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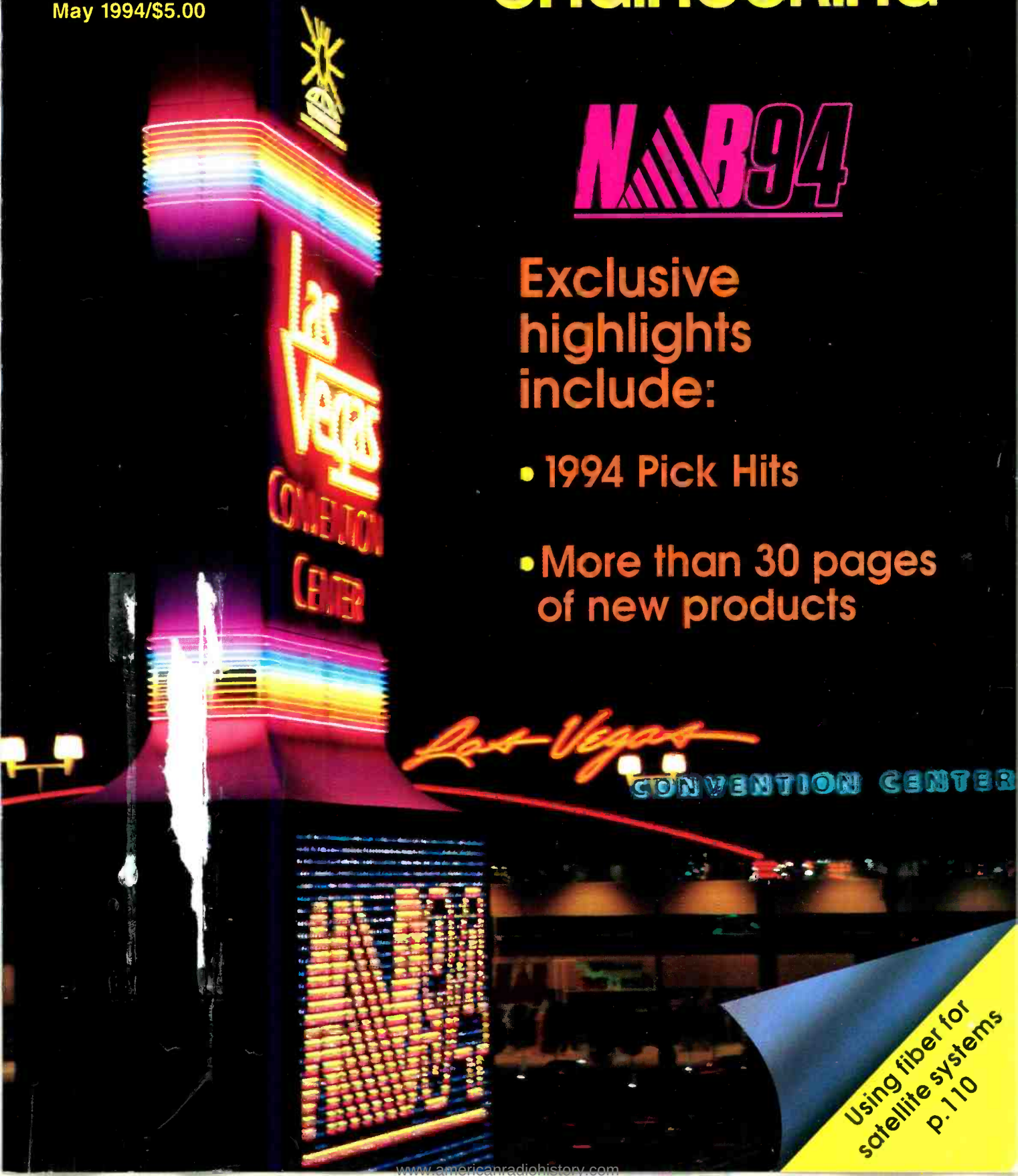

NAB94

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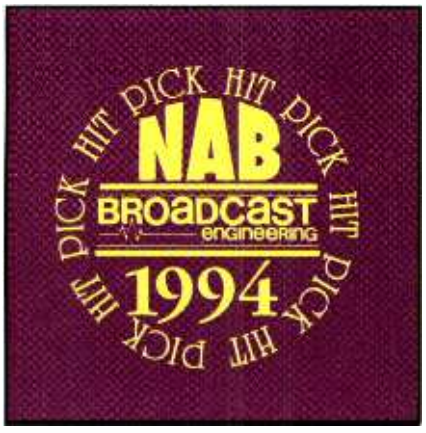

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NAB CONVENTION REPLAY:

In mid-March, more than 70,000 broadcast and production pilgrims completed their annual return to a relatively small city in the heart of the Nevada desert. This month's feature coverage looks at the spectacular event that drew them – NAB 1994.

THIS MONTH...

ON THE COVER: Cover photo by Douglas Schwartz.

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INNOVATION AT WORK.

News

By Dawn Hightower, senior associate editor

NAB wants changes on assessment of regulatory fees

The National Association of Broadcasters (NAB) has asked the Federal Communications Commission (FCC) to make several important changes in the way it assesses regulatory fees for radio and TV stations.

In comments to the FCC, NAB said that the 1994 user fees for radio stations are unfair. NAB cited a Congressionally-developed FCC fee schedule that charges all radio stations in a certain class the same regulatory fee. The FCC found that the statute prevents it from granting radio station relief for fiscal year 1994, but FCC relief could be granted for fiscal year 1995, said NAB.

To provide relief to radio stations, NAB is urging the FCC to base the radio station fee structure on the same scheme used for TV stations. The TV fee scheme adjusts regulatory fees to reflect the size of markets that broadcast TV stations serve.

In additional comments to the FCC, NAB asked regulators not to charge satellite TV stations, which largely repeat the programming of the parent TV station, the same regulatory fee designed to cover the government's full cost of regulation for a regular TV station. NAB also wants the FCC to establish one method to determine the size of TV markets and to develop TV regulation fees.

NAB also suggested that broadcaster payments to the FCC be deemed timely if they are postmarked by the due date rather than requiring the payments to be received by the due date.

PBS begins testing of ATV transmission technology

In April, the Public Broadcasting Service (PBS) started ATV field tests in Charlotte, NC. Testing of the advanced digital TV technology should deliver supersharp images and audio and will last about three months. It involves the digital transmission technology that will be used in the high-definition TV system developed by the Digital HDTV Grand Alliance.

The test is expected to prove that digital signals can be received over at least the same area that standard NTSC signals are received. The digital data test signals will be measured and evaluated at hundreds of sites in and around Charlotte. PBS is managing the field test in cooperation with the Association for Maximum Service Television (MSTV) and CableLabs.

NAB criticizes plan to hike FCC user fees

The Clinton Administration's proposal to help states pay for jailing illegal immigrant felons by hiking user fees for broadcasters and other FCC-regulated industries, has been called "unfair and outrageous" by the NAB.

In a letter to the Office of Management and Budget (OMB), NAB president and CEO Edward O. Fritts, said that although the program may be a noble one, there is no logical basis to connect this Justice Department program with FCC user fees.

NAB names new VP of legal affairs

Jack Goodman has been named vice president/policy counsel, legal and regulatory affairs, by the National Association of Broadcasters (NAB). Goodman, who joined NAB in 1990 as special counsel, will be responsible for developing and coordinating NAB regulatory and legislative policy objectives. He will work with executive vice president/general-counsel Jeff Baumann.

International News

Survey on tapeless technology in radio

Due to a growing interest in digital and random access technology, SYPHA, an independent consulting firm in the UK, is conducting a survey on tapeless technology for radio. The purpose of the survey is to gauge the market response to the technology by providing feedback from the user's point of view. The survey coverage will range from systems for simple cart replacement, to editing systems and systems aimed at full automation. Survey results should be available by September 1994. For more information, contact: SYPHA, 216A Gipsy Road, London, SE27 9RB UK, phone +44 81 761 1042; fax +44 81 244 8758. ■

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Editorial

Gold medal coverage

Editors are proud of their magazines, and often quick to tell you so. We and our staffs spend a lot of time and effort to produce each issue. For instance, the issue you are now holding is the result of several months of intensive planning and hard work. In fact, more work and effort are required to produce each of our NAB preview and review issues than any three regular issues.

What's particularly satisfying is that the May issue of *Broadcast Engineering* magazine represents an even higher level of product excellence. *BE* has always presented readers with the most comprehensive coverage of the NAB Convention. Our pre-show and post-show issues are the largest and most sought-after magazines of the year.

Despite our success, this year we embarked on an even more ambitious plan. Our goal was to bring to you a more comprehensive look at the new products on the convention floor, and to do so from the perspective of people who live and breathe the industry and technology like you do — fellow engineers and managers.

Starting with our regular staff of five *BE* editors, which by the way, are all former broadcast engineers, we built a veritable army of reporters. The difference is that our reporters didn't come from a journalistic (non-technical) background and they don't write for a living. Rather, the reporters we chose for our show coverage design, build and maintain the same type of facilities you do: radio and TV stations, post-production houses and cable networks and head-ends. They are engineers and managers — just like you.

To these 18 engineers, we added eight more trained editors and reporters to the convention to ensure our coverage was the most complete and accurate anywhere.

Our staff visited every booth at the show, and many companies were visited more than once by different reporters. Each reporter was assigned to write not about companies, but about specific technologies. This allowed us, for example, to send a camera expert to each camera manufacturer and that's all he covered. He wasn't there to cover everything the company had to offer, just cameras. This approach was followed for more than 20 different types of technology.

The result of our commitment to you is the most in-depth, thorough and exhaustive coverage of the NAB convention exhibits ever before available. It wasn't easy and my staff will tell you so, but this May issue shows that it was well worth the effort.

In your hands are more than 40 pages of NAB exhibition coverage representing hundreds of new products and services. If it was at NAB, you'll find it covered here.

For those readers who attended the show, but know they missed some booths, and for those who didn't get to go, this issue will fill those information gaps.

So read on. You are about to enjoy the gold medal of convention reports. NAB 1994, covered in exhaustive detail like you've never seen before.

Brad Dick

Brad Dick, editor

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FCC Update

FCC freezes broadcast application processing

By Harry C. Martin and Andrew S. Kersting

In a recent decision of the U.S. Court of Appeals for the D.C. Circuit, *Bechtel vs. FCC,* the court invalidated the FCC's long-standing integration policy. As a result, the FCC is temporarily suspending the processing of applications and the hearing and settling of proceedings that involve mutually exclusive proposals for new broadcast facilities while it re-evaluates its comparative criteria. During the freeze, the Mass Media Bureau will not issue cut-off lists or adopt windows for new FM filing opportunities. Also, amendments, integration proposals or hearing fees will not be required to be filed. The FCC's judges and the Review Board will continue to issue decisions only in proceedings in which consideration of the applicants' comparative qualifications is not necessary to resolve the case.

NRSC-2 AM compliance reminder: After June 30, all AM stations must comply with NRSC-2 emission limitations, as set forth in Section 73.44(b) of the FCC rules. See April's "Re: Radio" for more information.

Ownership reporting requirements

Commercial stations. Each licensee of a commercial broadcast station must file an annual ownership report on FCC Form 323 on the anniversary date that its renewal application is required to be filed. The only exceptions are sole proprietorships and partnerships comprised entirely of individuals. Licensees owning multiple stations with different anniversary dates are required to file only one report per year on the anniversary date of their choice. The reports shouldn't be more than a year apart. In lieu of filing a new report, licensees with a current and unamended report on file may certify the accuracy of their current report.

Non-commercial stations. Licensees of non-commercial stations are required to file an ownership report on FCC Form 323-E when they file their renewal application. Licensees owning more than one non-commercial station are required to file only one ownership report at 5-year intervals for TV stations, and 7-year intervals for radio stations. Licensees are required to file supplemental ownership reports within 30 days after any change occurs in the information required by a previous report. This includes any change in organization, officers or directors, and any transaction affecting the ownership (direct or indirect) or voting rights with respect to the licensee or permittee, or of any stock interest.

Ownership documents. All licensees are required to file, within 30 days of their execution, copies of contracts relating to the present or future ownership or control of the licensee. These documents include such papers as articles of incorporation, bylaws, partnership agreements, and agreements concerning the ownership or voting rights of the licensee. The documents also include:

- pledge, trust and option agreements;
- proxies;
- mortgage or loan agreements containing provisions restricting the licensee's freedom of operation, including those affecting voting rights, specifying or limiting the amount of dividends payable, the purchase of new equipment, or the maintenance of current assets;
- management consultant agreements;
- local marketing agreements when a station brokers more than 15% of the time on another station in the same market (both stations must file); and
- agreements for the sale of a station or an interest in one.

June 1 deadline to comply with FM translator revised ownership rules

On Nov. 8, 1990, the FCC amended its FM translator rules. An FM translator may not be licensed to a commercial FM broadcast station if the translator's coverage contour extends beyond the primary station's coverage contour. The rules were also amended to provide that commercial FM broadcast stations may not provide financial support beyond technical assistance to FM translators, except those translators providing service to white areas. FM translator stations operating prior to March 1, 1991, will be "grandfathered" with respect to complying with the revised ownership and service rules for three years from the effective date of March 1, 1991. After the date was changed to June 1, 1991, the termination of the grandfathered provisions was extended until June 1, 1994. To eliminate any confusion about the modified effective dates, the FCC issued a Public Notice on Feb. 25, 1994. The notice was to remind all FM translator licensees operating prior to June 1, 1991, that the grandfathered provisions terminate on June 1, 1994. After that date, all FM translators must comply with the ownership and service rules.

California AM broadcaster fined for exceeding power limits

The FCC's San Diego office and the Mass Media Bureau in Washington, DC, received an anonymous complaint alleging that a station in the San Diego area was reducing its operating power at sunset. However, it was increasing its power back to its permitted daytime level after the local FCC field office closed for the day. The San Diego office conducted an investigation by taking field-intensity measurements on 10 different dates. The station is required to reduce its operating power at sunset to protect other co-channel stations at nighttime. The investigation revealed that during the night on each of the 10 dates, the facility was operating at approximately its authorized daytime power level. The FCC fined the station $20,000 for these violations. ■

Date line

The deadline for filing 1994 annual employment reports is May 31. Annual ownership reports or certifications for commercial broadcast stations in the following states must be filed by June 1: Arizona, Idaho, Maryland, Michigan, Nevada, New Mexico, Ohio, Utah, Virginia, Washington, DC, West Virginia and Wyoming.

Martin and Kersting are attorneys with Reddy, Begley & Martin, Washington, DC.

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* 11 ounces

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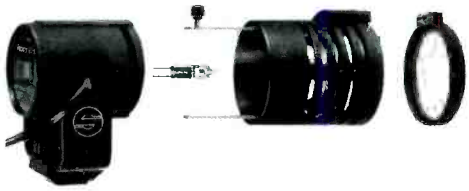

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Part 1

Strictly TV

HDTV roundup

State of HDTV

By Curtis Chan

This month and next month's column will center on the state of HDTV progress and will take a closer look at the 5.1 channel Dolby AC-3 audio technology. But for those of you that did not attend NAB this year, a brief recap of FCC chairman Reed Hundt's speech is in order.

Chairman Hundt's big three

Hundt summed up his vision of the broadcasters' future when he addressed the more than 71,000 NAB attendees by satellite from Buenos Aires. In his speech, Hundt talked about application of his three themes: 1) access, 2) reinventing the government, and 3) economic growth.

Citing House Energy and Commerce Committee chairman John Dingell, Hundt referred to broadcasters as public trustees and quoted his predecessor, stating that broadcasting is the glue that helps hold America together. He said the FCC will work hard to preserve strong, diverse, creative, free, over-the-air broadcast service.

On reinventing government, Hundt said the commission will "take another whack at regulatory underbrush," urging listeners to call Mary Beth Richards, who is heading up the commission's reinventing government initiative, at 202-418-1000, with suggestions.

Hundt also stated that some broadcasters feel the FCC is making a mistake by penalizing broadcasters with monetary forfeitures instead of encouraging compliance through warnings and nonmonetary penalties. Reinforcing this, he stated that broadcasters who make good faith efforts to comply with the commission's regulations should not have their licenses jeopardized by immaterial, unintentional violations of the rules.

Finally, Hundt stated that broadcasting is a strong, thriving business...but the FCC can help broadcasters do even better by acting more quickly on certain matters, examining the commission's ownership rules, analyzing new technologies and the development of the information highway – and the global information infrastructure.

HDTV takes shape

The proposed U.S. system places heavy emphasis on computer-compatible progressive scanning techniques and the use of MPEG 2 compression and decompression techniques. The submitted system is comprised of a layered architecture and is represented by multiple picture formats and frame rates along with a flexible transport channel that shares the video and audio signals.

Last October, the alliance decided on four main technologies for the digital HDTV system: 1) digital video compression technology based on MPEG 2 attributes, including the use of B-frames; 2) data transport based on packets; 3) interlaced and noninterlaced scanning capabilities; and 4) the Dolby 5.1 channel AC-3 audio technology.

On the issue of scanning formats, the alliance decided on several to provide a migration path to the final goal of 60fps, 1,920x1,080 progressive. In the meantime, there will be 24fps, 30fps and 60fps progressive scan with a pixel-by-line format of 1,280x720 and 24fps and 30fps progressive scan with a format of 1,920x1,080. At present, the system will also perform a 60fps interlaced 1,920x1,080 scan.

Figure 1. The various levels and profiles of MPEG 2.

MPEG 2's role

MPEG 2 forms a major part of the evolving standard and is best described in Figure 1. MPEG 2 is basically a tool kit with a range of compression grades that vary in performance and price.

The elements that can be called profiles (X-axis) are compared to the various formats or levels (Y-axis). The profile refers to one of the four types of compression: simple, main, SNR scalable and high 4:2:2. A given decoder can work at its own profile and its own or lower level. Following the chart, a decoder with a simple profile uses only forward motion prediction. Moving up the chart, a main profile implies the use of bidirectional prediction to improve picture quality (requiring two frames of storage). Of course, operating at different levels requires different data rates as depicted.

It is also interesting to note that MPEG 2 doesn't specify any details of how the hardware or software are implemented to produce the stated performance levels. However, the given syntaxes do imply many things. For instance, for any given profile, the decoder's throughput and memory specs are pretty much locked in. Also, the chart's profiles and levels provide the data necessary to deal with compressing, transmitting and decompressing different types of pictures.

In the end, the optimum compression scheme will depend on picture content and will require a compromise between spatial resolution, frame rate and the amount of noticeable compression artifacts. ■

Chan is president of Chan and Associates, a marketing and public relations service company for audio, broadcast and post-production, Fullerton, CA.

Part 5

Management

Departmental motivation

Individual employee motivation

By Rick Morris

Joe has good working relationships with his employees. This comes from the fact that he knows what motivates each member of his staff. He has taken the time to learn what makes his employees work. He understands that some of his employees always want to work on the latest project, while others want to supervise, or others are willing to work long hours to earn overtime. One of his engineers just wants to put in his eight hours and go home. In order to be an effective manager, you need to understand what individual incentives and feedback will lead to greater productivity and job satisfaction.

Employees are individuals

Motivational factors are personal to each employee and vary over a person's career. For example, money, frequently considered to be a key source of employee motivation, is not the most effective motivator, nor the one a station wants to use. However, there are times in an employee's career when money may be a motivational tool.

Principally, money is important early in an individual's career, especially in the beginning wage steps, when there may be high family expenses or if the station's pay scale is driven too low. Generally, however, a station paying market wages will find less success with money as a motivating factor than other motivational techniques, such as job recognition, increased responsibility and making the employee feel that his contributions are valuable to the job.

Motivational factors vary from individual to individual and vary across an employee's career. An excellent manager understands what is important to his employees and how to create a situation that motivates each employee to produce his best.

The "classical" theories of individual motivators

Money as a motivating factor is generally now less effective. When an employee accepts a job, he has already determined whether he can live on the salary offered. With few exceptions, in order to hire and retain good employees, the salary structure within a station must be competitive. Therefore, a manager must turn to other means of motivation.

There are several different theories on motivation, but they can be rationalized, summarized and combined with real world experience to give practical guidance to the engineering manager. One classical theory involves the "needs hierarchy," which involves meeting a person's basic needs regarding food, shelter and security. Once these are met, an individual's needs move to higher, more personality-oriented needs. Other research has shown a similar 2-part set of factors involved in motivation. These include maintenance factors, such as salary, job security, getting along with coworkers and work conditions. The second type are motivational factors and include achievement, recognition, advancement, status, power and affiliation. All of these motivational factors are discernible and usable to broadcast managers. Identifying and providing satisfaction for personal goals is an overwhelming key to motivation.

Therefore, the engineering manager can see that before proceeding to higher levels of individual motivation, a good manager must determine if there are *dismotivational* issues. These are structural issues, such as whether there is a good working environment and whether the salary is reasonable. Once these issues are identified and met, the most effective motivators will be those that match the needs of the employee. In determining the framework for individual motivation, try to appeal to self esteem and a sense of achievement before resorting to financial rewards.

Individual motivation on the job

Successful motivators will lead to greater productivity and to greater job satisfaction. This, in turn, reduces employee turnover and the costs associated with training replacements.

So what works as individual motivational techniques? Individual recognition, challenge and reward work best. Never forget to praise a job well done. No matter how busy you are, the most important job you have is *employee management.*

> ***An excellent manager will know what motivates his employees.***

Making an employee feel his contributions are valued and important leads to increased satisfaction. Take the time to give your employees feedback. Then evaluate your method of making job assignments. Do you repeatedly assign the same work to the same people? Is there a way you could challenge or train each employee by giving each one a job assignment that would lead to personal growth? Growth and advancement are important motivators.

The ability to advance is important to satisfaction and long-term retention of employees. Also, do you have a method for progressively assigning more responsibility to those who want it? Can a person move up in your department? Is there a recognizable method for a person to gather more responsibility between promotions? Do you have a formal public method of recognizing performance? A well-administered employee award program can recognize and provide tangible feedback and reward for a job well done. The rewards can be modest, such as dinner for two or a name on a plaque. Public recognition is the important component. An awards program can help satisfy the need for recognition.

Finally, are you sensitive to those who would like overtime when offered and those who would rather spend time with their significant others? Some employees will desire overtime; others will be motivated by additional time off. These practices, appropriately applied, will lead to increased individual motivation. ■

Morris is an assistant professor of radio/TV film at Northwestern University. He is a former TV manager at station network levels.

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Circle (4) on Reply Card

Using cellular phones for IFB

By Philip Hejtmanek

Most TV stations have some scheme to radiate an interruptible foldback (IFB) communications signal to talent and technicians in the field. (An IFB signal provides program audio that is momentarily interruptible by a control room director's verbal communications.) Getting IFB around the service area in a wireless manner usually involves a dedicated audio subcarrier on the station's broadcast channel or a separate RF link on a 2-way radio frequency. Both of these solutions fail, however, when the remote site is outside of those transmissions' coverage range. In that case, a telephone backfeed can be used to get IFB to the remote site, but only at remote sites where phone lines are available. The remote crew may also be inconvenienced by the inherent tethering of a telephone IFB approach.

Because ENG crews are typically faced with tight deadlines, any solution to this problem also has to be quick and easy to use. At WBBM-TV, Chicago, this challenge was met with development of a versatile wireless IFB suitcase package.

Two hops are better than one

The system uses a cellular telephone to receive station IFB, via a dial-up, auto-answer telephone circuit in the news audio control room. If a wired telephone line is available at the remote site, it can be used instead. IFB audio from either telephone service is then fed to the input of a remote pickup (RPU) transmitter, which is received by a pager-type cue receiver or hand-held radio worn by the reporter. (See Figure 1.)

The components of the system are assembled into a single, small (23"x19"x8") shipping case, with 115VAC or 13VDC powering options. (DC power comes from two ENG camera batteries.) The cellular telephone is a mobile unit, with the handset modified to provide an earpiece feed. The cell-phone and the RPU transmitter are bolted into place in the shipping case, along with the AC power supply, power source selector and landline telephone interface. The latter is a commercially available, line-seizing phone coupler, which is inserted into an existing phone line at the remote site via RJ-11 (modular) connections between a telephone instrument and its wall jack. The remote crew uses the phone at the remote site to place a call to the station's IFB line and then switches the coupler on and hangs up the telephone receiver.

A 600Ω/600Ω audio transformer should be used to isolate the telephone systems from the RPU transmitter (if the RPU transmitter's line input doesn't already have one). The audio input gain control on the RPU transmitter allows adjustment of IFB level to talent.

The cellular phone and the RPU transmitter use magnetic-mount mobile antennas, either of which can be extended from the shipping case by a 50-foot length of RG-58 coaxial cable carried in the kit. By extending the RPU transmit antenna, the case can be left in a good location for maintaining cell-phone contact (such as outside a building or above ground) while the reporter works in an RF-shielded area (such as deep within a building or in a subway tunnel).

Variations on a scheme

Generally, the RPU transmitter output power is throttled back to only one or two watts. For covering a larger area outside the station's coverage zone, however, where several different reporters or locations are involved (such as the Chicago Bears training camp at the University of Wisconsin at Platteville), the RPU transmitter's power can be increased to approximately 10W. Of course, careful frequency coordination is necessary to prevent interference with other users around the remote site.

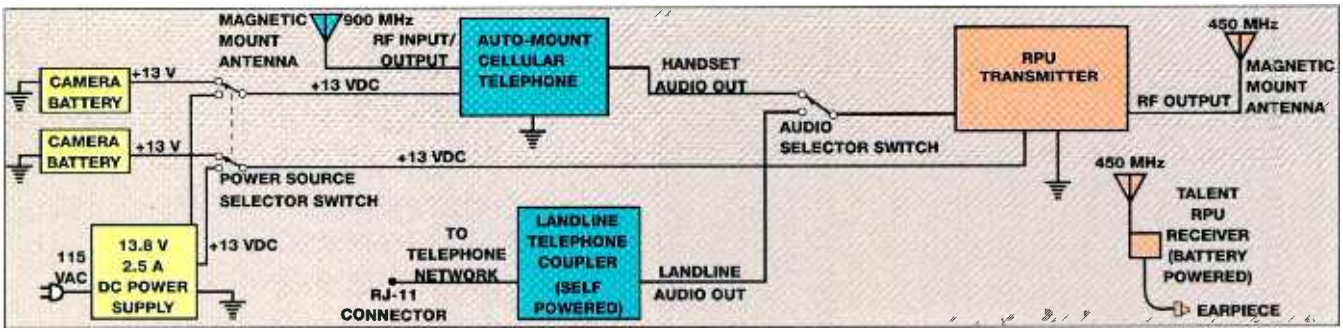

Figure 1. Block diagram of a remote wireless IFB system.

When using an SNG link for remote backhaul, the IFB program audio signal fed from the station must use a *mix-minus* (i.e., a mix containing all sources *except* the remote feed) instead of the usual station air signal to avoid the reporter hearing his voice with satellite delay over the IFB.

This versatile IFB system has been used for several years at WBBM-TV and is considered an essential ENG tool. It is simple and inexpensive to build, especially if your station already has a portable RPU transmitter. It travels well and can easily be customized to suit the specific requirements of your station. Your reporters also will enjoy the freedom of unwired communications. ■

Hejtmanek is manager of maintenance and RF operations at WBBM-TV, Chicago. Respond via the *BE* FAXback line at 913-967-1905.

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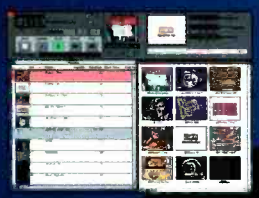

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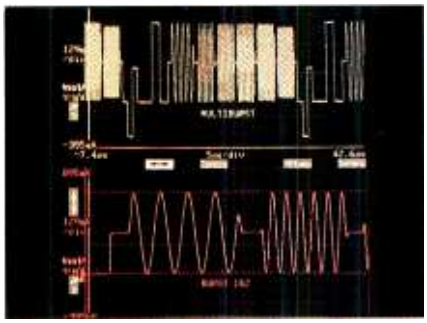
Part 2

Troubleshooting



LAN technology

Hardware requirements

By Kevin McNamara

Last month, the seven layers comprising the Open Systems Interconnection (OSI) were described. While moving through the OSI, the data is packetized, framed with header information and passed to the physical layer for transmission. The physical layer describes the physical hardware required to attach computers to a network. As a station engineer you will have to deal with the hardware side of networking.

Network interface card

Just as you need a modem to communicate with another computer over a telco line, a Network Interface Card (NIC) is required to attach a PC to a network. Every device with an NIC installed and connected to the network is called a *node*. It's possible to have more than one NIC installed in a computer. Let's say the sales and business offices each have a dedicated network. To join them, add a second NIC to one computer on each network, then connect the second NIC to each other. When the proper software is loaded on each network, they will communicate. A PC with this configuration is called a *router*.

The NIC is typically installed in an unused slot on the PC and, therefore, accesses data directly from the internal data bus. All NICs have a unique address burned into the ROM, which is what the network uses to locate the NIC.

Network connections fall into two categories:

1. *Bounded mediums,* which are essentially all types of cabling, including fiber optics.
2. *Unbounded mediums,* which are connections made by wireless means, such as satellite, microwave or laser links.

It is important to look at some *channel access methods*. What actually happens when data leaves a computer attached to a network? It is handled at the datalink layer (located above the physical layer). Channel access methods are defined in three basic ways:

1. *Token passing.* The computers are attached in a ring-like arrangement. A *token* bit is then passed to each PC. Because only one token is available, only the PC possessing the bit can transmit. Examples of this are token ring, ARCnet or FDDI.
2. *Contention.* Any device on the network can transmit when it wants. If two or more transmit at the same time, each will wait a random interval of time to retransmit. This is called *carrier sense multiple access/collision detection.* Ethernet (802.3) uses contention as an access method.
3. *Polling.* A file server in control of the network sequentially *polls* each device. This method was used in some early network implementations, but few systems remain in use today.

Token passing and polling are considered *non-contention*-type access methods — delivery of data is predictable, even under heavy usage. This characteristic lends itself to automation or data acquisition applications, though the speed of data through the system is usually slower than networks using the contention method. Contention is the access method of choice for most users of PC-based networks.

Cabling

Cables used for networks fall into three categories. In addition, limits are placed on the maximum distance between devices on the network bus, also known as *segments*:

- *10Base5* — also known as *thick ethernet*, uses RG8 or RG11 coaxial cables limited to 500m segments. Thick ethernet is used mainly as a backbone of the network bus. In this configuration, cables are connected to transceivers, which are then attached to the PC using a multiconductor jumper.
- *10Base2* — also known as *thin ethernet* or *Cheapernet*, uses RG58 coaxial cable limited to about 185m segments.

The RG-58 cable is daisy-chained to each device on the network bus, fitted with 50Ω male BNC plugs and attached to each device with a BNC "T" adapter. Both ends of the network bus must be terminated into a 50Ω load.

- *10BaseT* — also known as *twisted pair ethernet*, operates differently than the coaxial mediums. The devices in networks that use unshielded twisted pair (UTP) do not connect directly with each other, but to a common *hub* in a star arrangement (as opposed to a bus). The hub is a multiport device that can be passive or active. Active hubs can automatically block out a port that has failed (maybe due to a bad cable), in order to maintain proper communications through the remainder of the system. A passive hub is essentially a 50Ω combiner network and requires that each port be properly terminated at all times. This is used with coaxial ARCnet networks.

UTP can be purchased in several grades, and is typically terminated with RJ-45-type modular plugs. In larger installations, wires can be terminated on special punchdown blocks for ease of reconfiguration.

These are some of the key elements used to assemble a network. Many books cover the subject in detail. Next month we'll look at the software for dedicated and peer-to-peer-type networks. ■

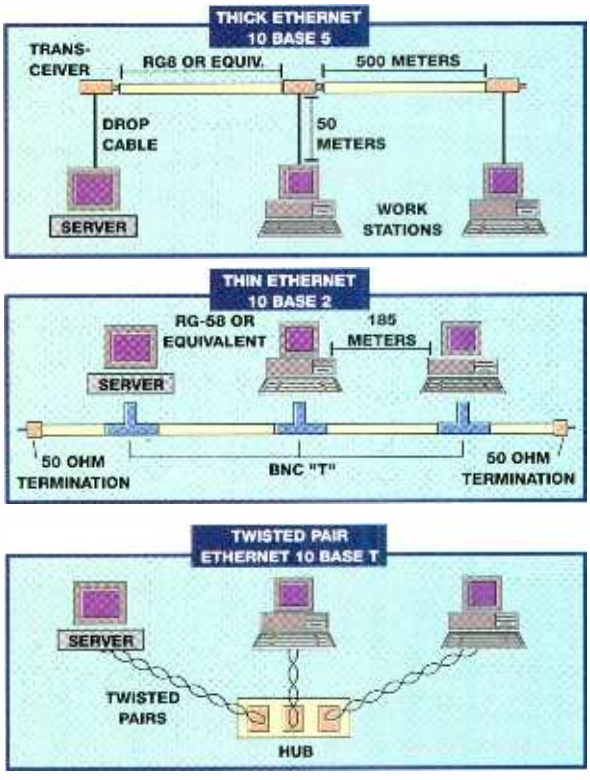
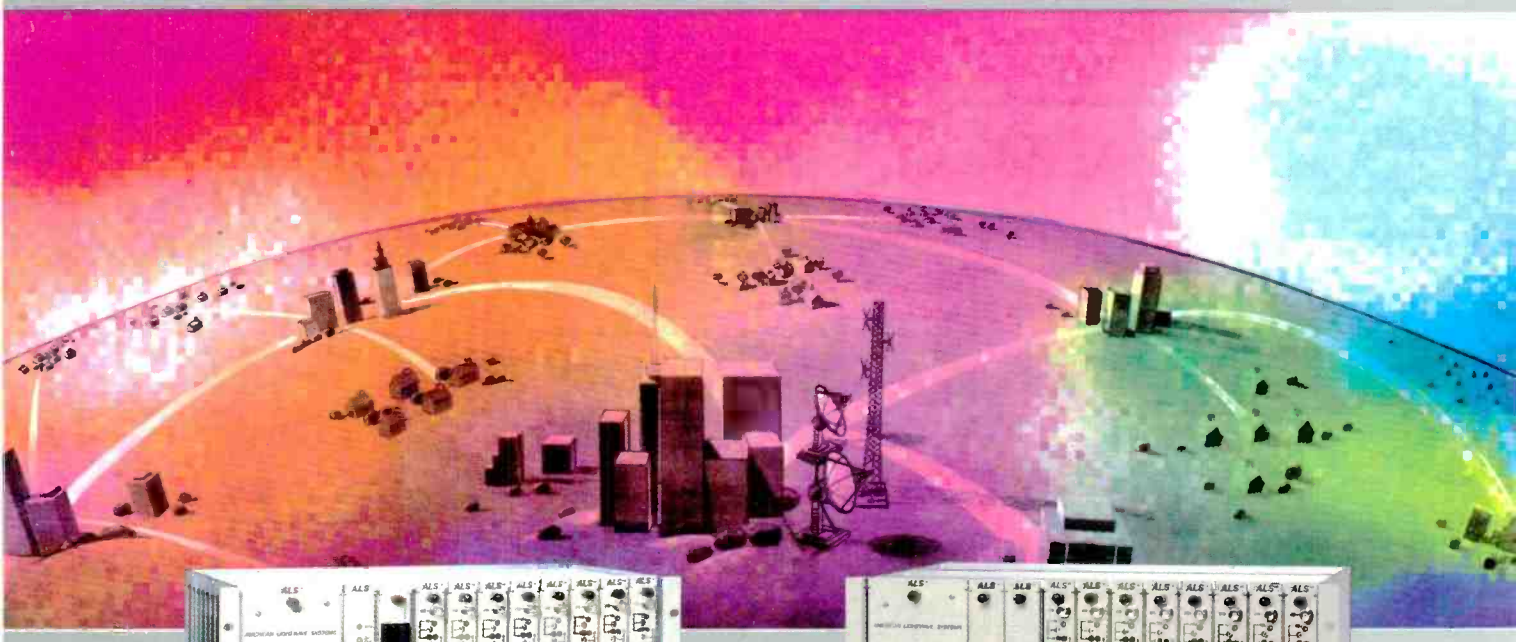


Figure 1. Equipment and wiring layouts for various network configurations.

McNamara is engineering manager for WGAY/WWRC radio, Washington, DC.

THE FUTURE IS REAL



The DV6000, 2.4 Gb/s, sixteen channel system with powerful drop/add/pass capability

DV6010, 1.3 Gb/s eight channel system, available also with Smart Alarm Panel (not pictured)

American Lightwave Systems brings uncompromised video quality and channel management flexibility to fiber video transmission. The DV6010™ and DV6000™ are high speed digital transmission platforms with eight and sixteen channel per wavelength capacities. Video and audio encoding does not employ waveform processing or compression, thereby eliminating artifacts. With 10 bit encoding, RS-250C short haul specifications are exceeded. Audio is 20 kHz bandwidth and CD quality. Encoders and decoders are universal, and are available in a wide variety of formats. DS3/DS1 telephony channels may also be transported simultaneously. DV systems also support module and fiber path redundancy.

These systems are completely modular, compact, and NEBS compatible for telephony installation. The eight channel DV6010 provides bidirectional transmission within a single shelf and is ideal for point to point applications. The sixteen channel DV6000 has powerful channel drop and insert capabilities and is ideal for creating multipoint ring and star networks for metropolitan areas.

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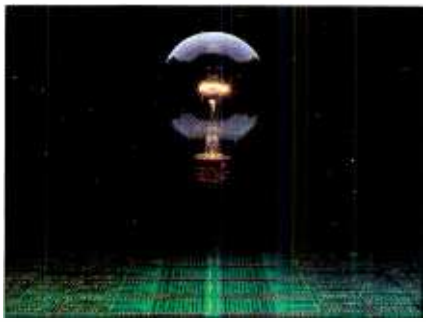
Circle (76) on Reply Card

Real-time MPEG 2 decoder



By Curtis Chan

By the time you read this, a new single chip (160-pin QFP), real-time MPEG 2 video decoder called the Videomax (CL9100) will have made its debut at NAB. In addition to MPEG 1 and MPEG 2 video decoding (no host decoding required), it provides a number of additional features to help reduce the overall system cost for consumer applications. The chip features a programmable architecture that allows the designer to customize the decoder's functionality to the application's needs. Some of the features include:

- Real-time decoding of MPEG 1 and 2 up to CCIR 601 resolution of 720x480 at 30Hz (NTSC) or 720x576 at 25Hz (PAL)
- Supports field- and frame-encoded input bitstreams
- Supports error detection and concealment
- Supports pan and scan for 16:9 source material
- Converts 24Hz source input to video frame rates using 3/2 pulldown (for 24Hz to 30Hz) or 1/1 pulldown (for 24Hz to 25Hz)
- Supports up to 16Mb/s sustained input data rate and has 8-bit host interface
- Supports audio/video synchronization using the MPEG presentation time stamp and decode time stamp
- Power consumption is less than 2W and has a dual power supply: 5V (I/O), 3.3V (internal circuits).

