M.A.R.C. system:** 450-cassette library management, playback automation; with AJ-D350 digital, analog 1/2" VTRs. Circle (1584)

**M.A.R.C. series 1000:** software for spot, program

playback with dual output channels, scheduled recordings. Circle (1585)

**M.A.R.C. series 2000:** software features of series 1000 with dub-in-line, auto program delay, 3-channel output. Circle (1586)

**M.A.R.C. series 3000:** software featuring full compile for advanced recording and spot material for delayed playback; multiple copies available for synchronized, protected backup. Circle (1587)

**M.A.R.C. series 4000:** spot compile. Circle (1588)

### Peerless Sales

**Monitor/VCR mounts:** desktop, wall, ceiling mounts place VTR beneath monitor. Circle (1589)

**JYM 000:** jumbo yoke-mount for monitors to 35" diagonal screens. Circle (1590)

### Penny & Giles

**M&M FlexiPatch:** 96 miniature jacks wired to 56-way EDAC connectors; normalled, half-normal, parallel and other configurations "rewired" within minutes. Circle (1591)

### PEP

**DigiSpot:** digital player, player/recorder; uses 3.5" digital re-recordable cartridges for spots and music; replaces tape cart machines; by Digital Broadcast Associates. Circle (1592)

**Shotlister 4:** produces graphic display of what finished master tape will look like; makes clean EDL for on-line edit session. Circle (1593)

### PESA America

**CG4733:** anti-aliased titler with graphic plane; internal architecture of 4:4:4 with RGB, YP<sub>r</sub>P<sub>b</sub> or CCIR-656 I/O; vector typeface masters for instant resizing; graphic plane option is 32-bit per pixel with dedicated 32-bit graphics processor, digital keyer, frame-grab. Circle (1594)

**DG5250, DG4220:** test generators; both units usable for digital and analog applications; -4220 for D1 parallel 4:2:2 formats; -5250 for D2 serial; supports 525-, 625-line standards. Circle (1595)

**BM4400 range:** grade 1 video monitors; precision displays with auto setup system; 14", 20" diagonals; PIL CRTs with EBU or SMPTE C phosphors; RGB, YP<sub>r</sub>P<sub>b</sub> inputs; optional decoders for PAL, NTSC, CCIR 656 inputs; remote control of 64 units from a single control point. Circle (1596)

**Model 162 router:** audio, video with 70MHz video bandwidth for HDTV or HR graphics and standard composite; 16x2 video matrix with associated 3-audio levels; integral control panel. Circle (1597)

**MVDA series:** miniature video DA; spec'd to 150MHz. Circle (1598)

**System 5:** router expands to 1,204x1,204; 70MHz bandwidth in video matrix; controller has multi-user, multitasking operating system. Circle (1599)

### Phillips Components

**YK1267:** ABC klystrons for UHF TV; 70kW rating with efficiency >65% in visual service; YK1221 for aural service. Circle (1600)

**YK1280, YK1285:** depressed collector klystrons rated for 30kW and 60kW; figure of merit >130%; air cooled. Circle (1601)

**YK1283:** air-cooled klystron based on depressed collector concept; 40kW rated; 4-cavity unit includes ABC electrode for 470-810MHz visual service. Circle (1602)

**RF power transistors:** for solid-state broadcast transmitters. Circle (1603)

### Phillips Test & Measurement

**PM 5686:** NICAM modulator produces digital QPSK modulation per BBC spec and EBU recommendation SP424. Circle (1604)

**PM 5682, 5683:** for version from IF to a TV channel between 45MHz and 900MHz; 4-channel capability with 5683 base unit. Circle (1605)

**PM 5640 generator:** 150 standard video signals, patterns; custom signals; integral sync generator with SC/H phasing, gen-lock. Circle (1606)

**PM 5643 generator:** component test, sync pulse source for RGB, EBU/SMPTE, Betacam, MII, 2-wire, 3-wire formats; over 100 special tests; locks to external sync source; 525-line version also NTSC composite, 1kHz audio output. Circle (1607)

**PM 5688:** demodulator for NICAM.728 decoding; IF intercarrier and digital inputs; integral diagnos-

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 5685:** NICAM stereo encoder using two independent channels; may be used for single monaural channel. **Circle (1610)**  
**PM 5644 generator:** color pattern source; RGB, YCrCb format for NTSC, PAL or SECAM; optional text/clock driven by station LTC or 1Hz 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 Software:** IBM/compatible PC for video presentations; show scripts stored on disk as DOS ASCII files. **Circle (1614)**

#### Pioneer Communications

**Reuritable Videodisc Recorder:** random access, frame-by-frame editing; instant replay without shuttle, jog; 54,000 images; Simultaneous erase, record; records audio on video for dubbing; CAV format for 30 minutes storage; PCM audio, 4.1MHz video bandwidth. **Circle (1615)**  
**RM-V2000 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; hand-held unit NiCad batteries. **Circle (1617)**

#### Prime Image

**CleanCut/EFX:** A/V 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/3.58, Y/R-Y/B-Y, RGB I/O; 4:2:2 sampling with TBC functions; sequence generate, recall features are programmable. **Circle (1619)**  
**6.5 P series (#6510):** wideband 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 lavalier microphone; omnidirectional characteristics; 126dB SPL with 40Hz-16kHz response. **Circle (1624)**  
**Seeport mixer:** portable mixer; 8-input, four aux sends/returns, extensive EQ; PPM, VU metering; communications; by SEEM Audio A/S. **Circle (1625)**

#### Prophet 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-inx4-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)**

#### QEI


**Model 710:** digital stereo generator; 65dB separation with 0.01% 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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## QSI Systems

**Model 800 inserter:** portable image inserter, logo generator; 760x480-pixel resolution image produced from non-volatile and reprogrammable CMOS IC device; adjustable matte level; TTL mirror output of image as key; overlay capability with RS-170/A source. Circle (1631)

**PCID 864:** portable ID labels for camera feeds; identifies field equipment in VBI or active portion of pictures. Circle (1632)

**Model 1500 demod:** off-air/CATV/MTS stereo; 155-channel tuner; auto retuning of last channel used when switched between broadcast, CATV modes; mono, stereo, SAP1, SAP2 selector; balanced audio out; RS-232 control. Circle (1633)

**Model 8000:** image generator, inserter; capture picture from a camera or titler; overlay with an RS-170/A source; produces TTL output of image for video key; adjustable matte level; EEPROM programmer to burn CMOS ICs for use in portable 800 inserter units. Circle (1634)

## Quality Video Supply

**Wilson video furniture:** Tuffly II consoles for commercial, industrial, retail and classroom; video tables. Circle (1635)

## 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 design; RGB or YUV and encoded output with key signals; internal downstream keyer; LX upgrades to SE model. Circle (1636)

**Orion SE:** low-price version of Orion character generator; full-featured with 1MByte storage on HD floppy disk; underlining, borders, shadows; YC output for S-VHS systems. Circle (1637)

**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 (1638)

**TAA ACM accessory:** telephone access arrangement for All Channel Message system; authorized agencies may use touch-tone telephone to initiate emergency message crawl over all cable program channels. Circle (1639)

## Quantel

**Paintbox Junior:** self-contained graphics system, the fundamental power of Paintbox system for the constraints of smaller budgets. Circle (1640)

**Presenter option:** facility for Paintbox HD, permits live sequencing on air, as well as compilation and editing of image sequences. Circle (1641)

**Paintbox enhancement:** options: *Collage*; *multiline text* generation; *fettle* color alteration; *library index card* retrieval; *smear* brush. Circle (1642)

**Picturebox upgrade:** single-output system with 520MByte hard drive, 2-output system with two disks for 1,000-image storage; optimized storage increases capacity; shared user bus links system to other equipment. Circle (1643)

**Picturebank:** ethernet link brings distributed power to a network of Picturebox still-store systems. Circle (1644)

**Flash Harry:** extension to current editing system; with increased processing power. Circle (1645)

**Harriet enhancement:** options include *Dynamic Collage* for multilayer graphics effects in a single pass. Circle (1646)

**Cypher enhancement:** options include *textured fonts* created on Paintbox and transferred to Cypher for use with any typeface; interactive computer control provides override of local Cypher control functions. Circle (1647)

## QuickSet International

**Mercury QYTH-B:** tripod with cam-fluid head for smooth pan/tilt movement; height range from 38-71", or 19" without spreader; capacity of 40 lbs; black or silver finish on tripod. Circle (1648)

## R-Columbia Products

**TR-470/R-160:** long-range VHF/UHF wireless IFB/ENG dual-muff headphones; usable for 2-mile range with full-range voice audio on VHF; receive IFB on VHF in one ear, monitor UHF channel in other ear. Circle (1649)

## Radiation Systems Inc./RSI

**#5010:** Step Track software. Circle (1650)

**Model 240KVO:** 2.4m transportable earth station antenna; meets US, Intelsat, Eutelsat sidelobe spec; optional monitor, control; supports C-, X-, Ku-band operation. Circle (1651)

**Model 240 AT:** air-transportable mobile terminal for Domsat, Intelsat, DSCS on C-, X-, Ku-bands for voice, data, teleconferencing. Circle (1652)

## Radio Design Labs

**ACM-2:** significant synchronous AM noise monitor; maximizes loudness, stereo separation; reduces subcarrier crosstalk on FM transmissions. Circle (1653)

**Stick-on series:** *STA-1M* audio line amp; *ST-SH1* stereo headphone amp; *ST-MX3* line-level mixer; *ST-MMX3* mic-to-line level mixer; *ST-GCA2* gain control amp; *ST-PH1* stereo phono pre-amp; *ST-ACR* audio-controlled relay; *ST-MPA2* mic phantom adapter. Circle (1654)

## Radio Systems

**RS-75 DAT:** based on Sony DTC-75es; balanced XLR audio, auto cue-to-cut, fast-forward to cue, cue-to-tape insertion; SKIP ID subcode data bit initiates special cueing functions. Circle (1655)

## RAM Broadcast

**ME2000:** newsroom mixer. Circle (1656)

## Ramsa Audio/Panasonic

**Tool Kit:** developer's 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 (1657)

**SV-3700 Pro-DAT:** digital audio recorder with front-panel shuttle wheel to control 0.5-15x speed range; 44.1/48kHz sampling; fade-in/out functions; XLR balanced connectors. Circle (1658)

## Rank Brimar

**Mark III assembly:** enhanced telecine tube; package with tube, optics and conversion cradle system for URSA telecine; avoids internal reflections and flare. Circle (1659)

## Rank Cintel

**DIVA:** Designer's Integrated Video Animation; with draw, animate and cel layering; Clips Stores library; view of individual layers. Circle (1660)