MPEG 1 and MPEG 2

When MPEG began the task of specifying a syntax for compressed digital video, the goal was the delivery of video on a CD (1.416Mb/s). Aware that it was impossible to represent a CCIR 601 resolution image at such a low data rate, they specified a one-fourth resolution image (352x240 NTSC and 352x288 PAL) as the standard input format (SIF). As a result, the committee made MPEG 1 frame oriented rather than field oriented. When decoded, the SIF resolution video expanded to fill a full TV screen, resulting in image quality similar to VHS.

Broadcast equipment companies recognized the potential of MPEG technology to increase the channel efficiency of satellite transponders, but they were not limited to CD bandwidths and were unwilling to settle for VHS resolution. As a result, the MPEG committee developed a second standard (MPEG 2) designed for broadcast applications. The MPEG 2 standard specifies 704x480 NTSC and 704x576 PAL resolutions at data rates of 4Mb/s to 8Mb/s. MPEG 2 also supports interlaced fields, 16:9 aspect ratio, multiple video channels in a single system stream, and extensibility to HDTV. Also, MPEG 1 is a subset of MPEG 2, so any MPEG 2 decoder will be able to decode MPEG 1 syntax video.

Video to the max

Six main attributes make up the Videomax: host interface, video interface, DRAM interface, input, decode and display processes. (See Figure 1.)

Host interface – The host interface is used for initialization and status reporting. It uses an asynchronous protocol compatible with MC68008-like processors. Transfers between the host processor and the Videomax are mapped through a set of eight I/O registers and access can be either local or internal. The data interface can support sustained data rates of 16Mb/s, 25Mb/s peak rate in serial mode and up to 40Mb/s in byte mode for a duration of 128 bytes.

Video interface – The video interface provides horizontal and vertical interpolation for pixel data. It reads decoded frames from the frame buffer and performs horizontal filtering to convert from input resolution of 352, 480, 540 and 704 pixels/line to the output resolution of 720 pixels/line.

DRAM interface – This interface provides support for standard DRAMs and the array can be configured using a 32- or 64-bit data bus. Full CCIR 601 applications that use I, B and P frames require a 64-bit-wide data bus and 2MB of DRAM while lower resolutions or CCIR 601 that use I and P frames only require a 32-bit bus and 1MB of DRAM.

Input process – The input process transfers data from the the host interface to the bitstream buffer. When the bitstream buffer is full, the input process is disabled or the chip can be programmed to handle a near full buffer automatically to prevent buffer overflow.

Decode process – The decode process manages the MPEG 2 decoding operations, which includes VLC decoding, dequantization and inverse DCT. Motion compensation vectors are used to compute addresses for fetching reference data from local DRAM. Decompressed pictures are stored temporarily in local DRAM. Reference pictures are also stored in the output buffer in local DRAM for use in subsequent decoding.

Display process – The display process takes the decoded video pictures stored in the local DRAM and outputs them to the video interface. The display process operates in either NTSC or PAL formats.

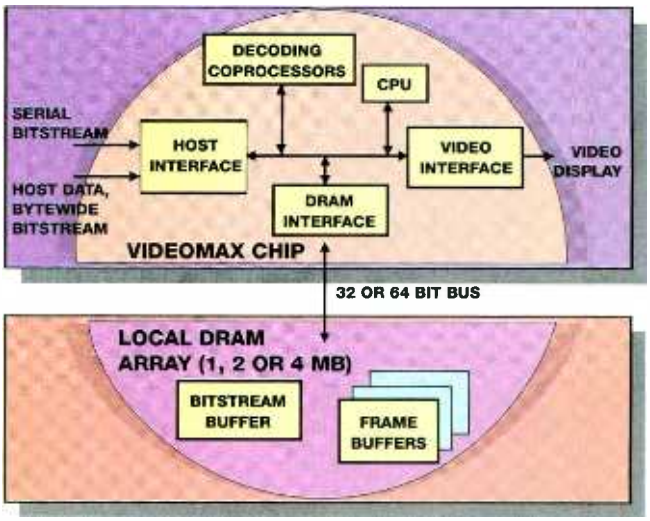


Figure 1. Simplified block diagram and external interfaces of the Videomax (CL9100) chip.

Chan is president of Chan and Associates, a marketing and public relations service company for audio, broadcast and post-production, Fullerton, CA.

Acknowledgment: The author would like to thank C-Cube Microsystems in Milpitas, CA, for help with this article.

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Circle (10) on Reply Card

NAB special report

Everything you could want from NAB show coverage and more.

This month's feature coverage centers on the 1994 NAB Convention. From audio to video and radio to TV transmitters, everything you could imagine was at the show. This year's exhaustive NAB coverage will provide you with even more details than ever before. If you attended the show, you know the exhibit halls were humongous, and how difficult it was to explore every booth in every nook and cranny. Even in four days, no one person could visit all the booths to learn about the new products. There simply was not enough time during the show to take in all of the innovations on display.

BE has the solution. With an army of technical experts (engineers like you), we canvassed the show to identify the hottest in technology and new products. The combined expertise of these engineers is contained in the following pages.

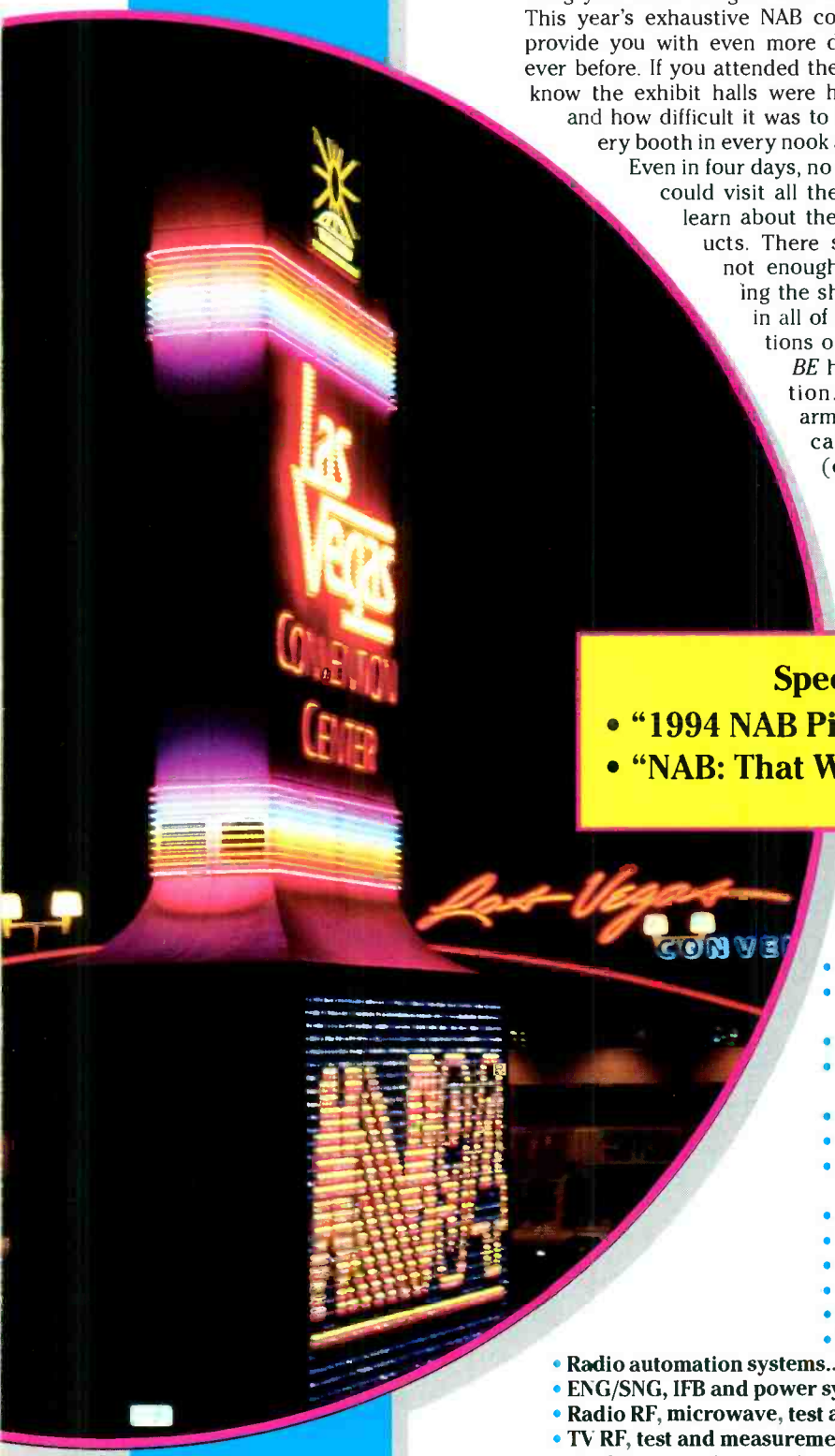
We begin our highlight coverage with the 1994 Video and Audio Pick Hits. Our panel of 20 engineers combed the halls looking for solutions to the problems station and post facility engineers face daily. They have identified this year's Pick Hits products for both video and audio applications.

If you missed a few booths or if you were unable to attend, read on. Beginning on page 43, you'll find that our comprehensive coverage provides snapshot reviews of hundreds of new products unveiled at the show.

Our report begins with an overview of the convention from the perspective of one who's been there and seen it all. I hope you enjoy our efforts.

Brad Dick

Brad Dick, editor



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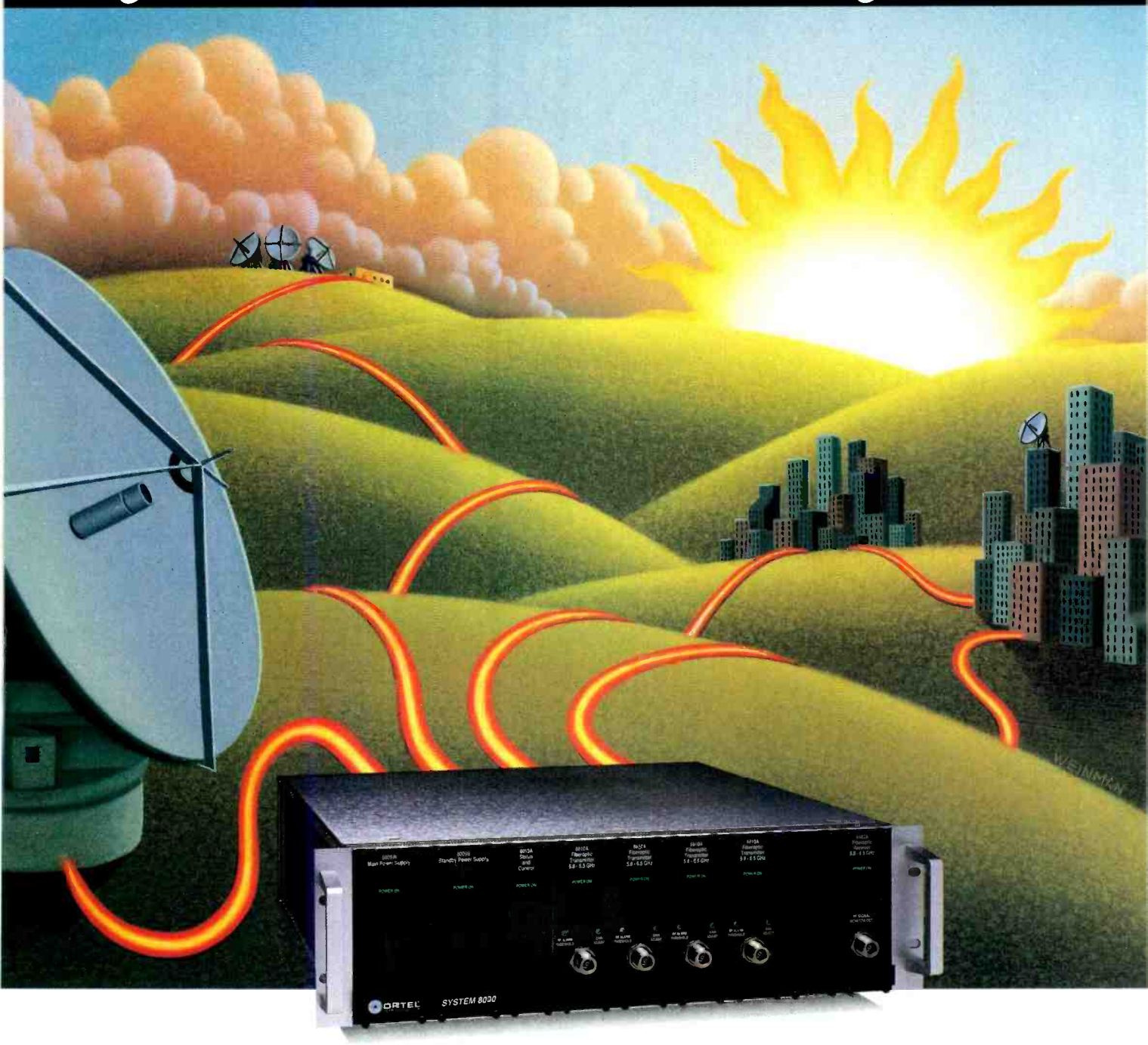

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1994 NAB Pick Hits

_BE's_ panel of industry experts selects the best new products at NAB.

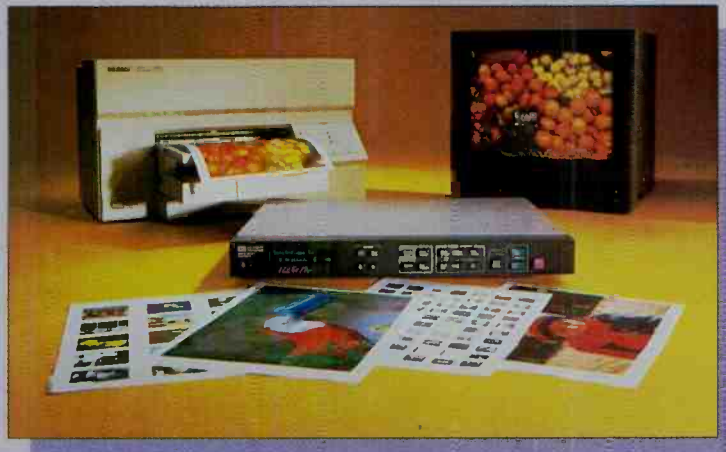
By Steve Epstein and Skip Pizzi, technical editors

This year, as in those past, the *BE* team of seasoned technical experts combed the NAB floor in search of new products. The judges assembled represented the diversity of the industry. (See "Judges and Rules," p. 108.)

Many products discussed had a common theme this year: Absolute cost was not as important as cost/performance. In addition, many of the products filled in holes in existing product lines, offering new features or lower cost. Buyers were given additional access to full-featured systems in several cost/performance categories.

Here are the judges' considered selections of the top new video and audio products exhibited at NAB '94.

Video Pick Hits



Hewlett-Packard: *VidJet Pro*

The VidJet Pro makes it possible to print video images on HP as well as many other brands of printers. The 1-rack unit accepts composite, component or S-video, depending on input card; a future card will accept serial digital 4:2:2. A 25-pin Centronics parallel output connects to a wide range of printers and plotters.

Field-installable RAM can be increased to store more than 85 single-frame images in a low-resolution format, several frames can be stored in the high-resolution mode. Frames can be grabbed automatically based on several parameters including time and scene changes. Printouts can vary from thumbnail to poster size and are limited mainly by the capabilities of the printer.

Circle (300) on Reply Card

Leitch: *MGI-1302N motion logo inserter*

LogoMotion is a 1-rack unit capable of storing up to 18 logos and associated linear key signals. When expanded, it can hold 72 logos and keys. It supports real-time playback and can display animated logos of up to six seconds. A built-in keyer allows logos to be inserted downstream, rather than tying up switcher resources. Logo and key information is stored uncompressed in an EEPROM for reliable instant access. Key, transition and repositioning information is remotely accessible and stored in memory, eliminating periodic readjustments. Users can quickly reprogram logos through a video capture option, or logos can be downloaded from a PC using free utility software.

Circle (301) on Reply Card

Horita: *TL-2100 portable GPS-based signal generator*

The TL-2100 is a portable video blackburst generator, SMPTE time-code generator and 6-channel GPS receiver. It provides video and time-code signals locked to each other and to UTC time and date. Applications include field use requiring a precise time lock between two or more video cameras or displays when the units cannot be interconnected because of the distance between them.

The receiver's external antenna, only 2.5 inches across and less than three-quarters of an inch thick, needs only a broad view of the sky, and can track up to six satellites. Only three satellites are needed for initial time lock, after that, only one is required to maintain the time lock.

Circle (302) on Reply Card

Magni: *WVM-710 video monitoring system*

The WVM-710 is a high-performance, high-resolution waveform monitor and vectorscope with real-time auto-measure capability. It is designed for use in the operational areas of professional video facilities. Freeing creative types from the hassle of interpreting waveforms, the unit immediately flags any parameter that exceeds preprogrammed limits. Engineers will find the unit simplifies measurements, and allows for simple setting of the limits numerically through menus. Once set, a full-screen display provides a continuous check of signal parameters. Ten-bit internal resolution provides sharp, rasterized images, as clear and accurate as conventional CRTs. The unit can be controlled from a PC or modem, and measurement values can be transferred to the PC for storage or printout.

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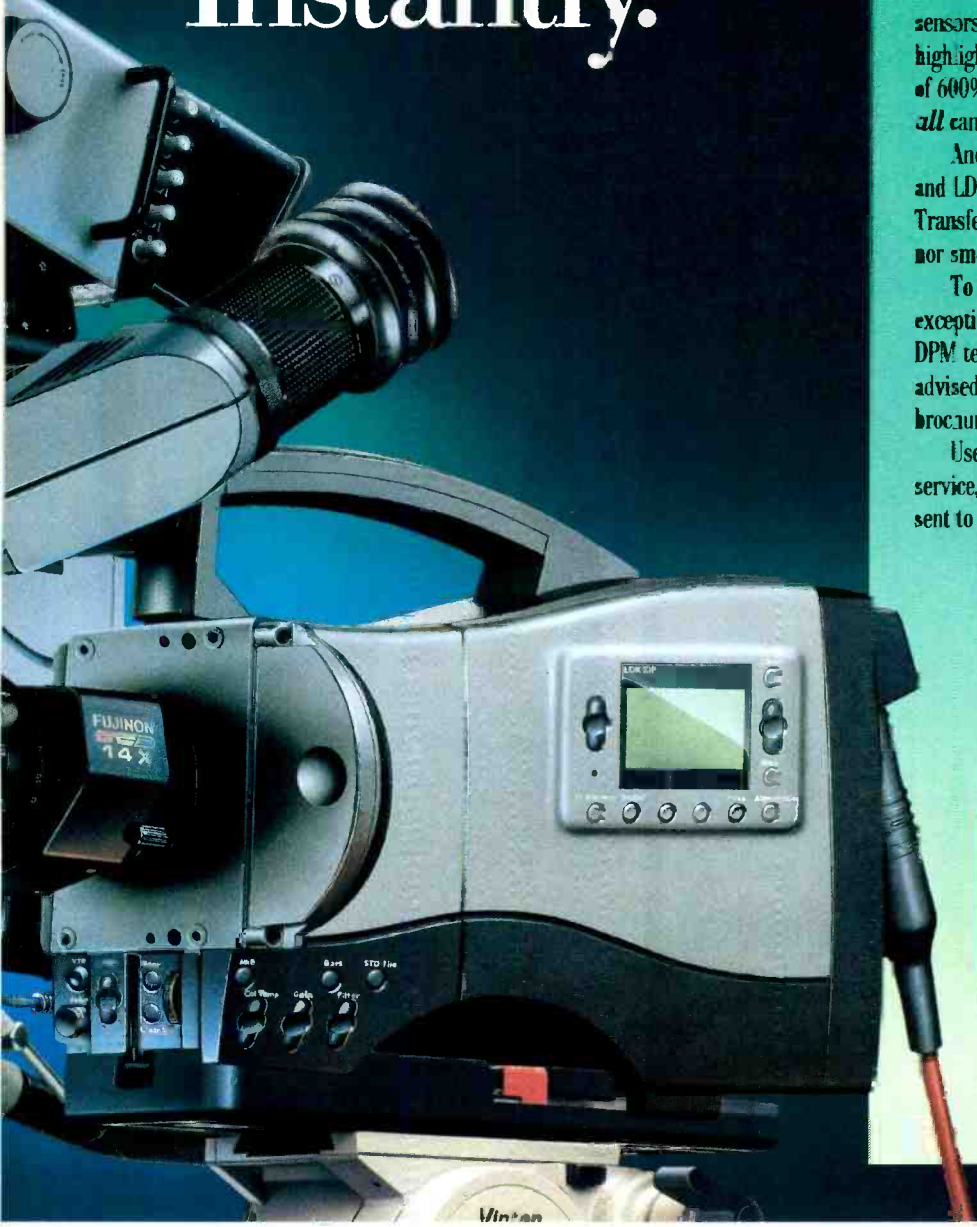

LDK 10 / LDK 10P

The touch of a button is all it takes to go from one format to another (and back again) with the LDK10 studio camera and its lightweight, compact and portable companion the LDK 10P.

Both incorporate a new BTS development: Dynamic Pixel Management (DPM) sensors.

This exciting technology spares you the laborious task of changing optical blocks or the costly expense of additional DVEs. Whilst simultaneously setting the superlative standards of horizontal resolution that 1000 pixels in both 4:3 and 16:9 formats bring. And without changing in the angle of view.

Other remarkable aspects of these 2/3" DPM sensors include no loss on vertical resolution, a highlight compression dynamic range in excess of 600%. Plus the highest possible sensitivity over *all* camera lens apertures.

And like all BTS cameras of course, the LDK 10 and LDK 10P with their DPM sensors, employ Frame Transfer technology. So naturally, you get neither lag nor smear. Just a truly outstanding performance.

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Creative Television Technology from BTS

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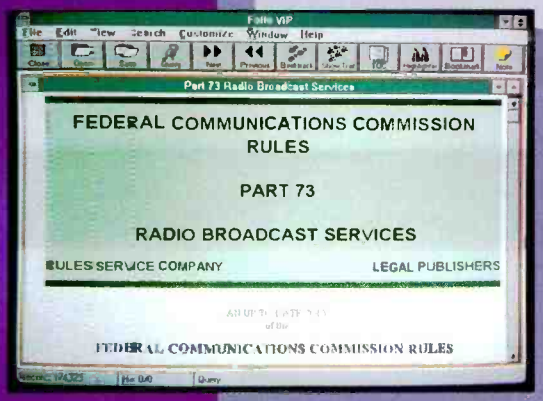
NAB BROADCAST ENGINEERING 1994 PICK HIT

Orban: *8282 digital Optimod*

The fully digital Optimod 8282 provides three processing structures for flexibility in tailoring a station's sound. *Protection* allows signals through the unit virtually unchanged, but still provides protection from overmodulation. Two-band processing with loudness control provides controlled audio for all types of programming. Multiband is designed for MTV-type formats or to correct poorly mixed or dated programs. Five bands of dynamic processing deliver quality sound on a range of material. Security is provided through a series of programmable passcodes that allow operators various levels of access. Help screens are accessible anywhere in the menu system for ease of setup and operation.

Circle (304) on Reply Card



Rules Service Company: *Rules service for Windows*

Tired of adding those regular updates to the FCC rule book? Well, so were the Pick Hits judges, who were quite pleased with this new product from Rules Service Company. FCC parts are available individually and in various packages with revisions issued bimonthly.

Software features include effective dates that appear as pop-up notes, and redlining that indicates new and obsolete material at a glance. Bookmarks allow the user to mark a section for reference and jumps allow for transfers to other sections of the rules quickly and easily. Two megabytes of RAM are required to run the program on an IBM-compatible machine.

Circle (305) on Reply Card

Sony: *DES-550 Destiny non-linear editing system*

Sony's Destiny edit workstation is now available with non-linear capabilities. Either complete (DES-560) or as an upgrade (DES-550) to the original Destiny, the new version offers linear and non-linear editing simultaneously for added speed and convenience. The unit offers a Windows graphical interface with selectable compression ratios, dual outputs and real-time 2-D/3-D effects.

In its standard configuration, the unit can store one hour of 15:1 compressed video and one hour of uncompressed 16-bit audio (48kHz sample rate). Additional hard disk drives can expand system record time to seven hours of video and seven hours of audio.

Circle (306) on Reply Card

Sony: *DVW-700 digital camcorder*

Last year, Digital Betacam was a Pick Hit. This year, Sony rounded out the line with a camcorder for field acquisition in component digital. For optimum results, 10-bit digital signal processing is used in the camera section, which uses three FIT HyperHad 1000 CCDs. The camcorder weighs a little more than 15 pounds (7kg) and is comparable to today's current analog camcorders.

Maximum record time is 40 minutes, with up to 120 minutes of power available from a new lithium-ion battery. A built-in tone generator allows a 1kHz tone to be recorded along with color bars.

Setup parameters can be stored on a key-sized card for use later. The card also can be used to set up multiple cameras to the same settings. Through DSP, many of the camera's parameters can be adjusted and fine tuned, including gamma, knee, black-and-white shading and skin tone detail.

Circle (307) on Reply Card

THOMSON BROADCAST would like to thank the National Academy of Television Arts and Sciences for once again recognizing the experience and savoir-faire of the mother of digital with an Emmy Award. In 1993, THOMSON BROADCAST's continual efforts to promote serial digital

STATE OF THE DIGITAL ART

technology, enhanced by the technical mastery of THOMSON-CSF/LER and super-efficient SGS-THOMSON VLSI components, have been unanimously lauded by the video domain. As both a manufacturer and systems integrator, THOMSON BROADCAST offers a full gamut of digital products which operate at the peak of performance. Cameras, routing switchers, color correctors, interfaces, production and post-production switchers, still stores, and master control rooms have all been conceived within the most sophisticated realm of research and development so that you can reap the benefits of tomorrow's technology today. Our drive to push the envelope of efficiency is visible in the 9200 switcher and the whole range of the 9000 series, which capitalize on the advantages of the latest THOMSON BROADCAST digital technology for the greatest satisfaction of video professionals.

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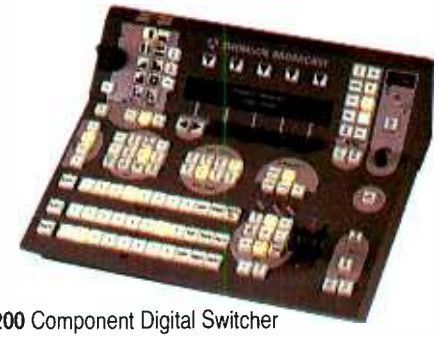

9200 Component Digital Switcher

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Sony: *UVW-100 camcorder*

The newest addition to the UVW line is the UVW-100 camcorder. Featuring three Inline-Transfer (IT) HyperHAD CCDs, the camera has a horizontal resolution of 700 TV lines. Because of the low power consumption, it will operate for approximately 60 minutes on a single NP-1B battery. A variable speed shutter helps capture clear pictures of fast-moving objects. Sony's Clear Scan helps to eliminate horizontal bands when shooting computer monitors.

In addition to the on-board recorder, a 26-pin VTR interface connector allows the user to feed composite, component or Y/C signals to an external recorder. Both the internal and external recorders can be used simultaneously if desired.

Circle (308) on Reply Card

Tektronix: *WFM 90 hand-held monitor*

The WFM 90 is a hand-held waveform/vector/audio monitor with an integrated picture display. A backlit 4-inch diagonal color thin film transistor (TFT) LCD is used to display the various text modes, accessible through menus. Operation modes include picture, waveform, vector, audio and waveform-in-picture. The waveform mode includes 1H, 2H and 2F sweeps with flat and low-pass filters. Vector mode offers 360° phase rotation with 75% and 100% amplitude settings. The audio mode is a voltage vs time display with reference levels at 0dBu, +4dBu, +8dBu and +12dBu. The waveform-in-picture allows for the waveform, vector or audio displays to be cut into any corner of the picture.

Circle (309) on Reply Card

Audio Pick Hits

Akai: *DP88 digital signal patchbay*

This handy product fills a growing need of every audio production facility for convenient routing of digital audio signals. Eight XLR and two optical inputs and outputs are provided, allowing flexible patching of AES/EBU or Tosslink format signals. One set of each I/O connector type is available on the front panel of this 2-rack unit device, while the other seven XLR and one optical connector set appear on the rear. Any input can be internally split and fed to any number of outputs. Up to 128 different patch configurations can be stored and recalled from internal memory. Existing patches can be copied and edited. The system is controllable from its front panel, via an optional footswitch or by MIDI. The latter allows programmable dynamic switching to be applied via MIDI sequencing during automated mixdowns or other operations.

Circle (310) on Reply Card

Audio Technica: *AT4050/CM5 studio microphone*

Three polar patterns are available on this reasonably priced, large-diaphragm condenser microphone. Using a dual-element design, either an omnidirectional, a cardiod or a figure-eight pattern can be selected. The microphone is capable of withstanding high SPL and offers smooth and extended frequency response. It operates on standard 48V phantom power. An external shock mount is supplied.

Circle (311) on Reply Card

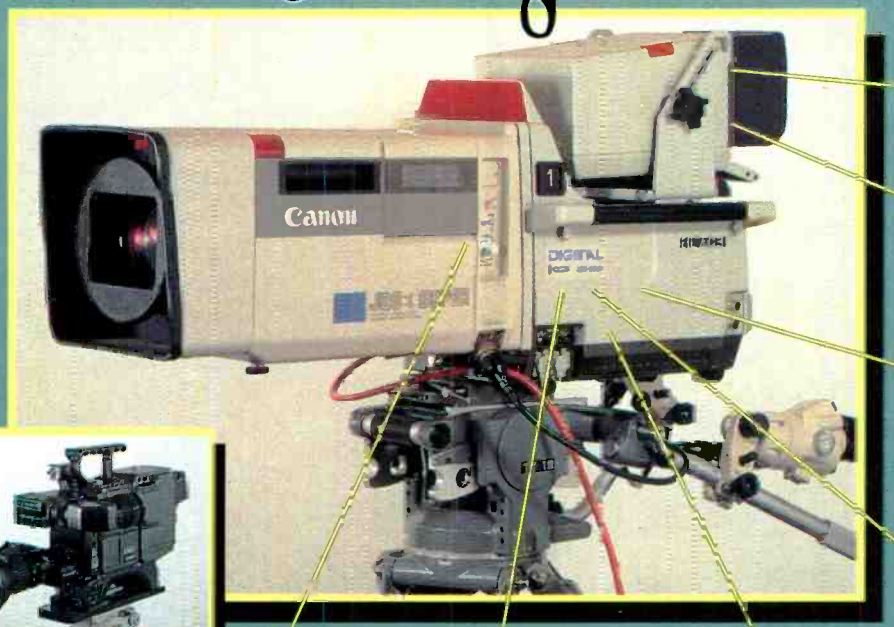
Buy a digital camera or else.....

Or else you may be stuck with a camera left behind by digital technology.

As we all know, communications, video, information...everything is going digital. Isn't it time cameras did? Today's digital camera not only outperforms the best analog can offer but sets new bench marks in video quality, features, stability and reliability. The days of the analog camera are numbered because digital offers too many advantages to be ignored.

With DIGITAL advantages such as a new video transparency, flesh tone detail to soften facial blemishes, precision detail correction, precision transfer of setups between cameras, a plug-in memory card to recreate exact setups of all cameras weeks or months later and serial digital outputs for D-1 or D-2/D-3 VTR's, now is the time to consider what all cameras will be...digital.

Introducing the Digital SK-2600



SK-2600P Portable Companion

Unique PIP (Picture in Picture) Allows a second video source to be windowed with camera video in any of four quadrants or reversed with camera video

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The Hitachi developed single LSI device provides full 13 bit digital processing for RGB video including detail and masking. Only Hitachi offers 13 bit video processing.

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PICK HIT PICK HIT PICK HIT PICK HIT

NAB BROADCAST engineering 1994

Henry Engineering:
StereoSwitch

This problem-solving box from Henry Engineering provides 3x1 stereo selection with a variety of external control possibilities. A 15-pin D-sub connector accepts either open collector, momentary or maintained contact closure, TTL/CMOS logic or 5VDC to 24VDC control signals. Control inputs are opto-isolated. Tally output is provided via open collector, indicating which source is currently selected. LEDs on the front panel indicate selected source input. Balanced stereo audio I/O is interfaced to the device via barrier strip. Sealed relays with gold-plated contacts are used for switching; no active audio components appear in the signal path.

Circle (312) on Reply Card

Panasonic:
SV-4100
DAT recorder

Based on the popular SV-3700 design, this latest offering in Panasonic's series of professional DAT machines provides features of particular value to broadcasters, including a RAM buffer for instant start, five programmable cue locations and wired or wireless remote control. The 3-second buffer can also be used to precisely determine a cue point using the shuttle wheel. Other new features include external sync capability (to either NTSC/PAL video or digital audio/word clock signals, including pull-up/down accommodation) and software access to error-rate display, SCMS copy-inhibit status and digital I/O format selection (AES or IEC, electrical or optical). Both analog and digital output levels are adjustable and programmable. A display of head-cylinder use is also provided. All setup and cue-point data is stored in non-volatile RAM.

Circle (313) on Reply Card

Wheatstone:
A-6000 on-air console

A flexible and sensible design philosophy characterizes this high-performance broadcast console. Standard mainframes are available in five sizes from 25 to 42 positions, and each allow for a wide variety of modules. Four main stereo buses are complemented by four mix-minus and two auxiliary send buses, two mono buses, plus four external line input returns and a stereo cue bus. Wheatstone's bus-minus option also allows each input channel to generate its own mix-minus output. Monitoring is provided for control room speakers, headphones and two separate studios. Dip switches on input modules allow versatile programming of control functions. Other available modules include a comprehensive phone input module, an 8-station intercom, 2-machine tape recorder remote, and event timer/meter control module. Available electronic switching eliminates the patchbay and allows selection of each input module's source directly from the module, with alphanumeric LED display of source name appearing above the fader. The intuitive, uncluttered layout makes operation versatile yet simple.

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JVC. The three most important letters in S-VHS.

Innovative Quality Software: *SAW digital audio editing/mixing system*

The Software Audio Workshop (SAW) is an inexpensive software-based digital audio workstation that operates in the Windows environment. It allows non-destructive editing and real-time mixing of up to four stereo virtual tracks, plus digital pitch-shifting and optional SMPTE or MIDI synchronization. The system includes no hardware of its own, but operates on sound files that have been created using any one of a wide range of PC/Windows sound cards from other manufacturers. Synchronization requires an additional SMPTE/MIDI card for the PC. Minimum platform requirements are 386/40 CPU running DOS 5 and Windows 3.1, 8MB RAM, VGA (SVGA suggested) and sufficient disk space for sound files at 11MB/minute (stereo). Editing across as many as 40 sound files in the same session is supported.

Circle (315) on Reply Card

See Judges and Rules for Pick Hits on page 108.

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Circle (16) on Reply Card

NAB: That was the week that was

From digital to dogma, NAB '94 had it all.

By Jerry Whitaker

More is the best way to describe the 1994 NAB Convention in Las Vegas. To be specific:

- More attendees, most notably foreign attendees.
- More exhibitors, including some you thought were out of business.
- More new products, usually offering more of something.
- More computer stuff, from vendors ranging from AutoDesk to Seagate.
- More jeans (I brought mine, but had second thoughts about wearing them to the show. I did, however, go casual on the last day of the show and didn't wear a tie, which was a first.)
- More representatives from Generation X (we Baby Boomers have officially reached middle age, you realize).
- More women engineers, marketers and managers, and fewer Barbie-type models.
- More expensive food in the convention center ($1.65 for a small coffee — a new record).
- More bizarre hotels and less available rooms for the convention. Go figure.

How does this relate to Las Vegas? Well, one day while driving the Strip from downtown to the Luxor Hotel, I was struck by the curious way this famous road has evolved. As little as three years ago, Caesar's Palace stood as an international symbol of Las Vegas opulence. Today, in comparison to the new Luxor pyramid or the Emerald City of the new MGM Grand Hotel, Caesar's seems rather bland and uninteresting. In NAB terms, it is yesterday's technology.

Despite the considerable draw of the Strip, a record number of attendees did manage to get to the show floor. With record-breaking attendance of more than 70,000, people jammed the aisles and technical sessions. The increase over last year was into double digits. Not bad for an industry that has been flat on its back for the last few years.

Same old song Eddie

It is against this backdrop that Raymond Smith, chairman and CEO of Bell Atlantic, gave the keynote speech at the NAB opening ceremonies. The speech was inspired, if not inspiring, and painted an unusually rosy future for broadcasters that choose to merge onto the information highway. In contrast, the opening ceremony remarks of Edward Fritts, president and CEO of NAB, focused on the same, tired song heard many times before that broadcasters are great, that we can stonewall our way to future technologies, and that lobbying Congress is where it's at. It was, to this observer at least, the same song, umpteenth verse.

Most of the NAB president's speech focused on using the clout of radio and TV stations to twist the arms of elected representatives so they will vote for bills that favor the interest of broadcasters. The reasoning goes that what's good for NAB is good for America. Here is a sample from Fritts' speech: "When these aspiring members of Congress come to your station, use the opportunity to get acquainted...Tell them about the business of radio and television. Brief them on our priority issues. Then, when we need it most, you'll be in the position to *ask for the order* (emphasis added) — their vote on a key piece of legislation. And they will be hard pressed to turn you down." Ask for the "order?" Is anyone else offended by this, or is it just me?

But wait, there's more. "You provide access for local politicians and to their constituency...For government officials — who must constantly reach the public in their quest for re-election — that access through your station is invaluable." The Fritts speech, to this observer at least, sounded like a scene from "Mr. Smith Goes to Washington," with NAB playing the part of the bad guys.

Fritts ended his remarks by assuring the audience that over-the-air broadcasting would become tomorrow's superhighway of information. "It's universal, accessible, mobile, pervasive, wireless, absolutely free for all Americans — and it's now." And if that wasn't enough, in a back-handed slap at his keynote speaker, the NAB president declared, "...I predict that in tomorrow's race for the gold, Marconi will give Alexander Graham Bell a real run for his money." So much for political finesse. Nice touch, Mr. Fritts.

Ray Smith for president

Ray Smith's keynote address was the model of constructive cooperation. The centerpiece of the talk was how to better serve the American public. No veiled threats. No talk of burying another industry. No blueprint for domination of the information infrastructure for the year

Whitaker, an industry analyst based in Beaverton, OR, is the author of nine books on various communications/engineering topics.