## RE Instruments

**RE 530 series:** RDS products, including *RE521* stereo coder for stereo multiplex with port for RDS/VRF signal inputs; *RE531/RE533* RDS coders; generates composite of information to be transmitted via RDS subcarrier -531 with full control panel, -533 space-saver unit; *RE530* RDS generator for system tests; *RE331* RDS decoder for monitoring system performance. Circle (1661)

## Reesortek

**Video utilities:** 1x4 VDA with cable equalization; VLCS-2 video level-controlled switch with alarm functions. Circle (1662)

## Register Data Systems

**System Six:** traffic, billing system; single, multi-user; interface for most automation systems with electronic log transfers. Circle (1663)

**System Seven:** multi-user general ledger package including sales, traffic, billing, accounts receivable/payable and payroll. Circle (1664)

## Research Technology Int'l/RTI

**TapeChek 490M:** videotape cleaner, inspector for MII; cleans, polishes; requires about two minutes per 90 minute cassette. Circle (1665)

**TapeChek Pro Line 4100:** supports Betacam/SP cassettes; vacuum-assisted wiping tissue, precision dual sapphire burnishing edges. Circle (1666)

**TapeChek D-211:** dropout count on D1, D2, other digital media; hard-copy record of dropouts per interval, cumulative dropout from two counters; adjust dropout depth from 1 to 24dB. Circle (1667)

## RF Technology

**14dBi Omni:** wireless cable, MMDs antenna; 50W capability; weighs 10 pounds. Circle (1668)

**D series:** compact portable transmitters for 1.8-15.6GHz; dual audio, AC power supplies, wideband, frequency-agile; high output. Circle (1669)

**RF-1303C transmitter:** miniature, DC power; dual audio, frequency-agile and wideband operation; audio bypass capability. Circle (1670)

**MM series:** micro-miniature transmitters for surveillance, RPV activities; 3W minimum output; two audio channels. Circle (1671)

**Flashback 7:** adds 7GHz band operation to Live news car ENG link, previously limited to 2-2.5GHz; 10W output power. Circle (1672)

**UPL series:** portable transmitters, receivers operating at 3.5GHz. Circle (1673)

**VML-Dsystem:** transportable microwave covering 1.7-24GHz range; for common carrier and emergency link restoration. Circle (1674)

**SIL filters:** Faraday Technology video filters in-line packaged; Gaussian to near CCIR 601 characteristics; selected cut-off from 1-30MHz with 1.4 cut-off rate; 40dB stop band. 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

**Media-Link/PM:** PC video editor, graphic user interface; advanced machine control; electronic patchbay feature; for IBM PC. Circle (1677)

**AmiLink/CI:** multimedia editing with consumer-industrial equipment; retains features and graphic interface of AmiLink. Circle (1678)

**AmiLink/VT:** multimedia editing for Amiga combined with NewTek Video Toaster; includes animation, paint, tiling functions. Circle (1679)

**AmiLink2.0:** video editor, advanced machine control; graphic interface on Amiga PC; 16 VTRs, any format/manufacture; 32 devices in serial-parallel network; electronic patchbay. Circle (1680)

## RGB Spectrum

**RGB/VideoLink 1450AX:** computer video scan converter translates H-sync rates from 21.5-80kHz; NTSC/PAL, RGB, S-Video and Betacam/MIU outputs; linear keyer. Circle (1681)

**RGB/View 2050:** video windowing system with integral TV tuner; supports workstations to 1280x1024 pixels. Circle (1682)

**X-TV 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

**NL347:** 1kW UHF transmitting tube. Circle (1904)

## ROH Div/Portland

**303TM:** tabletop intercom speaker. Circle (1685)

**Voyager PB-2000W:** portable PA; wireless mic receiver; wired mic, line inputs. Circle (1686)

**303TM:** tabletop intercom station. Circle (1687)

## Rohde & Schwarz

**SG series:** test generator offering 30 baseband signals; 12-bit accuracy on all signals; available for NTSC (SGMF), PAL (SGPF), SECAM (SGSF) and D-/D2-MAC (SGDF). Circle (1688)

**EMFT TV demodulator:** analyzes signals on UHF, VHF, CATV frequencies. Circle (1689)

**DMDC.03, DMDC.05:** test RDS decoders for monitoring, evaluation of RDS transmissions; .05 includes phase, level measurements; values displayed on LCD panels. Circle (1690)

**DMC.10:** RDS data coder per EBU 3244-E; develops 57kHz signal for FM subcarrier transmission; software upgradable. Circle (1691)

## Roland Pro Audio/Video

**SN-550:** digital noise eliminator cuts noise in frequencies not containing the original sound; reduced side effects of expansion; hum cancellation circuit. Circle (1692)

**DM-80 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; 3-D effects from 2-D system; sound localized in 360° horizon-

tal radius; vertical elevation control. Circle (1694)  
**SBX-1000:** MIDI cueing box with SMPTE/MIDI event generator, reader, synchronizer; sequencer controls external MIDI divides; stores for tempo data for 32 songs; editing features. Circle (1695)

#### Rosco

**Coloroll scroll:** selected color filters installed in the 3-24 frames; operates by DMX-512, AMX-192, 0-10VDC analog, other protocol. Circle (1696)

#### Ross Video

**Model 630:** live, on-air switcher; 30-input, two 4-bus multilevel effects, DSK; DVE control; RGB, component, encoded chromakey; extended effects memory. Circle (1697)

#### Sachtler

**Model 575D1:** lightweight, daylight lighting product; for studio, location. Circle (1698)

**Model 1800L:** Video 18 III; lightweight ENG fluid head. Circle (1699)

**Model 2000L:** Video 20 III; new lightweight ENG/EFP fluid head. Circle (1700)

#### Saki Magnetics

**ATR-100 heads:** metal or ferrite construction heads for Ampex ATR-100, -102, -104 audio recorders; NAB and DIN formats, most with SelSync available. Circle (1701)

#### Samson Technologies

**Concert Series II:** VHS wireless mic with true diversity in CR-3X receiver; belt-pack and HT-3 hand-held transmitters available. Circle (1702)

**MRI wireless receiver:** 13-channel unit mounts on cameras; 174-214MHz. Circle (1703)

#### Satellite Broadcasting

**Duplication, Transfer services:** film-to-tape transfers; standards conversion; video and audio cassette duplication services. Circle (1704)

#### SBC Technologies

**SAGE I:** alert system, preprogrammable for various conditions; broadcasts encrypted data, control signals on FM subcarrier. Circle (1705)

#### SCA Data Systems

**RD573:** RDS controller, generator; develops station ID for real time messaging and paging; phase locks to 19kHz pilot. Circle (1706)

#### Scala Electronic

**950MHz antennas:** full line of parabolic antennas for 950MHz STL and ICR links. Circle (1707)

#### Schmid 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. Circle (1708)

#### Scientific Atlanta

**Vector Quantization:** video compression system; compatible with TDM, FDM. Circle (1709)

**SEDAT:** Spectrum Efficient Digital Audio Technology; CD-quality digital audio compression for satellite-delivered audio. Circle (1710)

**Model 8860:** indoor antenna tracking control; higher tracking resolution with less antenna positioning motor wear; AdapTrack software learns satellite characteristics. Circle (1711)

**Integrated receiver decoder:** combines B-MAC, compression technologies. Circle (1712)

**Dichroic feed:** for ES antennas. Circle (1713)

#### Sennheiser Electric

**MD-422:** dynamic cardioid microphone; rugged design withstands rough treatment; spring suspension of element attenuates handling, mechanical noise pickup. Circle (1714)

**MKH 50 P48:** supercardioid RF condenser microphone. Circle (1715)

**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. Circle (1716)

**BF 530:** dynamic microphone; supercardioid pattern for recording; adjustable inlet basket permits

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personalization for talent to meet unique styles and requirements. Circle (1717)

**HD 490:** low-impedance, open-air headphones for home, portable use; radial bead diaphragm; neodymium-ferrous magnets with aluminum voice coils for low-mass design. Circle (1718)

### SESCOM

**In-Line series:** audio transformers, pads exhibiting high isolation characteristics. Circle (1719)

**Hand-held test equipment:** series of audio generation, testing and maintenance products in 3.6x6x1.8" packages. Circle (1720)

**Hand-Held series:** audio test instruments for professionals. Circle (1721)

**Isolator series:** in-line audio transformers, pads in isolated shell assembly. Circle (1722)

**Audio-Tran:** combines audio transformer 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"x1.2" grid centers. Circle (1723)

**Field Pro series:** audio utility boxes; mic splitter, combiner; active, passive direct boxes, A/V distribution amplifiers; telco interfaces; audio mixers. Circle (1724)

### SG Communications

**Strobe Light division:** complete tower strobe lighting service. Circle (1725)

**Tower-Guard:** complete tower maintenance program. Circle (1726)

### Shereff Systems

**Pro Video VGA:** titler software. Circle (1727)

### Shively Labs

**2500 series:** FM bandpass filters. Circle (1728)

**#1900:** motorized coax switch. Circle (1729)

### Shook Electronics USA

**MOD-20-27KU:** Ku-band mobile production vehicle; combines Ku uplink with a small format production facility; capacity for four cameras and four Betacam VCRs. Circle (1730)

### Shure Brothers

**Model VP64:** Video Production series; hand-held omnidirectional mic; windscreens, stand adapter; neodymium magnet for high output; scratch, chip-resistance black polyurethane finish. Circle (1731)

**Model FP410:** 4-channel mixer; automatic, portable; IntelliMix noise-adaptive threshold to activate mic in room with constant noise level; max bus circuit limits activated mics to current speaker; last mic lock-on holds current mic on until another mic is activated. Circle (1732)

### Siemens Components

**VHF TV PAs:** cavity power amplifiers based on RS 2022CL/RS2026CL tetrodes with power ratings of 5/10kW and 20kW in aural, aural/visual and visual service. Circle (1733)

### Sierra Automated Systems

**AXC-8:** 8-character alphanumeric X-Y panel for SAS-32000 switchers. Circle (1734)

**ANC-8:** 8-character alphanumeric panel for SAS-32000 series switchers. Circle (1735)

**GPI-1600 SI:** salvo sequencer; stores 1,200 programmed switcher, relay sequences. Circle (1736)

**CPI-80:** 8-character alphanumeric panel installs in audio consoles for audio routing. Circle (1737)

### Sierra Video Systems

**Model 161:** video with stereo audio routing system; 16x1 matrix. Circle (1738)

**Model 82:** 8x2 video, stereo router. Circle (1739)

**Models 44, 44C:** 4x4 video, stereo audio router; operated via serial control; standard video or components. Circle (1740)

**Series 32:** 32x8 crosspoint router matrix, expands to 32x64 for audio, video, sync, time code, machine control; RS485 2-wire party-line keypad controls; PC software control. Circle (1741)

### Sigma Electronics

**DEC-1.0:** decoder for NTSC/S-VHS to RGB signal format. Circle (1742)

**#2188:** 8x8 audio/video router. Circle (1743)

**TSG-2000:** portable test signal generator; AC/DC operation. Circle (1744)

**SLI-2000:** signal line identifier; designed for remote station checkout. Circle (1745)

### Signature Music Library

**Signature Select:** pick only those items desired from the Signature library. Circle (1746)

### Sira Sistemi Radio srl

**Channelcombiner:** for transmission by two 40kW UHF transmitters from one antenna. Circle (1747)

**LPTV combiner:** dual-sound, vision combiner; for 1kW UHF solid-state TV transmitters. Circle (1748)

### SISCOM Satellite Information System

**Newsroom equipment:** Editorial text editor; Machine control; Archive system. Circle (1749)

### Skotel

**TCT-421:** VITC-LTC translator; dual-standard for 525-line NTSC, 625-line PAL, SECAM. Circle (1750)

**TCG-333:** VITC/LTC generator, reader, inserter; NTSC, PAL compatible; character inserter, color field ID, code translations. Circle (1751)

**TCG-313 FTK:** film-to-tape transfer equipment offers KEYCODE reading capability. Circle (1752)

### SkyTel

**SkyPager:** satellite relayed messages to five minutes length; allows people to be in "constant" touch with office. Circle (1753)

### Snell & Wilcox

**PRISM decoder:** digital PAL, NTSC decoding uses 4-field, multitap vertical/temporal filtering; for D2, composite inputs to CCIR 656 digital, RGB/YUV analog outputs; for NTSC, PAL/-M/-N standards; wideband processing. Circle (1754)

**ATLANTIS series:** standards conversion; Advanced Motion Processing; supports the six world standards, component, composite I/O; Model 3 upgrade to Model 6 for all features. Circle (1755)

### SOFTIMAGE

**Creative Environment V2.1:** 3-D animation; Alpha channel for 2-D, 3-D textures; reflectivity mapping; metamorphosis function curves; texture definition libraries. Circle (1756)

### Solid State Logic

**SL 5000GP:** production version of SL 5000 console; for TV, radio production, on-air; flexible routing, multiple output capability. Circle (1757)

**SoundNet:** digital audio-for-video network system; multiple SoundScreen systems share and copy work; central database of audio; off-line backup, restore functions; slave mode offers 56-channel playback. Circle (1758)

**Sound Ideas Library:** available on WORM optical disk or four 8mm Exabyte tapes; over 11 hours of digitally recorded sound effects for ScreenSound audio-for-video system. Circle (1759)

**ScreenSound V3.0:** software update includes Events Lists, Print function, Chase mode, On-the-fly drop-ins. Circle (1760)

**Ultimation: Ultimate Automation modes** - dedicated VCA system, dedicated moving fader system or combination of both; extends G series equipment; dual signal path circuitry enhances automation capabilities. Circle (1761)

### Sony

**EVO-9800A:** Hi8 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 9-pin remote interface. Circle (1762)

**CDP-2700:** CD player; AES/EBU, IEC-958 II digital outputs; fader start/stop control, rapid start with auto cue function; 12.7% variable speed playback; accepts 3" and 5" discs. Circle (1763)

**BKM serial interfaces:** BKM-2085 component, BKM-2090 composite digital serial inputs; permits BVM 13" and 18" monitors to be used for D1 viewing; not required for PHM-3600 16x9 aspect ratio 800-line displays. Circle (1764)

**PCM-2700:** pro DAT; 44.1kHz, 48kHz sampling; 4-head design, confidence monitoring; alternative subcode, absolute TC recording. Circle (1765)

**800 series UHF:** PLL synthesized wireless mic; multichannel operation in 794-806MHz range; high stability; 94-channel selection, tone-squelch, companding. Circle (1766)

**DVR-20, -28:** D2 models providing 94-, 208-minute recording times; -20 uses small, medium cassettes; -28 supports all sizes; resolves digital audio tracks at slow speeds with crossfade capability; Multi-Loop test simulates multiple generations; ADSP audio digital signal processors. Circle (1767)

**SP 2000 series:** PVW-2800 editor, recorder; PVW-2600 player; PVV-1 camcorder transport; players include integral TBC and time-code capability; digital comb filter separates luminance, chroma in composite mode. Circle (1768)

**HyperHAD technology:** enhanced image sensor based on hole accumulated diode technology; increased sensitivity, low noise, high resolution; available for all camera models. Circle (1769)

**RVP-400Q:** rear screen projector; stackable cubic type for videowalls; multiple scan recognition of NTSC, PAL, SECAM, NTSC-4.43 inputs as well as HDTV and computer sources. Circle (1770)

**PHM-3600 monitor:** 16x9 aspect ratio on 36" diagonal CRT. Circle (1771)

**BVW-50:** Betacam SP VCR with 90-minute capacity; portable unit for field editing; reduced power needs; 200 minutes recording from single BP-90A battery. Circle (1772)

**DVR-2100:** cost-effective D1 VTR with dynamic tracking; supports all three cassette sizes; reduced size and power requirements; playback speeds from -1x to 2x. Circle (1773)

**DXC-107 camera:** 1-chip produces 470-line color images from 9 lx at F/1.2 maximum sensitivity; electronic shutter; for surveillance, educational, telecommunications systems; electronic exposure control. Circle (1774)

**DXC-327 camera:** 3-CCD using HAD sensors; increased chip sensitivity, enhanced detail; 700-line resolution; 60dB/S/N, F/5 sensitivity; recording output configures for U-Matic/SP, Hi8, S-VHS; standard output for VBS, Y/C (S-Video), optional RGB; 5-speed shutter. Circle (1775)

**FSR-2000A receiver:** 24-channel preset tuner with memory, subcarrier audio; 10-key tuning; signal strength indicator; unique ID per unit permits addressability; data output for remote control of associated peripheral equipment. Circle (1776)

**RVP-6000Q projector:** 60" diagonal, rear-screen; integral audio; multiscan sweep, optically-coupled lenses, CRTs; single-mirror reduces light loss; Fresnel, 0.6mm pitch lenticular screen structure increases viewing angles. Circle (1777)

**GVM-1305TS Trinitron:** 13" with MultiScan sweep, touchscreen control; composite video, Y/C, analog/TV inputs; 0.25mm dot pitch optimized for graphics, video images. Circle (1778)

**D2 options:** serial interface (BKDV-105) transmits video, 4-channel audio on single coaxial; audio pitch correction (BKDV-110), time compression, expansion range of ±15% play speed. Circle (1779)

**D2 software version 3:** for DVR-10, -18; animation editing for graphics; edits of constant duration or film with 2-field/3-field sequences; pre-read control; auto audio mute in still mode. Circle (1780)

**SVO-140, SVO-160 VHS:** professional mono, stereo HiFi VCRs; minimized jitter; digital tracking; high-speed rewind; Rapid Access transport, auto repeat; Double Azimuth 4-head. Circle (1781)

**BVX-D10:** digital color corrector; includes direct editor control. Circle (1782)

**System G effects:** production models, DME-5000, DME-9000. Circle (1783)

**DXC-151 camera:** single-chip RGB HAD CCD, 460-line resolution; sensitivity of 25 lx at F/1.4; electronic shutter. Circle (1784)

**EVV-325 camcorder:** DXC-325 camera, EVV-9000 Hi8 VCR; 400-line resolution; separate Y/C video inputs; time-code generator. Circle (1785)

**DPS-D7:** digital stereo audio delay; 3-band shelving, peaking, digital panpot; 18-bit oversampling, High Density Linear Converter D/A. Circle (1786)

**LMS software:** BZC-2100 multi-spot feature, conflict avoidance; for transmission simultaneously with on-line tape preparation; BZC-3009 compilation software; generates sequenced compiled commercial reels. Circle (1787)

**DXC-537:** HyperHAD IT CCD camera; 2,000 lx at f/8; docks with PVV-1, EVV-9000 Hi8 VCRs; adap-



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)

**VSP-8000:** digital video sound processor; complements D1, D2 VTRs; 48kHz sampling. Circle (1790)

**DVS-8000C:** component digital switcher; 24-input, eight external keys; 2.5 mix/effects banks; five linear keyers; two background generators; link to DME for 1-panel operation. Circle (1791)

**BVW-D75:** Betacam-SP analog component editing VCR; 4:2:2:4 serial digital I/O; four digital audio channels; range of interconnection capabilities with other equipment. Circle (1792)

**Editor updates:** software expands features for BVE-9000; *System Pacs* turnkey editors using BVE-9000, BVE-910. Circle (1793)

**DPS-RT:** reverb using LSI chips; MIDI-compatible includes 100 preset effects; RAM memorizes 256 additional effects; in 3-section design with pre-effect, reverb and post-effect blocks. Circle (1794)

**DVS-V6464:** serial digital signal router; 64x64 matrix. Circle (1795)

**VA-90 adapter:** connect any camera to portable Hi8 videorecorder; additional Hi8 enhancements to be announced. Circle (1796)

#### Sony Magnetic Products

**SBT series:** metal particle video tape for SP 2000 Betacam SP; 10-90 minute lengths; anti-static back-coating; recognition holes for tape type sensing; hub diameter for improved handling. Circle (1797)

#### Sound Ideas

**Wheels Series 5000:** digitally recorded; 25 vehicles, over 3,000 sounds; 24 CDs. Circle (1798)

#### Soundcraft

**Sapphire:** in-line recording mixer; 4-band overlapping EQ per I/O module; EQ splits between monitor, channel mix path; dual-stereo, dual-line inputs for any I/O; 20-44 input frames. Circle (1799)

**Spirit:** studio, live 3-bus mixers; discrete routing to stereo, mono outputs; in-line with splittable EQ; eight subgroups; direct routing for multitrack recording; 8-, 16-, 24x3, 8-channel expander for live model; 16-, 24x8x2 studio versions. Circle (1800)

**Delta AVE:** audio-for-video mixer; 8-, 16-, 24-channel mono, stereo frames; tailors to installation; flush mounting; controlled from VSA 24 II interface in manual, GPI, serial modes. Circle (1801)

#### Soundmaster

**Syncram:** random-access digital audio bridge; expandable 2-channel modular design with editing capability. Circle (1802)

#### Soundtracker

**Soundtracker editor:** digital sound editing system using modular hardware construction; workstation, audio processing module and disk storage rack complete the system; multi-user, multi-tasking features. Circle (1803)

#### Standard Communication

**MT-840:** agile Omni, international Global satellite TV receiver. Circle (1804)

**TVM-450:** frequency agile modulator. Circle (1805)

**MT-900:** Agile Omni spectrum advanced satellite broadcast receiver. Circle (1806)

#### Stanton Magnetics

**890AL DJ Pro:** phono cartridge for professional DJ applications; diamond stylus; 4-coil moving magnet design. Circle (1807)