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2000 and beyond. Just good business sense. He said the convergence really means "...that the three principle consumer communication devices — computer, television and telephone — are merging into one, and as they do, so too are the distinctions among once-separate businesses. It is clear that before this industry transformation is through, your computer will speak, your television will listen, and your telephone will show you pictures. This convergence will transform the way Americans work, play and learn. (It will transform the way each and everyone of us does business. It will stretch the boundaries of who we are, and what we do, and where we're going. Most of all, it will offer opportunities of historic proportions to those industries that can redefine themselves around an entirely new set of customer requirements."

Smith went on to urge cooperation between broadcasters and telephone companies as a way to fill the information highway that will soon develop. "Make no mistake about it — we cannot do that without you, any more than we believe you can do that without us...Even if we (Bell Atlantic) were able to develop our own programming capability, we still won't be able to duplicate the infrastructure of news, weather, sports and public affairs programming that makes you (broadcasters) such an indispensable part of the daily fabric of your viewer's lives."

NAB signifies the time when gear becomes another year older and is replaced by something that is smaller, works better and costs less.

Smith concluded his talk with an invitation to broadcasters to entertain new ways of serving the public through program distribution over an information highway. "The future belongs to open, not closed systems...The history of technological innovation teaches us that the most successful industries are those who embrace the possibilities of new technologies — even at the risk of cannibalizing their existing products."

Smith cautioned broadcasters to avoid protectionism as a way to preserve their future. Amen.

Enough griping, already

All jabs aside, one thing NAB does well is put on a trade show. Baseball/radio legend Harry Carey, who was inducted into the Broadcaster's Hall of Fame at the convention, would describe the convention with just two words: "holy cow!"

For most equipment owners, NAB signifies the time when your gear becomes another year older and is replaced by something that is smaller, works better and costs less. This show was no exception. New and enhanced products packed the exhibit floors in the video and audio halls, and the mostly multimedia exhibits in the Hilton Center. Last year, the multimedia exhibit area was an odd combination of non-traditional broadcast vendors and publishing companies. In its second year, however, the exhibition grew into what attendees expected: a first-class showing of advanced computer-based products.

It is an oversimplification to say that digital products were the hit of the show. But they were. New strides were made in graphics and non-linear editing systems. Perhaps the biggest splash came in the form of non-tape video storage systems. Several companies showed various types of disk-based storage systems that promise, when fully developed, to challenge the VTR for many production and on-air broadcast applications. Prices for the new systems ranged from sky-high (hundreds of thousands of dollars) to relatively affordable. Determining factors include, predictably, storage time, picture quality (influenced greatly by the rate of compression), and features (number of channels, multiple playback capability and other factors). This technology, by the way, is ready to go. Numerous orders were placed for disk-based recording systems at the convention. (For a complete rundown of the companies and products at the show, see the NAB Highlights, which begin on page 43.)

And speaking of orders, exhibitors of all types and sizes reported a good show in terms of floor traffic, sales leads, and even on-the-spot orders. Vendors and customers alike are hopeful that the '94 NAB Convention marked a turning point for the broadcast and professional audio/video industries. After years of lean times, it appears that the economy has finally turned the corner.

This mood was bolstered going into the show by an article on the front page of the *Wall Street Journal* three days before the convention began, proclaiming that the major TV networks, once considered dinosaurs, may in fact be at the dawning of a new "golden age." According to the article, "...the Big Three are hot properties again. They have proved themselves not only viable, but thriving contenders that can hold onto a mass audience and their approximately $9 billion share of the $25 billion annual TV advertising pie." The article included a declaration from Laurence Tish, CBS chairman, that free television is here to stay.

The NAB show floor included several products related to HDTV. Most attendees, however, appeared to be far more concerned with the needs of today than the needs of tomorrow's HDTV system.

Oh, what a week that was...

I feel compelled to explain the title for this NAB convention review. For those of you who weren't watching television in the early 1960s, there was a program on NBC called "That Was the Week That Was." (TW^3). The show, which aired on Saturday night, was a hybrid of "Saturday Night Live: and the "McLaughlin Group." TW^3, while short-lived, was on the air during the golden days of television. Color was just coming in and television was growing up. Cable television was little more than a concept. AM radio was king, but FM stereo was on the horizon.

Certain parallels can be drawn between then and now. At this point, broadcasters have little involvement in the numerous advanced technologies on the horizon, HDTV excepted. Business is basically good, and many stations are quite happy to conduct business as usual. It is clear, however, that the much-ballyhooed information highway will be constructed and that information-on-demand will be an important component of it. If radio and TV broadcasters fail to get into the fast lane of emerging technologies because of design or neglect, they will eventually lose the race for viewers and listeners. Broadcasters who make the right choices can look forward to a new golden age. Those who make the wrong choices face only an ice age. ■

Author's note: Quotes from NAB conventions speeches were taken from printed transcripts supplied by NAB to the press.

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People who don't use Grass Valley video production systems often find themselves in compromising positions.

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With that in mind, we'd like to introduce you to the Grass Valley Sabre™ 4100S Dynamic Editing System. Offering a startling new level of editing control, the Sabre 4100S virtually transforms the editing process, matching the editing tools to the video artist's individual creative process.

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NAB '94 new product highlights

A summary of the hot new technology from NAB '94.

Compiled by the *BE* editors

This May issue of *Broadcast Engineering* magazine contains the most comprehensive coverage of any NAB convention ever provided. We bring to you the most accurate, concise and complete reporting possible. Just as important, we wanted the coverage to reflect the perspective of engineers and managers like yourself. The only real way for a magazine to provide its readers with knowledgeable coverage is to do so with individuals who know and understand the industry and who are a part of it. In this case, it meant using expert engineers and managers who face the same problems you do on a daily basis. Because our reporters are engineers and managers like you and also work on the front line, it was easy for them to see through the smoke and mirrors that are always present at a convention. The result is accurate reporting with the information presented exactly the way the reader wants it.

Need more information? Use the Reply Card numbers at end of sections.

Within the next 40 pages, you'll find information on the products shown on the convention floor. At the beginning of each listing is the name and byline of the person who researched the technology. We are proud of our authors and know they share our pride in being able to bring you the most up-to-date and useful show coverage ever before assembled.

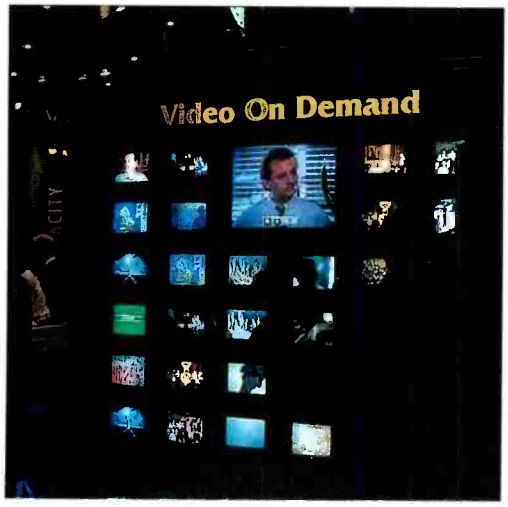
As an added reader feature this month, a special reader reply number symbol appears at the end of each technology section.

To obtain additional product information from the companies mentioned in the story, simply circle the number on the reply card located inside the back cover and drop it in the mail. This expanded NAB coverage and reply card service is another example of *BE's* commitment to you, the reader.

Video servers – The tapeless society?

By David Spindle
Spindle is a principal at Capricorn Associates, a marketing and technical consulting service, Madison, AL.

What is a video server? Typically, there is a high-end processor or multiples thereof, such as a 486 or RISC, that control mass data storage, such as a RAID (redundant array of independent drives) hard drive system, or some other sort of hard drive configuration feeding into a solid-state buffer with instantaneous parallel video and audio outputs. In some cases, there is also mass archival storage that may be tape- or optical-based. Internal data storage processing schemes range from CCIR 601 digital component on the high side, to MPEG 1, MPEG 2 or Motion JPEG on the low side. Most systems also accommodate digital AES/EBU audio or PCM audio. Compression techniques balance economy in data storage space and final output signal quality.



Micropolis exhibited the RAID disk-based AV Server series 100, which features two to 64 scalable, independent random access MPEG channels, 10GB to 240GB data capacity, and 120 hours of MPEG material available in NTSC or PAL outputs with mono or AES stereo audio. The series 100 also provides VCR-type control functions and "Hot Swap" disk drives. System control is managed by an Intel 486 server PC.

Channelmatic was showing its production version of the Adcart/D digital ad insertion system. The system also provides real-time MPEG compression and encoding and automatic insertion playback. The system provides full automation of scheduling, playback and trafficking.

The EMASS storage system was demonstrated in the Silicon Graphics' booth. It is unique in that it uses digital linear tape systems for archival storage of multiple terabytes (1,000 gigabytes or one million megabytes) of data that can be summoned into a disk-based system, the Silicon Graphics Challenge in this case, for instantaneous multiple playout of the video datastreams. The MPEG compressed system's capacity was quoted as 2,000 to 10,000 hours of program with up to 15 simultaneous datastreams in composite video and stereo audio.

IBM had its fully scalable video server system at NAB, with distributed architecture, multiple network interfaces and interactive application features. The IBM system addresses not only full-motion MPEG video, but also graphics and text. Using an RISC 6000 processor and RAID technology, the IBM system is capable of 250 to 400 simultaneous video streams, with full 16-bit stereo audio on the low end, to an almost unlimited ca-

pacity on the high end.

BTS introduced the Media Pool in a private suite. Media Pool addresses the tapeless storage, editing and archiving of digital video. RAID, hot swappable drives are used along with variable compression techniques that let the customer choose the level of quality on a spot-by-spot basis. System capacities are quoted as being from 10 minutes to 100 hours of full bandwidth video. Among the Media Pool product applications are a digital VTR emulator, a digital cart machine emulator and a time shift/delay system.

Hewlett Packard's high-performance video server boasts high reliability with a RAID array of disk-based, online storage that can deliver from six to 51 hours of broadcast video and audio. The HP system has a 2-channel output (scalable up to 12) and, like many others, uses MPEG compression to 15Mb/s, but scalable downward for non-broadcast applications. HP also provides the HP ad management system for spot playout and on-line file management software running on a workstation.

The Tektronix Profile is an open platform professional disk recorder that was also the disk-caching component for other manufacturers' systems. Profile has simultaneous read/write capability across four channels and can support analog composite and serial digital component formats in either PAL or NTSC. The Profile also boasts built-in video and audio routing in addition to mix/effects and control is based on the i486. Compression is accomplished with motion JPEG and storage time can be 40 to 160 minutes or more with expansion.

AVID demonstrated the AVID media server/library product as part of an integrated fiber-optic-linked system. The system includes Media Recorder, a disk-based system using motion JPEG compression and is compatible with composite or digital component video and AES/EBU digital audio. The storage capacity is variable de-

Continued on page 48

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DIGITAL LEADERS.

Since its inception as the nation's first advertiser-supported basic cable network in 1980, USA Networks has aggressively fulfilled its mandate to create a cable network providing a wide variety of programming for all family members.

USA's programming is seen in over 98 percent of America's cable households. Our network features exclusive original dramatic series and situation comedies. We produce over 24 original World Premiere movies per year featuring top Hollywood stars, and we continue to license top-rated off-network series. To our coverage of The Masters, we've added 11 PGA Tour Golf Tournaments. In 1994, we'll add the French Open Tennis Championships to the more than 90 hours of the U.S. Open Tennis Championships.

In 1992, we launched the Sci-Fi Channel, now in 15 million homes nationally, and in April, 1994 we will launch USA Network for Latin America. The Sci-Fi Channel formula blends classic favorites and contemporary off-network sci-fi shows. Its movies are theatrical blockbusters and original productions that are part of our "Planetary Premieres" series.

To accommodate our expanding networks, USA created a completely digital Broadcast Center in Jersey City, NJ. The new Center handles all of our post-production needs and our entire network origination, including the signals for USA's East and West Coast feeds, the Sci-Fi Channel and our blackout programming.

At the heart of our facility is the Panasonic Digital M.A.R.C. Type III automated record/playback library system. The system uses 10 Panasonic AJ-D350 D-3 VTRs with a completely redundant backup system, and is the major source of all program and commercial material seen on USA Network and the Sci-Fi Channel throughout the day.

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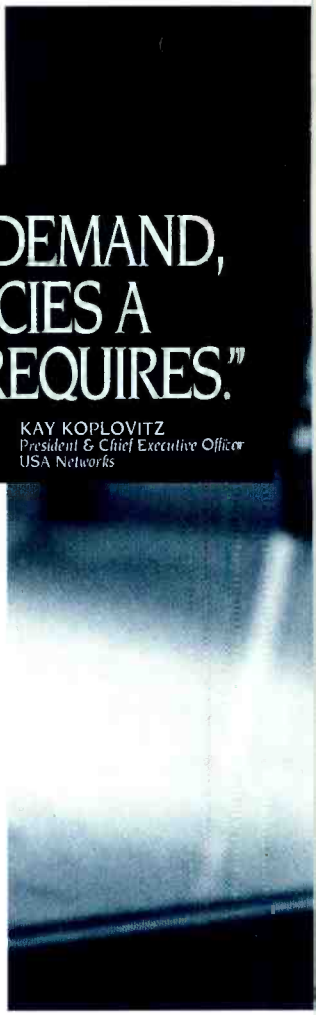
KAY KOPLOVITZ
President & Chief Executive Officer
USA Networks



In post-production, we are using the first non-linear edit systems with Panasonic D-3 VTRs. Our four edit suites connect to a "pool" of videotape machines, including 12 Panasonic D-3s.

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Our decision to use the Panasonic M.A.R.C. system was the right decision. We've achieved the look our viewers demand and the efficiencies that a growing company in a highly competitive field requires. Panasonic worked with us to develop the right software and provided extensive training to our employees.

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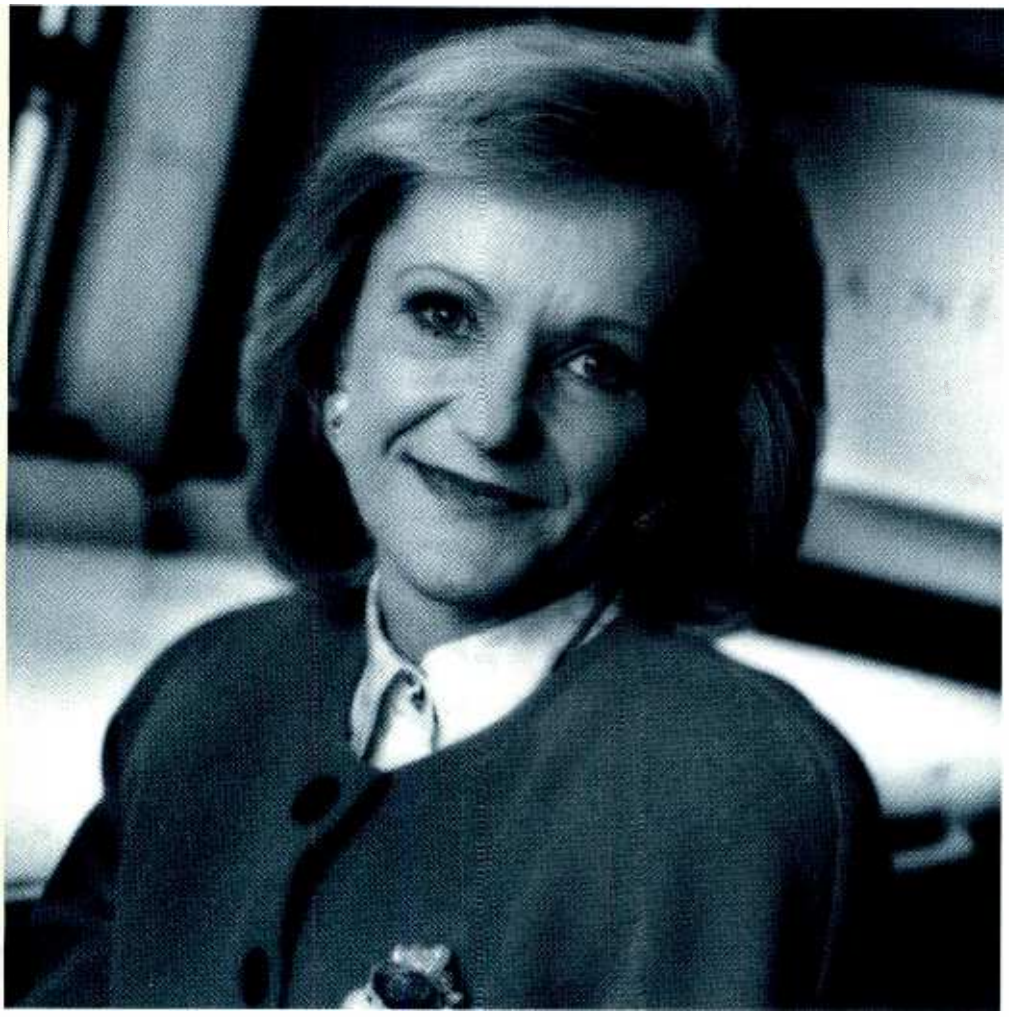

accurately that we got an unexpected bonus: a few extra minutes of air-time in our schedule. We're using it to promote more of our programming to our viewers.

We firmly believe that we have the highest-quality, best designed Broadcast Center anywhere.

Panasonic's strategy offers a simple, combined composite and component digital system that provides all digital solutions for diverse video recording applications through the eventual HDTV era.

Panasonic believes that digital composite and component signal equipment will continue to co-exist for many years. The company sees interrelated D-3/D-5 facilities with each equipment performing the tasks to which it is best suited.

Kay Koplovitz is founder, president and chief executive officer of USA Networks. She continues to be one of America's most influential corporate executives, charting new territory and keeping her network in the vanguard of the television industry.

Whether it's buying off-network series, making World Premiere movies, or building the cable industry's first all-digital Broadcast Center, Kay Koplovitz and USA Networks have never been reluctant to be first.

It's the industry's visionaries who see an all-clear path to the future.

Panasonic
Broadcast & Television Systems Company

Continued from page 44

pending on the drives selected. Other components in the applications-oriented AVID system include NewsCutter and AirPlay, all fairly self-explanatory in their functions, and integrating seamlessly with the server/library system.

Alamar USA announced a video server incorporating MPEG compression. The Mach II integrates MPEG 1 and state-of-the-art PCs to provide up to 74 hours of storage, including stereo audio.

Dynatech exhibited Digistore Broadcast Spot Playback System, an application-specific server that is the analog of a video cart machine. Digistore uses JPEG parallel compression techniques and can provide composite or component video I/Os along with 4-channel, 16-bit PCM audio. Capacity is quoted to be from five to 25 hours with three independent streams per unit.

Based on parent company DEC's technology, Basys Automation Systems debuted MAESTROworks, a suite of products including Storageworks, the RAID level-5 disk-based application-specific server. The Storageworks server currently uses motion JPEG as its compression standard, but is adaptable to MPEG. The system is multi-user and multichannel capable, and because Basys is using DEC technology, the product is scalable to just about any level. It integrates seamlessly on a LAN with other products in the line, such as Media Library and Multimedia Archives.

ASC Audio Video Corporation debuted the VR virtual recorder, another random access, disk-based server using JPEG compression with "Dyna-Q" — a variable Q factor conversion for the best possible resolution at a given data rate. The VR inputs a variety of analog video formats and 16-bit PCM audio to one output.

Cameras, lenses, character generators and special effects

By Marcus Weise

Weise is president of Marcus & Associates, Hollywood, CA.

Cameras

BTS showcased the LDK10/10P CCD cameras. New dynamic pixel management (DPM) sensors provide for an instant switch between 4:3 and 16:9. A serial digital video interface offers 10-bit 4:2:2 output at 270Mb/s.

Hitachi introduced three new broadcast cameras, two for the studio and one hand-held. The series SK-2600 and the companion portable SK-2600P are 13-bit digital cameras using one LSI chip for RGB. They use either triax for a 10-12MHz bandwidth or can be hooked to fiber-optic cable for full digital use. The SK-2000W camera is also 13-bit digital in a single LSI for all three video channels, and when used with a 520,000 pixel chip, is switchable at the push of a button from 4:3 to 16:9.

Ikegami has a new top-end studio/portable camera, the HK-366 and the HK-366P. The camera has dual motor-driven filter wheels, complete remote control of all camera functions and full auto-setup. It uses 2/3-inch FIT CCDs with 450,000 pixels. A long-range compensation feature allows cable runs up to 8,000 feet of 14.5mm triax. The SE-377 system expander unit allows the portable version of the HK-377 to be housed in a unit and installed on a pedestal giving it the look and feel of a full studio camera.

JVC introduced two new analog cameras, the KY27B that uses a 2/3-inch chip and the KY19 that uses a 1/2-inch chip. Both are available with triax.

Panasonic offered cameras for field production and studio use. The WV-F565 is an EFP/ENG digital camera with three 1/2-inch 400,000 pixel FIT CCDs. The camera has a memory of up to five different settings for presetting difficult or critical situations. The Supercam (model AG-DP800) is a 3-FIT CCD S-VHS camcorder. It has 700 lines of resolution, weighs 13.2 pounds and features built-in LTC and VITC. Other features include a 1.5-inch viewfinder and an electronic shutter with variable scan shutter speed.

For the studio, the AQ-235W uses three 2/3-inch 520,000 pixel chips. It is switchable between 4:3 and 16:9 and works with triax and fiber optics. The image also can be output from memory in a field mode (interlaced) and a progressive mode. A portable version is available and both versions can output component or composite serial digital and are interlace or progressive scan.

New products from Sony include three camcorders and an aspect ratio converter. The UVW-100 camcorder is an inexpensive, lightweight Beta SP camcorder. It uses 1/2-inch CCDs and has 700-lines of resolution and a 60dB S/N ratio. In addition, the BVW-D600 is a digital camera with a BVW-type recorder and the DVW-700 camcorder is for Digital Betacam field acquisition. Both use 520,000 pixel chips and have setup cards for storing the setup parameters.

Sony's ARU-700 is an aspect ratio converter that takes 16:9 camera video and outputs 16:9 and 4:3 pictures simultaneously. It accepts component analog video in 16:9. Outputs include serial component digital 16:9, serial component digital 4:3 and analog component 4:3.

Thomson Broadcast showed a unique new camera, the 1657. This PAL-only camera is switchable to either 16:9 or

Camera support, lighting and accessories

By Terry Fox
Fox is assistant chief engineer at WUSA-TV, Washington, DC.

Camera robotics, support and control

A.F. Associates displayed major system refinements and upgrades to the Radamec EPO robotics system, including a new touchscreen control system. Up to eight cameras can be controlled at once from the screen, with up to 12 shots displayed per camera. Frame-grabbed images are used as shot icons on the touchscreen. Another advance is the smaller RP3 robotic pedestal designed to allow multiple pedestals to come closer together. EPO has also removed the manual pedestal and head controls to reduce cost. For heavier payloads (up to 154 pounds), A.F. offers the new EPO 435H pan/tilt head with provision for switching between robotic and manual control. The Mini HCU, a miniaturized head control unit was also introduced.

At the TSM/Vinten booth, a complete TSM Autocam intelligent camera control system was operating. The TSM ACP-8000S automated control panel is based on a touchscreen monitor controlling up to eight cameras, with controls superimposed over the active camera's video. TSM has also added frame-grabbed video icons for shot selection on the touchscreen. Multiple controllers can be networked together, allowing either split or redundant operation. TSM also showed the SP-300/X-Y servo-controlled pedestal and a new, smaller Mini-Ped pedestal. TSM has added a new robotic pan/tilt head to its line, the HS-107P, jointly developed with Vinten and switchable between robotic or manual operation. Rounding out the TSM Autocam product line is the RM-300 automated monitor-positioning system, which allows monitors up to 36-inch size to be positioned robotically.

Telemetrics announced the TM-9400 environmental robotic camera remote-control system. It is a completely weatherproof camera package designed for outdoor use. The system uses a single RS-232 serial data path to control the pan/tilt unit, environmental controls (heater, fan, wiper, etc.) and camera controls.

The M.S. Russin Group displayed the Camrobotic system consisting of remote-controlled pan/tilt heads and lens interfaces that tie to a desktop controller via a rack-mounted computer. The news/sports QPT-15 pedestal and controller is commanded via DTMF dial-up, microwave subcarrier or 2-way radio.

Bandpro showed the new CAMS (computer-aided movie system), a remote camera control that allows the operator to handle the camera controls and the viewfinder as though the camera was really there. Also at the Bandpro booth was the Goblin, a lightweight, easily transportable, modular camera dolly that operates either on tracks or rubber tires.

Another new product is a matte box switchable between 4:3 or 16:9 aspect ratios. For cameras that can output both formats, this unit allows an operator to check both framings quickly and easily.

Innovision Optics showed a joystick camera motion-control device with memory. Time, speed, start/stop points and 4-axis positioning can all be stored. The system is portable and simple to operate.

Telemetrics displayed the TM-9250, a triax-cable-based package for controlling ENG/EFP cameras. Camera video, return video, gen-lock to the camera, tally to the camera, bidirectional data to/from the camera and pan/tilt (if used), microphone and program audio, intercom to camera, and camera power all travel on a single triax cable up to 5,000 feet. The TM-9255 is a similar system designed to use RG-59 or 8281 coax cable instead of triax. Telemetrics also announced the TM-9455 fiber-optic camera remote-control system for distances of up to 10,000 feet.

Concept W Systems displayed the Camplex remote camera control systems. The camera adapter is a small, portable unit designed to plug into various connectors on the camera head. The Camplex adapter can then be mounted on the back of the VTR or worn on the belt. Camplex uses coax cable up to 2,000 feet (for 8281 cable). Various configurations are available depending on the signals needed between the camera and control unit.

REPLY CARD 323

Tripods and accessories

Cinema Products displayed a slimmer, redesigned Steadicam Video SK unit that provides reduced weight and size with increased ruggedness and operability. System connectivity has also been redesigned, virtually eliminating support wires and cables.

Bogen displayed a number of items, including the Gitzo series 5 tripod legs, popular among ENG photojournalists. The Bogen Super Clamp is designed to clamp to almost anything round and can hold hooks, mounting pins/plates, lights or shelves. The Magic Arm is a fully articulated arm that operates similar to the human arm from shoulder to wrist, but with greater range of movement. Bogen also demonstrated the studio rail system, which included a motorized light bar.

The Clever Clamp was introduced by Cinekinetic this year. This product enables the camera operator to clamp a camera to any vertical, horizontal or angled support, eliminating the complex rigging that was previously required.

Miller Fluid Heads has a new lock mechanism for the tripod legs, the Pro-Lok torque clamp. It is designed to provide enough clamp pressure to lock the legs in place without deforming them. Miller has also added above-ground spreaders for several of its tripods. Another introduction was the Pro-Jib. Using standard barbell weights for counterbalance, this lightweight device attaches to standard tripod legs and becomes a mini-crane.

Innovision Optics' showed its 3-axis mini-jib arm, which provides highly stable, manually controlled camera movements. Designed primarily for tabletop, miniatures, effects and

4:3 operation by the single switch. The camera provides both formats instantly. Other new camera products included the Aspect Ratio Converter, which performs a unique 4:3 to 16:9 aspect ratio conversion.

REPLY CARD 319

Lenses

Canon brought both new and improved products to the show. The J15az8B IRS is an 8-120mm lightweight (under four pounds) internal focus lens using a new type of glass that increases resolution and reduces chromatic aberration. Another product is the optical stabilizing lens, J14zx17B VAP. The standard J14zx8.5 zoom lens now has a variable angle prism made of two pieces of flat glass joined by a flexible bellows filled with a silicon-based oil. A small actuator controlled by sensors moves the bellows and keeps the image centered, greatly minimizing image movement due to camera instability.

Century Precision Optics introduced two new products. One is a compact, low-angle prism for shooting an image from within two inches of the floor or, if the unit is inverted, close shooting in an enclosed space, such as a car or a cockpit, from a high angle. The other product is an aspheric, wide-angle adapter for zoom lenses.

Fujinon has two new ENG-type lenses, the A36x10.5ERD and the A36X14.5ERD. Both lenses have extremely long focal lengths and wide-angle capabilities. They incorporate inner focus, aspherical design and full servo control of zoom and focus. A new hand-held ENG lens, the A20X8EVM, weighs a little less than four pounds, uses aspherical technology, inner focus and has a zoom range from 8mm to 320mm with the built-in extender.

For the studio, Fujinon introduced an extremely high magnification lens, the Ah66X13.5ESM. This lens goes from 13.5mm in wide-angle to 1,780mm with the built-in extender. One interesting feature is the lens' self-diagnostics. A plug-in card takes the lens through a series of tests and can be hooked to a PC to keep a running record of all voltage levels and circuits. The information can also be modemmed to the factory in the event a problem cannot be solved locally.

From Nikon there were several new zoom lenses and ENG-type converters. New lenses include the S19x8B, S15x8.5B II and the S9x5.5B. New converters enable users to mount 35mm SLR lenses to 2/3-inch ENG/EFP cameras. In addition, Nikon had a line of lenses for HDTV at the show.

REPLY CARD 320

Character generators and keyers

Chyron introduced a still-store for the iNFiNiT!, MAX! and MAXINE! called the TVSTOR!. An extended effects frame buffer increases storage capacity of the still-stores and also allows wipes, dissolves, mix-effects and digital layering in one frame buffer channel. Also added to the line was the CODI/PC, a PC-based graphics system for the desktop user. In either NTSC or PAL, the CODI/PC provides real time, quality character generation and graphics on a PC system.

Grass Valley's new TYPE DEKO character generator is a CG that runs on Windows NT. It is non-proprietary and has two cards you just plug in. The software is switchable between 525-line and 625-line systems.

Quanta has two graphics and text products, the Delta Concorde and the Delta Classic. Both can be dual channel, have internal disk drives, can import and export Targa files and hook into ethernet.

The Masterkey 5 keyer from Broadcast Video Systems is now available in component format. The Masterkey 5 can operate downstream from a component production switcher or as a stand-alone keyer in a component edit suite. Also shown was a 4-input summing key switcher. The matrix switch allows a single input keyer to perform up to four simultaneous keys, switched on or off in any order.

Leitch added to its line of small keyers with LogoMotion, which will store and key moving logos of up to six seconds (see "1994 Pick Hits," p. 24).

Ultimatte had the latest version of its keyers, the all-digital Ultimatte 7.

Sierra Video Systems demonstrated the newest in the SVS line of high-performance chroma key image compositing systems. The BetaKey Plus has all the features of the BetaKey plus the company's Delta series format converters.

REPLY CARD 321

Video special effects

The KRYSTAL 4300 from Grass Valley has the ability to enlarge the picture twice in size with no noticeable graininess or loss of resolution. It also has two global channels and what are called camera channels that allow you to keep your effect while changing your point of view (for example, doing a camera truck around your effect channels without changing the effect channels themselves). Instead of having to rotate the object, you rotate around the object. The unit also interfaces with the K-scope.

Microtime introduced an improved version of the Impact. Series 5 has enhanced polygon capacity and minimized ragged edges. You can get up to 64 ready-made polygons, and the box is capable of generating objects with up to 512 sides, with three live real-time video inputs. It is available in either D-1, D-2 or analog component. Options include trails, sparkles, multilayering, motion blurring and defocusing.

Snell and Wilcox introduced an integrated 4-layer digital switcher and 3-D effects system called the Magus. The basic system is all-digital with six video and four key sources. The DVE can either be single or dual channel with 3-axis rotation, warp effects, trails and sparkles with multipattern, multicolor variable transparency and drop shadow capabilities. It includes a key channel standard and is designed to perform 2-channel-type effects on a single channel.

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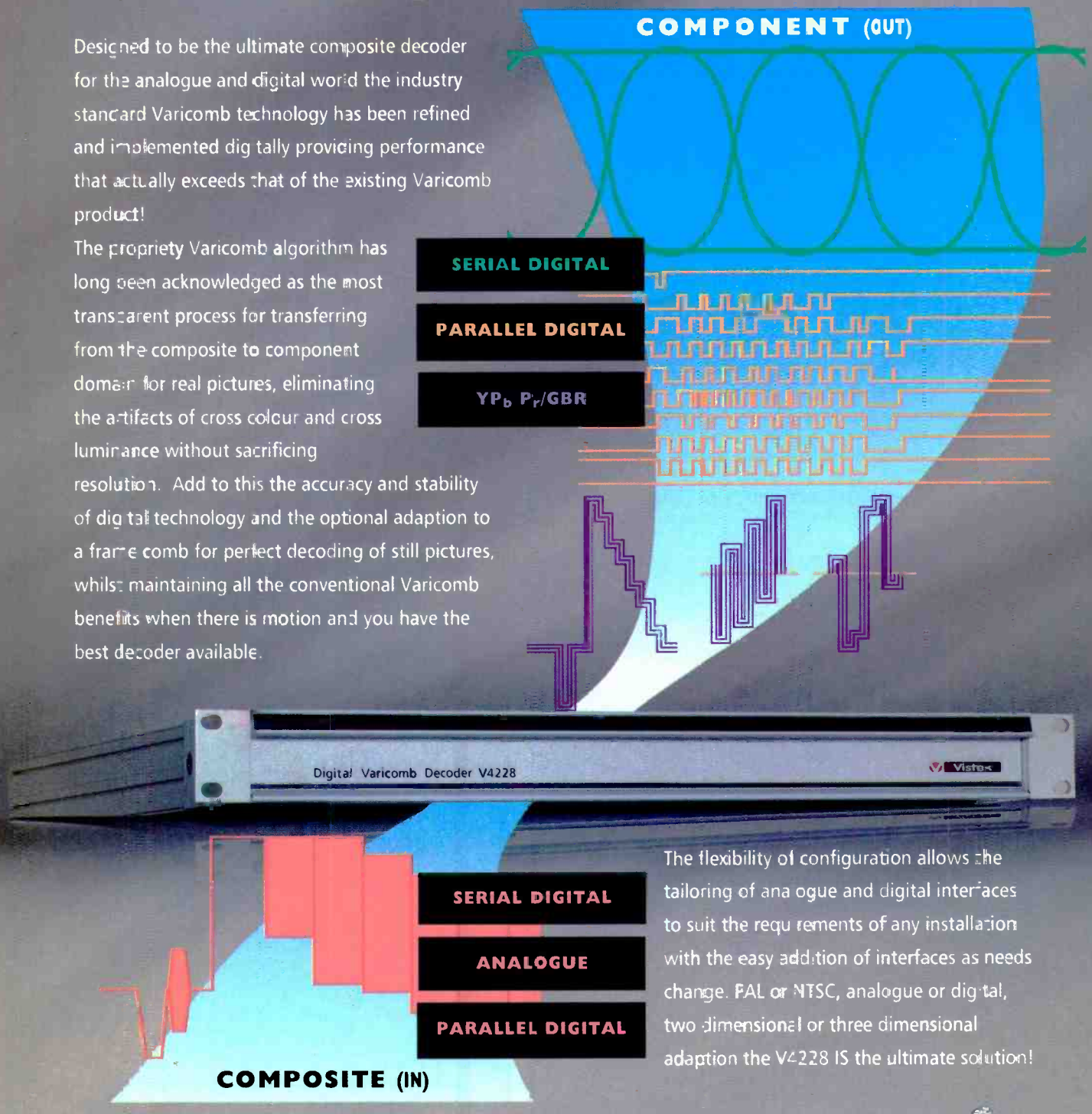
For more product information, circle the number on the Reply Card located inside the back cover that corresponds with the number located at the end of each section.

The V4228 Digital Varicomb Decoder

Vistek Electronics is proud to announce the launch of the V4228 Digital Varicomb Decoder.

Designed to be the ultimate composite decoder for the analogue and digital world the industry standard Varicomb technology has been refined and implemented digitally providing performance that actually exceeds that of the existing Varicomb product!

The propriety Varicomb algorithm has long been acknowledged as the most transparent process for transferring from the composite to component domain for real pictures, eliminating the artifacts of cross colour and cross luminance without sacrificing resolution. Add to this the accuracy and stability of digital technology and the optional adaption to a frame comb for perfect decoding of still pictures, whilst maintaining all the conventional Varicomb benefits when there is motion and you have the best decoder available.



The flexibility of configuration allows the tailoring of analogue and digital interfaces to suit the requirements of any installation with the easy addition of interfaces as needs change. PAL or NTSC, analogue or digital, two dimensional or three dimensional adaption the V4228 IS the ultimate solution!

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product work, the unit moves horizontally, vertically and forward/backward.

O'Connor Engineering Labs/QTV displayed its line of tripod heads, legs and accessories. The model 35 series tripods have one-touch quick-leveling legs made from either aluminum or carbon fiber, using either an aircraft-quality cable spreader or a rigid spreader at the lower or mid-leg position.

The Vinten line of tripods and heads includes a new tripod/head package for ENG/EFP use. The VIN-10ST can handle up to 30 pounds with a tilt range of up to 90°. The head brings Vinten's lubricated friction continuously variable drag system to ENG operation.

Sachtler introduced the Video 18/20 Sensor tripod systems offering an electronic balance meter that constantly indicates the balance point as the camera is moved. Operation is possible over a full ±90° tilt range. Sachtler's full damping range control (from none to full drag) is included. Also shown were suspension systems, teleclimbers and scenery hoists.

REPLY CARD 324

Lighting and batteries

Chimera displayed a new group of Micro diffusers for use with a variety of portable lights typically used in ENG or EFP.

Frezzolini Electronics introduced a dimmable version of its popular Mini-Fill. Using up to a 100W bulb, the MFIC Mini-Fill intensity control light allows videographers to alter the amount of light. Frezzolini Energy Systems debuted its NPX1 battery, a high-capacity, 11-cell Nicad that is computer-verified and compatible with all equipment using NP1-type batteries.

Christie was running a special at the show. The sale package consisted of a CASP/1200 universal battery support system, six video battery cables, serial printer kit, software, handbook and instructional video. The company's battery system is centered on a microprocessor-based charger designed to maintain rechargeable batteries at their peak performance.

CINE 60 introduced its new mini sun-gun light, The Spider. It is a multimirror, halogen 12V system adaptable to all professional cameras.

Anton Bauer showed its Ultralight system, available with a wide range of accessories and a modular design that allows different wattage heads to be quickly exchanged. The remaining-charge display of the Digital Pro Pac batteries is now available in a smaller and lighter package with the new Trimpac line.

Lowel-Light introduced the Fren-L 650, a 650W focusing fresnel light. It has a 7-to-1 focusing range that seemed clear and sharp, plus a high-quality mechanism. Lowel has also expanded its line of lighting accessories.

Die-cast aluminum housing gives Sachtler's new Director fixtures durability, ruggedness and precision. The Director balances heat dissipation and light spill to extend bulb lifetime while reducing spill. The Reporter 200D daylight fixture was also introduced.