#### Stanton Video Services

**Jimmy Jib:** portable camera boom with remote head; pan, tilt, zoom, focus, iris, and VTR start/stop control; easily transportable in automotive trunk. Circle (1808)

#### Steenbeck

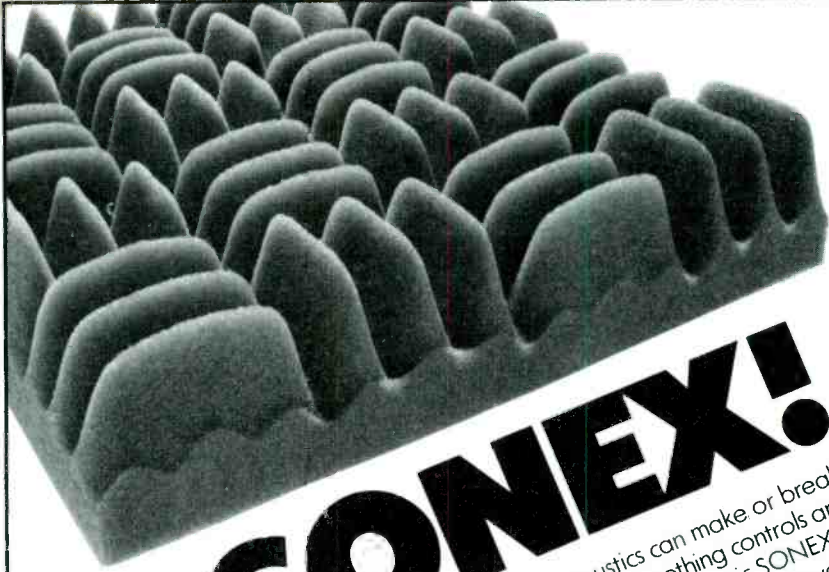
**ST-7310:** film transfer, sound dubber. Circle (1809)

**MFL-Combo:** mobile magnetic sound recorder; packaged in 19" flight case. Circle (1810)

#### Storeel


**RS2/10:** ABS tape storage. Circle (1811)

**DS4/16:** double-drive mobile videotape storage system. Circle (1812)



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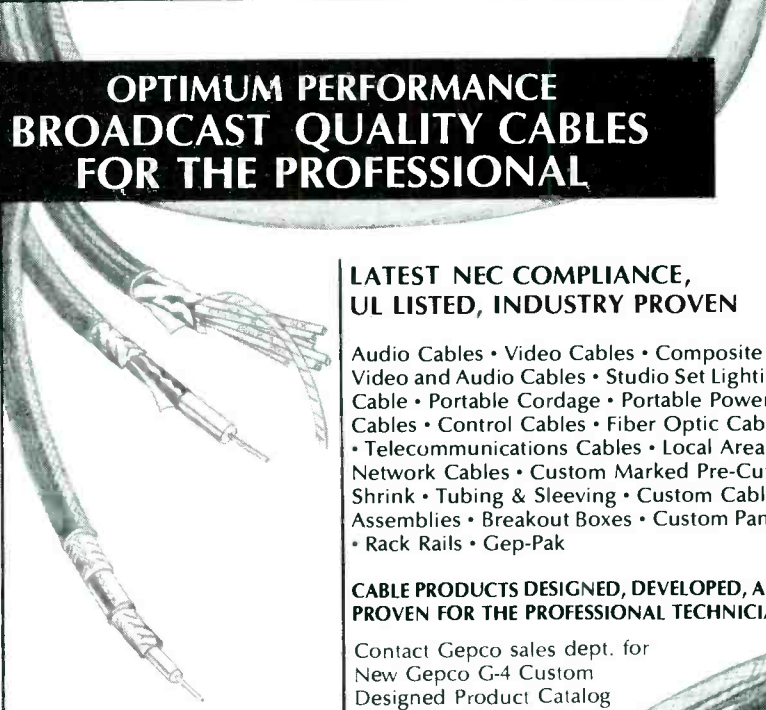


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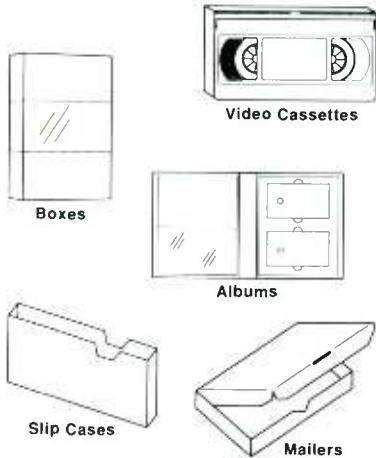
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### Strand Lighting

**Mantrix MX:** 12, 24, 48-channel 2-scene present faders; MIDI in, through, out and sound-to-light interfaces. Circle (1813)

**Quartet 650:** 650W spotlights; 22"/40" variable profile; 25" fixed profile; Fresnel and prism convex spot instruments. Circle (1814)

**Sirio Bambino HMI/MSR:** daylight fresnel; 2.5kW lamp produces equivalent of 10kW daylight corrected from tungsten. Circle (1815)

### 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. Circle (1816)

**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. Circle (1817)

**#902:** TV production audio console. Circle (1818)

**Studer A807-4 TC:** center-track time code 4-channel audio recorder in 1/2" design. Circle (1819)

**A728 controller:** CD player controller operates three A727 CD players; Ebus networking; cue wheel for frame accuracy. Circle (1820)

**D740 DC-R:** professional CD recorder using write once optical media; 100% compatible with standard compact disc format; dynamic range to 98dB; integrated PQ editor builds table of contents with track numbers, running times. Circle (1821)

**Model C221:** professional CD player from Revox line; 1-bit format for total linearity, error correction; minimal crossover distortion. Circle (1822)

**Magneto-Optical drive:** 540MByte removable file storage; permits instant import of sound files into Dyaxis system. Circle (1823)

**A623 monitor speaker:** 2-way compact monitor; self-powered; electronic circuitry corrects group delay, achieves accurate reproduction in a range of listening environments. Circle (1824)

**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. Circle (1825)

**Digital hybrid:** telephone interface with dual digital signal processors, FIR filtering; consistent reliability in on-air operation. Circle (1826)

### Studio Technologies

**IFB Plus series:** for talent cueing at local and remote locations; wide range of features; simple installation. Circle (1827)

### Swintek

**Mark 200D/CT:** full duplex wireless headset; operates at 900MHz. Circle (1828)

**Data transceiver:** wireless system for RS-232 data on 900MHz frequencies. Circle (1829)

**Barcode system:** barcode reader for Mark 200D transceiver for data transmissions. Circle (1830)

### Switchcraft

**1/4" RA jacks:** standard phone jack for PCB mounting. Circle (1831)

**PQC connectors:** series ST and RA types for printed circuit board mounting. Circle (1832)

**DC power jack:** PCB mounting type. Circle (1833)

**Mini-Din:** miniature connectors, plugs, per German/European standard specs. Circle (1834)

### SWR Inc.

**FM 10, FM3:** high-, medium-power circularly polarized FM antennas;  $\pm 1$ dB circularity; copper radiating elements. Circle (1835)

**FM-X:** medium-high power circularly polarized FM antenna; available 5kW to 20kW. Circle (1836)

**LPTV type:** antennas. Circle (1837)

### Symbolics/Graphics Div

**XL workstation:** D1 input, output, renders to NTSC, PAL, HDTV; combines PaintAmation, XL Animation in unified graphics environment; 4:4:4 internal processing; 2-D, 3-D elements; supports D1 tape, disk and compositing systems; imports, exports key signals with images. Circle (1838)

**High Definition PaintAmation:** operates at all currently proposed and defined high-definition TV resolutions; serves NTSC and PAL. Circle (1839)

### Symetrix

**Model 528:** voice processor combines de-essing, compression, expansion; transformerless balanced input, including 48VDC phantom powering; THD rated <0.025%. Circle (1840)

**Model 564:** audio processor; quad gate/expander system. Circle (1841)

### Systems Wireless

**T-677/T-680/R-662:** UHF wireless microphone system by Vega. Circle (1842)

**Clear-Com products:** MS-812 programmable master station; ICS-60/-100 Matrix Plus intercom stations; XP-10/-20 Matrix Plus expansion panels; CCI-2 party line interface. Circle (1843)

**T187 transmitter:** wireless mic operates with any Lectrosomics 170, 185 receiver. Circle (1844)

**Wireless systems:** UHF system series from Lectrosomics. Circle (1845)

### Tamron Industries

**AF28-70mm:** lens; f/3.5-4.5 aperture. Circle (1846)

**AF70-210mm:** lens; F/4-5.6 aperture. Circle (1847)

**Fotovix Editor II:** peripheral to Fotovix for cropping, editing, masking and other features for still image manipulations. Circle (1848)

### Tannoy North America

**PS-88 subwoofer:** near-field reference speaker; low response to 36Hz; 100W amplifier corrects 12dB/octave roll-off of woofers in sealed enclosures; high-, low-impedance inputs on 1/4" or RCA connectors. Circle (1849)

**Studio monitor series:** reference monitors; differential material technology; DMT Systems 10, 12, 15, 215 isolate moving, vibrating components from cabinet to reduce vibrations. Circle (1850)

### Tape Automation America

**Program Evaluator:** monitors, tracks quality of recorded programs; reports on measured parameters for quality control. Circle (1851)

### Tapscan

**QualiTAP:** respondent-based, multimedia qualitative analysis; with lifestyle, demographic and product use data for PCs. Circle (1852)

**TargetONE:** market research, radio buying tool; includes many brand names, database with over 4,000 product categories. Circle (1853)

**BRASS:** Birch Radio Audience Segmentation System; analysis based on specific survey areas, non-standard age ranges. Circle (1854)

**MultiMedia:** campaign analysis program; produces combined, individual reach, frequency, cost computations for radio, print, TV. Circle (1855)

### TASCAM

**424 PortaStudio:** 4-track cassette recorder, dbx noise reduction; 3 $\frac{1}{4}$ ips,  $\frac{7}{8}$ ips,  $1\frac{1}{2}$ ips speeds; separate EQ per track including mic/line inputs; assign inputs 5-8 to cue bus for listening without recording of effects, reverb. Circle (1856)

**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 buses, four effects returns, six aux sends. Circle (1857)

**Model 488 PortaStudio:** eight mono/2 stereo input mixer, cassette recorder; 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. Circle (1858)

**BR-20:** 2-track audio recorder; +4dBm balanced XLR; shuttle control with combination of EDIT, FFWD/REW with Quick Cue; dissimilar tape reel feature; fader start activation. Circle (1859)

**CD-301:** CD player; withstands rigors of broadcast and production environments. Circle (1860)

**M-2500 series:** 16-, 24-channel mixers; 8-bus recording, auto mute from MIDI commands; in-line stereo monitor; 3-band, 2-sweep EQ; pre-fade listen, mute, assignment switches. Circle (1861)

**Dolby S noise reduction:** option (with dbx type I) on MSR-16/D and MSR-24/D audio recorders; 10dB reduction at low frequencies, increasing to 24dB at higher frequencies through staggered-action compressors. Circle (1862)

**BR-20T:** 2-track recorder; center-track time code with servo motors for transport control with

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gentle tape handling; 1/4" machines are effective in audio-for-video applications. Circle (1863)

#### TE Products

**VAS-1600 series:** matrix routers; 60MHz band width; RGB, multilevel audio; 16-input by 4-, 8-, 16-output; various configurations. Circle (1864)

#### 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 (1865)

**LV-250SCR:** full-motion sequential color recorder; wideband design; frame accurate control includes external host capability; free of color distortion and typical playback artifacts. Circle (1866)

**LV-231ASCR:** sequential color RGB recorder; wide bandwidth than conventional recorders for more resolution; Qesta Databaser software, Kodak Ektagaphic Slide Video system; 18,000 slides with <1s worst-case access. Circle (1867)

#### Teatronics/Lighting Innovations

**Echelon:** memory lighting console; macros, soft-keys; relative intensity modification. Circle (1868)

**em+one:** control module; expands flexibility of dimmer control; blends AMX-192, DMX-512 protocol into DMX-512 data stream; records 96 cues for access from front panel. Circle (1869)

**MD-288E modular dimmers:** quad 1.2kW, dual 2.4kW, 6kW and 12kW modules; 0-10V analog, AMX-192, DMX-512 protocol controls. Circle (1870)

**MTR 9600:** on-location dimmer. Circle (1871)

#### TEKNO

**Balcar Backgrounds:** handpainted. Circle (1872)

**Balcar Zoom:** 500W halogen unit. Circle (1873)

**Balcar Flux-Lite:** dimmable lights; variation of 10% of power gives 50' drop in color temperature; 200W lamp equal to 2kW halogen. Circle (1874)

#### Tektronix

**1730D monitor:** digital waveform display; serial digital input; eye measurement; displays jitter, amplitude, rise time vs. calibrated time axis; analog input can be paraded side-by-side with parallel or serial digital signal. Circle (1875)

**VITS-100:** NTSC VITS inserter for satellite uplinks, CATV headends, ENG/EFP systems, transmitters; 12-bit accuracy on VITS, full-field signals; source ID signal compatible with VM700A; supports FCC composite, NTC7 composite, VIRS, multiburst, bars,  $\sin^2/x$ . Circle (1876)

**VITS-200:** 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 (1877)

**TSG-422 Opt 1S:** 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 (1878)

**1700F07:** utility drawer for accessory storage; 1/3ft<sup>3</sup> in side-by-side rack adapter. Circle (1879)

**TSG-130 Multifomat:** low-cost generator; output in NTSC; Y-C; Y/R-Y/B-Y for Betacam, MII, CDTM formats; stereo audio output; 10-bit resolution; *Op 1* includes MII level tests; *Op 2* provides a black burst source. Circle (1880)

**SPG-1000 HDTV sync generator:** multifomat signal source supports HDTV production environment; master, slave capability for different input, output formats; picture monitor test signals in RGB, YPrPb. Circle (1881)

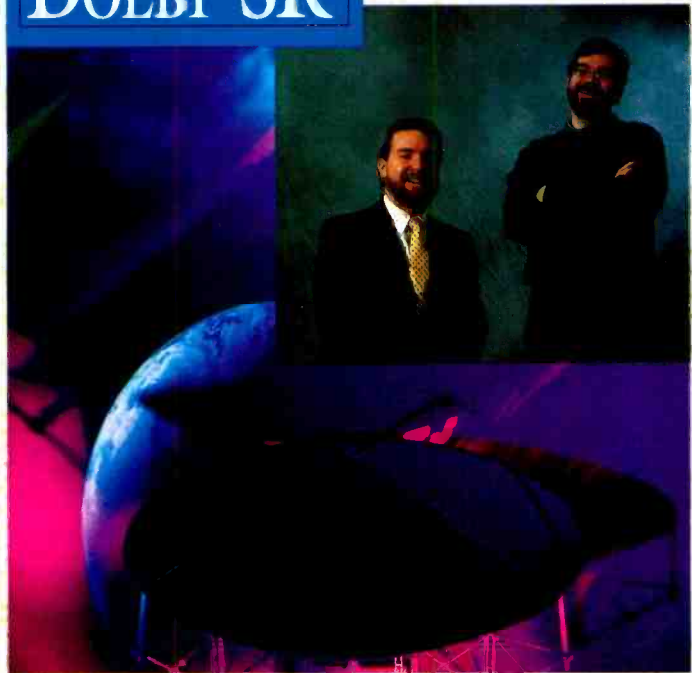
**VM700A measurement set:** D2 test signal source; comprehensive set of signals in 10-bit composite digital and analog forms; *Opt 1G* for measuring routing of white, black, 2T pulse echo, per German White Paper requirements; *Opt 1, 11* dual standard set for NTSC, PAL; *Opt 20* Teletext signal quality measurements; *Opt 30* component measurements with Lightning, Bowtie signal forms; *Opt VMREMGR* remote graphics program for near real-time display of VM700A screen on PC. Circle (1882)

**S26UT10 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 (1883)

# World Monitor

DEMANDS

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**Dolby**

Circle (93) on Reply Card

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**Model TSG170D:** digital composite NTSC generator; serial digital output; 1S serial digital output option tests serial digital transmission systems in addition to D2 and analog NTSC. Circle (1884)  
**TSG-120 Y-C/NTSC:** outputs in NTSC, Y-C, Y/R-Y/B-Y, stereo audio for maintenance. Circle (1885)  
**1720-SCH/1721-SCH:** vectorscopes for NTSC and PAL; all features of 1720 with SC/H-phase and color framing indication. Circle (1886)  
**2712 spectrum analyzer:** covers 9kHz-1.8GHz range; 4-trace digital storage with analog display; demodulates TV signals with Op 10 AM/FM video monitor; frequency counting to 1Hz resolution; AM/FM signal identification with integral audio demodulators. Circle (1887)

#### Tel-test

**ACA:** air control automation. Circle (1888)  
**UDC series:** universal device controller, for all equipment control applications. Circle (1889)  
**MC<sup>2</sup>SS:** master control switcher. Circle (1890)  
**ACC:** air channel control - advanced automation system. Circle (1891)

#### Telcom Research

**Model T102:** SMPTE/EBU generator, reader; RS-232-C serial control; jam-sync and continuous jam-sync modes; portable package; operates drop, non-drop, 24, 25 frame; EDL, TC-LOG, electronic front panel software. Circle (1892)

#### Telepak San Diego

**T-Hip:** hip-pack for accessories, batteries, phone, etc. Circle (1893)  
**T-D2 case:** Sony DVR-2 soft case. Circle (1894)  
**T-Lens:** lens covers. Circle (1895)

#### Telescript

**LAN package:** Novell newsroom and production system support. Circle (1896)  
**Monitor prompter:** 17" screen, weighing 22 pounds. Circle (1897)

**Amiga:** computer prompter. Circle (1898)

#### Television Equipment Associates

**ECD series:** video delay products. Circle (1899)  
**TCL series:** video filters; designed to remove sub-carrier signals at 5.7MHz. Circle (1900)  
**Daylight headset:** thick foam cushions for ambient noise attenuation; available with magnetic mic or noise-canceling electret; from Davies Electronics. Circle (1901)  
**TBW446B:** Brickwall filter from Matthey; passes full video at 4.46MHz with 45dB attenuation at 4.83MHz. Circle (1902)  
**CS 048:** video filter for HDTV signals. Circle (1903)

#### Telex Communications

**ELM-22, -33:** subminiature lapel mics; -22 omnidirectional with -56dB sensitivity and 138dB SPL; -33 unidirectional specified for 142dB SPL; various termination options; power from belt pack transmitter, PS-9 supply, 9VDC battery. Circle (1905)  
**FMR-100:** diversity wireless mic; Pos-i-Phase true diversity system; VHF operation between 150-216MHz; complements WT-60 belt pack or HT-100 hand-held series transmitters. Circle (1906)  
**V series:** professional headphones, single- and dual-side boom mic models; mic options of electret and dynamic types; variety of cord sets available to meet specific requirements. Circle (1907)  
**ProStar series:** wireless mics; R-10 receiver; B-10 belt pack transmitter; G-10 belt pack guitar transmitter; H-10 electret hand-held mic transmitter; receiver features Pos-i-Phase true diversity circuitry. Circle (1908)  
**PAS-1:** portable PA, integral wireless mic receiver, mixer; detachable speaker driven by 50W amp; volume controls for wired, wireless mics and aux input; battery or mains powered. Circle (1909)  
**SAP612:** source assignment panel; provides 6 inputs, 12 outputs; ancillary product for TW intercoms; permits system to be configured as single or dual channel. Circle (1910)

**MagnaByte LCD:** liquid crystal projection systems; 2001 connects to NTSC source, 2002 has VHS player; integrated amp, speaker; no technical, convergence adjustments except focus. Circle (1911)  
**Model PS15:** TW intercom power supply; for 30 user stations; one 24-32VDC channel and one with no voltage potential. Circle (1912)

#### Telos Systems

**Telos One-M:** 2- to 4-wire intercom interface links two systems; each has single-channel full-duplex operation; digital signal processing. Circle (1913)

#### Tentel

**TQ-300M:** motorized dial torque gauge for measurements on Betacam systems; replaces dummy reel and spring scale measurements; calibrated in gm-cm with 10gm-cm increments; adapter fits all Betacam spindles. Circle (1914)  
**T2-H5-SLCB:** Teltelometer tension gauge; measures tension for MII; 7-40g range with single gram increments; SLC style probes. Circle (1915)

#### TFT

**Model 9100:** frequency-synthesized STL transmitter; direct composite modulation at IF VCO for improved S/N, distortion, stereo. Circle (1916)  
**Model 9107:** frequency-synthesized STL receiver; 55dB stereo separation, 80dB S/N, 0.1% THD; pulse counting discriminator for baseband demodulation. Circle (1917)

#### The Express Group

**Series 2000:** studio furniture. Circle (1918)

#### Theatre Service & Supply

**EDI DMX isolator:** 1500VDC isolation with optical isolation device; LED indicates incoming DMX-512 signals; 5-pin XLR connector. Circle (1919)