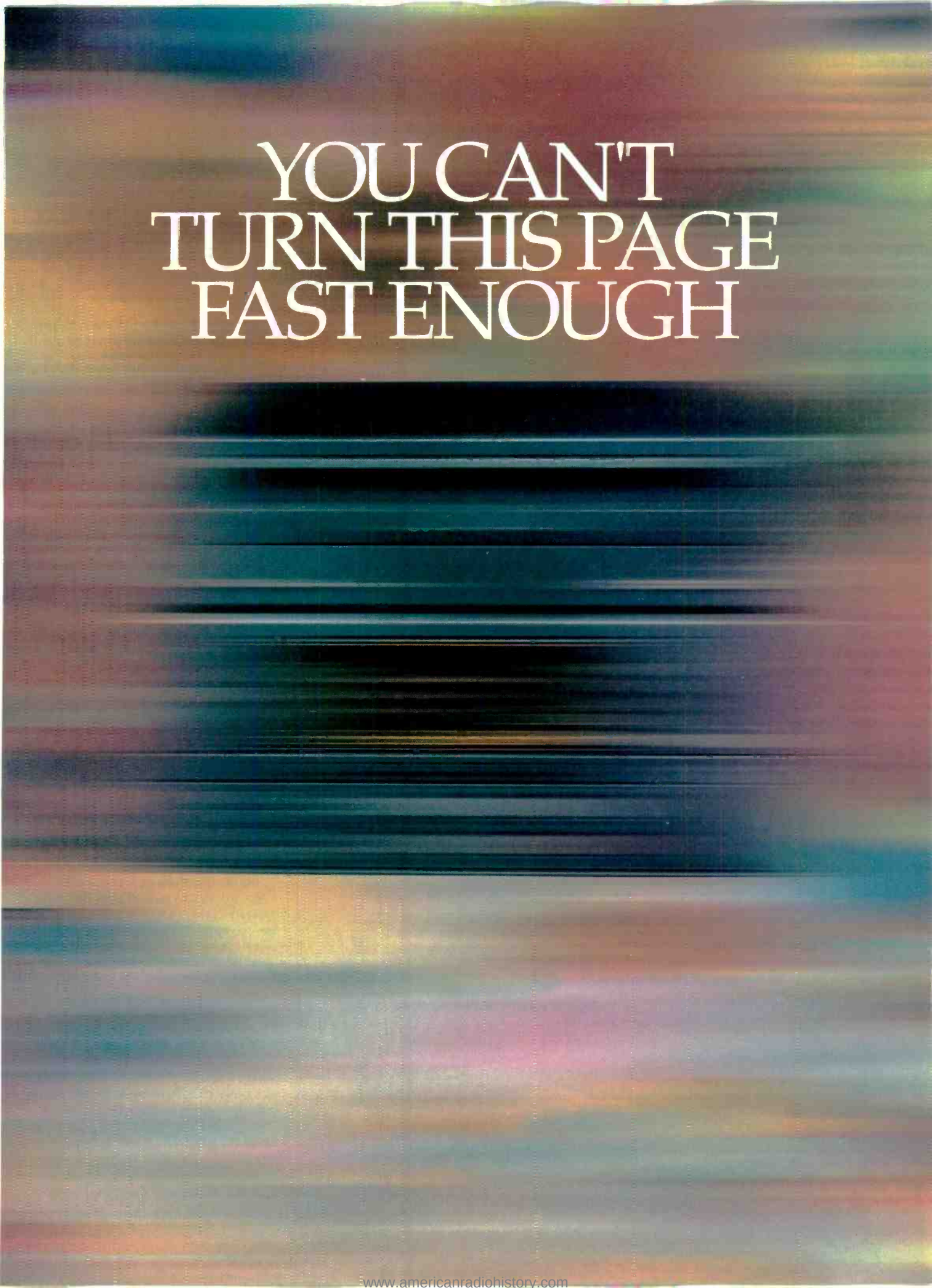
This year Videssence added to its Location Lighting product line with Vid-Sticks. These are modular, stackable light fixtures that can be ganged together to form whatever type of lighting is required. Videssence also introduced RGB Cosmetics. This is a line of theatrical makeup that the company claims can enhance color values while maintaining a natural look for various skin tones, especially under Videssence lighting.

New portable, collapsible chroma-key backgrounds were added to Westcott's Illuminator background line. The new chroma-key backgrounds open with a flick of the wrist, close easily to a hand-held circle that weighs only five pounds, and operates conveniently in ENG applications.

REPLY CARD 325

Prompting and captioning

Computer Prompting and Captioning (CPC) showed its IBM-compatible CPC-1000 prompting software and its



CPC-2000 package, which adds closed captioning. For closed captioning only, the company offers its CPC-600 software, or the CPC-700 with SMPTE time code. All captioning systems used the Chyron Codi or a captioning encoder and decoder, and foreign languages are supported. For the Macintosh, CPC also showed MagicScroll, a multilingual prompting system. CPC also offers a captioning service for pre-produced programs. QTV presented the QCP MARK II computer prompter. Its multitasking ability, which drives separate operator and prompting displays, allows for simultaneous prompting and editing.

Tekskil Industries presented WindowsPrompt, a fully integrated Windows-based prompting system. It provides flexible text creation and offline script control with NTSC or PAL format from a single BNC connector.

QSi Systems introduced the 808/824 series image inserters. They are fully bitmapped, non-volatile CMOS-based devices, which are ideal for inserting company logos, TV station call letters or even a full-frame color image over NTSC or PAL video sources.

Questar showed its AccuPrompt, a Mac-based prompting system that handles many languages, including Chinese and Japanese. It incorporates nonverbal communication cues and can import fully formatted scripts from a wide variety of word processors and platforms.

Cheetah Systems demonstrated the CAPtivator Online and CAPtivator OFFline captioning software. Also shown were the latest line 21 encoders and character generators from EEG, Link, Soft Touch and Chyron. These new products meet all FCC captioning specifications. Other captioning software enhancements include multilingual capabilities and increased company support for Spanish and French captioning.

REPLY CARD 326

Video accessories

Snell and Wilcox has announced two lines of products to aid in video system design and installation. The Video Brick series is a line of self-contained adapter boxes including video DAs, Y/C DAs, serial D-2 digital DAs, 0-to-9 field digital audio delays, blackburst generators (analog and serial D-2), and serial/parallel digital converters. The Gearbox line includes rack-mounted modules that handle interfacing tasks and offer a common remote-control protocol, Rollcall.

For those looking for multiple video images in one NTSC signal, Sumitomo Electronics has the Videoplex-2000, which can multiplex up to 16 NTSC video sources (individually captioned) into one NTSC output. Applications include high-end security, reduced monitor congestion or watching the competition in a newsroom.

Ultimatte unveiled the new Ultimatte 7 digital compositing device. It accepts CCIR 601 signals in 8- and 10-bit formats and uses 4:4:4 processing.

Broadcast Video Systems displayed the KP500 key processor. It accepts RGB from a camera and develops a linear key signal, which faithfully represents the color-difference signal of the camera shot.

REPLY CARD 327

Studio furniture and accessories

Anthro displayed its line of roll-around carts and furniture systems for A/V and computer-based equipment. They offer space-saving gadgets including shelves, baskets, wrist supports, document holders and more.

Nigel B. Furniture presented its modular furniture, workstations and accessories including systems for Avid edit suites, CAD, video editing and multimedia workstations. Accessories include chairs and tape storage units plus tape-deck, mixer, keyboard, monitor and speaker mounts.

Skaggs Telecommunications Services (STS) showed a blend between modular and custom furniture. The company relies on modular elements that are combined together to pro-

Continued on page 58

TO MATCH THE SPEED OF THIS MACHINE.

Lightning speed. That's why just about anyone doing anything with video -- from the major broadcast and cable networks to directors at sports arenas -- is doing it with the VDR-V1000 Rewritable Videodisc Recorder from Pioneer.

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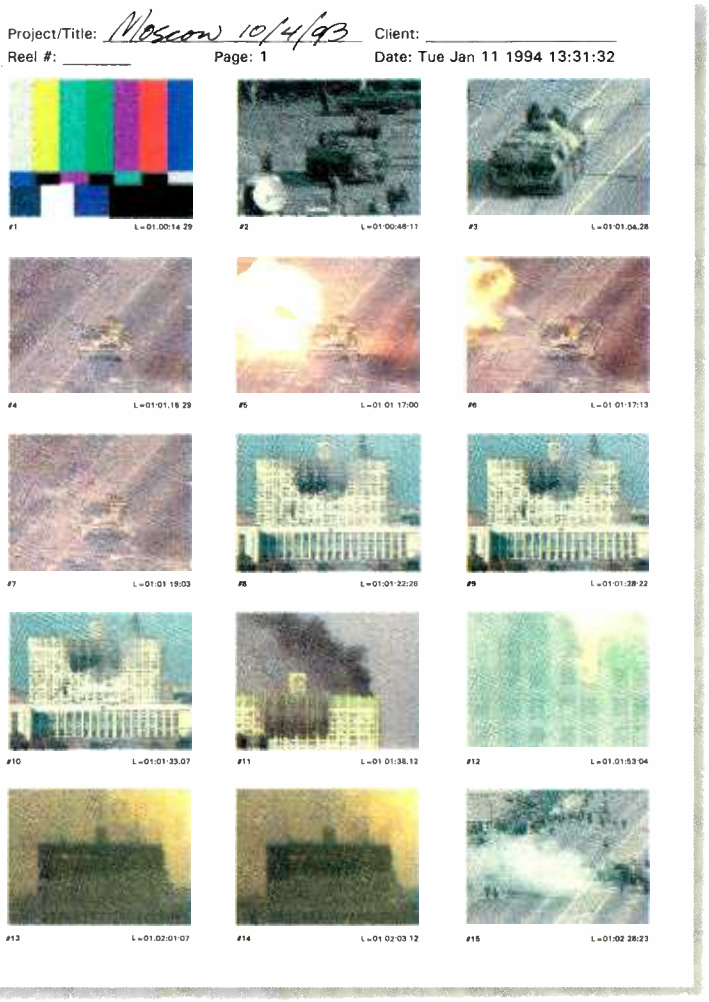

automatically — and from then on, you can find any shot at a glance.

Nobody has come up with a video print solution that made so much sense before. But it makes sense that HP would be the first to bring video printing into the mainstream. After all, with over 20 million printers sold, we're the company that made HP LaserJet and DeskJet printers household names.

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Continued from page 54

vide sturdy, customized furniture systems. STS works with customers to build CAD-based customized designs that can fit in limited space, at a cost comparable to a standard modular approach.

Winsted Corporation displayed its modular rack furniture and videotape storage solutions including multimedia consoles designed to support Avid editing systems. The knock-down racks and 24-hour shipping can be an effective solution for time-critical applications. Winsted also offers a DOS-based software package called WELS (Winsted Equipment Layout Software), which automatically builds a parts list as a furniture system is designed.

Zero/Stantron presented two new rack designs. The Series 600 is a low profile console that will not interrupt sight lines. The Series 900 uses a 19° slope to provide more than 21 inches of rack space above a writing desk surface.

In the more traditional vein, Electrorack demonstrated its line of consoles, cabinets and rack systems. The company has a line of heavy-duty rack enclosures and accessories that are solidly built for demanding applications.

For facility design work, Video Design Pro unveiled VidCAD for Windows, running under AutoCAD R12W. VidCAD enables the engineer to design systems quickly and accurately without typing or drafting. According to company officials, the program is more than 70 times faster than any other CAD program. VidCAD is also available for DOS.

Avitel exhibited the RMA rack-mount shelves for VTRs, which include cutouts for the VTR's feet. Avitel also displayed an integrated system of under-monitor display (UMD) and tally systems that can be driven from most major routing switchers.

ESE showed a new GPS addition to its clock lineup with the ES-185 GPS master clock/time-code generator. In addition to ESE, SMPTE, IRIG-B and RS-232C ASCII time code, the unit also produces a 1-pulse-per-second (1PPS) TTL level output. ESE also introduced black cabinets for its clocks and timers.

Hoodman has expanded its line of glare-reducing hoods to handle more pieces of equipment, such as viewfinders and test equipment, including the new Tektronix hand-held WFM-90. Another new product is the Video Chariot, a heavy-duty remote equipment caddy designed to hold three shelves of equipment, cabling, light stands, monitors, rack-mounted gear and even a small generator.

Illbruck expanded its assortment of Sonex acoustical products with a line of 2-inch-thick baffles for applications that don't require 3-inch thickness. The company also added new ceiling tiles and 2'x4' acoustic fabric panels in a variety of colors.

REPLY CARD 328

Video recorders and duplicators, tape, disc and optical media systems

By Curtis Chan

Chan is president of Chan and Associates, Fullerton CA.

Tape machines

Ampex displayed the latest enhancement to its DCT line, the DCT 1700d. Aside from the blazing fast transport speeds (60x play in less than a second), the new drive boasts a 2-year or 2,000-hour scanner warranty. One of the more interesting products from BTS was the DCR-6000 HDTV universal cassette recorder. The 1.2GB recorder records at either 1,250/50/2:1 or 1,125/60/2:1 on a standard 19mm cassette and can be adapted to future HDTV standards. Additionally, the recorder features up to 12 channels of digital audio with the ability to per-

form audio/video split editing.

JVC took the industry by storm by showing the BR-S525U, a variable tracking S-VHS player with slow-motion and digital noise reduction. The company also introduced an affordable (around $8,000) S-VHS time-code edit system, which is just the ticket for videographers on a limited budget. The system is comprised of the BR-S800U editing recorder, BR-S500U player and the RM-G800U editing controller. In addition, JVC demonstrated the SR-W310, the world's first affordable professional VCR capable of recording NTSC and HDTV signals. The W-VHS format of the SR-W310 is playback compatible with S-VHS and standard VHS.

Panasonic unleashed a multitude of products including the AJ-D580 D-5 studio VTR. The unit offers recording and playback of CCIR 601 digital video at 10-bit uncompressed form with full-resolution digital audio. Because it's 13.5MHz and 18MHz selectable, it's also suited for 4:3 and 16:9 applications. To expand the D-5 and D-3 DVTRs range of applications, there is a multichannel audio processor (MAP) designed to expand the AES/EBU channel pairs from two channels to eight or from four to 16. The AG-DS850 S-VHS editing VCR was showcased and features digital slow-motion capability. Using a 3-D-type TBC with a full-field memory, the unit allows noiseless playback from one-quarter reverse to half forward speed. The AG-DS840 S-VHS player was also introduced as a companion product.

At Panasonic's NAB press conference, executives from Matsushita Electric Company (Panasonic's parent organization) announced plans for a consumer digital VCR, dubbed the DVC. The format, which uses a 6mm videocassette, is the result of cooperation between a number of manufacturers. The consumer DVC is expected to provide excellent picture quality, using 4:1:1 component recording technology, however, compression will cause significant losses during dubbing, thus protecting the movie studios' copyright interests. A professional version was said to be planned for introduction sometime after mid-1995, although little was revealed about differences between the consumer and professional DVC decks.

REPLY CARD 329

Disc and optical systems

Abekas unveiled the Hexus digital disk recording system. It is a 10-bit digital disk recording system ideally suited for 3-D graphics, telecine transfer and on-line random access editing. The unit is a multichannel, multiuser system with up to six record or playback channels available to four users at a time. Hexus can also import or export EDLs and act as a non-linear editing system with the optional graphical user interface (GUI).

Another system, the Brontostore from Accom, is capable of managing clips of still frames, real-time video, key and audio. Up to 53 hours of uncompressed CCIR601 video can be stored on the system. This is the system that Turner used for the 1994 Winter Olympics.

Quantel unleashed another series of products. For broadcasters, Clipbox, which is touted as the world's first tapeless, multi-user, multitasking, multiple output, post-production, scheduling and playout system, was shown. Central to Clipbox is a massive storage system (Videobank), storing up to 30 hours of CCIR 601 and compressed video. Up to eight users can be on-line having simultaneous random access to any of the stored material, without conflict or the need to duplicate files.

Hewlett-Packard showed the 4:2:2 video disk recorder, which is a non-linear VTR replacement with 3-, 6- and 12-minute storage capability with completely non-compressed storage.

In the area of computer-type hard drives, Rorke Data unveiled its 9GB 11-platter hard drive with smart thermal recalibration. Other drives included the Elite series (2-9GB/5,400rpm/11ms seek time), Seagate's Barracuda 1.5-4GB, 7,200rpm, 8ms seek time and Hawk series touting 1-2GB, 5,400rpm at 11ms seek time. Sony showed an upcoming 8-inch MO capable of 3.9GB/s. Maxell offered a 5.25-inch 594MB/652MB rewritable MO capable of withstanding 10 million erasures. Maxell also offered 580MB and 680MB CD-Rs for desktop productions.

For time delay applications, Pioneer New Media Technologies' TD-001 time delay software features a Windows-based GUI and allows delays ranging from one second to 32 minutes. Also shown was the revamped VDR-V1000A, which touted four user presets, 198 cues, RS-422 and dual head play capability.

Asaca's AMD-1340NS MO drive was also at the show. Capable of 12MB/s, the unit incorporates four beam optical heads and can be configured with 20MB of on-board buffer memory. The removable disk cartridge has a 1.2GB capacity.

Sierra Design Labs was showing its Quick-Frame family of digital video disk recorders. The DVR provides D-1 capability, with seamless real-time non-linear playback. Systems configured starting at three minutes, with expansion to more than 90 minutes. Optional 4:2:2:4 and 4:4:4:4 configurations are available.

SGI users are enjoying an ever-widening circle of support from third parties like Ciprico. The company unveiled the Spectra 6000, a high-speed on-line storage system using RAID arrays that are capable of sustained data transfer rates of 19MB/s. Drives can be hot replaced and the data will be regenerated automatically by the array with no performance degradation. Storage capacities range from 2GB to 16GB.

REPLY CARD 330

Tape and duplication

Sony unveiled a new MP Hi8mm tape called the P6-HMPX, with improved dropout and shedding performance, while an editable Hi8mm metal evaporative version (E6-HMEX) is slated for release in the fall. A low dropout, low headware BC-metal Betacam SP formulation was introduced by 3M that promotes 3M's Anti-Stat system of protection. In addition, 3M announced support of Panasonic's D-3 format with the unveiling of D-3 videocassettes, available in six sizes from 12 to 95 minutes.

Maxell introduced the CL-S freon-free/fluoride base magnetic head and transport cleaner. The company is

also offering 1/2-inch Betacam SP tape with ceramic armor metal technology, providing increased robustness and strength. For special applications, the black magnetite formulation ensures extended use and can be found in the 1/2-inch BQ-certified S-VHS cassettes, P/I Plus VHS, HGX Plus VHS and 1/2-inch bulk and pancake products.

In other tape-related areas, Garner Industries, one of the leaders in audio, video and computer tape degaussers, showed its CF750 Type II degausser. This unit meets the NSA/CSS specification L14-4-A and DoD's 5200.28M for erasure of Type II magnetic media. In just 22 seconds, the CF750 will erase 7500e media to -90dB, including S-VHS, 8mm and 3480 cartridges.

A leading supplier of video scrambling equipment, Macrovision, showed the StarShaker transmission scrambling system for low- to mid-end applications and the VES-C1 videocassette (VHS, S-VHS and 8mm) scrambling system that allows video information to be recorded, distributed and archived with complete security.

REPLY CARD 331

TV automation and production switchers

By Philip Hejtmanek

Hejtmanek is manager of maintenance and RF operations for WBBM-TV, Chicago IL

TV automation

Station automation was once again a major topic of interest at NAB '94. A wide range of hardware and software solutions were offered by the major players, including different operating environments and user interfaces. Video servers were featured in several of the products, as disk storage technology added a new aspect to station automation. For more information, see *Video Servers* on page 43.

One such system was offered by Odetics Broadcast. It features the new Tektronix Profile disk recorder as a caching device and uses an Odetics cart machine in an archiving role. Spots are played to air from the disk recorder. Use of the disk cache eliminates conflicts associated with multisegment-per-tape cart storage schemes and allows for simultaneous dual-channel output. This disk-tape hybrid system exploits the cost-effectiveness of tape storage and the random-access capabilities of disk. It is available as a dual-channel option for a single cart machine or as a multichannel presentation system (MCP).

Louth Automation was another vendor that explored the use of disk technology in an automation environment. The ADC-100 automation system was shown interfaced with the Tektronix Profile disk though the company also is working with Hewlett-Packard, Silicon Graphics, ASC and others. Louth's Object Oriented Programming Software (OOPS) approach to the automation problem eliminates individual external interface boxes and simplifies the connection of peripheral devices (VTRs, cart machines, master control switchers, etc.) to the system, by representing them as software objects. This provides flexibility in system configuration and allows for upgrade or change of devices without the need to rewrite the application software. The OOPS software was used by several equipment vendors, including Sony, to control a variety of devices such as video servers and video disk recorders.

BASYS demonstrated a complete automation package designed for the BBC. The Resource Management System modules handle input feed scheduling, tape tracking and booking of lines. The Windows-based user interface features a time line display of resource allocation and scheduling. Hardware includes hand-held and rack-mounted barcode readers for tape tracking. The Network Automation System was designed to meet the demands of the multichannel BBC operation. Again, a comprehensive Windows-user interface handles program scheduling and air control. As a wholly owned subsidiary of the Digital Equipment Corporation, BASYS used VAX and DEC PC computer hardware throughout. Also demonstrated was the BASYS entry into the disk storage arena, using MPEG-1 compression and Scientific Atlanta disk hardware.

FloriCal Systems offered a complete set of integrated automation systems for TV stations. The popular ShowTimer package controls acquisition devices such as earth stations and station routers records program feeds and then determines segment timings automatically. The SpotLinker and CartDirector allow a Pioneer laser disk and Sony Flexicart, LMS or Betacart to function together to create a compiled spot reel or disk, from one or more playlists. These compiled reels can be played back via AirBoss, the FloriCal air control software product.

Dynatech presented a demonstration of its full facility automation capabilities. Based upon the TAS client/server network architecture and software, the system integrates VTR machine control, video cart machine control, the Utah Scientific MC-500 series analog or DMC-600 digital master control switchers and newsroom automation functions from NewStar. NewStar's current newsroom automation software integrates wire services, teleprompters, character generators and cart machines to provide real-time response in a fast changing environment.

Columbine Automation had a demonstration master control setup running its MCAS-III software. This package features a tight link and full compatibility with any station traffic system, allowing last-minute spot changes to be downloaded directly from the traffic department. It supports single and multiple separate schedules, including regional spot breakouts. MediaBase is the companion media management software. This software uses hand-held barcode readers to identify tapes and machines and is capable of multicut per tape cart machine operation.

EVA is a resource management package from Advanced Audio Visual Systems (AAVS) of Montreuil, France. This real-time automatic sequencing system runs on Apple Macintosh hardware and is upgradeable to accommodate station expansion. It operates with a networked architecture and controls external peripheral equipment through the use of AAVS series 400 interface cards. One feature of EVA is the graphical representation of a VTR control panel on the operating screen. Users can fully control each connected machine with the mouse. Other screens

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include an on-air schedule showing the status of each event and machine resource, router status and resource scheduling chart. The company also makes a video cart machine, the DIVA Mk. II.

For station automation, Alamar introduced the MSL-4000, a LAN-based machine controller that uses a PC-platform to handle device interface.

REPLY CARD 332

Switchers

The new generation of component digital production switchers bears more resemblance to digital effects units than switchers. Most of the major switcher vendors had something impressive to show the crowds at NAB '94. The relative absence of new composite analog products from the display booths marked the trend toward digital components. Most of the component digital switchers offered advanced keying features, layering and time line effects storage.

Grass Valley Group had several production switchers on display including the long-awaited composite model 3000 switcher with three mix/effects banks and the component digital model 4000. The real show stopper was the model 1200 component digital production switcher, featuring a built-in setup and configuration screen, internal floppy disk drive, direct aux bus control, and auto setup on the chroma-key. Serial or parallel digital I/O are provided to minimize the need for external converters. Proc amp controls are provided for each input to correct source errors.

Abekas rolled out the new ASWR8100, a compact, powerful switcher packed with advanced features. The switcher has color correctors associated with each of its three keyers and four background buses. This single M/E switcher also features a graphical user interface that displays time lines, setup adjustments and wipe patterns, versatile keyer functions and the mBoss border generator that performs borders, trails, shadows and a variety of other effects.

Snell and Wilcox, a British company best known for standards converters, entered the component digital switcher marketplace with the introduction of the Magus, a 4-layer digital switcher and 3-D effects system. The system offers 4:2:2:4 processing with six video and four key sources, expandable to 12 video and eight key inputs. The system is capable of four independent layers over a background, instant switching of layer priority and the ability to perform two channel effects with only one DVE channel.

Another British import is the D8001 digital vision mixer from Vistek. This compact component digital switcher features 4:4:4:4 internal processing and handles 4:3 or 16:9 signals. Both 4:2:2 and 4:4:4 inputs can be accepted and mixed together through a variety of optional input router configurations. The D8001 provides control of luminance, chrominance and black level for each input, as well as a variety of keying and mix effects.

The digital video switcher line from Sony ranges from the two M/E plus PGM/PST DVS-8000 to the two M/E DVS-6000 to the compact single M/E DVS-2000C. The two bigger switchers can be purchased with either a composite or component digital processor and feature the full range of mixing and keying capabilities. The larger DVS-8000 is well-suited to live operations, while the more compact DVS-6000 would fit into a post-production environment. Both switchers have editor interfaces and attach easily to digital video effects systems.

The DVS-2000C is a 16-input component video switcher designed to work in a compact digital post-production environment. The user interface features an LCD display, with soft keys and rotary encoders. The unit has dual video keyers with an optional DSK and chroma-keyers that allow full 4:4:4:4

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processing of foreground and background video. An optional frame memory can be added, which can store two frames for video or key signals. The Depth Key option allows effects keyers to operate in 3-D, with Z-axis data from the companion DME-3000 digital multi-effects unit.

Switchers with the most distinctive control panels at NAB were models from Thomson Broadcast. The powerful two M/E plus PGM/PST 9500 and the single M/E 9200 had Euro-style control panels with wood trim on the 9500. These 4:2:2 component digital mixers offer an impressive array of features, and are designed for use in live and production environments.

VGV featured the DX-EX expanded digital matrix addition to the DX120 and DX60 product lines. The DX-EX expands the capability of the DX120 composite digital switcher to 20 primary inputs with two aux buses available.

Switcher shoppers with more modest requirements had a number of choices at NAB '94. The modular video switcher series from ECHOlab is an example of a powerful system with a modest price tag. The MVS series features a single chassis that can be field configured as a composite analog, Y/C or component analog video switcher by selection of appropriate video cards.

Hotronics showed its new AQ21 TBC/switcher, which is a low-cost switcherwith eight inputs (Y/C or composite) that is controllable from a PC and/or editor. The unit has an audio follow option and offers digital effects.

Ross Video showed the RVS 630, designed for live, on-air, and on-location productions. Also at the Ross Video booth was the RVS 424 featuring 24 video inputs, two 4-bus multilevel effects, serial interface and downstream keyer.

Videotek showed a pair of analog switchers with a good mix of features. The 18-input PDG-418 and the 10-input Prodigy have multilevel M/Es, linear keyers with three external inputs and auto external key follow, programmable effects/transition memory and can be fitted with an optional stereo audio-follow-video system. The Prodigy model can be ordered as a composite or as a component analog video switcher while the PDG-418 is composite.

One of the few new master control switchers introduced was Saturn from BTS. The system offers preset/take selection of up to 16 sources, full fade/mix/key transition control, machine control features and an audio section with over/under mix controls, metering and monitoring.

REPLY CARD 333

Routing switchers

Marvin Born
Born is vice president of engineering for WBNS-TV, Columbus, OH.

Small routing systems

The term routing switcher suggests big video and audio switching systems. However, Broadcast Electronic Services has built an interesting router that switches GPI pulses. This is a 1RU panel with 10 thumbwheel switches connected to a common output. Because the switches can be ganged, a single GPI pulse from an editor can control three MEs, a downstream keyer and a DVE.

Looking at smaller systems, there is a new product from Videotek, called Omniframe. It is a basic structure that allows different devices to be installed in the frame. The RS-61 routing modules provide vertical interval switching in the basic 6x1 switchers. The modules also have small push-buttons and LEDs for local control. Along those same lines, the VM video switching Matrix from Broadcast Video Systems, Ltd. is designed to plug directly into a Leitch video or Grass Valley Group DA frame. The VM400-1 is a 4x1 matrix and the VM400-2 is a 4x2 matrix.

The small, but innovative company, Adrienne Electronics, demonstrated its line of small routing switchers, time-code products and machine control products. The company has some cost-effective solutions to routing and control you should see.

Knox Video offers a line of video and audio routing switchers in 8x8, 16x16 and 12x2. The units will switch any 1V video signal including off-air and non-time base corrected signals plus audio. Rather than 600Ω balanced, audio is 100kΩ input and 1kΩ output unbalanced.

Nova Systems is well known for its line of time base correctors and frame synchronizers. The company also offers a line of card-mounted processing equipment, such as TBCs, frame syncs and distribution amplifiers on circuit boards that plug into a standard computer bus. Routing switchers have been added to this series, and software for computer control is available.

REPLY CARD 334

Larger systems

Leitch/Hedco offers a full line of analog and serial routers. The VSM-16X/PLUS modules form the basis for a line of 100MHz bandwidth general-purpose vertical interval routing switchers for the needs of today's broadcast environment plus the needs of future HDTV and computer graphics systems. The 16x1 modules can be stacked and configured to accommodate RGB or Y/C component. In the same series is a 16x16 serial digital video module for the X/plus frames. The digital switcher will operate in the same frame as its analog twin and may be operated as an additional router level.

Datatek's new routing switching system, the D-2800, handles analog video and audio, serial digital video, AES/EBU audio, time code and data. New additions to the D-2500 series of switchers included the D-2530 serial digital video switcher and the D-2535 130MHz analog video switcher. Dynair showed a flexible new family of routing systems, the System 2000. This 120MHz system routes high-resolution computer graphics video, HDTV, broadcast video, NTSC, PAL and SECAM. Utah Scientific displayed all of its components for routing, master control, and automation including the AVS-2 routing switcher.

Sierra Video Systems offers a series of high-performance routing switchers in a compact high-density package. The Sierra series is a line of small utility routers available in video only or video and dual audio. A new model, the 51C, has LED push-button switches on the control panel and a built-in serial interface adapter. The company also introduced a video router with four audio channels built in. In line

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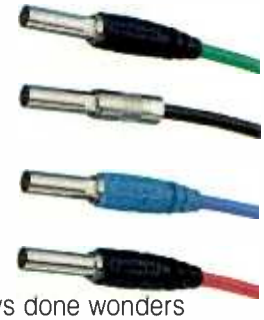

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with the component needs, the company introduced a 12x12 3-channel component switcher that handles RGB/YUV, model 1212C. This switcher is available in a 70MHz bandwidth for high-resolution graphics applications.

Grass Valley Group offers a line of products from small 10x1 video-only switchers up to the TEN-XL offering video, audio and data switching. The Horizon series offers 8x16 as a basic configuration up to a maximum of 128x128 video and audio. GVG's flagship product is the series 7000. Available as a 16x16 system or a 1,024x1,024 with video, multiple audio and machine data control. Series 7000 supports component serial digital, composite serial digital, 360Mb/s, AES/EBU audio, component analog and composite analog plus RS-422/232 data.

On the subject of moving data, Broadcast Video Systems unveiled a low-cost data link. The VBI232 data encoder/decoder allows the transmission of 1,200 baud data on one line in the VBI. Virtually any information that can be handled in a standard RS-232 format, can be distributed on the VBI of a composite video signal.

The BTS Mars system is a compact switcher designed to provide a 24x8 switching matrix in a single rack unit of height. Mars offers separate units for analog video, audio, digital video and EBU digital audio. The Venus series is BTS's expandable 32x32 system that can grow by adding input and outputs until the system reaches 352x128. Venus features 400Mb/s serial digital video and wide bandwidth analog video, either composite or component, to offer full HDTV compatibility. The Mars and Venus units can be controlled by a stand-alone SC-400 control system or the BTS Jupiter integrated facility control system.

Sony offered its line of DVS digital routing switchers. The model numbers are DVS-V for video, DVS-A for digital audio, DVS-RS for RS-422 routing and DVS-TC for time-code routing. Up to 64 frames can be cascaded to form a 512x512 switcher. The DVS-RS1616 modules are bidirectional control switchers for VTRs ATRs, DME and editing systems that transmit control signals over a single 4-wire cable. Crosspoint selection in the router is restricted to one destination per source to prevent jamming signals. The control router can be expanded up to 128x128. Control panels can have 16 character names programmed for each source and destination to make identification easy.

Pro-Bel offers MADI, a multiplexed audio digital interface switching system. MADI can distribute up to 56 mono audio channels of digital audio over a single coax or fiber-optic cable. The TS16 is a 16x4 analog and digital router, and the HD series is for large applications.

ADC Telecommunications offered an interesting product. Its LightSwitch routing switchers will route any digital signal regardless of format. ADC LightSwitch does its magic by *not* regenerating or reclocking the digital signals, which means they can pass any digital signal. ADC claims 1.5Gbps per channel that can support even non-compressed HDTV. The LightSwitch can support either coax cable or fiber-optic cabling as an input or output termination. Not only can the system switch video or audio in the digital domain, it will also transport and switch computer network systems, such as SONET, FDDI or ethernet.

Vistek demonstrated a new Windows Control Interface for its family of V2000 array routers. The interface permits the supervisory function to be carried out using the full power of Windows with unprecedented control options.

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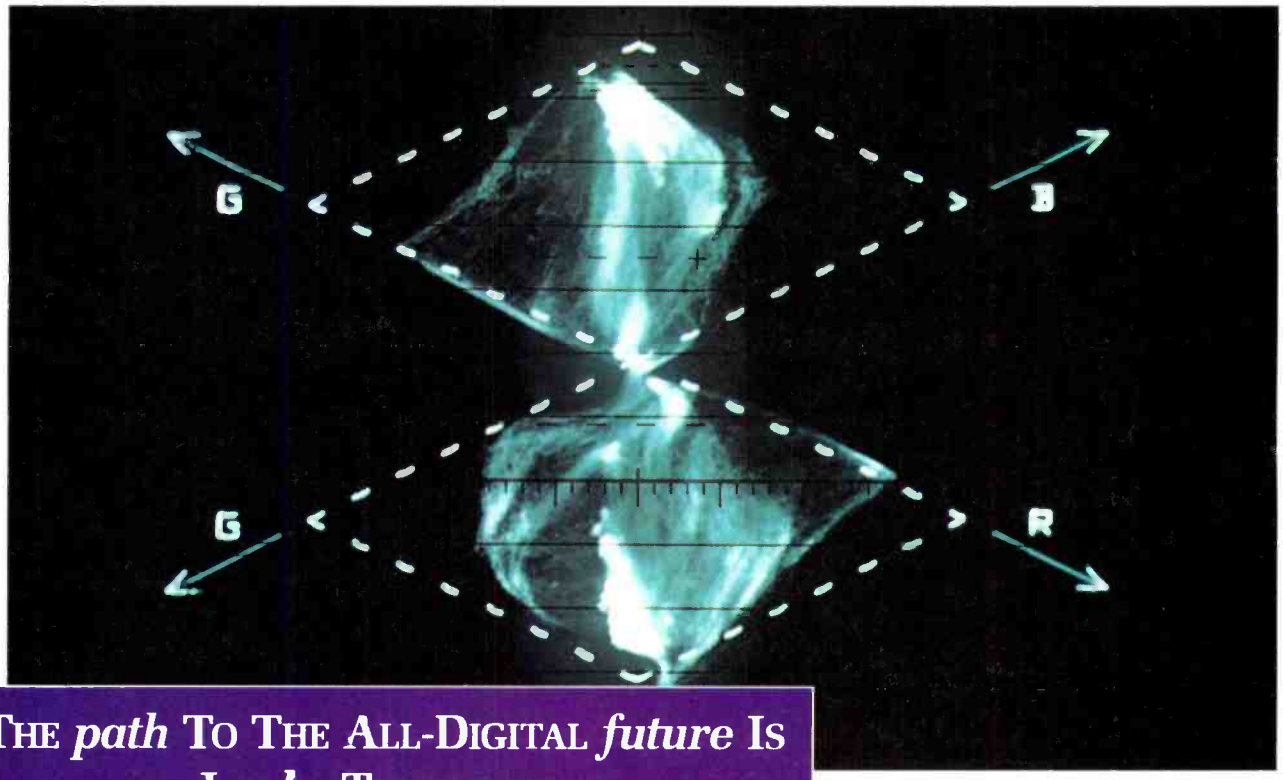

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1994 NAB New Product Highlights

Frame synchronizers, TBCs, standards/format and signal converters

By Kenneth Hunold
Hunold is audio/video project engineer for ABC Engineering Lab, New York.

TBCs and frame syncs

Although the category of time base correctors and frame synchronizers may be considered "old hat" in today's multimedia world, the desktop video mini-industry has spurred a second coming for these units.

Digital Processing Systems (DPS) introduced its DPS-290, a component TBC/transcoder/synchronizer. It allows transcoding among different source systems including Y/C and composite signals. A new 3-line adaptive comb filter maintains full bandwidth and is used in the frame synchronizer section. There are many built-in frame-related effects, such as freeze frame, strobe and 3:2 pull-down simulation. Red and blue color gain controls provide an easy way to do some basic color-balance correction of incoming feeds. A new low-cost frame synchronizer, the DPS-235, shares some of the advantages of 3-line adaptive comb filtering for Y/C and composite video feeds. Red and blue color balance controls are also included. In addition to a dedicated front control panel, remote control is also possible via a PC. The new RC-2001 "Master Control" brings together remote control of many DPS devices. The unit is intended for broadcast and other production applications and provides RS-232 and RS-422 input and output ports.

Hotronic had its PC/TBC, a full bandwidth TBC that plugs into a standard PC. I/O is composite and Y/C configurations allowing for transcoding from Y/C to composite or composite to Y/C.

Jim Grunder and Associates displayed the Feral C-100N, a stand-alone TBC/framestore synchronizer with full frame memory and

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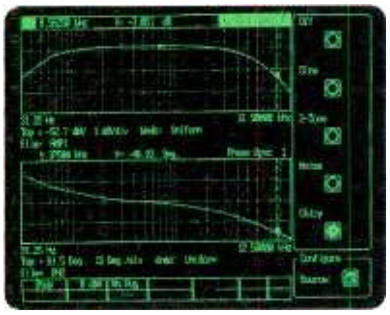

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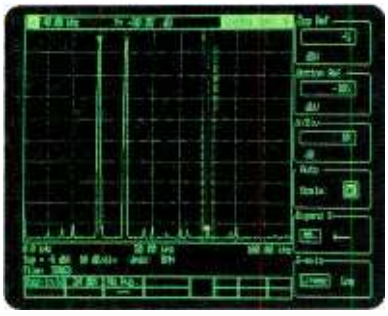

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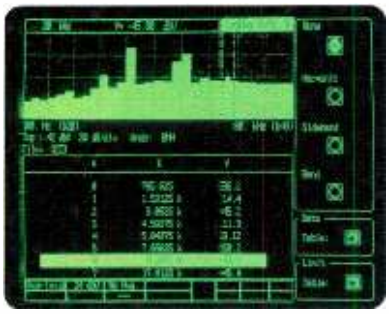

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8-bit 4:2:2 processing. Also shown was the Feral D4:2:2LC, a full frame, infinite window, 8-bit, dual channel TBC/FS that plugs into any personal Amiga or IBM expansion slot.

Nova Systems, Inc. expanded its NovaBlox line. The NovaMate XT component transcoding TBC/frame synchronizer has U-dub, YUV, Y/C and composite inputs and outputs. Also available in the XT is a median noise reducer for dropout compensation. The NovaSync 3/MNR, a wideband composite video frame synchronizer with median filter noise reduction can cover up impulse noise and transmission sparkles. Nova Systems also introduced the HR600II high-resolution TBC and TBC/synchronizer. The unit has a video bandwidth of 7.5MHz, 16-line TBC window (for TBC-only models, full 525-line memory for frame sync models), 0-20dB noise reduction, and an adaptive comb filter decoder. An expanded version of the model 50II TBC/FREEZEII is available for the NTSC, PAL or PAL-M standard. Features include 1-, 2- or 3-line vertical color advance, horizontal chroma/luma delay adjustments, three levels of detail enhancement and variable rate strobe.

Snell and Wilcox featured its TBS-24 TBC-synchronizer, a multistandard time base corrector and synchronizer that will work with either 525- or 625-line standards. Standard procamp controls are included, as well as chroma shift for correcting chroma/luma delay errors. A built-in color bar generator is included for test purposes.

Tektronix featured the VS-210, a replacement for the discontinued 110S. The 210 does not have a TBC option available and operates only as a frame synchronizer. Tektronix also offers a one-rack unit remote control for the VS210 that can control up to six VS-210s.

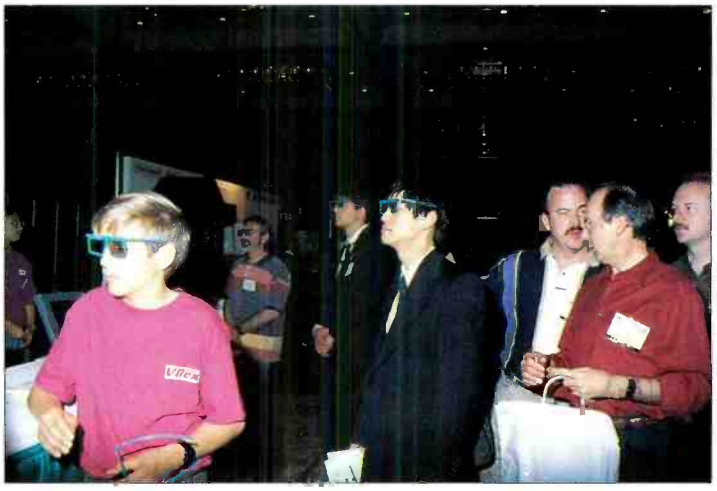
REPLY CARD 336

Standards converters

Many technological similarities exist between the conceptual design of frame synchronizers and TV standards converters. The idea of writing video into memory in one TV standard rate and reading it out at another TV standard rate just takes the basic frame synchronizer concept and raises it to the "nth" degree. Although it should not be a surprise to most people in our industry, there is no such thing as a "perfect" standards converter, even though advances in motion estimation, motion compensation and interpolation have improved dramatically. Users should consider their program material, market and budget when evaluating the many products offered.

AVS Broadcast introduced two new standards converters. The EOS is an 8-bit, 4-field, 4-line converter supporting all world standards in and out. The Cyrus Prime is a 10-bit, 4-field, 4-line standards converter. It is upgradeable to a motion compensation system licensed from Vistek Electronics. I/O interfaces are provided for analog and digital composite, as well as analog and digital component. Chroma and luma noise reduction and Y-channel detail enhancement are included.

Prime Image announced its Passport 4000, a stand-alone device that allows the NewTek video toaster to operate in the PAL TV standard.



Vistek released a new software upgrade to its vector VMC (vector motion compensation). This enhancement to its proprietary algorithm is said to improve its motion compensation capabilities.

REPLY CARD 337

A/D, D/A and format conversion

As the migration from analog to digital continues, analog signals have to be converted to digital for processing, and eventually converted back to analog. Although conversions from the analog domain into the digital domain have become routine, crossing the barrier from the composite to the component realm is still not an easy or trivial process. Although it is easy to fall into the habit of referring to digital video formats and transmission protocols by using videotape formats (i.e. D-1, D-2), this is incorrect. When appropriate, SMPTE or CCIR designations will be used.

Abekas Video Systems offered four types of digital video conversion devices. The A25 analog-to-digital (A/D) converter and A26 digital-to-analog (D/A) converter are parallel component digital (CCIR 656) converters, with 8- and 10-bit serial component digital (SMPTE 259M) inputs available optionally. Both feature integral key channels for 4:2:2:4 signal processing and can be controlled from a single-point remote control using the proprietary LINC protocol. The A27 digital 525 decoder and A28 digital 525 encoder are format converters designed to do the tough job of converting from composite digital to component digital and vice versa, respectively. The A28 digital 525 encoder will encode parallel component (CCIR 656) digital video into composite (SMPTE 244).

The Grass Valley Group offers its SMS 8221 composite digital to component digital converters. Input and output are serial only, per SMPTE 259M. Part of the SMS 8000 series, the 8221, has front-panel controls for chroma level, bandwidth and type of chroma decoder (adaptive, comb or notch). The SMS 8122 is a component digital to composite digital format converter. Front-panel controls include 8/10-bit mode selection, component bandwidth selection and filtering, and noise coring.

Leitch, Inc. offered several conversion products, the 3500AD 8-bit component D-A with parallel outputs, the 3501AD 8-bit component A/D with serial outputs, and the 3511 10-bit component A/D with four serial outputs. The 3511 also includes a setup aid where internally generated color bars are "chopped" with the input signal allowing easy comparison to a reference. It also includes an EDH inserter (SMPTE RP 165) and can pass or blank VITS and VITC lines. The 3500DA 10-bit component D/A has parallel component inputs and two sets of analog outputs. The 3501DA has 10-bit serial component inputs, two sets of analog component outputs, and four equalized and reclocked serial outputs.

The ADC3620 10-bit composite D/A is part of the DigiBus series consisting of three modules — the input module, the 3612VI-A A/D module and the 3610VO-S output module. The DAC-3620, part of the DigiBus line, is a composite serial D/A converter. In addition to supplying four composite outputs via the 3612VO-A output card,

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four reclocked serial digital outputs are provided via the 3610VI-S card. The DAC and the ADC feature 10-bit digital operation. The stand-alone CES-3500 serial component to analog composite encoder converts 10-bit 4:2:2 component digital signals to either NTSC or PAL. The unit has a line buffer to remove any serial jitter before encoding the signal into composite form, eliminating chroma phase smear in the encoded output. A frame synchronizer is available to integrate nonsynchronous datastreams into a timed system.

The DEC 3610 composite NTSC to component digital video decoder converts composite analog signals to any combination of serial component, parallel component or analog component, depending on the mix of output modules selected. Part of the DigiBus line, the 3610 consists of a 3611VI-A composite analog input module, 360CFD comb filter color decoder, and any combination of serial, parallel or analog component output cards, as required.

Snell and Wilcox introduced its "gearbox" line of digital devices. Among them is the RD1ENC, a component serial digital to composite analog converter. Variations of this model offer analog component outputs and/or active serial digital loop-through. Card edge controls are available for EDH mode (SMPTE RP165), horizontal blanking and VITS blanking. Common control of many units is provided by the proprietary "Rollcall" protocol.

The Sony BKPF series consists of many digital video conversion products that fit into a PFV frame. The PFV-series frames power and house up to either four or 14 BKPF cards. The BKPF-101 is a 10-bit composite A/D converter. The BKPF-101CA is similar to the 101 except that the 101CA is for component digital signals in either the YUV or GBR mode. The BKPF-102 is a 10-bit composite D/A converter. The BKPF-102CA is the component version of the 102 providing one output in either YUV or GBR mode from a serial component digital signal. The DFX-1201 digital rate converter is a stand-alone 2-rack unit format converter that converts component digital signals into composite digital signals. The DFX 2101 digital rate converter converts composite digital video to component digital video. An adaptive comb filter performs the Y/C separation, then the sample rate is converted for component digital sample rates.

Vistek also introduced the V4228 2-D digital decoder, a composite decoder for analog, serial digital and parallel digital applications. The V4228 uses an improved Varicomb algorithm with an optional 3-D comb filter for improved decoding of NTSC and PAL to the respective analog and digital component representations.

Extron introduced the Andora, a new video to VGA converter that enhances standard video by scan doubling. Extron also introduced the CD 400 digital quad standard decoder that provides an RGBS output from NTSC, S-video, PAL and SECAM.

Miranda showed many digital solutions including the Espresso SCSI to digital video interface, the SDM-301Ni DAC with timing adjustment, and the ASD-301Ni NTSC to 4fsc converter.

REPLY CARD 338

Cable and fiber

Les Brown
Brown is president of Les Brown Associates, Grass Valley, CA.

Digital video on coax

Purchasing cable used to be fairly simple, propagation factor was always 66% and delay/timing calculations were almost automatic. The early trend toward serial digital video was composite, especially in the broadcast community. Although 143Mb/s did just fine through 8281, cables with a layer of foil plus a layer of braid

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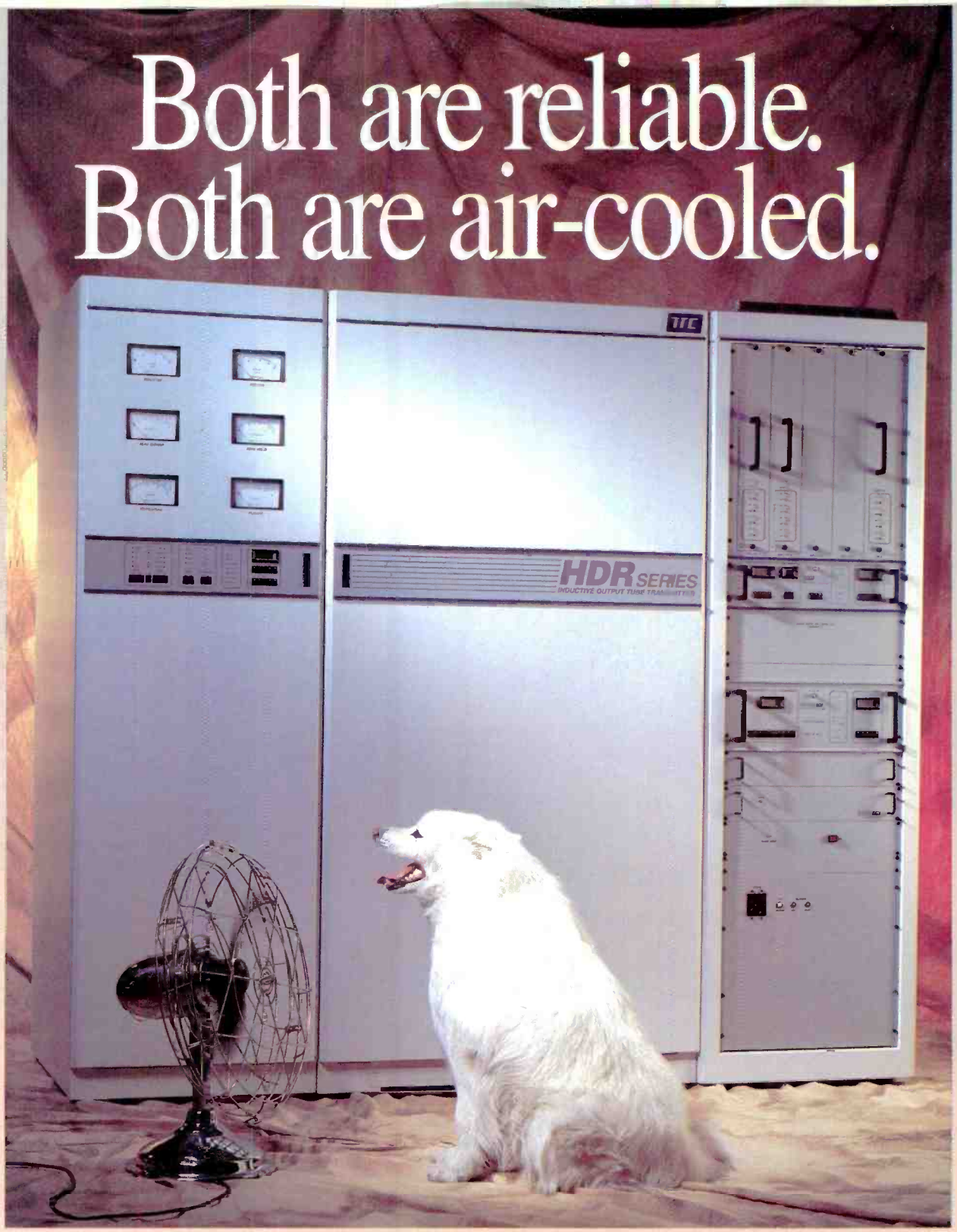

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1994 NAB New Product Highlights

offered some advantages. Gepco's VPM2000 and Belden's 1505A are primary examples. Both are also offered in plenum-rated versions for compliance with recently enacted changes in the NEC. Belden's plenum version is 1506A; this year Gepco broadened its user choices with a new plenum-rated VPM2000TS. Though this class of cable has proven effective for the hybrid analog/digital cable plant, 270Mb/s video at 1,000 feet is near its limit.

Broadcasters are taking component serial digital video seriously and looking to a possible 360Mb/s HDTV future. The cable manufacturers are paying attention, and at NAB, Canare Cable introduced a serial digital coax, L-5CFB. More than adequate at conventional 143 and 270Mb/s data rates, the application notes address performance out to 400MHz, easily capable of dealing with the proposed HDTV 360Mb/s rate. L-5CFB is also available in a 5-channel version V5-5CFB. Canare also offers its own 75Ω BNCs tailored to the new cable.

Belden showed a pair of new cables with similar characteristics, 1694A and 1695A (plenum-rated). Both are intended for 360Mb/s HDTV service at runs up to 1,000 feet. Physical size is comparable to RG-6/U, so Belden lists several brands of 75Ω BNC connectors for use with 1694A. The Belden and Canare entries depart from the usual propagation factors. Canare quotes L-5CFB at 79% and Belden lists 1694A at 82%.

Several makers of "snake" or "composite cables" reported vigorous broadcaster interest for non-traditional purposes. Composite cables neatly package combinations like video, audio and power in a single jacket or zip cord-type configuration.

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Industry overview of broadcast regulations

By Dawn Hightower, senior associate editor

Now, more than ever, the shape of broadcasting is changing. Differing technologies and stiff competition are challenging the industry. But do broadcasters have a sense of where the industry stands on specific issues today? This was the gist of the FCC Industry Technical Panel at NAB '94.

Representatives from the NAB, the FCC, the SBE and others each gave an overview of how their organizations view the issues facing today's broadcasters.

Leaving no stone unturned

Within the past year, NAB's agenda has focused on such issues as EBS, RF radiation standards, proposed changes to directional antennas and FM modulation, and how they will impact radio and TV stations.

Digital audio broadcasting (DAB) and advanced television (ATV) with regard to competition and policymaking is another concern at the NAB.

The impact of multimedia on the industry is a recent topic of discussion. NAB is in the process of developing new opportunities for revenue in the form of high-speed FM subcarriers for radio and data broadcasting systems for television.

Hodge podge of issues

The Mass Media Bureau of the Federal Communications Commission also is dealing with a variety of issues. All's quiet on the FM front. However, it's another story on the AM band. Proceedings are under way on directional antenna performance. An inquiry is seeking ways to improve predictions and maintenance of AM directional antenna patterns so they will be more accurate and less expensive.

Another standing issue involves RF signal radiation. The FCC is tightening the standards because ANSI has adopted a tougher standard for protecting humans from the effects of RF signals. Attention needs to be paid to this issue, especially with those stations at shared sites. The FCC doesn't want to get involved in disputes over access to towers and facilities.

HDTV is rolling right along. The Grand Alliance completed its leg work and is now in the process of constructing the needed equipment.

This year, after a couple of years in hiatus, the FCC will be addressing more policy issues. Congress is entertaining an amendment to the Communications Act to allow broadcasters to use HDTV channels for ancillary and supplemental services and multiprogram broadcasting. This was proposed by the FCC in September 1992.

Digital audio broadcasting is being handled by the Office of Engineering Technology, which has a rulemaking pending for allocation of spectrum for a satellite-delivered service.

Hitting close to home

An issue close to SBE's heart is that there are 30% less jobs for engineers today than there were five years ago. The economy, as opposed to technical reasons, has been a critical factor. Duopoly has also played a part. Consolidation of radio stations has resulted in the elimination of many engineering jobs. Broadcast engineers are having to make the transition to other roles, including contract engineering. The SBE is pursuing measures to assist engineers through its job line and training and certification programs.

In the technical and regulatory environment, the SBE is working with regard to the radiation hazard rulemaking for ANSI standard docket 9362. SBE is looking for federal pre-emption because it feels broadcasters may not be adequately prepared to deal with RFR compliance on a state-by-state basis as well as federal standards.

SBE is vigorously defending the broadcast auxiliary bands. Another petition for rulemaking was filed by TRW, which proposed to take 1,970MHz to 2,010MHz for earth to space communications. No rulemaking number has been assigned to it. However, SBE is keeping a close eye on the issue.

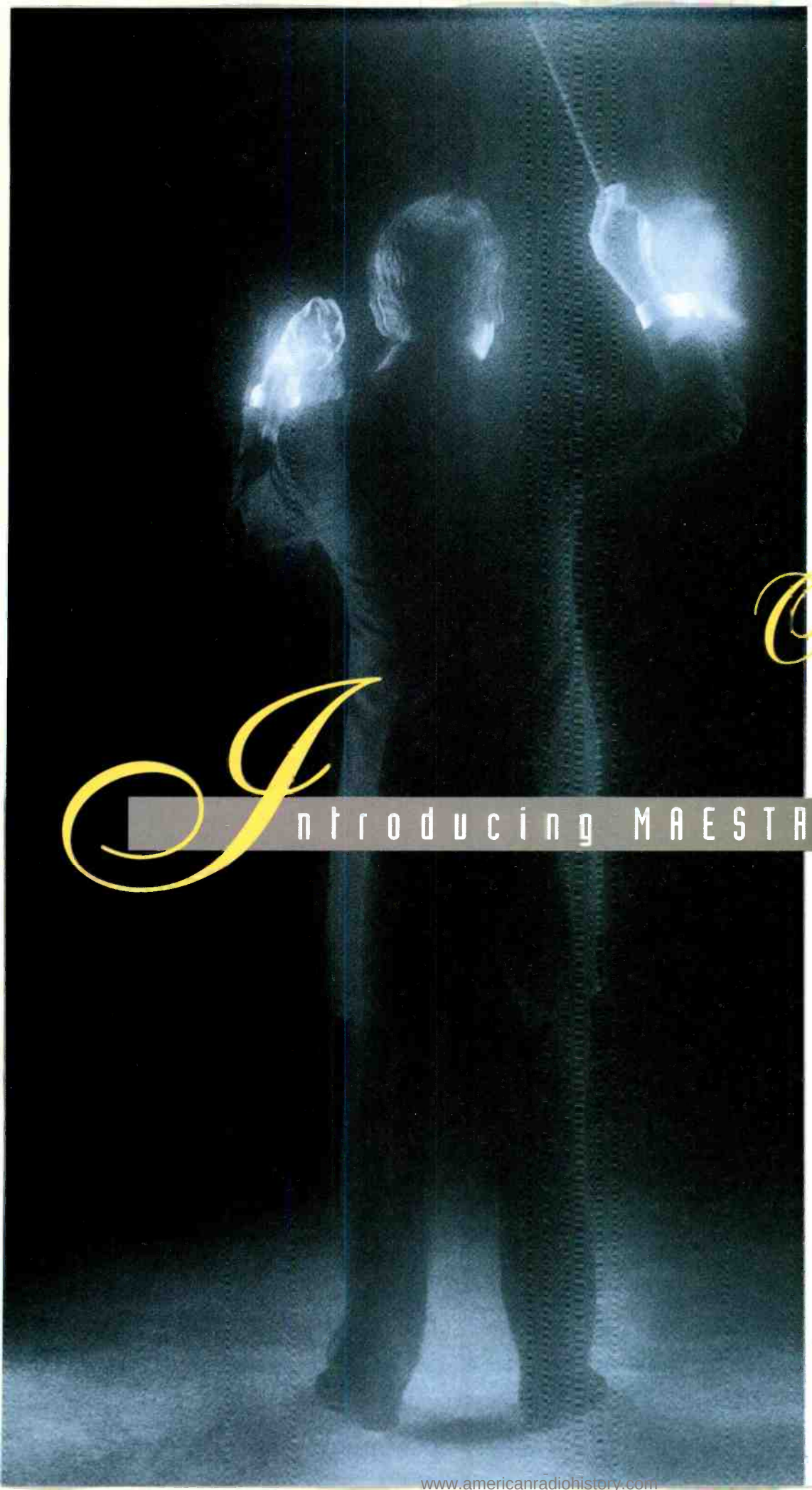
SBE also is interested in the EBS rulemaking. Its concern is that when the new system is implemented that it will be practical for broadcast engineers and radio and TV stations.

SBE also is keeping an eye on docket 93225 regarding FM peak modulation.

Efforts are ongoing in the continued effort to have an FCC commissioner hire at least one engineering assistant. Each commissioner has the opportunity to have up to three assistants, one of which has traditionally been an engineer. At this point, there are no engineering assistants on staff.

Progression of ATV

Adoption of the North American advanced TV transmission standard is moving quickly. Field tests of selected ATV transmission equipment was being conducted in Charlotte, NC, last month. (See "News," pg. 4.)



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showed a broad array of the Remote Composite Cables (RCC) which are stocked in 14 varying combinations. Cole Wire and Cable's Tim Logan also noted increased broadcaster interest in composite cables.

It was tough to find a 50Ω BNC at NAB. Kings and Trompeter featured them prominently and cable suppliers were quick to provide lists of potential sources including names like AMP and Amphenol. True 75Ω video patchbays were no longer hard to find. A notable new entry from Trompeter is the J24WHF series designed expressly for 360Mb/s applications which, of course, supports anything with a lower data rate and analog video as well. Switchcraft showed its video jack panel, the insulated VIP series, good up to 400MHz. Connectronics showed a low-cost alternative for facilities that historically had made its own patchbays with rack panels and BNCs on both sides. Connectronics PV series uses BNCs behind the panel, but RCA phono connectors are used on the front.

REPLY CARD 339

Audio on a wire

Audio cable had a new and stronger focus among all the suppliers at NAB. The recent trend toward 75Ω coaxial interconnect of AES/EBU digital audio moved Canare Cable to offer a 1V version of its BNC/XLR adapters. The company joins Graham-Patten Systems in supporting the digital audio users who want to use existing analog video DAs and routers with digital audio. The move away from the 110Ω XLR standard isn't universal, however, especially in Europe. Belden introduced a series of 110Ω digital audio cables that include double-shielded 1696A with a heavy PVC outer jacket for portable applications. Other new Belden audio products include 1800A, a foil-shielded general-purpose package, with 1801A being plenum-rated. A dual, general-purpose version is 1802A, effectively two 1800A pairs in a zip-cord-style jacket.

One of the strongest arguments for a 75Ω coaxial interconnect standard for digital audio has been the complexity (at least as opposed to BNCs) of terminating with XLRs. Neutrik has made life a lot easier for the technician working with 110Ω digital audio with a new non-soldering XLR. Individual conductors don't even have to be stripped, let alone tinned. A clever shell design allows the installer to decide whether the shell is grounded by simply rotating an inner section.

For audio and data transport, BEC Technologies introduced the änet series, a 2-channel version of the Very Large Array ProLine Series. The 2-channel half-rack units allow the accumulation of up to 64 channels of audio and data on four high-speed RS-422 data pairs. Optional modules include 18/20-bit converters and remote-controlled, premium mic preamps.

REPLY CARD 340

Lots of fiber optics, but not much optical fiber

Though you could find optical fiber at NAB, it wasn't prominently pressed by any of the major cable suppliers. And broadcasters haven't been big customers. At least not directly. The big fiber buyers are still the telephone companies and bypass carriers.

This year there were some definite moves toward fiber inside the facility. It seemed Lighthouse Digital System's fiber-optical routers were everywhere, although often under different names. The concept behind them is simple and effective. At the input, light is converted to an electrical signal (digital, of course) and routed without reclocking or regeneration. After switching, it is converted back to light and put on another fiber. Literature states the bandwidth at up to 1.5Gb/s per channel.

Though not intended for HDTV, a tiny device from IRT Electronics, Ltd. of Australia hinted at things to come. IRT's DV-430 transmitters and receivers are intended for those awkward distances of more than 1,000 feet and out about a mile with 143Mb/s, 177Mb/s or 270Mb/s digital video. Each is a cigarette pack-size box with an external 9V power supply. They are handy for remotes and also compatible with a rack-mounted version making them effective in facilities where equipment is spread over several floors.

Another peek at the future was found at the Kings Electronics booth. This year Kings showed something new in connectors for triax. A conversation with Fred Della Iacono, King's new product development boss, uncovered a low-key, strategic alliance involving Kings, Belden and OptoDigital. The simulated camera had what looked like a rugged triax connector attached to it, but it wasn't triax going into the connector; it was optical fiber. The connector was bigger and more rugged than the conventional connector because it contained an OptoDigital Design transceiver.

The cable coming out is also radically new. Inside is a pair of fibers, one for the camera signal, the other for the viewfinder backhaul. They're surrounded by a power braid, an insulator, another power braid and the outer jacket. The package is loaded with Kevlar for strength and strain relief at either end. Of course, identical connector pods are needed at either end. The digitized signals aren't subject to the analog degradations common to triax. Also, because the video is traveling as light on fiber optics, the distance factor is tied not to picture quality, but rather to power. The hefty shields carrying power support lengths up to 2km.

Also using light, but not over fiber, was the Canobeam from Canon. This unit can be used to either remotely control a camera or allow a camera operator to be in a remote location without need of cables to return a signal. It is bidirectional over distances of better than one mile and can handle up to four video channels, eight audio channels and one intercom channel each way.

REPLY CARD 341

Fiber audio transport

This year's NAB saw some innovative approaches to the needs of the audio community. Lightwave Systems showed the DAS-2000 package that includes audio transmission, routing and distribution. The system accepts up to 64 analog audio inputs, digitizes them and multiplexes them down a single optical fiber. At the received end, there are up

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to 64 analog outputs, but it's not necessarily a one-to-one relationship to the inputs. A remote-control system, which can be enhanced with external computer control, allows the patching of any input to any output so that any combination is possible up to a single input feeding all outputs.

NVISION tackled audio transmission in a way that covers close to every imaginable need. The NV2000 system is based on frames and plug-in modules. At the heart of the system are multiplexer and demultiplexer modules that support 10 channels, but whose optical outputs can be wavelength division multiplexed to handle a total of 20 audio channels on a single fiber. That's 20 in one direction or 10 in each of two directions. There are also versions of the mux and demux modules with electronic I/O. These offer a bi-phase data signal good for up to 4,000 feet without equalization and a 6MHz 4-level-coded analog signal that can be routed or distributed like analog video. Input and output modules are available (blocks of two in/out each) for 18- or 20-bit conversion of analog to the internal digital format; for AES3 digital audio; and for auxiliary purposes like time code, RS-422 data and cue audio.

Fiber Options showed its 1312B audio transmission system, featuring an 18-bit A/D with 48kHz sampling rate. The unit can transmit high-quality stereo audio over single or multimode fiber. Systems can also handle two low-speed (50 baud) CMOS level and two RS-422 data paths.

REPLY CARD 342

Multichannel video over fiber

Video on fiber isn't new. There's a lot of fiber in place, much of it put there over a 5- to 10-year period when the need for fiber transmission of video was grossly underestimated. Existing fibers are fully occupied and it's often prohibitively expensive to pull more, but an answer was supplied at NAB: Put more video on the existing fibers.

C-Cor/Comlux showed a system based on a 1.55Gb/s transmitter/receiver pair. Multiple

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analog video signals with audio subcarriers are digitized at eight, nine or 10 bits (depending on picture quality requirements) into 194Mb/s packets, which are then time division multiplexed onto the 1.55Gb/s datastream for transmission. When 8-bit quantizing is used, it's possible to carry two video signals per packet for a total of 16 signals.

Grass Valley Group's MCF series uses a 1.2Gb/s datastream down the fiber, but takes a modular approach to how that stream is used, as well as the way in which systems are physically assembled. Video is 10-bit digitized so that a maximum of six channels (one per input or output module) of video are supported per fiber, however, audio isn't multiplexed onto the video. Instead there are separate audio modules that support four audio channels each. Audio inputs/outputs are analog with 18-bit digitizing at 20kHz bandwidth. This approach makes it possible to juggle the number of video and audio channels for optimum use.

Although today's baseband fiber-optics transmission systems provide excellent picture quality, they don't fit well in an earth station environment. On the receive side, there may be extra down and up conversions and, on the transmit side, a baseband system moves encoders to the uplink site. Ortel Corporation has come up with a solution it calls "Microwaves on Fiber" and the Ortel product line is called Light Links. It carries the entire transmit or receive bands for Ku, C or L band over one single mode fiber. At the downlink, the LNA is coupled to Ortel's fiber transmitter, and the signal is carried up to 40km (65km for 70/140MHz links) to a receiver where it's fed to the downconverter. In the uplink situation, the user's encoders remain on the premises, and the signal is delivered to the teleport in the correct format for simple upconversion.

REPLY CARD 343

Digital video on fiber

When talking about coaxial cable, component serial digital video is discussed. When talking about fiber, everything switches to analog composite video (at least at the inputs and outputs of the various fiber systems). At the AT&T booth, the OmniMedia Network display not only demonstrated routing of digital video over fiber from within the exhibit hall, but also from Canada and Los Angeles over AT&T's switched 45Mb/s service called Accunet.

The Los Angeles signal originated from a component digital VTR whose parallel digital video output and analog stereo audio outputs fed an Alcatel Codec. The 4:2:2 video was serialized and compressed to approximately 42Mb/s without encoding into composite form. The stereo audio was compressed into a T1 package that was then combined with the compressed video into a single 45Mb/s DS3 channel easily handled by existing networks.

At the Las Vegas Convention Center end, the video and audio were decompressed, the audio converted back to analog, and the video restored to the original 4:2:2 parallel form. The effect was impressive giving credence to AT&T's claim of 45Mb/s switched network service being adequate to component post-production applications.

Another company providing terrestrial transport on fiber is Vyvx. The company provides multipoint-to-multipoint distribution, and the service is rapidly replacing many satellite links due to the high quality available. In addition, the normal time-delay problems associated with satellite links are avoided.

REPLY CARD 344

HDTV at NAB '94, By John C. Kean

Kean is senior engineer for Moffet, Larson and Johnson, Inc., Falls Church, VA.

HDTV transmission is being seen as part of the future broadband digital data network, capable of delivering a variety of services to the end user.

Flexibility of the digital medium is producing a new telecommunications industry. Digital video, and with it, digital transmission, is a means to offer new services and a chance to raise new revenues against the high costs of constructing a new digital TV facility. Specifically, broadcasters are looking at ways to use their spectrum for future multimedia and interactive services, particularly the new channels to be awarded for HDTV services.

HDTV: state-of-the-art

Selection of Zenith's 8-VSB over General Instrument's QAM by the Grand Alliance gave transmitter manufacturers little time to prepare demonstrations for the NAB show. PESA-MCI displayed "the first 8-VSB transmitter." The company scrambled in the four weeks prior to the show to produce a working 1kW UHF solid-state transmitter, which was running a 32Mb stream of random data.

Lurking as a new contender for HDTV transmission is COFDM. This system received considerable attention recently in Europe as a possible modulation mode. It also was the subject of a technical session of three papers titled "Digital Modulation for Television Broadcasting" during the conference. A task force from the Transmission Expert Group of the FCC Advisory Committee suggested that COFDM's claimed strong tolerance of multipath deserves further study in the United States.

Across the exhibit hall, Dolby Laboratories highlighted the company's support for delivering high-quality digital audio to complement multicasting as well as HDTV audio. Dolby's AC-3 was chosen by the Grand Alliance as the HDTV audio format. AC-3 allows storage or transmission of multiple audio channels in significantly less space than is required for uncompressed audio, such as compact disk media.

Please stay tuned – A new EBS system *is* coming

By Deanna Rood, associate editor

For the past several years, the FCC has been evaluating the current Emergency Broadcasting System (EBS) which has been in use for more than 40 years. In the near future, the commission will vote on a new system. During this year's NAB, Richard Smith, FCC chief of field operations in Washington, DC, gave some highlights on what is to come.

The best news about the new EBS system is that the 22-second, loud, over-the-air, test will become a part of history. Not only does the current weekly test take up valuable air time, but the public has become so desensitized to the signal that it no longer serves its purpose. Testing has been conducted on more than 30 devices that have the ability to turn on and off consumer alerting equipment, such as personal pagers, VCRs, car radios, cable TV sets, and even smoke detectors that can provide the initial alert for an EBS warning. Other considerations for the new system include modes of alerting everyone including the hearing impaired, the blind and the non-English speaking population.

The new system will ensure compatibility among all technologies so that cable television will serve as an equal partner in alerting the public. In the past, cable did not always run the EBS message, and when it did air, it was often a rebroadcast of the local signal at a later time.

Advances in technology have made possible major improvements that will result in a more cost-effective system. With the use of automation, the system will no longer have to be activated manually. Not only will this reduce the ineffectiveness associated with the current system, but it will also eliminate the operator training presently required. Stations will be able to decide who to monitor, thus reducing the dependency on the daisy chain system.

The economic impact of the new system may not be as bad as some might think according to Darryl Parker, director of marketing at TFT, Inc. TFT surveyed more than 50 stations and determined that the median operating cost for the present, 2-tone EBS system was $5,410 per station per year. These costs came from four main sources: 1) loss of air time, 2) record keeping, 3) repair and maintenance, and 4) training of personnel on how to handle EBS tests in addition to real emergencies. Using a new system that would operate automatically with less operator intervention, TFT estimated the median operating cost at $131 – a savings of more than $5,200 per year per station. The added cost of hardware will depend on the FCC's requirements.

With the ever-changing technology in the industry, flexibility for individual systems to be upgraded is another strong concern.

The commission's goal is to provide options to the industry and the public that will create a flexible architecture capable of accommodating current and future technologies. Field tests have been conducted and the commission will be presenting a final report and order for establishing a new EBS system.

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Editing and desktop systems

By David Leathers
Leathers is president of Eye Square, Carlsbad, CA

Editing systems

At NAB '94, systems began to cross over the lines between linear and non-linear. Many systems exhibited hybrid configurations that allow the unit to function as either linear or non-linear. Because of this, the majority of editing systems are grouped together.

BTS showed its new offerings in the desktop editing arena, the Windows-based Rio Bravo editing system and Rio Quatro compact A/B/C roll edit controller. BCD Associates showed its new video DataBase editing system that controls four VCRs from a single PC serial port. For those who have used Calaway before or are presently using one, a few new features are now offered, including a multiple VTR "gang" feature for running several machines together in sync. A "look-ahead" pre-cue function for auto-assembles combined with a cluster function allows only a specific block of edits to be auto-assembled. Another feature that is unique is individualized preroll times for each machine.

Not to be outdone by the many companies offering new PC- or MAC-based editing systems, CMX introduced the Gemini, named because it works as a traditional keyboard-type editing system or it is switchable to a time-line display clip editor. The system uses a Silicon Graphics platform, talks to more than 200 different devices and hooks into ethernet for networking.

Media 100 Version 2.0, from Data Translation, debuted at NAB '94. Its all-on-one mastering provides higher-capacity editing and mastering on one system, integrating character generation, digital effects and multitrack audio mixing.

The Ensemble Pro editing systems were shown by Editing Technologies Corporation (ETC). With the exception of the Ensemble Pro 2, these systems offer A/B roll editing with GPIs and serial switcher interface on a user-supplied IBM-compatible AT computer.

Fast Electronics has developed two new software options for the Video Machine. One converts the Video Machine into a live broadcast switcher so the system can be used in a production environment when it's not being used for editing. The other new option allows the use of the Inscriber/CG in the Video Machine, allowing greater capabilities in graphics and text.

Grass Valley has put the Sabre 4100 on an SGI/UNIX platform, getting away from the typical proprietary programs. It can be used with a keyboard or mouse, has graphical displays,and outputs standard EDLs.

The new VideoCube for NTSC and PAL was introduced by ImMix. New features include variable-speed playback of clips with infinitely selectable slow and fast motion, freeze-frame in and out for clips and multiclip move for blocks of clips.

Matrox introduced its cuts only non-linear system that fits into the existing Matrox linear system. The system has been extensively redesigned based on input from users and Matrox now assembles and sells the systems. The high-end system includes three channels of 3-D digital video effects and the non-linear program. A full non-linear system with wipes, dissolves and effects is expected by the end of the year.

NewTek, the makers of the Video Toaster, introduced the Toaster Flyer, an A/B roll system that purports D-2 image quality using a proprietary compression scheme called Video Toaster Adaptive Statistical Coding or VTASC. The Flyer works in conjunction with the Video Toaster in an Amiga 4000 and at least two fast SCSI-2 hard drives.

From Panasonic comes the Postbox, a non-linear editing system featuring a

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486 computer, SCSI-2 hard drives, hardware control interface and a new menu-driven graphical user interface. Real-time effects offer more than 300 wipe patterns, luminance and chroma-key effects, three built-in title generation programs and 2-D DVE effects including slide, mosaic, paint, rotate and others.

RGB has a new editing system called the Unisuite. It is an edit bay in a box and works in NTSC and PAL and can also input SECAM. It can handle component and composite I/O. Features include five stereo pairs of audio on the input and one stereo pair on the output, a built-in digital effects generator, character generator, keyer, paint system and an edit controller that can handle up to 16 sources.

Sony introduced a non-linear upgrade to its DES-500 Destiny editing workstation. (See "1994 Pick Hits," p. 24). It includes four key components for video editing, an edit controller, video switcher, audio mixer and 3-D effects, all combined on a GUI on one computer screen.

Norm Strassner introduced a new program that runs on a PC, uses Windows and turns a computer into a standard edit controller. However, you do need to buy the tape machines. The system will control almost any of the current machines on the market, uses a mouse or the keyboard and has multiple edit list bins. An internal switcher and jog/shuttle controls are available. The system will do standard previews, motion memory editing with a correct match point showing in the menu at the end of the edit, and can import and export any of the major list formats. It also features auto assembles along with GPIs and has full list management and on-line help menus.