#### Thomson Broadcast

**TTV 1645 Sportcam:** ENG portable camera with

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triaux adapter; FIT CCDs; adapter interface to remote recorder, 14 lx at f/4, 21dB gain; external frame holds long field, studio lenses. Circle (1920)  
**TTV 7651, TTV 7661:** A/D, D/A converters; 7651 includes 270Mbit/s serializer; 7661 includes deserializer; 4:2:2 technology; single and dual input/output versions. Circle (1921)

**TTV 5670 keyer:** two 4:2:2 video plus key inputs; stand-alone or in multichannel system; luminance keyer; cut, dissolve, wipe transitions; three matte generators, fade-to-black; control from front, or optional external panel. Circle (1922)

**TTV 5790, 5791 routers:** 4:2:2 serial, digital routing switcher; matrix sizes of 16x32 or 32x32; -5791 expands to 256x256; numerous control panels; cable EQ, audio matrix interface. Circle (1923)

**TTV 1542:** studio camera featuring FIT CCDs; dynamic lens correction, color restoration; 80dB dynamic range; electronic shutter; maximum sensitivity of 15 lx at f/4; 61dB S/N ratio. Circle (1924)

**TTV 7655:** dual serializer and/or deserializer; 4:2:2 system may be used as a repeater for signal distribution needs beyond 300m. Circle (1925)

**TTV 1647 camera:** ENG/EFP unit with three CCDs; docks with Betacam SP VCR; adapters for remote recorder, triax operation; 62dB S/N ratio; 5-speed electronic shutter; 15 lx at f/4. Circle (1926)

#### Thomson Digital Image/TDI

**TDI Explore V2.3:** 3-D animation for video production; BUILD program language; RAY ray-tracing, rendering; PARTICLE particle effects generation; CONTOUR wire-frame animation; EXTIO interface for peripherals. Circle (1927)

#### Thomson Electron Tubes & Devices

**TH 3787, TH 3754:** TWT devices for 10.7-12.7GHz; 130W output; 3787 with depressed collector, 15-year cathode life for satellite use; 3754 with 3-stage depressed collector; 58% efficiency. Circle (1928)

**HDTV projection CRT:** 9" tube front-projection system; projection screen brightness of 200cm/m<sup>2</sup> on 100" diagonal at 1,500 TVL. Circle (1929)

**THX 898 Primicon:** 1" camera tube for HDTV; Primicon photoconductor; electrostatic deflection, integrated magnetic focus coils; bias light; 40% transfer at 700 TVL; limiting resolution greater than 2,000 pixels per line. Circle (1930)

#### Thomson Video Equipment

**HD 1250 Proscan enhancement:** triaxial cable adaptation for studio camera. Circle (1931)

**Digital mixers:** IMPULS serial digital unit; TTV 5650 production, post-production mixer; integrated serial routing switcher. Circle (1932)

**Colorado upgrade:** 4:2:2 color corrector; multi-channel system with individual channel processing capabilities. Circle (1933)

**HD 1250 Light:** portable version of HD 1250 Proscan HDTV camera. Circle (1934)

**1250 monitor:** 16:9 aspect ratio; accepts 4:3 images; zoom capability expands image, removing blank sides or letter-box effects. Circle (1935)

#### Thomson-LGT

**Terrestrial networking:** system management for multichannel, multiple main, relay TV transmitter plant; microwave interlinking. Circle (1936)

#### 3M Magnetic Media

**Hi8 MP:** videocassette material. Circle (1937)

**TapeCare:** storage boxes. Circle (1938)

**# 996:** analog audio mastering tape; to operating level of +9dB; 79.5dB S/N for tape only; bias compatible with #226 media. Circle (1939)

#### Time Logic

**APDU-200/E:** software enhancements to automatic tape control system; time zone, prime-time program delays; automated copying; scheduled, unattended functions. Circle (1940)

#### TimeLine

**Lynx System Supervisor:** enhanced with interface for Neve audio consoles. Circle (1941)

**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)

#### TM Century

**Digital Commercial System:** hard disk record and playback; stereo storage with minimum of 2-hr capacity. Circle (1944)

#### Torpey Controls

**CLK-22 time displays:** operate with DQSB-6 serial code drive. Circle (1945)

**STW-5:** timer, up-down counter. Circle (1946)

#### Toshiba Consumer Products

**TFS-590:** HDTV digital frame store; 72-frame capability. Circle (1947)

**TSC-100:** Hi8 video camcorder; 1/2" CCDs, 700TVL; 413,000-pixel array; 14W drain allows batteries to record up to two hours. Circle (1948)

**TSW-1000HD:** analog HDTV switcher. Circle (1949)

**P500SRI:** 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)

**HV-8900:** 1/2" analog VCR for HDTV. Circle (1953)

**P32H100, P36HD00:** HDTV monitors; 21", 30", 34" CRT diagonals. Circle (1954)

#### Toshiba Information Systems

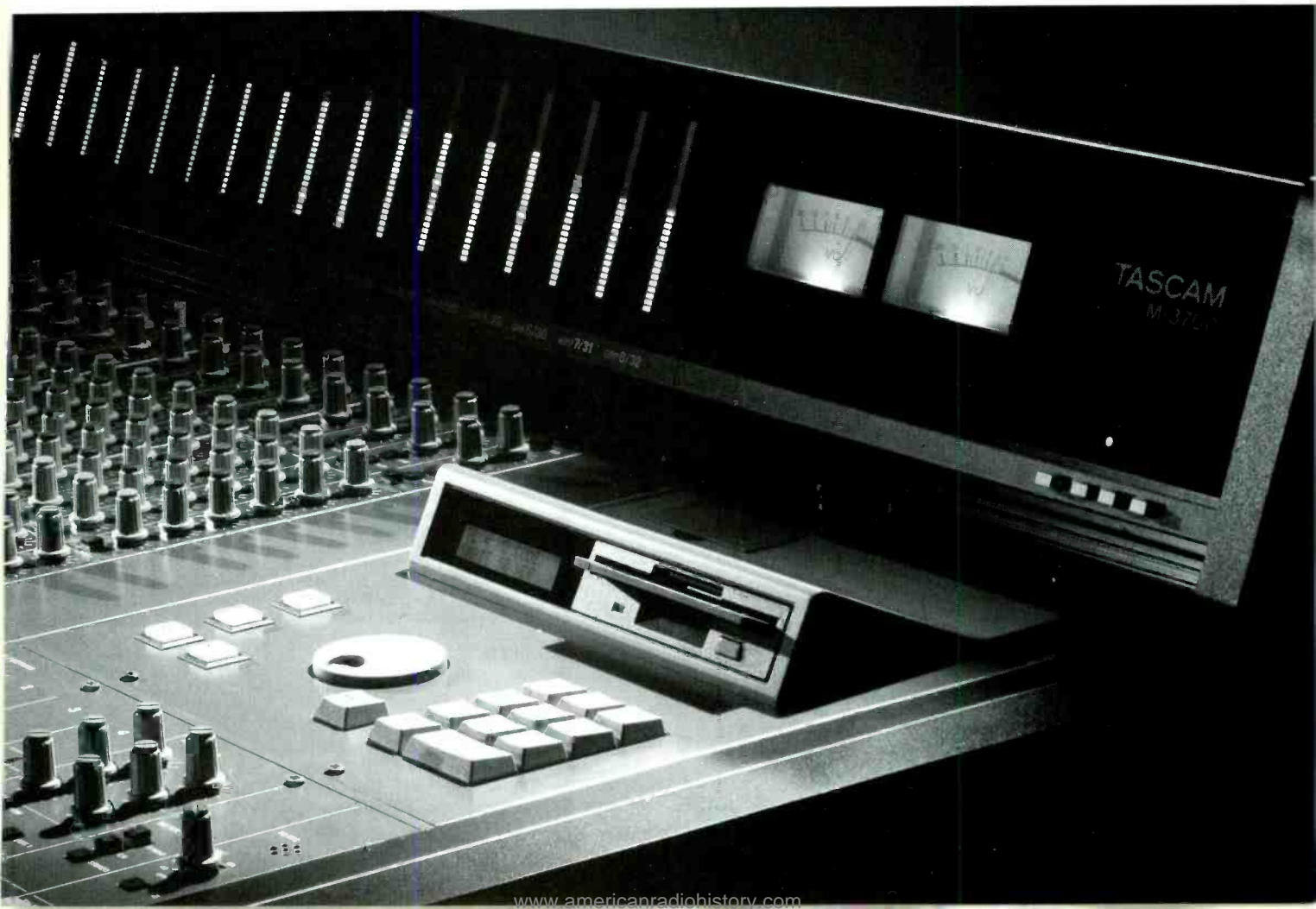
**HSC-100:** HDTV camera; CCD sensors with 2-million pixel array; 16:9 aspect with f/5.6 sensitivity at 2,000 lx; 52dB S/N ratio. Circle (1955)

**HPE-1000:** video effects system for HDTV; 3-D manipulations. Circle (1956)

**HSW-1000:** HDTV digital video switcher; full-feature component system. Circle (1957)

#### Toshiba Video Systems

**IK-M40A camera:** high resolution color; Y/CS-VHS



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output; 470-line resolution; shutter to  $1/10,000$ s;  $1/2$ " CCD provides 420,000-pixel array; sensitive to 15 lx at f/1.6. **Circle (1958)**

### Total Spectrum Mfg.

**SportsFocuser option:** calibrates to *near* and *far* points, calculates proper focus settings for intermediate positions. **Circle (1959)**  
**ACP-4000:** field production system; automatic control panel; portable; touch-screen user interface; SportsFocuser software. **Circle (1960)**  
**AutoCam ACP-8000S:** 80486 CPU; multipedestal collision avoidance; camera CCU control; VGA, graphics; pedestal repositioning software. **Circle (1961)**  
**Battery power kit:** four standard ENG camera batteries operate AutoCam pedestal at remote location. **Circle (1962)**  
**Manual Control Box option:** mounts on camera pan bar to permit change of the AutoCam unit to local, manual control. **Circle (1963)**

### TouchVision

**D/Vision:** PC software for random access editing with compressed video; incorporates Intel DVI processor; open architecture. **Circle (1964)**

### TRF Music

**TRF Custom:** original music for special production requirements. **Circle (1965)**  
**DAT format:** classical releases. **Circle (1966)**

### Trompeter Electronics

**TDSX-3/4 cross connect:** module interconnect DS-3, DS-4E, DS-4 transmission signals. **Circle (1967)**  
**BNC, TNC plugs, jacks:** straight, right-angle plugs, cable racks, patch plugs for cable types 724, 728, 734A, 735A, K19224L2; splices available for 728-735 and 734A-735A interfaces. **Circle (1968)**  
**UPLRN connector:** right-angle BNC connector; 75Ω, 50Ω; to 4GHz. **Circle (1969)**