On the MAC side, Sundance offers a program that turns a MAC into an edit controller. It is software-only with cuts-only and A/B roll multimachine versions. The big system has multimachine slave/sync roll and a Toaster interface. It controls up to 15 serial sources using Sony RS-422 protocols, multiple record capability, motion memory and GPIs.

TAO showed its new Editizer system that offers A/B rolls and cuts editing and it can interface with a wide variety of equipment.

The D/Vision-Pro 2.2 non-linear editing system from TouchVision Systems offers batch digitizing and importing, Flex and Evertz Film Edge Code List, multicamera lockup, EDLs and a digital video effects suite. It operates in PAL and NTSC and is bundled with CrystalGraphics Flying Fonts Plus! and D/Vision Sound Library.

The OZ-PRO on-line video workstation introduced by Videomedia integrates V-LAN technology with a graphical user interface and a jog/shuttle keyboard. The V-LAN Phantom Hub control system allows control and assignment of "n" devices to "n" control locations simultaneously.

REPLY CARD 345

Desktop systems

As was mentioned above, the lines between what is and what isn't desktop are blurring. Because of this many products that might be considered desktop products may not be found in this section, having already been covered elsewhere. Some products, however, are unique and are covered here.

At the Accom booth, the company demonstrated the new Axial WSE Work Station Editor for SGI systems. The WSE was shown with Accom's popular Work Station Disk. The Work Station Editor allows use of paint, graphics, animation and compositing systems running on SGI platforms to perform on-line editing tasks. Using live video display windows and a graphical interface with clip library, operators can easily create industry-standard EDLs.

The Personal Animation Recorder from DPS is now available for the PC. It permits recording and real-time playback of full-color computer animation sequences directly from a hard drive.

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Ensemble Designs introduced Serial Box I and II serial digital component-to-analog converters. Serial Box I is the basic model, which fits in a 1/2-rack-unit space. Serial Box II adds composite and Y/C outputs. Ensemble's MultiBuffer DS-2 is an NTSC/digital composite framestore.

KUB Systems has introduced non-linear, uncompressed D-1 compositing and effects software called DANCE that composites and manipulates live video inputs and multiple static images simultaneously in 3-D at full resolution in real time.

The Alladin, from Pinnacle systems, is an open architecture, Windows-based, video post-production system. The Alladin offers switching, DVE, still-store and bundled graphics software for character generation. Pinnacle also showcased Flashnet Plus, which can handle hundreds of thousands of still images from 10 or more workstations in a single network. Flashnet uses a dedicated file server and peer-to-peer network architecture that affords a user direct access to stills stored on a FlashFile still-store at any other node on the network.

Quantel unleashed another series of products. Among them, the Edit Box non-linear on-line system was shown with new enhancements including 30 minutes of storage, the ability to integrate external character generation output via the Record Back Text Keyer, and Scene Select, which allows clips to be grabbed and a rough cut assembled on-the-fly while rushes are reviewed from a VTR. The sister product, Newsbox, was also shown. It is a self-contained editing system focused on the deadline-driven business of news editing.

Microtime now has the Composium II, an integrated workstation with a paint system, typography, switcher, digital video effects and a still-store all in one. It operates with better than D-1 specs and works with Adobe and other third-party software. In real-time it can handle up to four simultaneous layers.

Truevision's TARGA 2000 is a high-end digital video card for EISA-based PCs. It can capture to disk full-frame, full-motion PAL and NTSC video and CD-quality audio, manipulate it and record it onto videotape. The unit also offers Video-in-a-Window on its non-interlaced desktop.)

REPLY CARD 346

Multimedia

By Terry Barnum
Barnum is an editor at
GTE Interactive Media, Carlsbad, CA.

Multimedia, like today's editing and desktop systems, is another difficult topic to define. Like with desktop products, many of the so-called multimedia products may be found elsewhere in the NAB coverage. At the same time many of the products listed here are unique in one way or another.

One of those unique products was Digital Magic from Advanced Digital Imaging (ADI), which allows D-1 quality frame-by-frame animation and special effects in real time.

From Aurora comes the Liberty Version 3.5 paint and 2.5-D animation pack that includes a new Undo feature, pressure-based rotating brushes, automated emboss, extrude and drop-shadow tools and a color-mixing palette. It supports SGI's Galileo video frame buffer, the Accom WSD disk recorder and Aurora's new Avion video solution for the Indigo^2.

Autodesk multimedia has introduced 3-D Studio Release 3, 3-D modeling, rendering and animation software for 386/486-based PCs. Among its 200 new features are enhanced quality and speed. Autodesk also offers Plug-in Toolkit for this software.

Dubner introduced its Scene Stealer for Windows for automatic scene detection. The Scene Stealer now supports the D/Vision, Avid and Vid-

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Circle (63) on Reply Card

eoCube formats. Promoted with the Scene Stealer was the Executive Librarian, a Windows-based image database/management tool from Imagine products.

From Hewlett-Packard comes the VidJet Pro (see "1994 NAB Pick Hits," p. 24), which allows users to print video images on most laser printers. In addition to obtaining hard copy from the printer, various layouts provide additional information, including time code and room for descriptions.

Softimage showed its new Digital Studio, which is an integrated suite of tools that runs on Silicon Graphics workstations. Interesting products at the show included resolution independent nonlinear editor, on-line editor and 3-D audio editing packages.

Using high-tech computers and software combined with robotic camera heads, the new Virtual Studio from Ultimatte integrates multiple technologies to eliminate the need for construction of expensive broadcasting sets. The system allows sets to be generated in the computer, and talent is then keyed into the image. The system will automatically change the set perspective as the camera shot is changed.

Aiming for the in-house and industrial market, Intergraph's InterVideo is its first expedition into the non-linear editing fray. The hardware and software system consists of a video card, a JPEG compression/decompression board, a 16-bit audio card and editing software that operates under Windows NT. Video is accepted as either composite or S-Video and is motion JPEG compressed directly to standard Windows Audio Video Interleave (AVI) file format. A high-quality compression setting yields around 13MB per minute including compressed audio.

Filling the need for corporate communications, Target Vision Incorporated is a business information and messaging system that can operate over telephone lines, closed-circuit television and LANs. Using a PC running the Target Vision Operating System, or TVOS, a user can create video slide shows using full-color text, graphics and optionally, full-motion video from a VCR. These messages can then be distributed throughout a company and viewed on TV monitors placed in strategic areas, such as break rooms, lobbies and cafeterias. Alternately, TVI DeskTop allows employees to receive company news and information on a Windows PC.

In light of recent MPEG licensing confusion and implementation delays, The Duck Corporation offers a viable real-time video compression/decompression algorithm alternative. The company's products offer content developers the tools to pack full-motion video into programs to address the videogame, CD-ROM and cable TV applications.

NTL demonstrated several new MPEG products including video storage and distribution schemes. Even with rates as low as 1.5Mb/s, the quality remained high.

Of interest to desktop or game companies is the new Comprending software technology that combines real-time compositing of multiple images with 360 degree visualization potential.

One of Sony's potentially far-reaching demonstrations was of S-PEG, a compression scheme designed for use within a post-production environment. The benefits of this yet-to-be-delivered technology are two-fold: Multiple generations are less susceptible to compression artifacts than material encoded in JPEG and MPEG, and the ability to easily edit S-PEG compressed video.

Minerva had its real-time scalable MPEG encoder on display. A unique feature of the system is the ability to view the quality of the output in real time. This allow the operator to make adjustments to the compression ratio, optimizing the image quality vs. storage requirements quickly and easily.

RE America debuted the RE 8860 and RE 8870 linear PCM, 140Mbit/s video codec for broadcast contribution and distribution. The RE 8860/8870 features a S/N of more than 67dB, and the composite video interface supports PAL, PAL-plus, SECAM and NTSC video formats.

REPLY CARD 347

Audio mixers, recorders and media

By Christopher H. Scherer

Scherer is chief engineer of WZAK-FM, WZJM-FM and WJMO-AM in Cleveland.

On-air mixers

Arrakis Systems exhibited two new mixers, the 1200 and the 22,000. The 1200 is an economical addition, available in input frames of five or 10 faders. The top-of-the-line 22,000 series is available in frame sizes of 20 and 30 modules. A tall meter bridge accommodates EQ submodules, line selectors and other options.

Logitek has added an RS-232 control upgrade to the Mariner console making it the heart of an automation system. Logitek also demonstrated the Crossfire II ESAM, a 4x2 automated mixer with RS-232 and RS-422 control. It is expandable to 12x2 or 6x1 stereo.

Wheatstone displayed the A-6000 on-air console. (See "1994 NAB Pick Hits," p. 24.) It is a top-of-the-line modular console with mono mic/line inputs, stereo line inputs, four stereo mix buses, tape machine remote controls, intercom modules and a variety of outputs for mix/minus, IFB and more.

For high-end facilities, Sony presented its DMX-B4000, a digital broadcast audio mixer, available in eight or 16-fader mainframes (accepting 16 or 30 stereo inputs respectively). A touchscreen is used for audio processing, pan, trim and aux controls. Its operation can be set at three skill levels.

Solid State Logic demonstrated the SL-8000GB console. Based on the SL-8000, this console was designed for on-air audio production. Up to 24 clean feeds are possible with a variety of configurations for live mixing and multitrack work.

REPLY CARD 348

Production mixers

Shure showed the FP32A portable mixer, an enhanced version of the FP32. New features include a 30dB lower noise floor, peak limiters, 1kHz oscillator and the ability to gang inputs two and three for a stereo mic input. Phantom power (48V and 12V), three mic/line inputs and a carrying case are standard on the FP32A.

Otari introduced two new consoles. The B-10 broadcast production console comes in frame sizes of 14 and 24 inputs, with four subgroups, four aux sends, fader start, VCA control, four talkback outputs, mono or stereo inputs and EQ on each channel. It uses a narrow module design for compact size. The Status digitally controlled console is so named because it can change status so quickly (settings can be saved to floppy disk). It is available in frame sizes of 32, 40 or 48 inputs.

The Sony DMX-E2000 is a new digital edit suite mixer with 16 AES/EBU inputs, four AES/EBU aux returns, a 2x4 AES/EBU output matrix, two AES/EBU aux sends, stereo analog monitor output, 3-band EQ, variable audio delay (0 to 4.9 frames in 0.1 frame steps), flexible control and video interfacing and 99 snapshot memory. Sony's MXP-700 TV production console was also shown. Available in 16, 28 or 44-input sizes, it offers mono mic/line input modules and stereo line input modules, with EQ, six sends and fader start. There are two stereo outputs, eight groups and a dynamics module assignable to inputs, groups or outputs.

Henry Engineering displayed the Fast Trac II, an enhancement of the original Fast Trac newsroom/dubbing station rack-mount mixer. New features include additional input selectors, a mic input with ducking control, and an adjustable timed auto-start function for easy 1-button dubbing. Henry also introduced the Stereo Switch, a 3x1 balanced stereo routing switcher. (See "1994 NAB Pick Hits," p. 24.)

SESCOM presented the R/S MIX, a 4-input mic mixer, part of the Rackem' and Stackem' series. Features include a line level output, aux input, phantom power, master volume, VU meter and headphone jack. Although designed for rack mounting, its small size makes it applicable for portable use.

Pro-Bel showed a small, modular digital audio mixer, designed for customized applications in edit suites or other facilities. Sizes range from 4x2 to 16x2 AES/EBU (stereo) channels.

Soundcraft introduced the BVE100s, an automated audio-for-video mixing console. All major video editing protocols are supported.

Mark IV displayed a J.L.Cooper automation interface for the DDA line of consoles. The design of the consoles allows this automation interface to be installed without any additional physical modification.

Yamaha again showed its DMC1000 digital audio mixer, which incorporates a fully automated mixing system. All its recording and mixdown operations are performed in the digital domain.

MiniDisc and MO systems

Digital Broadcast Associates showed a version of the dB-CART using 3.5-inch, 128MB magneto-optical disks. The system provides over 10 minutes of high-quality, uncompressed stereo

audio, or over 60 minutes with data reduction. An LCD display shows cut titling and timing information. The disk drive is a separate module allowing future upgrades. Files are stored under the ASPECT standard, which is shared by one other manufacturer at present.

That manufacturer is AIRcorp Systems, which showed the AIRcart.mo system, also using 3.5-inch MO disks for 10.5 minutes of uncompressed, 48kHz stereo audio. It includes cue "tone" features, a cut selector and a preview/outview feature that allows the beginning or end of a cut to be auditioned.

Several companies presented MiniDisc systems as cart replacement devices. Sony showed the actual production models of the MDS-B1 and MDS-B2P MiniDisc recorder/player and player (previewed at last year's show). They have analog I/O, a remote-control connector, auto pause and auto cue and quick random access.

Denon debuted the DN-990R MiniDisc recorder and DN-980F MiniDisc player. Both will cue to music and offer instant start, end monitor, single or continuous play and EOM. The recorder features AES/EBU digital input and both provide AES/EBU outputs.

Otari introduced the MR-10 MiniDisc recorder and player. They offer analog and digital I/O (SPDIF), parallel and serial control and programmable operation.

REPLY CARD 350

Compact disc

Denon also introduced the DN-650F professional CD player, a rack-mount, drawer-style CD player with digital S/PDIF output and front-panel varispeed.

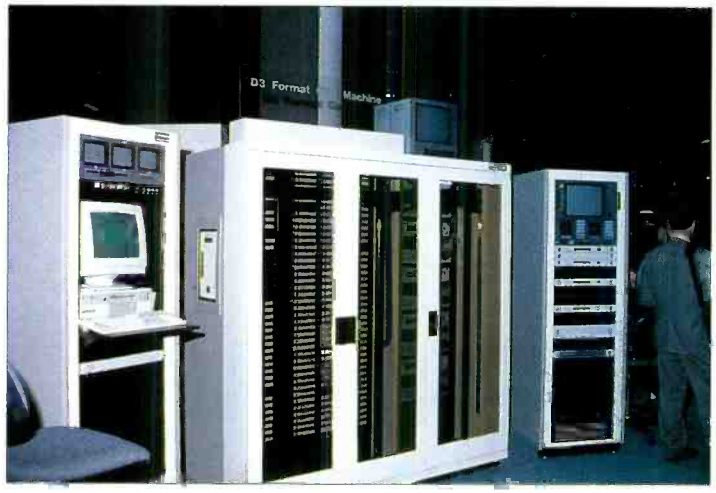
The Otari CDC-600 CD changer has a 360-disc capacity with dual drives and serial control. An optional RAM buffer allows for instant starts, and units can be daisy-chained to a central controller.

Pioneer showed the CAC-V180M, an 18-disc CD autochanger using three 6-pack magazines for storage and RS-232C control. Several units can be stacked for automation or live-assist use allowing modular addition of players in lieu of one large changer.

Sony also showed a full line of CD hardware, including the CDP-2700 standalone player, the CDP3100/CDS-3100 high-end system (which can be interfaced to digital audio and video editors) and the CDK-3600 auto-loader with 360-disc capacity and dual, crossfading players.

Yamaha's YPDR601 professional CD recorder remains uniquely useful to broadcast users. The YPDR601 features partial recording via its pre-TOC function, which allows material to be appended to a CD-R while retaining Red Book compatibility.

REPLY CARD 351



DAT and ADAT

HHB Communications introduced the Portadat PDR1000 and PDR1000TC. Both of these truly compact units offer 4-head, 4-motor design, with sampling rates of 32kHz, 44.1kHz and 48kHz. Mic and line-level inputs, phantom power, AES/EBU I/O and confidence monitoring are standard. The PDR1000TC adds time-code generation/reading in all standard frame rates.

Ramsa Audio/Panasonic introduced the SV-4100 R-DAT professional tape deck. (See "1994 NAB Pick Hits," p. 24.) Based on the Panasonic SV-3700, this machine adds RAM for instant start, variable frame resolution, five cue points, separate left/right input level controls, and optical and AES/EBU digital I/O.

Sony is now delivering a DAT workstation, the PCM-E7700. It has two DAT tape drives in one compact case (about the size of a laptop computer). One drive is a player, the second is a recorder. Video editing personnel will quickly adapt to this compact audio editing station. It uses EDL-based editing allowing cuts from multiple original cassettes to be assembled to a single edited master tape at 2x real time. It also allows previewing of edits in RAM.

The Tascam DA-60 4-head synchronizable DAT can lock to SMPTE time code with the addition of SY-D6 synchronizer card. Tapes recorded on other DAT machines also can be post-striped with time code.

Otari announced new software releases for its DTR-90T DAT recorder.

Fostex exhibited several DAT recorders, including the PD-2 portable with SMPTE time code, the D-10 studio master recorder and the new D-30 master recorder. Fostex also showed the RD-8 ADAT format modular 8-track recorder.

Elsewhere in the ADAT world, Alesis has worked with TimeLine to design the Al-2 multipurpose audio/video synchronization interface. Alesis ADAT now can chase lock to time code and resolve video, as well as emulating a VTR in an edit system using standard 9-pin serial communication.)

REPLY CARD 352

Hard disk recorders

Otari announced that it will now market the RADAR, a multitrack hard disk recorder (8, 16 or 24 tracks) with full-time dedicated I/O for each track. It includes editing features, a jog wheel, SMPTE sync and variable sampling rates.

Some additions were introduced to the popular DigiCart from 360 Systems. DigiCart/TC adds time-code reading to the control allowing interface with VTRs and VTR emulation with a jog/shuttle control. OnScreen/II is Windows control and file management software for DigiCart/II. A new interface option provides AES/EBU I/O for all series 2500 DigiCarts.

Adding to a wide range of storage media, Rorke Data now offers the Seagate Elite 10, a 9GB drive. This fits in the standard 5¼" slot and can be fixed or removable. It can also be used with Rorke's rack-mount drive systems.

REPLY CARD 353

Tape, optical media and accessories

Garner Industries showed the CF750 Type II Degausser, designed for security applications where high depths of erasure are required. Its advantages can also apply to broadcasters using high-coercivity media.

Maxell introduced the BQ series of Hi8 and S-VHS tapes designed for multitrack audio recorders. Also displayed was the new environmentally safe head cleaner CL-S, using a non-freon/fluoride base that is non-flammable and virtually harmless.

Storeel presented new high-density storage dividers for CD and 8mm tape and highlighted its Room Stretch-

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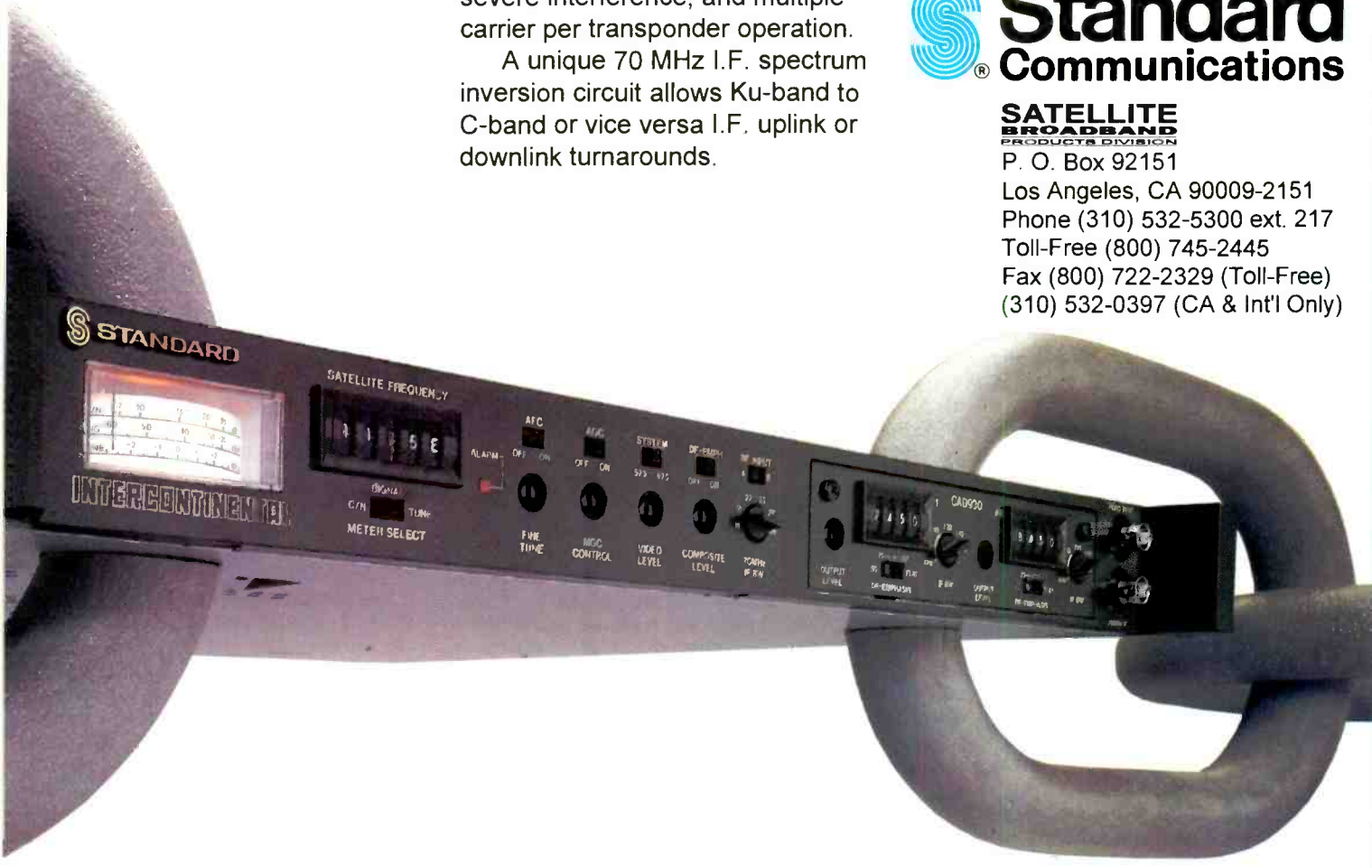


Circle (47) on Reply Card

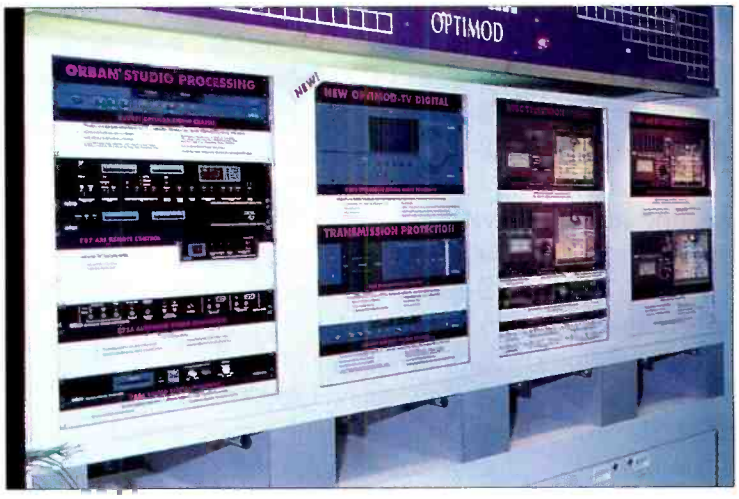
er Hi-Roller, a free-standing, pull-out storage system. This system requires no floor tracks so it can open into a hallway or aisle — an attractive solution if space is tight.

The BC-Metal videocassettes displayed by 3M Pro A/V Products feature a tape formulation that reduces RF loss. The company also showed the ASD, a new S-VHS tape designed for use in audio multitrack recorders (ADAT format), and new 908 low-print mastering tape, which replaces 3M808.

Professional Label Inc. showed the LazerPro for Windows software, which can create labels for most common audio and videotape boxes and reels under Windows 3.1.

United Ad Label exhibited examples of professional audio/video labels and production supplies. The company will custom design labels to meet a client's particular requirements.

REPLY CARD 354



Digital audio workstations

By Tom McCarthy

McCarthy is systems engineer at National Public Radio, Washington, DC.

Pacific Recorders and Engineering unveiled a prototype of Version 4.0 software for the ADX Workstation and ADX Mixstation. New features include time compression/expansion, equalization within the workstation and some new audio track displays. The company is now offering the ADX Basic, which is a desktop version of the ADX standard workstation. On the hardware side, both ADX versions include MO drives for archiving.

Three significant software features were added or enhanced on the Arrakis TrakStar8. The audio waveform on the display monitor now travels across a center line playback head changing color as it passes. The screen time has also been doubled to accommodate eight minutes of audio, and the speed of redraws has been increased for faster operation. Additionally, a Hotlink has been added to allow quick set up with DigiLink, the company's broadcast automation system.

Orban has assumed the support, development, manufacturing and distribution of the (formerly AKG) DSE 7000, which the company expects will result in accelerated hardware and software development. To that end, a new digital input/output module will be standard on new systems and will also be available as a field-installable upgrade for all existing units. Synchronization capabilities also have been enhanced. Orban also announced a sixth free software update to all registered owners containing many useful improvements.

Studio Audio and Video, Ltd. released version 2.1 for the SADiE disk editor. It offers a streamlined graphic user interface and improved audio processing. Digital noise reduction is also available. Other handy features include PQ editing for CD master preparation and CD-R recorder control. Autoconforming allows users to create or modify EDLs in an ASCII text editor or import CMX format files. With the autocut function, the unit can automatically record delineated sections of audio from DAT. Sony 9-pin machine control has also been added.

Roland demonstrated a fully released version 2.0 software for the DM-80 that provides more than 50 new features and enhancements. It also brings waveform editing to the remote controller. Other enhancements include improved backup, cataloging and sound library function refinements, new editing features and an advanced trigger mode, which allows sound files to be assigned to eight soft keys on the control surface for fast access and playback (including multiple keys firing simultaneously). This feature comes in handy for live foley or theater.

Otari announced the release of Version 4.4 software for the ProDisk workstation. The most significant new feature is the ability to directly record into the GUIDE editing screen so users can record, edit, playback and mix without changing the screen settings or the active window. Version 4.4 also brings an improved library system, quicker access to sound files, time compression/expansion with pitch shift option and direct sync to video and VITC.

Korg introduced version 4.0 for its SoundLink. This no-charge update includes more than 30 new features, including EDL importing, auto-assembly and auto-loading of audio. SoundLink is CMX- and Sony-compatible with 9-pin VTR emulation for external machine control.

Avid announced shipment of version 2.5 for its AudioVision, which includes several new editing features and enhanced DSP capabilities plus support of the Open Media Framework (OMF) interchange. Avid also demonstrated its AvidNet, which was used to transfer files over a fiber-optic link. It is based on asynchronous transfer mode (ATM) technology with a transfer rate of 10-to-1. Also on hand was the AudioStation, a stand-alone digital audio workstation (without picture) that can be used for audio transfers, dialog, music and sound effects editing and processing.

Fostex showed its new Foundation 2000, which features some unique elements, such as event-based routing of DSP functions and a 16/24-bit scalable architecture. Its proprietary platform provides an intuitive control surface.

Studer Editech introduced MultiDesk, a dedicated control surface designed to dramatically improve speed accuracy and ease of use of Dyaxis II. Studer also released MultiMix 2.0, a major software upgrade for Dyaxis II, including dynamic automation and direct OMF compatibility. The plug-and-play option has been improved to include 1.3GB 5¼-inch MO drives.

Akai presented two new models of the DD1000 magneto-optical disk editor — the DD1000i and the DD1000s. They offer direct random access to material for editing and playback on a removable medium. The DR4d is a new, lower-priced digital audio recorder that is hard disk-based and operates like a tape recorder.

Solid State Logic (SSL) launched ScreenSound V5 at NAB '94. The V5 benefits from a faster processor, advanced editing options, improved con-

forming capabilities, improved machine control and higher-resolution screen graphics. ScreenSound V5 also offers a random access video option, which allows audio and picture to remain in hard lock at all speeds. SSL again showed the OmniMix system, an extension of the Scenaria that features digital surround sound and spatial signal processing. OmniMix expansion is available to present Scenaria users.

Corporate Computer Systems entered the workstation market with the new PACE system, a high-end, UNIX-based news production system originally developed for CBS Radio.

Digidesign demonstrated a multitude of hardware and software tools. They included Pro Tools 2.5, a software update to the company's Mac-based multitrack DAW system, and PostView and PostConform, two products in Digidesign's Post series.

A major achievement for the Siemens Audiofile at NAB '94 was the demonstration of a working OMF interchange with the Avid Media Composer. Material was recorded on a removable hard drive at the Avid booth, walked over to the Siemens booth and simply played back on the AudioFile directly from the drive. Several other AudioFile enhancements were shown, including a new cue directory structure, a new waveform display, a loop editing feature, a feet-and-frames display and a simplified time-code display.

Micro Technology Unlimited (MTU) displayed the MicroSound digital audio workstation, an IBM-compatible system suitable for all types of audio applications. An array of recent software updates have further refined its appropriateness for broadcast use.

The VoxPro was introduced at NAB '94 by Audion Laboratories. It is designed and priced specifically to replace reel-to-reel recorders in radio control rooms and newsrooms. VoxPro features simplified recording, playback and intuitive simple editing. Twenty personalized jock folders are available with password protection. It is Macintosh-based and includes a small dedicated control surface.

Another new entrant in the DAW market is Innovative Quality Software, presenting the Windows-based Software Audio Workshop (SAW). This is actually a third-party, software-only DAW upgrade to a number of popular PC audio cards, such as those from Digital Audio Labs and Turtle Beach. SAW provides 4-stereo-track editing, mixing and audio processing, plus SMPTE and MIDI synchronization. (See "1994 NAB Pick Hits," p. 24.)

Spectral Synthesis presented its Windows-based AudioEngine workstation and its new integrated single-board AudioPrisma DAW. The latter operates with the company's new Prismatica software.

Fairlight showed its third generation of MFX technology. The MFX3 provides a full range of multitrack recording/editing for post and general multitrack applications. Also available is a smaller, portable and lower-cost system, the MFX MINI.

Last, but certainly not least, Sonic Solutions highlighted a new sound file format for its Sonic System, featuring OMF compatibility and Sony Super Bit Mapping. The Mac-based DAW will now be available in a Silicon Graphics platform as well. Also of interest was MediaNet, a high-performance networking system optimized for multimedia applications. A number of new enhancements and partners in MediaNet operations were announced. Finally, the SonicCinema add-on to the Sonic System was introduced. It is designed for premastering of Video CDs using real-time MPEG 1 encoding.

Reader FAXback

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Radio automation systems

By Stephen K. Bramham

Bramham is engineering manager for CNN Radio, Atlanta.

Prophet Systems displayed its Wizard for Windows, a complete networked digital automation system. Two 1.3GB SCSI hard drives in a mirrored configuration provide up to 425 minutes of Dolby AC-2 audio. A real-time digital editor workstation provides one play/record and three playback channels into an external mixing console. All operations, including sales, programming, production and on-air talent, are combined in a single integrated system. System size can range from two to more than 15 workstations. Automatic recording, an 8-input switcher and a 4-stereo-track waveform editor/mixer are also included, along with automation control of internal hard drive audio and external devices.

Celebrating its 25th year in operation, International Tapetronics Corporation (ITC) continues to develop its DigiCenter line, splitting the system apart into modules that can operate independently. The DigiCenter CD-25 is a new combination of software, CD controller, DJ module and a rack. The DigiCenter Lite is an entry-level system that allows low-cost operation with all the advantages of DigiCenter. The DigiCenter 33-182 is a combination specifically designed for AM/FM operation. The LN-220 DigiCenter Plus adds expanded networking capability so each user can simultaneously control three workstations. The NW-416 DigiCenter News gives a newsroom the ability to manage text as well as audio for the all-digital newsroom. The DigiCenter Editor is a multitrack waveform editing option for the DigiCenter workstations.

Arrakis moved its approach clearly toward integration of live and live-assist applications. Several new modules were offered for interfacing Arrakis's traditional audio consoles to its Digilink and new Gemini line of audio management/automation systems. Gemini allows integration of newswires, transmitter remote control and administrative/traffic functions, and it also offers its own series of modular mixing console/control surfaces that incorporate workstation, automation and live on-air console operations. New Smartphone products add telephone interface and control to the digital audio management system using the GAP² protocol developed by Arrakis and Gentner.

ENCO Systems demonstrated the most recent enhancements to the popular DAD486x digital audio delivery system. The cut-and-paste assembly editor has been revised and multicut montage capabilities have been added. Live-assist automated program operation and digital I/O are now available, as well as Dolby AC-2 and ISO/MPEG Layer II data reduction. Multiple workstations can share files via Novell NetWare 3.12 and user interface is either through the computer keyboard, mouse or optional touchscreen.

DCS and DCS Live from Computer Concepts are aimed primarily at the satellite and live-assist formats with emphasis on traffic management. A central audio storage file server and distributed databases on a single system allows for quick file access and rapid updates. One central server will support up to 16 DCS machines for a total of 48 discrete stereo audio channels. AES/EBU options provide multiple sampling rates. An optional RAID array provides additional redundancy. The Windows-based system offers control via touchscreen or mouse. Each DJ can customize a setup, and up to 18 loaded cart machines can be instantly available.

Register Data Systems (RDS) presented the Phantom automation system. It supports several data-reduction algorithms (including Dolby AC-2), simultaneous playback and editing, an integrated switcher/mixer (handling 14 or more inputs) and comprehensive back-up capabilities. The system integrates fully with the highly developed RDS line of traffic/billing software or other systems, allowing long walk-away times.

The Italian manufacturer AEV showed two radio automation products, Aurad System 2 and Digital Jingle. The first is a modular device controller capable of operating, switching and mixing up to 64 sound sources ranging from analog tape recorders to hard disk systems. Satellite, remote control and multiple-output operations are also possible. Digital Jingle is a hard disk audio storage system that allows live or automated playback of up to 15 hours of audio. The system can be networked or accessed by an outboard controller.

Sierra Automated Systems and Engineering presented the SAS 32000 audio switching and mixing system, with its wide variety of routing/distribution, intercom, mix-minus, IFB and teleconferencing options. The system allows versatile control via direct serial port, interface to automation or other user configurations. The company's DAS 9600 digitally controlled audio system offers programmable and remote level control. The DCA-8 digitally controlled amplifier contains eight independent channels, each with 128dB level range.

A cross between digital cart machine and computer hard disk categories is the new DDS from Radio Systems. Based on a 486 CPU, the DDS operates under UNIX and uses multiple control terminals that look and act like cart machines. A separate audio output corresponding to each controller is fed from the system mainframe to conventional audio console inputs. Buttons on each control surface provide playback control and flexible sorting of audio cuts, with cut title and timing data viewed on an LCD display. Up to 16 stereo channels can be played back simultaneously, and external devices can be controlled. An alternate user interface provides instant, one-button access to more than 150 audio cuts on a keypad.

Another total system concept is Master Control from Radio Computing Services (RCS), available in three basic packages. Model 100 is designed primarily for the satellite affiliate, while model 200 includes additional features for live-assist operations or full local automation, including LAN capacity. Model 300 is the top-of-the-line system that can be configured for more than 9,900 minutes of on-line storage.

Other software modules available in the RCS Works package provide music selection, song information, radio research, news, inventory, traffic and schedule management.

Dalet, a French company, offered a highly developed, fast and flexible, networked audio management/automation system in use at many large facilities around the world. A modular approach allows the system to be used in small configurations with simple migration to larger systems as needs grow. Manual and automated on-air operation is supported, including satellite interface and outboard device control.

McCurdy debuted a PC-based digital audio storage system called McCart, which allows networked access of up to 100 control stations to common, redundant storage of more than 3,000 hours of audio on SCSI-2 drives. Mixed sampling rates and APT x-100 data reduction are supported, and AES/EBU digital I/O is available. Control can originate from a mix of dedicated push-button panels, touchscreen or mouse/trackball devices. An outboard automation package can control the system, and external device control is also provided.

An interesting system called MAR was shown by the Spanish manufacturer AEQ. It features ISO/MPEG Layer II (MUSICAM) audio coding and comprehensive DTMF remote control. The system can be networked via LAN, and its control options include touchscreen, mouse/keyboard or dedicated hardware panel. AES/EBU audio I/Os are offered, along with multiple language capability for the on-screen displays. The system supports live and automated operations including telephone hybrid control.

Basys Automation Systems again exhibited its D-Cart, a powerful multi-user recording, editing and playback system. For stations using the Basys Newsroom computer system, the D-Cart interface ties both systems together on one screen. Editing functions are precise, non-destructive and intuitive, and the system's playlist feature allows any number of items to be assembled in a sequence for broadcast. Each item can be triggered automatically by the previous item, or simply cued for playback in order. A DTMF interface allows reporters in the field to file reports unattended with time/date stamping of each feed.

Auditronics has reconfigured its Destiny 2000 system, now using two standard video displays instead of a single touchscreen. A new hard disk system has also been incorporated, while the overall concept of integrating hard disk, CD changer and analog console into a user-friendly, flexible package for live, live-assist or walkaway has remained and been refined.

Scott Studios showed its CompuCarts system, which provides a low-cost, PC-based replacement for cart machines. A simple, dedicated push-button controller is used with the system. Audio database management is included, and traffic software bridging is provided. The new Troll system incorporates more integrated operations, including outboard device control, multistudio shared access and pop-up copy windows on screen.

Broadcast Electronics presented enhancements to its Audio VAULT storage system. AudioVAULT On-LINE provides LAN-based networking of AudioVault workstations, allowing integration of traffic and automation systems as well as simultaneous access by multiple studios. AudioVAULT MTE is an 8-track DAW production module that includes editing, mixing and comprehensive audio processing. Meanwhile, daBOX is a new, lower-cost system unveiled at NAB '94. It is a stand-alone PC-based digital storage and automation system controlling up to seven CD players, a satellite network interface and an internal hard drive holding up to five stereo hours of Dolby AC-2 audio.

Schafer World Communications introduced its Genesis system, designed for flexible live or automated operation. The system can be synchronized to an external clock and interfaced with satellite, CD and DAT equipment. Convenient scheduling and logging is included, and up to eight different satellite programs can be integrated. Long walk-away times are supported, with real-time synchronization for keeping correct breaks on the air.

LPB unveiled a system called SALSA, which interfaces with most popular logging/billing and music scheduling systems. It can handle simultaneous record/play and mixed sampling rates, and optional Dolby AC-2 data reduction can be added. Manual or automated operations are supported, with interfaces for up to 15 different

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network feeds and control of up to eight external devices.

Fidelipac again presented its Air Marshal digital storage and automation system, making it the only exhibitor to offer removable and PC-based hard disk cart-replacement systems. Several PC-based front-ends from other developers were shown by 360 Systems that control the 360 Systems' Digicart II Bernoulli system in an automated configuration. The DSI DigiCart satellite interface integrates traffic, billing and logging into a low-cost satellite automation system using a PC and a single DigiCart/II.

The Management, now associated with Electric Works, presented a new automation system that improves upon its earlier Digital DJ system. The new product, called AXS, has an enhanced graphical user interface, more flexible operation and higher speed. It can be networked via LAN, control external CD jukeboxes and interface with satellite systems. Modular design allows sizing and upgrading as required. Simple cut-and-paste editing is included, which operates on data-reduced audio files.