### TTC/Television Technology

**XLS-1000MU:** 1kW UHF transmitter; complete, redundant solid-state design; configurable for translator service. **Circle (1970)**

### 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 (1971)**

### Ultimate

**System-6 ITA:** Interface-to-Anything ties System-6 to editing control; routers to load files from System-6, to synchronize switching of cameras. **Circle (1972)**  
**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 Ultimate-6 disk drive. **Circle (1973)**  
**Smartstore:** screen correction; if no clean frame of backing color exists, Frame Builder memorizes backing areas revealed to build clean frame. **Circle (1974)**  
**System-6 transcoder:** 2-channel, bi-directional system; permits use of compositing system with any component recorder. **Circle (1975)**  
**PC Remote with GPI:** IBM/compatible PC emulates System-6 remote control; series of menus serves all control functions. **Circle (1976)**  
**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 (1977)**

### Union Connector

**2H+G/C:** 208V stage pin connectors; current range 60-100A. **Circle (1978)**  
**polybox:** main switch panels - company switch with S.I.S. output. **Circle (1979)**

### Unique Business Systems

**RentTrace V3.31:** enhanced rental, tracks equipment availability. **Circle (1980)**

### United Ad Label

**Label stock:** new design tape labels. **Circle (1981)**  
**Labels Unlimited 3.0:** software for custom label printing. **Circle (1982)**

### 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 (1983)**

### Utah Scientific

**DVS-2/32:** serial digital router for D1, D2 signals; may operate with AVS, DVS-1 or stand-alone routers; 32x32 matrix. **Circle (1984)**  
**Model 112:** production switcher; one mix-effects switcher with program/preset bus; optional configuration for two mix/effects; four linear keyers; memory effects systems; interface to all Utah Scientific routers. **Circle (1985)**

### Vacuum Tube Logic

**Model CR-3A:** studio condenser mic; European styling with cardioid polar characteristic; high-pass filter, -10dB pad. **Circle (1986)**  
**Reference D/A converter:** 20-bit resolution digital input; analog output tube-design uses eight triodes with 20dB headroom. **Circle (1987)**  
**Manley MONOBLOCKS:** audio power amps; tube designs from 50W to 1kW ratings. **Circle (1988)**

### Vantage Lighting

**Ken-Rad DTY:** 10kW halogen lamp. **Circle (1989)**

### Vatek

**Unityworkstation:** 8-input composite, component inputs; D1 option; combines digital switching, video effects, re-entry picture storage for multilayering, montage effects; multiformat I/O; editing control feature. **Circle (1990)**

#### VEAM/Litton Systems

**F.O.M.S.:** fiber-optic mic snake; electronics, 52 audio signals to 1km without crosstalk or RFI; option permits 2-way operation. Circle (1991)

#### Vega/Mark IV

**Q-Plus:** 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; 108dB S/N. Circle (1993)  
**T-680 transmitter:** UHF wireless mic from 600 series UHF systems; 150mW RF covers range to 1,700 feet; internal dipole antenna; DYNEX III processing. Circle (1994)  
**VX-20 wireless system:** for video production, ENG, EFP; R-27 camera-mounted receiver, with T-25, T-28 or T-29 microphones. Circle (1995)

#### VG Electronics

**VGE 1076D/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 (1995)

#### 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 4xFsc; 10-bit conversion to NTSC/PAL. Circle (1996)  
**DX120:** composite digital mixer; 4-bus multilevel mix/effects, key priority, memory; 16/32-bit processing; serial editor interface. Circle (1999)  
**DX 300:** composite digital mixer; 16-/32-bit internal architecture; 23-input, 10 key inputs, all for 8-/10-bit parallel, serial; three MLE systems; integral preview monitor routing. Circle (2000)

#### Video Access Software

**BL9-BL-14:** teleprompting unit. Circle (2001)  
**LT3500+:** laptop teleprompt. Circle (2002)

#### Video Accessory Corp.

**SVDA-1, YCDA-1:** Y/C VDAs. Circle (2003)  
**SV/A-1:** DA for S-video, stereo audio. Circle (2004)  
**XB/VDA:** 120MHz bandwidth DA; 1-inx8-out, two are unity gain; can be used to distribute VCR channel 4 RF signals. Circle (2005)

#### Video Associates Labs

**MicroKey Digitizer:** video-to-VGA digitizer; windowed video VGA preview. Circle (2006)  
**MicroKey/Genlock:** locks signals from MicroKey/A. AV output to video source. Circle (2007)  
**MicroKey/A:** adds digital sound 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 track; collapsible, assembles quickly; loads to 275 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-M36P miniature camera. Circle (2011)

#### Video Design Pro

**Autodesk 3-D Studio:** for VidCAD/AudCAD; 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 standards converter system; low-cost design. Circle (2013)

#### VideoLab Para Technologies

**LCX-108 Logichron:** time-code processor; simultaneous LTC, VITC read, generation functions; new approach to LTC reading demodulates code often not readable by standard methods. Circle (2014)

#### Videomagnetics

**CDS-3500 degausser:** 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 80dB erasure. 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 animation; displays PICT, PICS files; permits mixture of file types in edit list format. Circle (2018)  
**TurboVPC:** edlist management software for VLC-32, SuperMICRON systems; for IBM and DOS type computers. Circle (2019)  
**V-LAN-POD:** extended V-LAN compatible transmitter with full-function VTR transport control switch cluster. Circle (2020)

**VLX modules:** enhanced transport control modules; combines V-LAN-T, V-LAN-R features; downloadable device drivers, slow motion; for IBM, Macintosh. Circle (2021)  
**nTITLE:** interactive titler for still, motion images; by Xaos tools and Silicon Graphics; full character control, character animation. Circle (2022)  
**V-LAN-II:** expanded V-Lan system; time-code reader, generator; downloadable VTR drivers; rack-mounted package. Circle (2023)

#### Videotek

**TVM-710:** combination waveform monitor, vector-scope instruments; facilities include cursors, line selection, SC/H phase measurements; four composite inputs; picture mode display; 3-D mode rotates color bar signal on R-Y/B-Y axes to show all dimensions of video signal. Circle (2024)  
**TVM-720:** enhanced TVM-710 for component analog, composite video; displays two component

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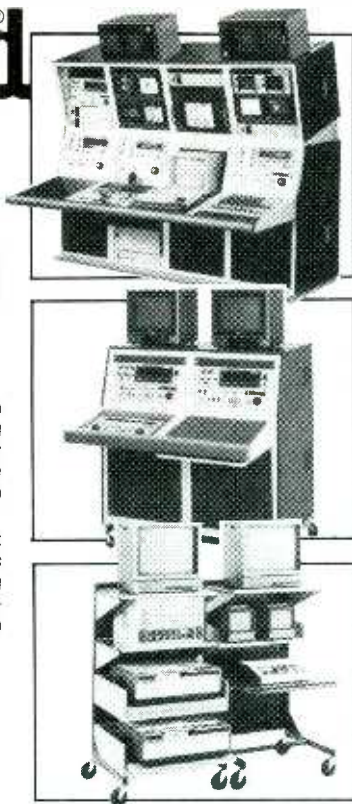
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and two composite, one component and five composite or eight composite inputs. Circle (2025)

**TVM-730:** adds Auto Measure graphics and text on-screen readouts of measurements to TVM-710 package; special 3-D display mode. Circle (2026)

**BTG-100:** hand-held portable SMPTE color bar generator; 8x clock rate used for generation of test signals. Circle (2027)

**Prodigy C:** component analog video production switcher. Circle (2028)

#### Videssence

**Color Wall illuminator:** high intensity, seamless ionic light. Circle (2029)

**Portable Lighting:** small ionic light equivalent to 750W tungsten. Circle (2030)

#### Vinten Broadcast

**Vision CV-5 Corporate:** professional tripod; single-stage, black anodized aluminum; spreader, pan/tilt head, pan bar, clamp. Circle (2031)

**TurboSwift:** 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. Circle (2032)

**MicroSwift option:** graphics tablet operator interface. Circle (2033)

**MTC 200:** Microswift Touch Control; 33MHz PC-based unit; VGA monitor; for simplified multicamera automation setup, operation. Circle (2034)

**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. Circle (2035)

#### Vistek Electronics

**Sound-in-synchs:** dual-channel sound encoder, decoder; rugged algorithm withstands poor quality link conditions; option for V3020/3021 ACLE encoder, decoder units. Circle (2036)

**Vector VMC:** near transparent conversion with Vector V4401 standards converter; VMC Vector Motion Compensation detects moving objects, generates compensating signals for reconstruction of moving images with correct spatial positioning. Circle (2037)

**GM6004, GM6005:** digital, analog-faced clock displays; -6004 can be positioned anywhere on screen; -6005 permits custom-design hands; 4:2:2 product with internal frame store to position clock over backgrounds. Circle (2038)

**V4301:** frame synchronizer; component, composite, Y/C, D1; TBC mode, freeze, grab; corrects video, chroma gain, black level, chroma/luma delay. Circle (2039)

**GM7500 series:** color monitors; tri-stimulus analyzer for auto alignment; assignable inputs for multiple analog, digital component, composite signals; 14", 20" CRTs; automatic and manual input standards selection. Circle (2040)

**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. Circle (2041)

#### 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. Circle (2042)

#### VYVX

**Switched FO network:** demonstrations of FO TV transmission network; remote switching capability. Circle (2043)

#### WaveFrame

**Removeable Optical:** removable, erasable disk media. Circle (2044)

**DSP-X digital mixing:** provides 24-bit digital mixing in a 10x6 mixer card; patchable, cascadable EQ; with MIDI control. Circle (2045)

**MDI-32:** multichannel interface for AudioFrame offering high-definition digital audio. Circle (2046)

#### Wavefront Technologies

**Advanced Visualizer:** 3-D graphics, animation; enhanced rendering, modeling; 32-bit. Circle (2047)

**Data Visualizer:** interactive, multidimensional data analysis. Circle (2048)

**HP support:** Visualizer, Data Visualizer for HP Apollo 9000 Series 700 RISC workstations running UX 8.0 operating system. Circle (2049)

#### Weathernews America

**PLUS:** 3-D graphics for forecast period, transmitted to the station's graphics workstation provided by Weathernews America. Circle (2050)

**Genesis:** complete weather productions sent to the station's graphics workstation; 3-D imaging; script describes forecasts, related graphics. Circle (2051)

#### Wegener Communications

**Series 2900 descramblers:** encryption using VideoCipher II Plus. Circle (2052)

**Series 1900 DBS FM:** subcarrier receiver; for addressible C-/Ku-band point-to-multipoint communications. Circle (2053)

#### Wheatstone Broadcast Group

**TV-600S:** TV production console; Bus Minus IFB; event computer directs router, on-board switcher; optional 8-selector overbridge; two master stereo, two mono outputs for SAP, mono sum output; VCA group masters. Circle (2054)

**SP-40 series:** production consoles. Circle (2055)

#### Wheeler-rex

**Auto tie-wrap:** secures cable bundles with hand-held unit containing reel of bulk tie-wrap. Circle (2056)

#### Whirlwind

**MIX5-SB:** broadcast mixer; 4-channel unit operates from AC or DC. Circle (2057)

**presspower:** active press box; 2-input, 12-mic output; AC/DC. Circle (2058)

**Model P-12:** power amplifier, rated 12W stereo; for headphones. Circle (2059)

Continued on page 133



## D100 NTSC DECODER



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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.

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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.

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High-power TRASAR® antennas for UHF-TV are offered for channels 14-69 and channels in CCIR Bands IV and V. The antennas in this photo are mounted on the SUTRO Tower serving the San Francisco Bay area.



**ANDREW**  
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Orland Park, IL 60462  
1-800-255-1479

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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.



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### CANARE RCA VIDEO CRIMP PLUGS

The worlds first fully crimpable RCA plug for video applications. Reduces assembly time by 80% over older solder type connectors. DC to 200 MHz impedance matching performance with Canare 75 Ohm coax video cable.



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### IK-M40A

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 460 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 (f1.6) and cable length up to 30 meters.



82 Totowa Road, Wayne, NJ 07470  
Phone: (201) 628-8000  
FAX: (201) 628-8755

Circle (106) on Reply Card



### 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 (f1.2 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.



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FAX: (201) 628-8755

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### 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. 708-298-9420  
Fax: 708-635-7946

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### MICROWAVE ISOCOUPERS

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 28 DBi or better
- Insertion loss 6 DBi
- Dimensions 15L x 8H x 8W
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- Connectors-Waveguide Flanges
- Protection Spark Gap



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Mark Antennas Division

P. O. Box 1548  
Des Plaines, Illinois 60017  
Tel. 708-298-9420  
Fax: 708-635-7946

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### 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 f1.8 from 9.5 to 124 mm and f2.2 at 152 mm, and focuses down to 3.1 ft.

For more information, contact John Webb at Fujinon:

(201) 633-5600

 FUJINON

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### 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  $\pm 10$  min. It can accommodate any camera/lens combination weighing up to 8.8 lb., requires a 15 VDC power supply and weighs 4.4 lb.

For more information, contact John Webb at Fujinon:

(201) 633-5600

 FUJINON

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# CASE NAB SHOWCASE NAB SHOWCASE N



### 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**  
**audio line**

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 A20x7ESM 3/4-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 f1.4 remains constant from 7 mm to 124 mm, and varies only to f1.6 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 A20x7ESM can deploy its extender from the lens position, or via a remote demand unit or shot box.

For more information, contact John Webb at Fujinon.

(201) 633-5600

 FUJINON

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### FUJINON ENHANCES WORLD'S BEST-SELLING ENG EFP LENS

Fujinon has made dramatic improvements in its A14x8.5ERM Pegasus III ENG/EFP lens. The servo 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 2.8lb. The A14x8.5ERM has a maximum aperture of f1.7 from 8.5 to 103 mm and f2.0 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.

(201) 633-5600

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### FUJINON 55x FIELD LENS COMBINES LONG ZOOM, CLOSE-UP FOCUSING, AND FASTEST APERTURE

Fujinon has enhanced its A55x9.5 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 A55x9.5 has a minimum focal length of 9.5 mm, maximum focal length of 525 mm, and maximum aperture of f1.4 to 253 mm and f2.9 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.

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## 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!



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## DX300

The DX300 is the most powerful DIGITAL PRODUCTION SWITCHER in daily use world wide today. 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!



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## SHURE VP88 STEREO MICROPHONE

The Shure VP88 is a single-point MS stereo condenser microphone that utilizes a forward facing Mid capsule and a bidirectional Side capsule to create either a classic mid-side output or, via its internal matrix, a left and right channel stereo output. Internal 6V battery or phantom power; supplied with vinyl storage bag, stand adapter, foam windscreen, and Y-cable. List Price \$995.00.

Call 1-800-25-SHURE.



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## SHURE VP64

The new Shure VP64 Omnidirectional Dynamic Handheld Microphone is designed primarily for field interviewing and features sleek, contemporary styling, a neodymium magnet for higher output, internal shock mounting for reduced handling noise, a non-reflective, scratch- and chip-resistant black polyurethane finish, and extremely rugged construction. List price is \$135.00, which includes foam windscreen and stand adapter. Call 1-800-25-SHURE.



Circle (121) on Reply Card



## SHURE FP410

The new Shure FP410—the world's first portable automatic microphone mixer—keeps unused microphones turned down to dramatically improve audio quality and provide a "seamless" mix automatically. With a variety of features useful to broadcasters and news gatherers, the FP410 will find primary applications in the video production, corporate television, radio and TV broadcast, and field production environments. List price is \$1595.00. Call

**1-800-25-SHURE**



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## PRODUCT SHOWCASE

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### Radiomixer

Radiomixer costs no more than "BMX-clones," yet delivers what they can't—it cuts costs without cutting out durability, features or performance. For your copy of the color Radiomixer brochure, call us direct at 619-438-3911.

**Pacific Recorders & Engineering Corporation**  
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### Productionmixer

Productionmixer delivers PR&E's extraordinary reliability, performance and functionality for no more than an ordinary console. For more information and your copy of the color Productionmixer brochure, call us direct at 619-438-3911.

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Ross RVS 630 live, on-air production switcher combines the production power of 30 video inputs, two 4-bus Multi-Level Effects Systems (MLE), complete switcher set-up storage and the Ross Downstream Multi-Keyer with a PGM/PST bus for uncomplicated on-air production; plus offers totally integrated DVE control.



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### WV-F700

The WV-F700, a professional digital signal processing camera with a 2/3" super high sensitivity Interline Transfer (IT) CCD, achieves 750 lines of horizontal resolution, signal-to-noise ratio greater than 60dB, high sensitivity of F8.0 at 2,000 lux, and a minimum illumination of 7 lux at F1.7 at 24dB gain.

The WV-F700 successfully changes the conventional analog circuit of the signal processing section to digital, dramatically increasing reliability, flexibility and compactness and reducing maintenance and camera setup time.

**Panasonic**  
1-800-524-0864

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### AG-7350 and AG-7150

The AG-7350 S-VHS Hi-Fi VCR and AG-7150 S-VHS Hi-Fi player have been introduced by the Audio Video Systems Group of the Panasonic Communications and Systems Company (PCSC). The AG-7350 S-VHS VCR and AG-7150 S-VHS player are ideal for many applications, including video presentations, training videos, video 'newsletters'; and for cable companies, the units are ideal for commercial insertion, as well as other applications.

The units feature outstanding S-VHS picture quality, a 34-pin parallel (or optional RS-232C serial) interface port, advanced tape transport mechanism, 4-channel audio (2 Hi-fi channels and 2 linear channels), and jog/shuttle capability.

**Panasonic**  
1-800-524-0864

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### AG-A770

The AG-A770 multi-event edit controller allows storage of up to 128 single-cut editing events for automatic editing. The edit controller comes standard with the RS-422 9-pin serial interface, or optional 34-pin parallel interface (model AG-IA81) can be installed. Its multiple interfacing capabilities enable editing in MII, S-VHS or interformat editing in MII/S-VHS.

**Panasonic**  
1-800-524-0864

Circle (129) on Reply Card

**Will-Burt**

**Hardlube Mast Finish:** hard anodizing AL surface with permanent Teflon lubricant; longer trouble-free operation of telescoping masts. Circle (2060)

**Winsted**

**TapeCube:** stores small D2 cassettes. Circle (2061)

**Slide kits:** rack-slide kit for Panasonic MII; holds in any position for maintenance. Circle (2062)

**Economy series:** vertical rack cabinets in knock-down or welded models. Circle (2063)

**Wireworks**

**TE-3 mic cable tester:** performs open, case short, conductor short, out-of-phase conditions for each conductor; 9V battery; designed for standard, single twisted-pair plus shield cables with XLR connectors and phone plugs. Circle (2064)

**Wohler Technologies**

**AMP-9:** 2-channel 1-RU powered monitor/speaker; performance similar to AMP series. Circle (2065)

**MSM series:** multi-source metering; LED bargraph arrays in various groupings; VU, PPM ballistics; Phase indicator; one unit houses 16 displays; links to MSM for remote monitoring. Circle (2066)

**ARS series:** audio router; 20 mono, stereo inputs; routed to independent, ganged balanced buffered outputs; balanced, bridging inputs; level, phase indications, audible alarm. Circle (2067)

**10-input option:** enhances AMP units to operate as audio router and HiFi stereo monitor; 25-pin terminal blocks; front panel rotary knob selects desired input. Circle (2068)

**Wolf Coach**

**QD-III:** ENG mast; attaches to ENG vehicle with 2" trailer hitch; 15' mast nests to 48". Circle (2069)

**WSI**

**WEATHERspectrum 9000:** all-in-one workstation; analysis, forecasting, graphic production; NOWrad storm presentations. Circle (2070)

**Yamaha Music**

**S8M speakers:** 3-way monitor for foreground, background music installations; black wood-grain finish with black grill cloth; base-reflex cabinet; 8" LF driver, 5" MF driver, 3" tweeter. Circle (2071)

**DTR2 recorder:** R-DAT recorder with Delta-Sigma A/D conversion; four types of I/O connections; twin 24-segment peak metering; achieves 103dB S/N, 96dB dynamic range, 100dB separation, 0.0025% THD. Circle (2072)

**DMC 1000:** digital mixing console; 14-input with eight mono, three stereo; eight monitor input channels; mixing, EQ, level control, processing, routing performed in digital domain without intermediate conversion to analog. Circle (2073)

**PC4002M professional:** monitor amp for studio listening environments; 700W/channel into 4Ω; 10Hz-50kHz response, 0.005% THD; calibrated meter level controls per channel. Circle (2074)

**YPDR:** compact disc recording system using WORM drive; numerous applications include replacement of cartridge tape. Circle (2075)

**Zaxcom Video**

**TM100 Taskmaster:** automatic TBC adjustment, timing unit; interface to TBC/D2 control for automatic tape setup; single keystroke adjusts level, setup, chroma, hue. Circle (2076)

**D1 Toolbox:** processor for D1; gain control, digital limiting, filtering; key inputs; CCIR-6601 10-bit processing of 525-/625-line signals. Circle (2077)

**Zephyr Weather Information**

Lightning data: nationwide service for instant information about cloud-to-lightning strokes in regions or the nation. Circle (2078)

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# Preview

July...

## AUDIO TECHNOLOGY UPDATE

### • Digital Audio Broadcasting Arrives

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. Unfortunately, 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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