Gefen Systems showed its comprehensive array of audio management and sound effects (SFX) libraries for DOS, Windows or Macintosh platforms. A range of CD players/changers, DAT machines and other outboard storage systems can be controlled by Gefen software, along with the company's own switcher and crossfader hardware devices. Direct digital interface with several DAW systems is also provided.

Smart Broadcast Systems displayed its Smartcaster system in a number of different configurations. New features include a touchscreen system designed for live operation, simultaneous playback of multiple files, and a fully integrated hard disk storage and automation system. Satellite network and external audio switching are also available, along with Dolby AC-2 data reduction.

At the TM Century booth, the new Ultimate Digital Studio II automation system was shown. It allows software control of all audio levels and crossfades, plus enhanced real-time functions for network joins and clock updates. Outboard device control and LAN capabilities are also expanded, along with additional remote-control features and a new screen display.

Finally, touchscreen pioneer MediaTouch showed its MediaTouch II system, with several new operational improvements.

REPLY CARD 356

ENG/SNG, IFB and power systems

By Peter Zawistowski
Zawistowski is senior engineer at Target Enterprises, North Reading, MA

ENG vans and masts

Phoenix ENG showed a van with its main operations area near the sliding door, allowing a single person to operate the camera and the rack-mounted gear. Other user-friendly items include telescoping 750W work lights on the roof to the slide-mounted 5kW generator.

BAF Communications displayed its ENG-18b. One of the innovations is the crow's nest camera, a Panasonic 1-chip camera in a weather-tight housing mounted on the mast.

One of the more operator-friendly vans is the K Edit from ENG Mobile Systems. This Ford E-350 with its wraparound console and dual edit bays provides extra counterspace for editing without sacrificing rack space. Exterior gull-wing doors provide instant access to the racks for quick fixes or wiring changes.

Frontline offers the ENG 350 with its rear-mounted mast and 117" overall height, which includes microwave antenna, pan and tilt on a 42-foot mast. This model offers 63 rack units of space with two console areas and a storage cabinet. A 58-foot pneumatic mast is just one of the options available.

Harris Allied presented its familiar M-1 series with a 2- or 3-rack configuration across the rear wheels. The M1-ENG with its 1- or 2-rack layout has plenty of efficient storage and shelving. Harris Allied also offers the M-1 and the M1-ENG on a Ford or Chevrolet chassis.

The Isley's Companies displayed photos of the mobile broadcasting/interviewing vehicle. It is built on a Ford E-350 with steel frame construction and features three 3' by 7' swing-up windows. A prewired interview table seats five people. A Honda 6kW generator, pneumatic mast and microwave system is also included.

Wolf Coach's Benchmark van, in-

troduced at NAB '93, is being delivered at the rate of nearly one per week. Although promoted as built-on assemble basis, this vehicle is not a stripped down ENG van. This unit can be custom tailored for 1-person operation, multicamera use or equipped with a single mast RF repeater capability. Also available from Wolf Coach is the cable drive mast. Known for its quick deployment and retraction, the mast now features power-down retraction. This overcomes the problems of ice build-up stopping the mast.

Will-Burt, an experienced builder of telescoping masts, demonstrated its new electromechanical telescoping mast. The unique drive train uses technology similar to the remote arm on the Viking space landers, and consists of a heat-treated, stainless steel, thin-foil column driven to any desired height by an electric motor.

Television Engineering Corporation (TEC) displayed a fully integrated ENG van. Shown in a 3-rack configuration, the control area can be designed to meet a user's needs. The unit can be equipped with a generator ranging from 4kW-7kW output power.

REPLY CARD 357

Satellite news vehicles

The newest addition to the Harris Allied fleet of SNVs is the S-21. Available in two body lengths of 11 feet or 12½ feet, the S-21 is equipped with either a 1.8m or 2.4m antenna along with four racks for equipment.

At Frontline the trend was toward larger vehicles. Many affiliate stations are drawn to the SNV-8000 with six or seven racks, GTE Skyswitch communications package and video production capability. If the commercial driver's license (CDL) is a concern, Frontline offers a 6-rack SNV built on a Ford F-700. Both models are available with a dual path waveguide option, allowing transmission of two different video signals on same or opposite polarity on the satellite. For smaller vehicle needs, a 4-rack version on a Chevrolet P-30 with RSI 240KVO antenna is also available. Its 11 foot, 4-inch height allows it to fit in many garages and under low bridges.

Wolf Coach unveiled the Power Truck, a design developed from the collective input of seasoned operators. It is fitted with seven equipment racks and a half-rack to mount 2-way radios, telephones and other gear previously mounted on the walls. It can accommodate 10 seated operators, yet it's smaller and lighter than traditional SNVs. It offers lots of exterior storage space but maintains its GVWR under 26,000 pounds and does not require a CDL. Wolf Coach also showed off an SNV with a 3.7m antenna using a proprietary aiming mechanism.

BAF Communications offers the largest selection of SNVs from the FE-42 built on a Volvo FE chassis to the SD-22 SNV on a Ford Super Duty chassis. The SD-22, TK-SNV and P-Chassis do not require a CDL.

REPLY CARD 358

HPAs, TWTAs and klystrons

MCL introduced several new products at NAB including the model 30042, a 300W multi-

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band HPA. Capable of operating over the frequency range of 5.85GHz to 14.5GHz, this includes uplinking for the C-, X- and Ku-bands and ideal where the use of more than one transmission band is required. Also introduced at NAB, the model 30028, C-band HPA is available with a 600W or 700W TWT (traveling wave tube).

Varian Associates' year-old program of rebuilding klystrons gives these tubes a second life. The 24-hour klystron replacement program is now available to all end users in the United States. Varian will exchange most C- and Ku-band klystrons from Varian and Thompson CSF for a remanufactured replacement tube with full warranty. The company also introduced a compact 350W Ku-band amplifier. This 5.25-inch tall, high-efficiency medium-power amplifier (MPA) uses a dual-depressed collector TWT, requiring less input power than traditional power amplifiers.

Aydin Corporation (West) had on display its new single drawer, 10.5-inch high, 600W Ku-band HPA. This unit has a modular resonant switching-mode power supply. The amplifier is designed for simple installation, operation and maintenance like its 300W counterpart introduced a year ago. Aydin also displayed the 2000 series power amplifiers. This series is configured for L-, S-, C-, X- and Ku-bands depending on the tube deck chosen.

Electromagnetic Incorporated (ETM) displayed its 400W, 8.75-inch high Ku amplifier. ETM uses an energy efficient dual depressed TWT.

ST Keltec Corporation was showing its line of hub-mounted and rack-mounted HPAs. The lineup includes H40 and H50 compact series of amplifiers normally used in VSAT and data transmission. Model H60 with power output of 250W and 300W as a triband unit or in discrete C-, X-, and Ku-bands. The R70 series is capable of more than 915W at the output flange in the Ku frequencies.

REPLY CARD 359

Satellite antennas and services

Andrew Corporation announced an alliance with Compression Labs, Inc., (CLI) to offer digital data-rate reduction in its earth station antenna systems. The effects of a 6dB noise increase were demonstrated on an analog signal and the new Spectrum Saver digital signal. Video monitors and spectrum analyzer displays showed how the signals differed but how little effect the noise had on the received digital signal. Andrew also displayed its new 4.5-inch flanged connector for 4-inch and 5-inch Heliax, which maintains a maximum VSWR of 1.05 over the 54MHz-216MHz band. Simplified installation using bolted flanges eliminates the need for spanner wrenches. Antennas for domestic and international wireless cable, MMDS and other types of point-to-multipoint distribution were also on display, along with new Cold Shrink Heliax weatherproofing and the MR-050 series of low-current (AC or DC) dehydrators.

LNR showed its well-known Slimline models of C- and Ku-upconverters, exciters and modulators, along with some new prepackaged systems. These include the DAVSAT earth stations, MVC-10 for SNVs and the DVF series of flyaway terminals. DAVSAT provides full-duplex satellite transmission for data, voice, compressed audio and video from 3W to 300W for C- and Ku-bands.

Scientific-Atlanta presented earth stations that bridge the transition from analog to digital communications, including the DDS digital DAMA system. The Skylinx.MCPC multiplies the power of satellite communications by allowing each satellite carrier to accommodate multiple channels and multiple applications.

GTE Spacenet showed off its Skyswitch and Digital News Express, a domestic SCPC communication package familiar to many SNV operators. GTE Government Systems was field-

ing inquiries on its new Portable Satellite Terminal (PoST). This spread-spectrum system is capable of transmitting and receiving data up to 64kbps as a flyaway or 256kbps with a larger antenna. Fast and simple setup make this an ideal unit for emergencies or disaster communications.

France Telecom announced agreements with Keystone Communications to provide broadcasters and business TV users with enhanced international satellite transmission services. Along with Maxat, France Telecom's UK subsidiary, the corporation is one of Europe's fastest-growing satellite service companies.

Macrovision, a leading supplier of video scrambling, introduced its VES-TX addressable transmission scrambling system for broadcast-quality applications including network feeds, live pay-for-view and commercial television. It employs 9-bit digital video processors and hi-fi audio. A simple Windows-based user interface, capable of controlling up to 10,000 decoders per encoder, allows rapid authorization. The VES-TP system is suited for backhaul and SNG/ENG use.

Colby Systems demonstrated the DR-3000, its broadcast quality, 30-frame video recorder and modem system. This MPEG 1-based device is capable of sending full-motion video across cellular phone or standard phone lines using a store-and-forward delivery.

ComStream, in partnership with ABL Canada, presented the Digital Compressed Video Broadcast System for satellite distribution of broadcast-quality video. For audio distribution, the ABR200 receiver provides high-quality satellite-fed audio, data and relay signals.

IDB Communications Group announced the acquisition of TeleSPOT commercial delivery service from Sonnet Communications. Using computer workstations, the service delivers radio spots and instructions from production facilities to radio stations.

Standard Communication Corporation presented the Agile Omni Global VU series, a broadcast-quality satellite TV receiver that meets RS-250C and CCIR567 performance standards. Another new product, the CAM830IB, provides control of MT830BR series receivers via a PC.

REPLY CARD 360

Field IFB systems

Telex introduced additions to the Audiocom intercom line with the BP-1000 (single channel) and the BP-2000 (2-channel) beltpack headset stations.

Clear-Com premiered the Matrix Plus II, a multiprocessor-controlled, multimemory, analog and digital intercommunications system. Also shown was the ICS-2002 intercom control station along with the company's extensive line of intercom and IFB systems.

McCurdy showed off its DCS 3000 fully digital intercom/talkback system, which uses a single coaxial cable for interconnection between each control panel. Its digital routing matrix provides 10kHz audio bandwidth.

The INTEGRATOR field IFB system from Critical Communications is one of the most configurable designs available. It has two independent 6x2 source assign buses that can be equipped with a variety of interfaces for cellular phone, land line and 2-way radio.

Studio Technologies IFB Plus series is a compact, yet user-friendly IFB system. The model 2 is equipped with dual 6x1 buses, each with four program inputs and two telephone interfaces. The model 22 access station provides additional origination points for interrupt, ideal for producers and directors who need to cue talent.

REPLY CARD 361

Remote powering

Superior Electric displayed its STABILINE series of voltage regulators. Special POWERSTAT variable transformers are designed for regulator use. These variable transformers have a limited range of output voltage, but

allow fine adjustment of the output voltage to within fractions of a volt. This increases current and power rating without increasing size or weight. Typical efficiency of the STABILINE series is 99%.

Control Concepts/Leibert showed AccuVar, a surge suppression system for AM, FM and television. It exceeds industry standards and offers remote monitoring. Internal fusing ensures safety from failure caused by surges or installation/application errors.

SureSine, the new product line from Westinghouse, offers active 2-way harmonic protection, distortion power factor correction and instantaneous regulation. It also provides current harmonic cancellation to actively cancel out harmonic current generated by non-linear or pulsed loads.

REPLY CARD 362

Radio RF, microwave, test and measurement

By John Battison

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

RF transmission for radio

Following a general trend of NAB '94 toward digital replacement technologies, Nautel showed its NE50 50W digital FM exciter. This solid-state device uses 32-bit direct digital synthesis (DDS) technology to generate a modulated FM carrier of exceptional spectral purity and audio fidelity. By avoiding the use of a conventional VCO, instability and non-linearity are avoided.

Harris also brought back its digital FM exciter, DIGIT, this time as a real product ready for market. Claimed as the world's first such exciter (it was first introduced two years ago), this device now makes it possible to have a completely digital FM operation from audio input to RF output. Thus, all A/D and D/A converters and associated distortion are eliminated, as are intermediate interfaces. Its audio specifications are impressive, and this exciter appears to ratchet FM broadcasting up another notch on the quality scale.

Continental Electronics recently announced three control panels for exciters and transmitters. The 377C-1A and 377D-1 and -2 provide automatic and manual RF switching for AM and FM transmitter sites. Also shown were the 802B FM exciter and 816R-6C 30kW FM transmitter.

Thomcast showed the usual wide range of radio transmission products. Most interesting among new radio items was ALLISS, an adaptable, integrated, high-power shortwave transmission system. Comark, another part of the Thomcast organization, announced that it acquired the RCA Broadcast Transmitter Service Business & Parts from General Electric.

QEI introduced the Quantum series of solid-state FM transmitters and the QEI 675B, an advanced-technology FM exciter.

Circuit Research Laboratories (CRL) had its usual fine array of goodies. The CRL SC-100 enables a broadcaster to enter the potentially lucrative radio broadcast data system (RBDS) field. It can be programmed and controlled with an external PC via RS-232 (directly or via modem), or via the unit's own front-panel keyboard. Everything needed to become an RBDS, RDS or SCA operator is included in SC-100, which generates the subcarriers via DSP.

Also in the RBDS area, Modulation Sciences introduced the RDS monitor, which determines the injection level of an RDS/RBDS signal and thoroughly analyzes its data content. It works with composite input from virtually any tuner source and includes an RS-232 interface with software.

SCA Data Systems showed the Music 4, an SCA generator and receiver system that puts four audio channels on a single FM subcarrier. Also on display was the Data 4, a variation on the Music 4 that can transmit up to 1,800bps within its 5kHz bandwidth. Also shown was the PG 57-3 SCA paging generator.

Need an inexpensive FM exciter to replace that old one you have? For under $2,000, BEXT offers the LEX 25, a programmable FM exciter capable of 25W power output. Other new BEXT products include the SF series of solid-state MOSFET FM amplifiers with powers ranging from 100W to 1kW and the TCX 100 FM exciter with lots of bells and whistles.

Crown Broadcast showed the FM 200, a 200W solid-state FM transmitter. Completely self-contained, it meets FC, DOC and CCIR technical requirements and makes a perfect emergency or standby unit for the FM broadcaster who does not wish to spend thousands of dollars for a standby unit.

Broadcast Electronics offered the fourth in its series of solid-state FM transmitters, the FM-3C. It uses the FM-100C exciter, and the VSWR foldback allows operation even under the worst conditions of VSWR mismatch. Redundancy in the power supplies allows for operation even if the RF or its power supply drops out.

Electronics Research Inc. (ERI) was showing the new "X" series of FM antennas and Lambda antenna mounting system. The Lambda system custom tailors the antenna/tower interface to provide optimum pattern control and coverage for stations.

Shively Labs displayed its broad assortment of high-performance FM antenna systems and transmission components.

New software options shown for the ARC-16 transmitter remote-control system by Burk Technologies provide innovative control solutions. The system offers complete management of remote and studio facilities, such as EBS, automation and STLs.

Speaking of EBS, the FCC's interest in this topic is reflected in TFT's EIS 911 system. Since its demonstration earlier, TFT has modified it and reduced its potential costs. A fascinating "freebie" was also found at the TFT booth. Although priced at $20 on the inside page, the primer "Digital Aural Studio to Transmitter Links" is actually free from TFT for the cost of a letter to the company. Although TFT equipment is referenced throughout the book, the theory of digital STL is well developed and explained.

REPLY CARD 363

Microwave systems

QEI has adapted its uncompressed CAT-Link technology to the RF spectrum to come up with Quick-Link. (See

"1994 NAB Pick Hits," p. 24.) It is a digital transmitter/receiver pair that provides a stereo pair of 10Hz to 15kHz channels for radio or TV aural remotes. As a bonus it can also be used as a backup for a 950MHz aural STL using existing coaxial cable and dishes. It uses the 902-928MHz band as a Part 15 device with direct sequence spread spectrum transmission. Ten front-panel selectable channels can be accommodated.

Dolby Labs demonstrated a new 4-channel version of its DSTL digital 950MHz aural studio-to-transmitter link. The new DP5503 and DP5504 transmitter and receiver provide four audio channels and two RS-232 data channels in an occupied bandwidth of only 400kHz.

DB Elettronica highlighted a complete line of FM and TV products including the TD/16 and RD/16 digital coders/decoders for aural STL applications.

Moseley Associates showed the first all-digital open-architecture modular STL transmission system, the Starlink 9000. (See "1994 NAB Pick Hits," p. 24.) Its design allows the user to build anything from a no-frills link to a complete unit including stereo and RDS generators.

In another ground-breaking move, Marti Electronics broke its long-standing tradition and introduced an FM-composite STL.

REPLY CARD 364

Test and measurement equipment

In addition to its new AutoCheck measurement system for VTRs, Audio Precision displayed the Portable One Plus audio measurement system. The Plus includes all the Portable One features plus sweeping, graphing and printout capability.

Schmid Telecommunication showed the SIAT-MAX hand-held audio test generator. The SIAT-MAX operates on four AA batteries and is designed for use in conjunction with the Schmid SZ346 measurement receiver.

With the upcoming NRSC-2 measurement requirements, the Delta Electronics' Splatter Monitor was a highly sought after piece of test equipment. The monitor allows AM stations to verify compliance with NRSC emission limits, which go into effect next month.

Logitek had six new items. The familiar line of bar graph meters has been expanded with the Super-VU LED meters, analog and digital. The dual bar graph uses 40 bar-type tricolor LEDs and displays VU and peak levels on the same instrument. It is also possible to show image/phase and mono-sum information. The former is unique in that the location and width of the stereo image and phase reversal or off-center mono can be seen.

Neutrik introduced a full line of connector jacks and plugs for audio, as well as several new, easy-to-use systems for audio test, measurement and service.

CRL showed its DAA-50 digital audio analyzer. It can receive and decode AES/EBU, IEC-958, S/PDIF and EIAJ CP-340 digital audio standards. It will identify the digital signal's format and report its status, including pro/consumer, emphasis on/off, audio/non-audio, frequency and errors. It includes a high-quality D/A converter for headphone monitoring with volume control.

Two innovative metering systems were displayed in the Dorrough Electronics booth. The models 280 and 380 audio meters provide two channels of audio monitoring from AES/EBU inputs.

Providing simultaneous display of peak and perceived power, the meters provide operators with a lot of information in a small package.

There's not enough space to describe all 10 new items from Leader Instruments Corporation. Noted for its full line of test and measuring instruments, the model 2250, a 250MHz 4-channel multifunction oscilloscope, is probably the most exciting of its new releases this year. The ability to display four parameters at once is something that must be seen.

Tektronix showed nine new products. Perhaps most impressive was the WFM90 hand-held waveform/vector/picture/audio monitor. (See "1994 NAB Pick Hits," p. 24.) This is the first hand-held monitor of its type. A color thin film transistor (TFT) LCD provides a full-screen color TV display of the four test modes: color picture monitor, waveform, vectorscope and voltage vs. time audio monitor. The unit is powered by an external AC adapter or six C-cells.

Bird is a powerful name in power measurement. For the high-power station, Bird has introduced the model 6085 broadband high-power RF calorimeter. A built-in microprocessor enables accuracy to within ±3%. Remote control via RS-232 and preprogramming are also available.

The long-established company of Belar Electronics Laboratory introduced its first digital stereo modulation monitor, the FMSA-1. (See "1994 NAB Pick Hits," p. 24.)

Potomac Instruments' excellent line of field intensity meters (FIMs), which date back to the early days of AM radio, now includes the latest brainchild, the FIM 71. This is a true VHF field-strength meter that indicates field intensity in microvolts per meter. Potomac also introduced the 1750 TLM tower light monitor that can alarm for single-bulb failures of beacons and obstruction lights on a single circuit.

The need to measure and label nonionizing emissions is met by the broad range of indicating and detecting devices shown by Holaday Industries. Any emission between 10kHz and 40GHz can be measured by its new HI-4000RF/microwave hazard MEAsurement system. RF engineers also might be interested in the model 3500 area monitor for locations of high RF and microwave emissions.

TV RF, test and measurement

By Don Markley
Markley is president of D.L. Markley and Associates Inc., Peoria, IL.

TV transmitters

It's a strange industry in which we dwell. Once upon a time, a little upstart company named Comark kicked at the shins of the big manufacturers like RCA and GE. Today, the situation is reversed because this year Comark obtained the license rights to use the RCA trademarks for transmitter and professional broadcast studio equipment, including the use of "Nipper." Though this doesn't necessarily mean any big change in the Comark transmitter line, it is important in that parts and technical assistance for existing RCA transmitters are now available through Comark. Also at NAB was Comark's new UHF TV transmitter, which uses an IOT final power amplifier and has Class A amplifiers as drivers to minimize the overall system correction needed.

Another wedding of companies has resulted in Larcan-TTC with a new line of UHF transmitters, also with IOT finals. There was also a joining of forces between Marconi Communications and Continental Electronics. The technology will be provided by Marconi with the equipment actually being manufactured by Continental. The Marconi line starts with solid-state transmitters and continues upward to the high-power IOT systems. The most interesting transmitters are the solid-state units that come in power levels from 2kW to 20kW and use liquid-cooled amplifier modules.

Harris Allied also displayed an IOT transmitter available in the normal high-power configurations, starting at 30kW and continuing upward. In addition, a 2kW unit was added to the line of solid-state VHF transmitters. Harris also showed a line of solid-state UHF transmitters with models for 5kW, 10kW and 15kW. The transmitters use broadband modules that are interchangeable for visual and aural service.

The Acrodyne booth teemed with innovation as vice president of engineering Dr. Tim Hulick demonstrated his company's latest wares. Shown were the TRU/30kV single tetrode 30kW UHF transmitter, the TLU/1KSCE 1kW UHF LPTV transmitter, the TLU/100E 100W UHF translator and the TLH/100 VHF transmitter. A complete range of transmission products was shown at the Thomcast booth, from 1W low-power TV translators to 2MW AM transmitters. At center stage in the EMCEE booth was a solid-state 1kW UHF transmitter popular for LPTV, translator and standby service. Also, EMCEE has added a backup MMDS transmitter, the TTS10EB, to its line. In automatic mode on main transmitter failure, the TTS10EB automatically fires up and reroutes the combiner inputs to insert the standby unit.

REPLY CARD 365

Broadcast tubes

Thomson Tubes Electroniques presented its high-power UHF tubes for up to 60kW. The TH760 improved IOT uses Pyrobloc grid technology. With tetrode-like input and klystron-like output characteristics it offers high gain and efficiency. For engineers who like tetrodes, the Thomson TH680 Diacrode tube is basically the same as a tetrode. The main difference is the manner in which power is brought out, effectively doubling the delivered power.

EEV showed its improved IOT7360. A feature of this design is the ease and speed with which tubes can be changed.

Varian is celebrating the 60th anniversary of the Eimac tube division, a contest is looking for the Eimac tube with the longest operating history. Check your tube logs! New products shown were the 60kW Klystrode IOT, 60kW wideband external-cavity klystron and 350/400W satcom uplink amplifiers. Varian also highlighted its new remanufacture program for power grid tubes and TV klystrons.

Shown in the Richardson Electronics booth was its range of tube products, including cavity amplifiers and sockets. Richardson also supports camera tubes and new and rebuilt klystrons and a variety of broadcast accessories. Burle showed its line of VHF and UHF power tubes ranging from 500W to 50kW, as well as camera tubes.

Econco reconditions a wide range of tubes and is known for its expertise and customer support. Attendees were provided with a close-up look at the process of rebuilding transmitter tubes.

REPLY CARD 366

Transmission line and antennas

Andrew Corporation displayed a new type of rigid coaxial line called HR Line, which uses bolted together inner conductors that eliminate contact sliding between sections. Thermal expansion is accommodated through a spirally grooved inner conductor. There is no wear at the junction between sections, and VSWR numbers are comparable with rigid line systems. For HDTV, Andrew was showing the Super-Alp antenna, which is essentially a higher-power version of the Alpine LPTV/translator antenna system.

Dielectric Communications placed emphasis on its TUP panel antenna, which is designed for emergency high-power operation, as well as digital HDTV at any future channel. Digital transmission requirements have spread to transmission line. At first thought, it might seem a little strange to specify a digital transmission line — after all, a piece of coax probably doesn't know or care what it is carrying. However, Dielectric Communications does not agree. Its new digiTLine has been designed to combine the best features of rigid copper coax and semi-flexible lines.

Cablewave showed its line of transmission line products with emphasis on the 6 1/8-inch flexwell cable. Shown in the MYAT booth were samples of the FM and TV lines, ranging from 7/8" to 9 3/16."

REPLY CARD 367

Microwave systems

At Broadcast Microwave Service (BMS) of San Diego, three versions of video receivers were shown. The BMR-70 lightweight airborne receiver occupies only 25 cubic inches. The BMR-120 is also lightweight, but has more bells and whistles, and the rack-mounted BMR-200F designed for helicopters and mobile vans meets all EIA-250-C video standards and is available in PAL or NTSC.

Radiation Systems showed its line of STL and microwave antennas. The company specializes in providing a complete line of high-performance short and long-hop antennas for broadcast and telecommunications applications.

Microwave Corporation of Chelmsford, MA, showed a line of Millennium Series microwave transmitters. The model 2T10 2GHz portable transmitter features selectable power of 3.5W or 10W. Color bar generator and two synthesized subcarriers 4.83 to 8.59MHz are available. It is designed for ENG operation and operates from AC or DC using a choice of two internal power supplies. In the 1.7GHz to 15.2GHz range four models are offered: the 2T4 provides 4W at 2GHz, and the 7T4 offers 4W at 7GHz. For 13GHz and 15GHz models 13T1 and 15T1 offer 1W output.

From Nurad technologies came a full line of antenna products including the series 3000, which

is available in 2GHz, 7GHz and dual band models. Troll Technology of Valencia, CA, showed a number of items designed for ENG operations. These ranged from the 950SL local/slave ENG site controller to the Touchstar model TS900e master ENG site controller

On the subject of ENG, Horita showed its TL-2100 (see "1994 NAB Pick Hits," p. 24) portable GPS-based blackburst generator. Because it locks to GPS reference, it is ideal for time-syncing two sources that cannot be hard-wired.

REPLY CARD 368

TV/video test equipment

Tektronix introduced a new line of test equipment centered on products for digital and component systems. Several hand-held units included the SDA601 serial component analyzer and TSG601 serial component generator. The series also included the WFM 90 hand-held waveform/vector/picture/audio monitor (see "1994 NAB Pick Hits," p. 24).

Magni Systems showed the WVM-710 automated video signal monitor. (See "1994 NAB Pick Hits," p. 24). It provides full-screen graphic and numeric display of video signal parameters and also gives on-screen warnings. A printer port allows for hard copy output.

From Asaca/Shibasoku came three new products: the TX20AX NTSC/PAL video signal analyzer, the TP17A1 moving test pattern generator and the TG76BX test generator. The TX20AX accepts four video signal format inputs (composite, component Y/R-Y/B-Y, RGB and Y/C). In addition, it switches automatically between NTSC and PAL, computes sum, average, min/max points and has 36 pattern memories. The TP17A1 is a programmable moving test pattern generator with an NTSC-M output format. This generator outputs two images simultaneously from memory; a background pattern and a window pattern that moves on the background screen. The TG76BX is a reference quality multiformat video test generator with options for all-digital production formats. The unit generates 32 test signals and houses up to four optional modules for digital signal output.

AAVS demonstrated its S310 real-time, on-line, digital video analyzer and presented a paper on digital video testing. New from Leader Instruments was the 5212 vectorscope and the 5222 waveform monitor. Both are multiple input devices that automatically switch between NTSC and PAL modes.

From Audio Precision, a leader in the automated audio testing world, comes AutoCheck, an automated testing unit designed for use with videotape machines. Tentel introduced the latest entry to its Tentelometer line, the T2-H7-SLC tape tension gauge for Betacam decks. It has a single gram division to 60 grams, and simplifies tension measurements.

For RF testing, Barco showed the TMD-200 measurement demodulator, a tunable modular 4RPU device with four RF inputs capable of storing up to 200 user-defined presets. Barco also showed a number of cable TV devices including the FSM-860 automated supervisor, the CC 200 TV processor, tunable input and output converters and fiber-optic equipment. Hewlett-Packard showed the HP8782B-K03, a digitally modulated vector signal generator, as well as the HP 8591C cable TV analyzer that performs required FCC proof-of-performance RF measurements. The HP 8591E Option E80 is a solution for complete RF testing of broadcast TV transmitters and repeaters.

Videotek introduced the DM-154, a high-performance agile stereo video demodulator. Videotek also announced the SSI-1000 PC-based system software interface that can define, schedule and perform tests with the TVM-730 or S-2000, control all functions of the DM-154 demod, and control all functions of the RS-103 series routing switchers. Another product from Videotek, the VTM-100 TV signal monitor, provides measurement tools including waveform monitoring, vectorscope, SC/H measurement, timing and audio level indication.

REPLY CARD 369

Audio processing, routing, microphones and accessories

By Robin Cross
Cross is chief engineer at WNIU/WNIJ, DeKalb, IL.

Audio processing

Continuing its tradition of top-notch analog audio circuitry, Aphex Systems displayed several new products, including the model 106 Easyrider, a 4-channel compressor added to the Serious Tools series. Model 105 is a 4-channel high-performance noise gate and model 622 is a low distortion expander-gate with 100kHz frequency response and a dynamic range exceeding 20-bit PCM.

Eventide presented a new value-priced Ultraharmonizer designated as the H3000-D/SE. It features a multitude of special effects that will be welcome in the production studio. Also shown were the economical BD941 and BD942 broadcast audio profanity delays.

Orban, well-known for its air-chain audio processors, introduced a new TV audio processor, the programmable Digital Optimod-TV 8282. (See "1994 NAB Pick Hits," p. 24.) It has remote programming capability and settings can be changed via modem or by daypart. Remote-control software for the 8200 digital Optimod (for FM) is also complete.

Cutting Edge displayed the Unity AM, a remotely programmable AM audio processor. A free upgrade upon request was also announced for owners of the Unity 2000i. The Dividend composite filter, a unique and useful device for cleaning up an FM signal was also shown.

AEV presented its Exclusive FM broadcast audio processor, which offers audio processing over 10 bands and independent control of all variables.

CRL showed its TVS-3003 MTS generator, which builds a stereo TV audio signal digitally and includes a stereo limiter.

At the Lexicon booth, the 480L digital effects system was demonstrated with its direct digital interface, allowing its seamless integration in digital production. It can run two entirely different programs simultaneously.

Roland added to its lineup of innovative effects processing with the SDX-330 dimensional expander. The device can move audio signals around the 3-D field using conventional stereo amplification and no other special equipment.

REPLY CARD 370

Audio routing

Leitch has expanded the Digital Glue line with an AES/EBU serial router. The ASR-16x1 audio serial router conforms to AES3-1992 specifications and supports sampling rates of 32kHz, 44.1kHz and 48kHz.

Datatek has a new routing switcher that will handle virtually any signal — analog video and audio, serial digital video, AES/EBU digital audio, time code or data. The D-2800 is fully modular and field-expandable, with sizes from 16x16 to 1,024x1,024.

Pro-Bel unveiled a router using the MADI protocol (the multichannel AES/EBU standard) featuring small size and modular, field-upgradeable design. The new TM24 and TM16 are flexible, lower-cost digital routing switchers for smaller applications.

BTS presented its new Venus audio routing switcher, an analog product that is fully convertible to AES/EBU digital when a facility requires it. This conversion also effectively doubles the capacity of the router because AES/EBU paths carry two audio channels through each crosspoint.

Wohler Technologies showed an electronic audio switcher in matrix sizes up to 20x1 or 5x4, with optional output VU meters. When combined with Wohler's audio monitoring equipment, a control signal brightens the selected source's level meter.

REPLY CARD 371

Wireless and wired microphones

Shure Brothers introduced the SC, a new wireless series featuring a battery fuel gauge, 8-position switch for frequency agility and tone-key squelch to prevent unwanted noise.

The Lectrosonics 195 series diversity wireless microphone receiver was designed for the critical sound needs and the DR195 receiver offers advances in circuit and mechanical design.

AKG exhibited a new line of wireless microphones. The WMS900 multichannel system allows up to 12 microphone channels to be used simultaneously in a UHF TV channel. The WMS100 is a single-channel VHF system featuring dbx noise reduction and high resistance to interference.

Telex added the FMR-450, a professional UHF wireless microphone system, to its product line.

Sennheiser introduced several wireless products: the SKM 5000 UHF hand-held supercardioid microphone, the pocket-sized EK 4015-UHF miniature diversity receiver, and the EM 203 modular UHF receiver system.

Audio Technica showed the ATW-1235 and -1236 professional wireless mic systems, which provide broad audio frequency response and high RF stability.

Beyerdynamic displayed its new wireless UHF diversity receiver and MV100 microphone pre-amp.

As part of its Star Power Series, Nady Systems presented the Nady SP 2 all-purpose wireless microphone. It is targeted as a stage mic for vocals or instruments.

The new HT-200 series of hand-held wireless microphones offered by Telex Communications provides impressive RF field strength, an integral antenna that prevents hand interference and has an easily accessible battery compartment.

Vega Wireless introduced the R-662B PRO PLUS true-diversity UHF receiver. In addition to remote monitoring functions, the R-662B also includes remotely controlled frequency selection, muting and forced diversity selection.

In wired microphone introductions, Audio Technica premiered its large-diaphragm AT-4050/CM5 multipattern studio capacitor mic (see "1994 NAB Pick Hits," p. 24), with switchable car-

Continued on page 116

Noteworthy new product

In addition to the 10 Video Pick Hits, the judges felt one other product deserved to be mentioned. The BTS Media Pool was shown in a suite at the convention, and therefore ineligible for a Pick Hit. Despite this, many of the judges attended the Media Pool showing and felt it deserved recognition.

Media Pool is an expandable multichannel tapeless video recording system. The unit's architecture is based on RAID technology, where multiple disk drives are used to build a large block of memory. The system offers variable data compression, and allows users to determine how much, if any, compression is used on each clip. All modules are redundant and hot swappable. At present, software applications allow for emulation of digital cart machines, VTRs and variable delay capabilities. The unit is scheduled to be formally unveiled at the ITS conference in Washington, DC.

TV judges

Marvin Born, vice president, engineering
WBNS-TV, Columbus, OH

David C. Felland, director of engineering and operations
WMVS/WMVT, Milwaukee, WI

Ken Hunold, audio/video project engineer
ABC Engineering Laboratory, New York

Mark McKeon, director of engineering
The Weather Channel, Atlanta, GA

Phil Mendelson, vice president, engineering
Digital Magic, Santa Monica, CA

Harlan Neugeboren, director of operations and engineering
NY 1 News, New York

Karl Renwanz, general manager
SITNO TV, Bratislava, Slovakia

Ed Sutton, director of engineering
KPHO-TV, Phoenix, AZ

Roy Trumbull, assistant chief engineer
KRON-TV, San Francisco, CA

Radio judges

John Battison, P.E., consultant
John H. Battison and Assoc., Loudonville, OH

Rick Edwards, vice president
Guy Gannett Publishing/Gannett Tower,
Ft. Lauderdale, FL

Kirk Harnack, president
Harnack Engineering, Memphis, TN

Andy Laird, vice president, engineering
Heritage Media Radio Group, Santa Clarita, CA

Stuart Rosenthal, technical director
Alaska Public Radio Network, Anchorage, AK

Richard Rudman, engineering manager
KFWB, Los Angeles

Christopher H. Scherer, chief engineer
WZAK-FM/WZJM-FM/WJMO-AM, Cleveland

Milford Smith, vice president, radio engineering
Greater Media, East Brunswick, NJ

Michael Starling, director of engineering and operations
National Public Radio, Washington, DC

The rules

***BE's** Pick Hits judges operate anonymously. Each year they look for new products that meet the following criteria:*

1. Products must be new and not shown at a previous NAB. In some cases, distinguishing a new product from a modified old product is difficult. For our purposes, a new product is one with a new model number or new designation.

2. Products must have some positive effect on the user's everyday work. Judges search for equipment that will be used on a regular basis. Products should provide new solutions to common problems.

3. Products must offer substantial improvement over previous technology. Unique circuit architecture need not be included, but some new approach or application must be involved in the product's design.

4. The prices of the products must be within reach of their intended users. The judges seek products appropriate to a wide range of facilities.

5. Products must be available for purchase within calendar 1994. Equipment must be on display on the show floor and currently (or imminently) in production. Judges take the exhibitor's word on availability dates. Products demonstrated in private showings do not qualify.

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You won't have to travel far to see a Varian satcom high power amplifier (HPA) in action. Fact is, we have installations in 73% of the countries around the world—for unparalleled reasons.

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Circle (29) on Reply Card

varian

Using fiber for satellite systems

Using off-site earth terminals no longer involves costly links and cumbersome operations.

By Philip Hejtmanek

The Bottom Line

Line-of-sight or space limitations have forced many TV stations (especially those in downtown areas) to locate their satellite receive terminals off-premises. This has implied expensive microwave or telco links between locations. It also typically requires extensive coordination with additional staff and/or the use of a commercial teleport. Given the growing use of satellite feeds, a new, cheaper and more flexible alternative should be welcome wherever remote downlinks are required.

$

Most TV broadcast stations depend heavily on satellite feeds for network and syndicated programs, news feeds, commercials and other program material. The construction of the receive terminal for these programs is usually a simple matter of putting up a satellite earth station in the parking lot or backyard of the station. It is not always that easy, however.

Consider an example of a major market TV station operating from a 3-story building surrounded by skyscrapers. There is no useful view of the satellite arc anywhere on the station's property. As a result, the station acquired the needed program material from satellite feeds via local teleports at an extremely high cost. Even the station's primary network feed was downlinked tens of miles and three microwave hops away. As a result, incoming path resources were scarce and needed to be scheduled carefully. Each program feed used up one of the limited number of lines into the facility.

The station had investigated the possibility of a remote-controlled earth station, but concluded that coordinating the large number of necessary microwave circuits would be untenable. Although fiber-optic paths had recently become available from common carriers in the market, the need to lease a single circuit per program at comparatively high cost made that option prohibitive as well.

Sending RF via fiber

Eventually, station engineers turned to technology more commonly used by cable operators. It was well known that major cable MSOs were replacing the coaxial cable and amplifiers on their long-haul trunks with fiber. This allowed a reduction of the number of amplifiers between the head-end and the subscriber, which translated into less noise and better reliability.

These fiber-based systems employ high-performance intensity modulators and wideband, single-mode fiber to transmit the entire 400MHz or 500MHz bandwidth of the cable system to high-linearity photodetectors at neighborhood nodes throughout the service area. RF output from the photodetector is fed into a standard CATV wideband trunk amplifier and passed from the nodes to individual subscribers' homes in traditional manner via coax.

Clearly, the bandwidth of these fiber systems would be adequate to convey the entire frequency spectrum of a satellite downlink if the RF was downconverted. An examination of current periodicals relating to the cable and laser industries revealed that there were available products optimized for use in remote satellite downlinks. One such product, from Ortel Corporation, carried 500MHz of bandwidth at the common L-band IF frequency (950MHz to 1,450MHz). It also carried another 500MHz at the C-band RF downlink carrier-frequency spectrum of 3.70GHz to 4.20GHz. In other words, one fiber strand could carry 1GHz of RF bandwidth across as much as 35km of single-mode fiber, with baseband video signal-to-noise performance of better than 60dB.

The advantages of such a system are

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substantial. A remote earth station that conveys the full RF spectrum of the satellite to the station allows multiple simultaneous feeds to be received on station-based hardware, via a single fiber path from the downlink.

For the most versatility in a broadcast operation, a steerable satellite antenna with a 4-port C/Ku feed is the best choice. This provides all four possible RF polarizations that could be encountered (C-band H and V, Ku-band H and V) at the station. However, it requires two fiber strands for full-time dedicated access to all feeds from any given satellite. (See Figure 1.) Alternatively, the C-band or Ku-band outputs from two separate antennas could be applied to the same 2-fiber path for simultaneous access to two different satellites.

Finding the fiber

In some cases, a broadcast operation can secure utility rights-of-way and lay its own fiber between the earth station and the control facility. More commonly, however, the broadcaster will lease fiber pathways from a common carrier. For the RF application required by this type of project, the common carrier must provide the broadcaster with *dark fiber*. Dark fiber is a fiber-optic path without any telco-provided terminal equipment (the equivalent of a *dry pair* in telco's copper environment). This may be harder to obtain than standard fiber service in some cases, because of the carrier's fear that the customer will use the fiber to offer competing service. A broadcaster may need to affirm to the carrier that the fiber will be used only for a specific, in-house RF application.

In the example cited earlier, the negotiation of contracts and leases for a 5km dark fiber path and the earth terminal site took much longer than the actual construction of the facility.

Getting fiber into the facility

Fiber-optic lightguide is rapidly replacing coaxial cable as the medium for video transmission via common carrier. Future TV station connectivity is certain to include analog and digital transmission by fiber. If your station is not yet connected to a fiber vendor, it might be worth the effort to investigate the availability of fiber resources before the rush is on to deliver a needed circuit.

Installation may involve digging up the street, installing manholes, pulling cable and a time-consuming splicing process. Fortunately, the fiber vendors handle most of these details, but the user is generally subject to an installation cost.

Fiber vendors will want to establish a point of presence (POP) in a TV station, similar to the telco demarcation point. The location of the POP is dependent upon the requirements of the customer and the expected uses of the fiber. It consists of a panel with multiple connectors, one for each strand in the fiber cable. The vendor will also place any required terminal equipment and power supplies at the POP.

For earth station telemetry, status and other control signals (such as antenna motion control for steerable dishes), separate telco data lines may be required.

Some fiber facts

Fiber-optic cable consists of an extremely small glass core, surrounded by a cladding material that has a different index of refraction from the core. Light from a laser or LED is coupled into the fiber and travels down its length to a photodetector at the other end of the path. The fiber is frequently optimized for the wavelength of the light to be transmitted. Typically, infrared lasers with wavelengths of 1,310 nanometers or 1,550 nanometers are used as light sources in high-performance systems. (See *BE* articles, "Fiber Optics in the Broadcast Industry," September 1990 and "Building Fiber-Optic Transmission Systems," Parts 1-3, November 1991-January 1992.)

The small diameter lightguide used in single-mode fiber allows only light rays that are directly coupled into the fiber to propagate. The larger diameter *multimode* variety allows direct propagation and other modes of coupling. The latter are created when light that is not precisely coupled into the fiber reflects off the cladding and arrives at the far end, slightly delayed in time relative to the direct-coupled light. This modal dispersion results in substantially poorer bandwidth per kilometer of fiber. Single-mode lightguide is about one-tenth of the diameter of a human hair and is spliced or mated to a connector using a microscope. Of course, the thin glass strand is surrounded by many layers of strengthening material, so the actual fiber cable is quite robust.

Most analog video and some less demanding digital applications can use the

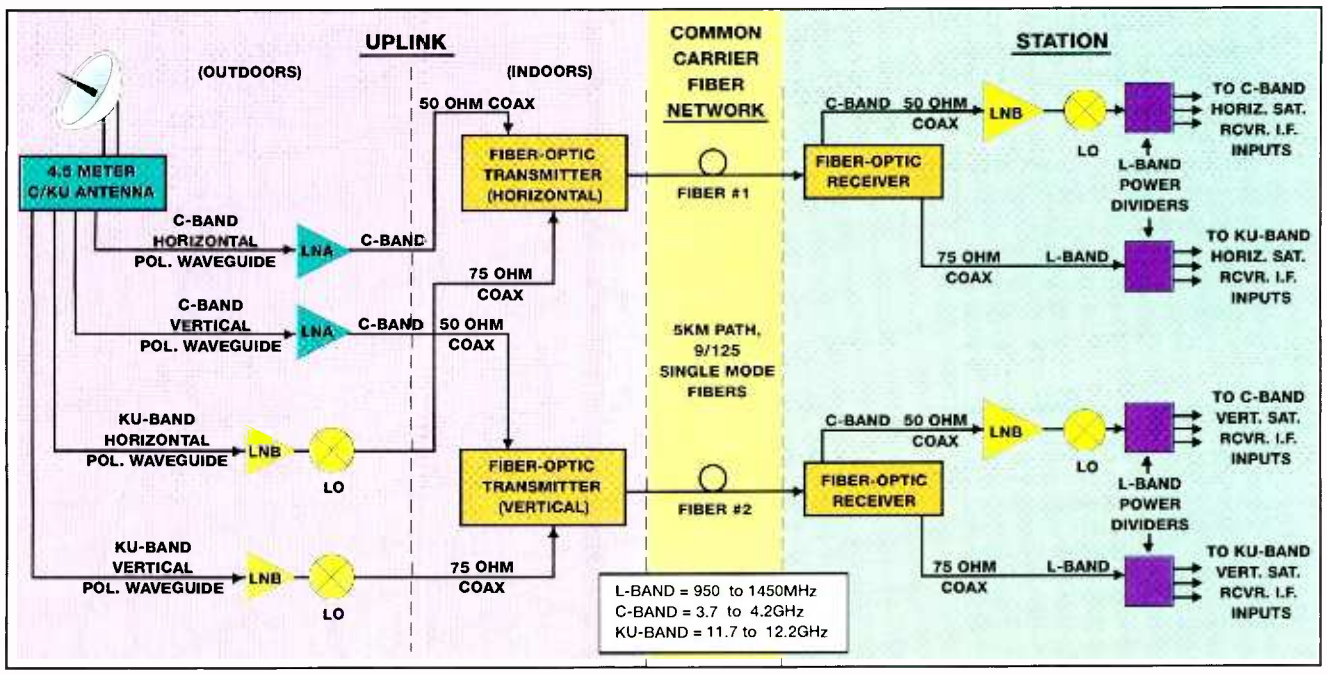
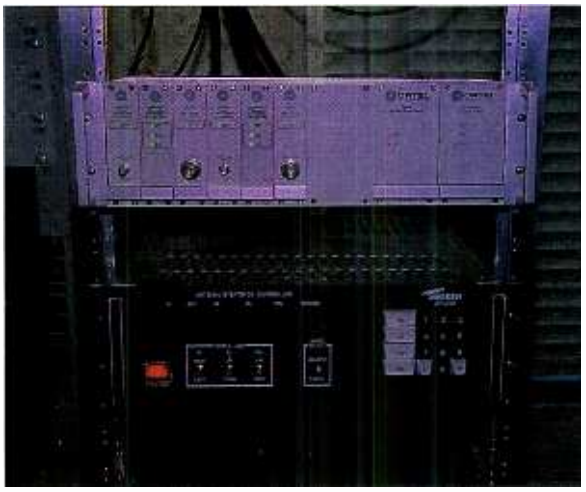


Figure 1. *Block diagram of remote earth-station link using fiber optics to carry undemodulated RF signals to satellite receivers located in the studio. Ku-band signals are block-downconverted to L-band at downlink, traveling to station on lower-band portion of fiber link, while C-band signals occupy upper-band portion of fiber link without downconversion.*

cheaper multimode fiber and LED emitters successfully. However, high-performance digital and RF applications, such as CATV, dictate the use of single-mode fiber and lasers, as well as *fusion splices* between fiber segments. (Fusion splices create far less loss in the optical path than connectors.)

Would-be fiber users should be aware of these different types of fiber, as well as the seemingly endless number of connector types, which are frequently incompatible with each other. For example, in the case considered above, it was critical that *wideband 9/125 single-mode* fiber be used. (The 9/125 designation refers to a 9-micron diameter glass lightguide, inside a 125-micron diameter cladding.) When the system cited earlier was initially tested after installation, one of the fiber paths was delivering intermittent signals. The installers found that a multimode pigtail jumper had been accidentally used as a short interconnect in the otherwise single-mode path. Replacement of this jumper with a single-mode segment fixed the problem.



This rack at a station's remote downlink contains fiber-optic terminal equipment (above) and satellite antenna controller (below).(Courtesy of WBBM-TV, Chicago.)

Conclusions from experience

This project has been in successful operation for more than six months. Signal quality is excellent, with little or no degradation attributable to the fiber path. This compares favorably with the seasonal adjustments that previously had been required at the station to maintain its microwave video circuits from teleports.

Reliability of the optical transmission path has been 100% to date. The station quickly began using the antenna for daily news feeds and syndicated program pickups. It has since canceled a substantial number of long-standing orders with local teleports. The system is projected to pay for itself in saved teleport charges within the first year. For other stations faced with these similar circumstances, this approach seems worthy of serious consideration. ■

➡ *For more information on fiber-optic transmission equipment, circle (316) on Reply Card.*

NRG

970 Power-MAX

The 970 Power-MAX is designed for power-hungry professionals who have high-current draw situations and long run times.

- Highest capacity quick-charge capable 12 Volt 14-AMP sintered nicad power pack (removable).
- Rugged high-grade, black leather belt case; chassis assembly with dual 3-pin XLR inputs for pack interchange without shutdown.
- 2,500-cycle cell life provides lowest cost per cycle.
- Microprocessor-controlled 5-step multi-colored power indicator display.
- Belt with cellpack weighs a comfortable 7.5 lbs.
- Charge in little over two hours with the optional 650-III Intelliquick Fast charger.
- Dual outputs allow simultaneous powering of two devices (eg. camera and light). Output configurations include cigarette lighter and 4-pin XLR in any combination.
- Includes Power-MAX belt and power chassis, 14-amp cell pack in 12V or 13.2 volt configuration, model 600 overnight charger, comprehensive owner's manual. Fits waist size 29"-44".

VARI-LITE PRO

Professional DC On-Camera Light

Thanks to on-board control IC's using NRG's Light-Gate technology, light intensity can be infinitely adjusted by the user within a range of 10% to 100% of the lamp's rated power. You can instantly adjust light output to exactly meet changing light requirements, all without changing hot bulbs or fussing with power rabbit diffusion filters. Best of all, the Vari-Light Pro virtually eliminates color shift and dramatically conserves precious battery power by using only the power required for the selected light level. Accomodates bulbs from 20W to 100W DC.

- Prismatic Pyrex dispersion grid provides smooth even light ouput and reduced glare without changing light intensity.
- Sturdy all-metal click tilt mounting bracket with unique ratchet action. Eliminates shake during action shooting.
- Front retainer assembly pops off for instant bulb access without the bother of screws.
- Rugged milled aluminum light head disperses heat and provides years of service under adverse conditions.

Power Station Series

Designed to replace expensive original-manufacture AC power supplies, the affordable Power Stations deliver precisely-regulated 12-volt DC power from AC sources worldwide. High-current capability allows for powering not only large camcorders, dockables, decks, and cameras, but lights, monitors, and other high draw 12-volt equipment as well.
The stations provide up to 9 amps of precisely regulated DC power eliminating the need for battery power in stationary applications where an AC source is available. The Power Stations exceeds all original manufacturer performance specifications.

- Available in different configurations: The 12560 features a single cigarette or 4-pin output and up to 5 amps of output current. The 129100 features dual outputs in any combination of cigarette or 4-pin and 9 amps of output current capability.

Features:

- High-current output
- Worldwide voltage selection
- Rugged steel case
- 4-pin or cigarette lighter outputs
- Lighted power switch

Power Station-2 Series

Just plug the PowerStation-2 into any AC outlet in the world and out comes perfectly regulated 12-volt DC power through four 4-pin XLR connectors and one cigarette lighter connector. It uses an advanced pulse-width-modulated power supply which allows for ultra-light weight and small size. It operates with little heat even at full output. The PowerStation-2 is the ultimate multiple-output professional power source for cameras, decks, lights, monitors, and a host of other video accessories.

- 85-264 volts worldwide auto-adjusting input (just plug in).
- Supply is fully protected from overcurrent.
- Ultra-light weight - under 3 lb.
- Outstanding 300,000 hour mean time between failure is far in excess of any other manufacturer.
- Ultra-efficient PWM regulation generates far less heat than linear type supplies.
- Provides the ultimate in performance and reliability in a universally compatible and compact package.

Panasonic

NEW! Broadcast & Television Systems

AG-DP800 SUPERCAM

S-VHS FIT 3-CCD Digital Signal Processing Camcorder

- Three high-density 380,000 pixel CCDs with half-pitch pixel offset to over 700 lines of horizontal resolution, a S/N ratio exceeding 60dB and remarkable sensitivity of f8 at 2000 lux result in simply extraordinary image quality. Additionally the Frame Interline Transfer (FIT) CCDs minimize vertical smear, so you maintain impressive picture quality even in very bright illumination.
- Uses advanced digital signal processing circuitry which provides four valuable benefits.
  1) Consistently reliable up-to-spec performance.
  2) Fine adjustment of a wide range of parameters.
  3) Memory storage and instant recall of specific settings.
  4) More flexible and higher quality image processing, as well as easier maintenance.
- Some of the DSP circuits and their functions:
  - CHROMA DETAIL - This function compensates for poor resolution in the high chroma areas of the picture.
  - DARK DETAIL - Determines optimum degree of contour enhancement in dark areas to deliver crisp, natural-looking images
  - HIGHLIGHT COMPRESSION - Expands the dynamic range of the highlighted areas and prevents halation. The highlight compression circuit allows a wide dynamic range producing detailed images even against bright backlight or daylight.
  - FLARE CORRECTION CIRCUIT - Compensates for unsteady black caused by light or by a subject's movements.
- Six Scene File modes. There are two user modes for custom digital parameter settings including Horizontal Detail, Vertical Detail, Chroma and Dark Detail, and Color Correction. The four preset modes are normal, fluorescent, special and sparkling.
- In addition to regular AGC (Automatic Gain Control), Supercam has a Super High Gain mode. At F1.4 this enables shooting under illumination as low as 2 lux while retaining detail and color balance.
- Synchro Scan function allows flicker-free shooting of computer monitors. Electronic shutter increments can be set variably from 1/61 seconds to 1/253 of a second.
- Built-in internal time code generator lets you record with SMPTE LTC/VITC (Longitudinal/Vertical Internal) time code
- 26-pin connector for direct signal output from camera section for easy backups using 2nd VCR equipped with 26-pin connector.
- Two hi-fi stereo audio channels with a dynamic range of 80 dB, as well as two linear audio channels with Dolby NR. Normal/Hi-Fi recording is selectable and the levels of all four channels with Dolby NR. Normal/Hi-Fi recording is selectable and the levels of all four channels are controllable. Uses XLR connectors to further ensure high-quality sound.
- Phantom power can be supplied to an optional microphone. Power can be switched off to prevent battery drain when not in use.

WJ-MX50 Digital A/V Mixer

- Four input switcher and any two sources can be routed to the program busses
- Two-channel digital frame synchronization permits special effects in each of the A/B busses.
- Combination of 7 basic patterns and other effects creates 287 wipe patterns.
- External edit control input for RS-232 or RS-422 serial controls. Also has GPI input.
- Wipe boundary effects: soft/border (bold, 8 back colors available)
- Digital effects including strobe, still, mosaic, negative/positive, paint, monochrome, strobe, trail, and AV synchro
- Real-Time compression - the entire source image is compressed inside a wipe pattern
- "Scene Grabber" makes it possible to move a pattern, upholding the initially trimmed-in picture integrity.
- Non Additive Mix (NAM): selects between A and B sources, passing only the signal with the highest luminance value.
- Fade-in and fade-out video, audio, titles individually or synchronously faded.
- Down stream keyer with selectable sources from character generator or external camera.
- Incorporates 8 separate memories that enable virtually instant recall of frequently used effects.
- 8 preset effects include: Mosaic Mix, Position Stream, Corkscrew, Bounce, Flip, Shutter, Vibrate, and Satellite.
- Audio mixing capability of 5 sources with 5 audio level adjustments.

NEW! AG-DS840/AG-DS850

S-VHS Slow-Motion Editing System

Editing machines truly designed for professionals

The AG-DS840 player and AG-DS850 Editing VCR are state-of-the-art S-VHS editing machines that provide the quality required for professional video production and even broadcast systems. Equipped with Panasonic's advanced digital technology they offer features such as Digital VHS Circuitry, Digital 3-D Time Base Correctors, Digital Slow Motion, and Digital Noise Reduction. They also have built-in Time Code Generator/Readers for frame accurate editing, and component video output for connection to MII and Betacam machines.

AG-DS840 & AG-DS850 Features:

- They provide clear, noise-free, high quality slow playback. Playback speed, including Digital Still is selectable in 10 steps (-1/4, -1/8, -1/16, -1/25, 0, -1/25, +1/16, +1/8, +1/4, +1/2).
- Built-in enhanced performance, 3-dimensional digital TBC with a correction range of one field. With the VCRs continuously retaining one field in memory, the data is used for 3-D type processing thereby providing excellent dropout compensation.
- Digital Signal Processing for improved picture quality, and for maintaining uniform picture quality during editing. A Chrome Aperture Compensation (CAC) circuit eliminates color blurring and expands chroma bandwidth. Other digital processing circuits include:
  - Digital Noise Reduction (DNR): Processes Y and C signals separately to boost S/N Ratio by minimizing noise during playback.
  - Digital Comb Filter: Uses an advanced 3-dimensional system for complete Y/C separation. The result is reduced color and luminance blurring.
  - Switching Noise Mask Circuit: Effectively eliminates noise caused by head switching during slow motion playback.
- Employs amorphous video heads that have a higher magnetic coercivity than conventional ferrite heads. Expanded color signal frequency response from the amorphous heads enhances picture quality by minimizing color blurring.
- They have built-in LTC/VITC (Longitudinal/Vertical Interval) time code reader/generators for absolute frame accurate editing.
- Equipped with component outputs allowing easy connection to other component video equipment. This allows high quality transfer of S-VHS source material to Betacam or MII.
- Equipped with RS-422 (9-Pin) serial interface. The standard control system for professional broadcast machines.
- IQ (Intelligent Quest) mechanism delivers precise, high-speed operation, plus the reliability needed. The dual-loading system achieves high-speed response while protecting tapes and heads from damage. The tape transport mechanism uses five direct drive motors, including two reel drive motors. Automatic head cleaning is also provided.
- Capstan Control System with large capstan spindle allows high-speed search at 32x normal speed.
- Four channel audio including two hi-fi stereo channels with a dynamic range of 90dB as well as two linear channels with Dolby NR. Each audio channel has its own input (AG-DS850 only) and output with individual channel-level setting capability. All audio channels use XLR connectors.
- Provides 16:9 wide aspect compatibility, so they are fully equipped for the next generation of televisions.
- 3 rack units high, they are unbelievably compact for easy space saving installation. 19" rack-mountable with optional AG-M730.

LEADER

Model 5850C

Vectorscope

An ideal companion for the 5860C Waveform Monitor, the 5850C adds simultaneous side-by-side waveform and vector monitoring. Featured is an electronically-generated vector scale that precludes the need for fussy centering adjustments and eases phase adjustments from relatively long viewing distances. Provision is made for selecting the phase reference from either (A or B) inputs or a separate external timing reference.

Model 5860C

Waveform Monitor

A two-input waveform monitor, the 5860C features 1H, 1V, 2H, 2V, 1 µs/div and 2V MAG time bases as well as vertical amplifier response choices of flat, IRE (low pass), chroma and DIF-STEP. The latter facilitates easy checks of luminance linearity using the staircase signal. A PIX MON output jack feeds observed (A or B) signals to a picture monitor, and the unit accepts an external sync reference. Built-in calibrator and on-off control of the DC restorer is also provided.

Model 5864A

Waveform Monitor

A fully portable waveform monitor for field use, the Model 5864A is a two-channel unit that provides 2H and 2V sweeps with MAG, FLAT and IRE response, and normal and X4 gain.

Model 5854

Vectorscope

2-channel portable vectorscope is ideal for field use and features A and B phase reference, fixed and variable gain. Both units shown with optional battery holder and NP-1 type battery.

MAGNI

MM-400

- The MM-400 is a combination waveform and vector monitor especially configured for the cost-conscious producer. A low-cost alternative to CRT-based waveform monitoring the MM-400 produces a video picture of the input signal's waveform and displays it on any video monitor. It provides a simple, affordable and accurate way to set camera levels before a shoot, or to check time base correctors and color fidelity in editing. Problems like hue shift, smearing, muddy contrast and loss of detail are easily identified for correction.

FEATURES:

- Converts waveform or vector display information into a standard video signal which can be displayed on a video monitor or routed around a video facility, no need for additional expensive monitors. Switch between pictures and waveforms at the push of a button.
- Incorporates an advanced SC/H phase and color frame indicator that is a must for editing and post production. At a glance it tells you if a signal's subcarrier-to- horizontal phase is properly adjusted and if the signal's color frame matches the house black burst connected to the MM-400 external reference input.
- Works anywhere and with any analog video format—NTSC, PAL, Component or S-Video. It has automatic detection between NTSC and PAL formats.
- Three loop-through inputs can accept three composite signals or one component, or RGB signal
- No complex displays or special test signals are required for component video monitoring
- Interchannel timing and amplitude display make component analog monitoring easy, has color bar limit markings for Betacam, M-II and SMPTE formats.
- Waveform and vectorscope controls, including channel, sweep speed, position control, phase rotation are on easy-to-see dedicated pushbuttons.
- Besides instant toggling between picture and waveform, a mix mode combines waveform and picture displays for simultaneous viewing.
- The MM-400 can be readily used by even novice operators. It has easy-to- understand set-up menus for display color, Interchannel timing, SC/H phase alarm.
- Usable in any video facility of any size for displaying signals, its low cost makes it affordable by the smallest studio, while its features and performance make it ideal for monitoring in high-end facilities as well.

Continued from page 107

dioid, omni and figure-8 polar patterns.

A new line of hand-held dynamic microphones was presented at the Sony booth. The F-710, F-740 and F-780 mics offer low handling noise, high sensitivity and even response throughout the frequency range.

Electro-Voice introduced a neodymium version of the 635A. The new mic is the 635N/D, featuring the versatility and ruggedness of the old standby, but adding higher sensitivity, improved frequency and off-axis response, and 6dB higher output.

REPLY CARD 372

Audio accessories

Gentner introduced a new line of digital telephone interfaces. The G2500 provides its own internal mix-minus from the console program feed. The G3200 includes an acoustic echo canceler that will eliminate "studio echo" on callers. Gentner also premiered its Direct Connect Technology (DCT), which allows the G2700DCT super-hybrid to be connected directly to any digital or analog PBX via its insertion between a phone instrument and its handset. It also includes a built-in speaker. The Gentner TS612 multiline telephone system (see "1994 NAB Pick Hits," p. 24) is a flexible controller using two superhybrids, available in 6- or 12-line versions.

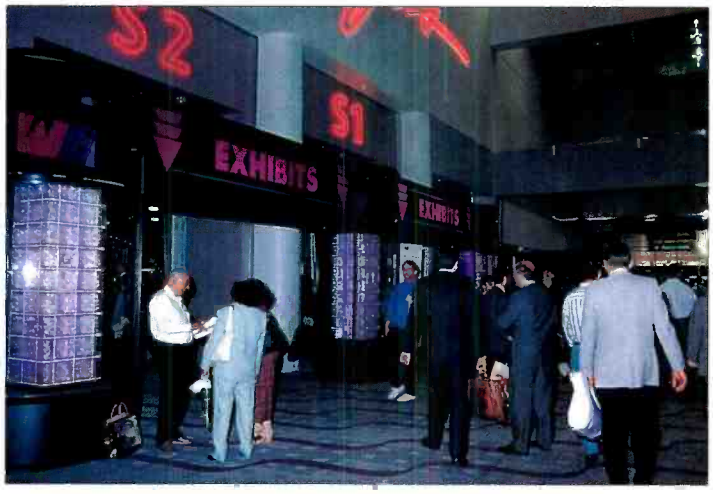
Logitek showed a new series of LED level meters. The Super-VU meter simultaneously displays VU and peak levels on the same bar graph. The meter+image and mono sum display model shows mono-sum and stereo image width at a glance.

Opamp Labs presented the custom-configurable Press Feed Systems, which eliminate the jungle of microphones and cables at a news conference via pool-feeding of audio and/or video to all media at the event.

Rane unveiled the AVA 22 audio/video alignment digital delay, designed for synchronizing audio to video. Two independent channels are provided using low-noise, low-distortion Dolby Timelink delay circuitry. A simple user interface and high cost-effectiveness are featured in the 1 RU device.

Switchcraft presented several new products, including a corrosion-resistant, nickel-plated version of the Bantam (tiny-telephone) patch plugs. Other new products included a space-saving dual stereo mini-phone jack designed for circuit-board surface mounting and twist-lock versions of the DC power plugs commonly found on low-voltage "wall-wart" and other power supplies (along with new mating DC-input jacks).

Sescom presented Box-It, a package of project-box components that can be used to construct professional-looking home-brew projects. Extruded side panels accept up to four modular power supplies per side rail. Front and rear panels come with holes punched and pre-labeled for on-off switch, pilot light, fuse and AC cord.



Radio Design Labs showed new products for the Stick-on series: The ST-RG1 ramp generator is an adjustable output device (0 to 10VDC) for remote control of VCA devices. The RLC1 remote level control is a control surface/display for the ST-RG1. The ST-SX4 is a 4x1 unbalanced audio switcher. The ST-OSC2A and ST-OSC2B are oscillators, each with two separately adjustable, balanced sine-wave outputs (1kHz/10kHz and 100Hz/400Hz respectively).

Benchmark Media Systems displayed several accessories that will make installation and maintenance of the revered audio circuits easier and more efficient: the EX-370 extender board, LC-316 lab card, SIB-70 rear-interconnect module, BP-100 build-out panel and wiring options.

REPLY CARD 373

Sampling-rate converters

Logitek introduced the Mini RateGate, a digital audio sampling-rate converter that is small and especially appropriate for portable applications.

NVision displayed its NV1050, which provides four channels of conversion. This rack-mounted unit is well-suited for fixed studio installations.

Pro-Bel showed the compact 5023 converter/synchronizer, designed for converting asynchronous 44.1kHz samples (such as consumer CD-player outputs) to synchronized 48kHz signals.

REPLY CARD 374

Codecs and terminal equipment

Telos showed the finished production version of Zephyr, a high-quality ISDN codec/interface that can provide bidirectional dual mono or stereo for radio remotes (or high-quality IFB) in a single box using ISO/MPEG Layer III coding.

Audio Processing Technology (APT) displayed its APT-X100ED digital audio coding IC and associated products. The system provides 4-band ADPCM rate-reduction.

Comrex presented its 7.5kHz digital audio codecs using G.722 coding included the DXP portable and DXR rack-mount.

Corporate Computer Systems (CCS) showed its well-known CDQ-2000 MUSICAM codecs and its more recent CDQ-1000 system. The latter offers G.722 and MUSICAM, including a half-sampling rate option that provides 10kHz audio in a 56 or 64kb/s circuit.

Using its AC-3 perceptual digital audio coding, Dolby displayed its DP521 and DP522 digital encoders and decoders for the U.S. HDTV market.

At the Intraplex booth, conventioneers could listen to three different digital audio coding algorithms within a single product — linear uncompressed (16-bit PCM) audio, J.41 (14:11 PCM) coding and APT-x100 (4-subband ADPCM) coding. The STL Plus, Intraplex's new low-cost STL, uses a T1 path.

REPLY CARD 375

System integration

For one-stop shoppers, Harris-Allied went completely digital at this year's NAB. The company assembled an all-digital radio station in the Harris-Allied booth, from CD player to exciter. The chain kept the audio in the digital domain (via AES/EBU) once it had been converted. The only analog devices were microphones, mic preamps and the FM transmitter. ■

REPLY CARD 376

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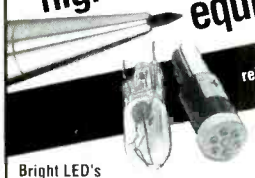

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Send letter with salary history, résumé, and three current references (names, addresses, telephone number) to: Dr. C. Daniel Miller, Executive Director; NASA Classroom of the Future Program; Wheeling Jesuit College; 220 Washington Avenue; Wheeling, WV 26003.

Position may begin as soon as July 1, 1994.

AA/EOE

MAINTENANCE ENGINEER: Top 50 Northeast Affiliate seeking a broadcast maintenance engineer. Experience should include Sony 1" VTR's, Sony 1/2" Beta equipment, Grass Valley production switchers and routing systems. Two (2) years previous broadcast experience preferred. Comprehensive benefits package offered. EOE. Send Resumes to Skeeter Lansing, WTEN-TV, 341 Northern Blvd., Albany, NY 12204.

CHIEF OPERATION ENGINEER: for 2 suburban a.m. radio stations located in northern New Jersey and Long Island, New York. Individual must have proven record and be dependable. Send resume and letter to: WVNJ, 1086 Teaneck Road - Suite 4F, Teaneck, NJ 07666 or Fax (201) 837-9664.

CHIEF ENGINEER for high speed video duplication facility in Indianapolis. Must be experienced in maintenance of D2, 1", Betacam SP, and Sony 5000 and 800 sprinters. Must be able to troubleshoot to component level. FCC General and SBE Certified a plus. Salary commensurate with experience. Please mail or fax resumes to: Jim Weinberg, Magnetech Corp., 3941 SW 47 Avenue, Fort Lauderdale, Florida 33314, Fax #305-791-6788.

BROADCAST MAINTENANCE ENGINEER: Bring your expertise to a state of the art facility in sunny and warm Central California. KSEE 24 (NBC), is seeking a self-motivated Television Broadcast Maintenance Technician. A minimum of 2 years maintenance experience troubleshooting 1" and Beta and equipment related to an aggressive news operation is required. UHF transmitter experience, computer knowledge and SBE certification desirable. FCC license required. Minorities and women are encouraged to apply. Send resume to: Personnel, KSEE-TV, P O Box 24000, Fresno, CA 93779 or FAX 209-454-2485. EOE M/F ADA.

GENERAL MANAGER: TECHNICAL OPERATIONS - Minimum 10+ years of extensive broadcast engineering experience at network or equivalent level in studio and ENG news production. Strong technical credentials to oversee engineering manpower at in-house facility and remote sites in Washington coverage area. Need solid managerial and organizational skills. Experience in planning and personnel supervision required. Please send resumes with salary requirements to: ABC News, Attn: Personnel Dept., 1717 DeSales Street, NW, Washington, DC 20036.

POST PRODUCTION ENGINEER. Hands-on experience with Switchers, VTR's, Graphics, Editors, and Audio. Must be capable of troubleshooting to component level. Send resume to: Director of Engineering, P.O. Box 95311, Atlanta, GA 30347.

NORTHEAST UHF TV STATION seeks "hands on" Assistant Chief Engineer for transmitter supervision. Must be experienced in UHF transmitters maintenance. RCA TTU-110 transmitter experience a plus. Repair and maintenance experience of studio equipment and computer knowledge will also be required. Please send resume to: Chief Engineer, WHSH-TV, 71 Parmenter Road, Hudson, MA 01749 or FAX (508) 562-1166. No Phone Calls. EOE.

WEST COAST RF manufacturer seeks to fill one Sales Engineering position and two International Sales positions. Bi-lingual a plus. Reply to: Broadcast Engineering, P.O. Box 12901, Dept 742, Overland Park, KS 66282-2901.

TELEVISION SR. PRODUCTION TECHNICIAN: WYNC Public TV currently seeks a Senior Production Technician. Resp. incl. Floor Managing, setting up lighting, audio, field camera, editing, studio staging, technical directing functions, & other elements of the studio, location, & post production operations. Reqs. incl. a BA Degree in Communications or satisfactory equiv., & 2 yrs. recent operational exp. in TV production. Previous post-production editing exp. & the ability to supervise is also req'd. Applicants must have a driver's license valid for operation in NY. Salary: $29,624 + benefits incl. 3 wks. vac. If interested, please send a resume to WNYC, H.R. Dept. 16-P, 1 Centre St., 26th Flr., NY, NY 10007, EOE M/F/H/V.

CHIEF ENGINEER, WIRELESS/CATV: Wireless company has an excellent opportunity for an experienced, broadcast, headend and plant engineer in sunny South America. We are seeking a hands on management style to supervise a small staff. Spanish/English communication skills a must. Excellent salary plus benefits. Send resume with salary history to: Direct Cablevision, Attn: Mr. Vallecilla, 48 Woodland Ave., Rockaway, N.J. 07866.

TELEVISION ENGINEER - Applicant must be familiar with studio and transmitter equipment. Strong background in electronic theory is required, as well as hands on experience. Send resume and salary requirements to: EEOC Officer, KBMT-TV, P.O. Box 1550, Beaumont, TX 77704.

ENG/STUDIO MAINTENANCE ENGINEER: Must have formal electronics training with ability to troubleshoot to component level. Knowledge of video, audio and RF systems required. Prefer experience with Betacam studio/ENG equipment and microwave systems. SBE certification a plus. Qualified applicants send resume to: Personnel, KTUL Television, Inc., P.O. Bos 8, Tulsa, OK 74101. EEO/MF.

ENGINEER: High end graphic/commercial post facility in L.A. with Quantel suites seeking engineer to comprehensively maintain D1 to 3/4" machines and systems. Unix experience desirable, will train. Must have at least 4 years experience in post to apply. Fax resume to: Sandra Beladino, (213) 462-3505.

MAINTENANCE ENGINEER needed immediately. Position entails all facets of TV Studio maintenance and repairs and assistance in transmitter maintenance. Minimum two years of TV broadcast experience including computer/digital service and operation preferred. Electronic technician degree or equivalent required. Send resume to: Maintenance Engineer, KXLN-TV 45, 9440 Kirby Drive, Houston, TX 77054. EOE.

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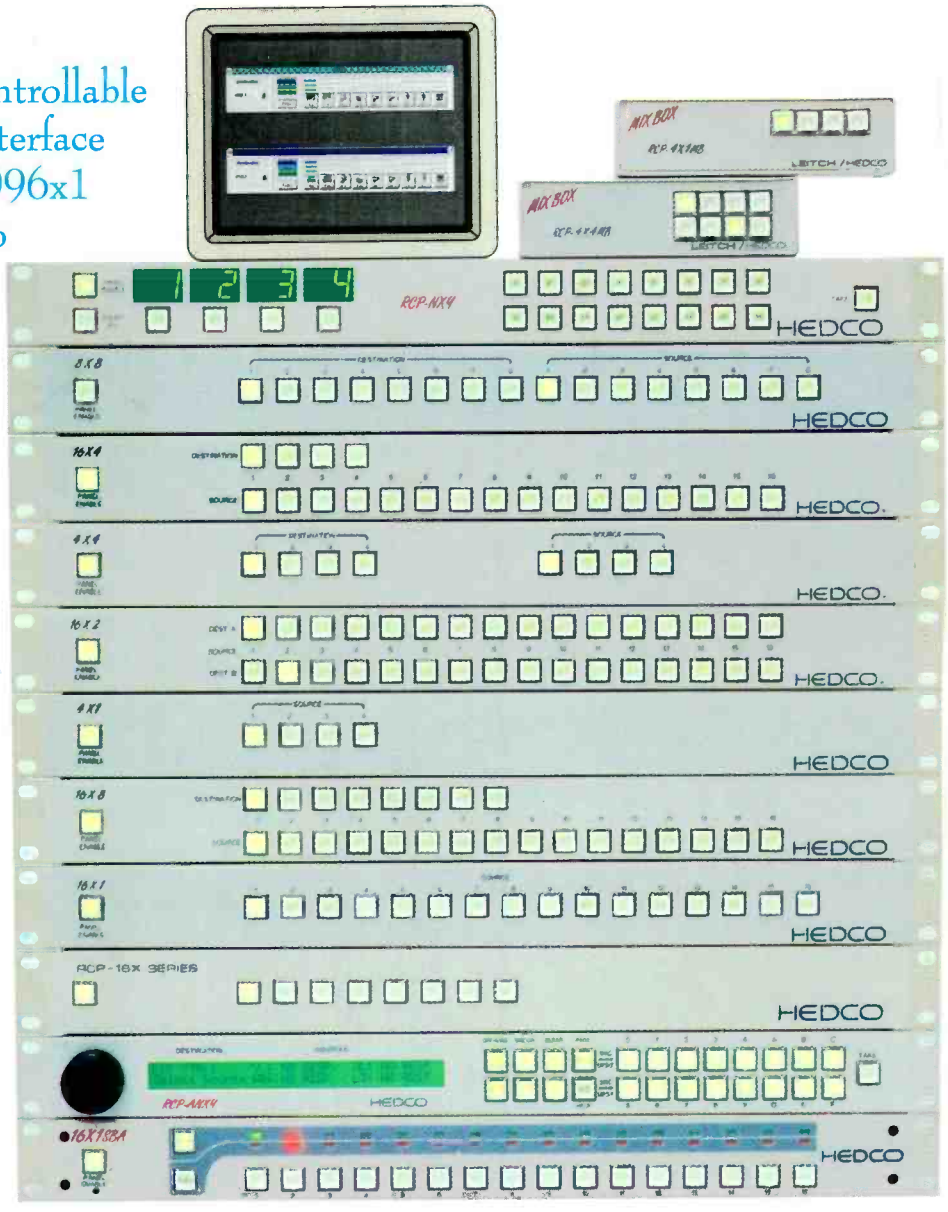

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