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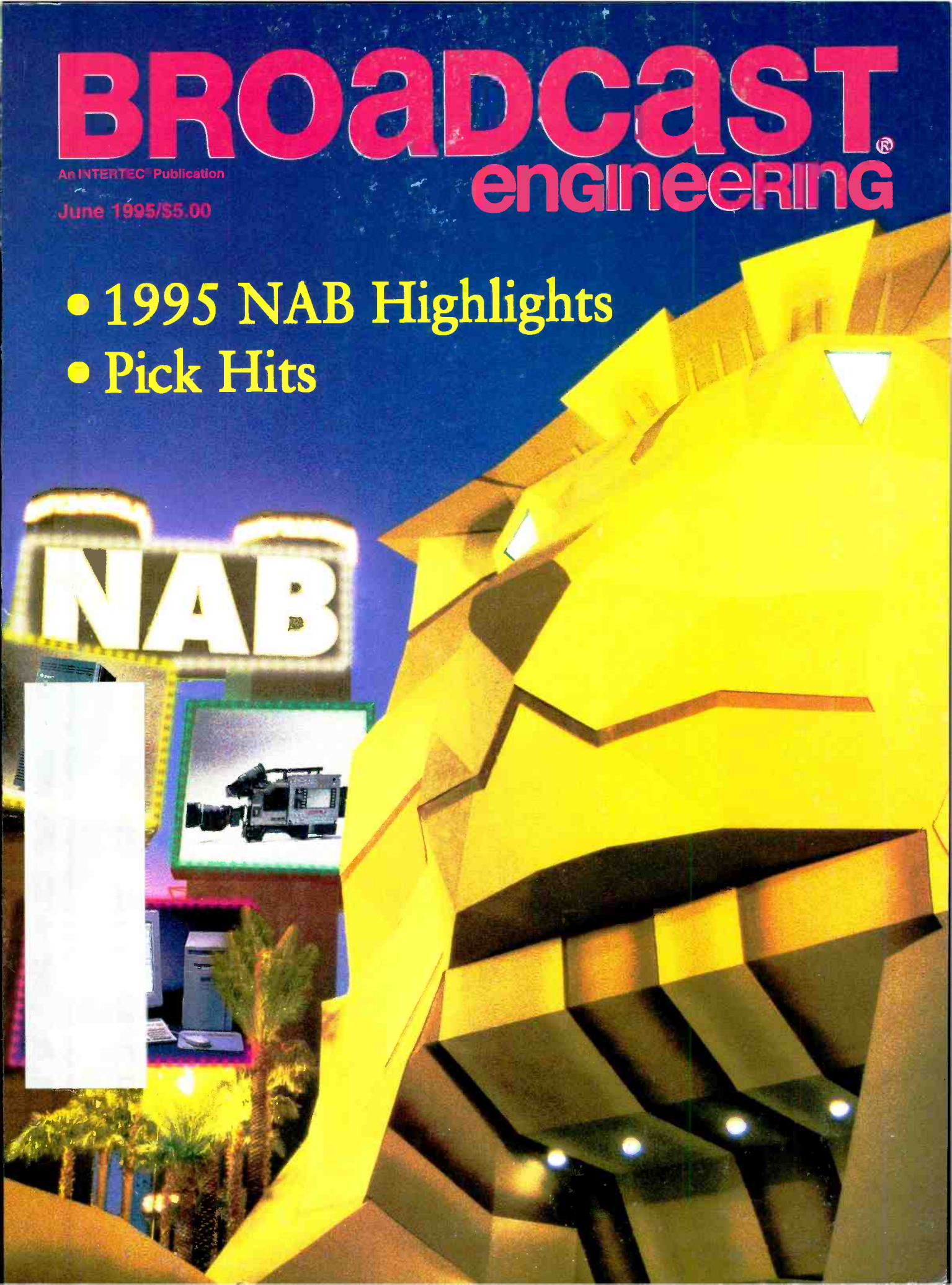
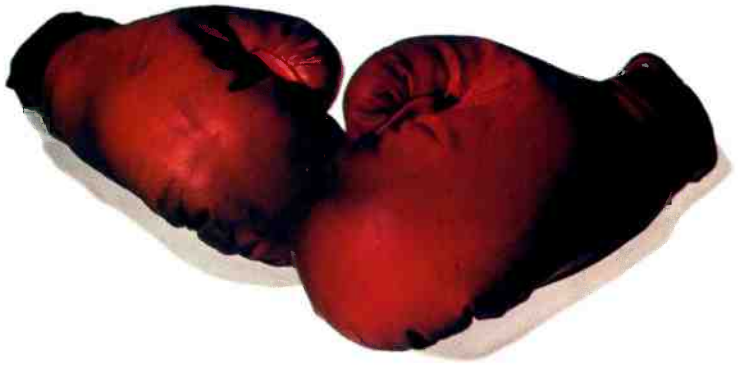
- 1995 NAB Highlights
- Pick Hits





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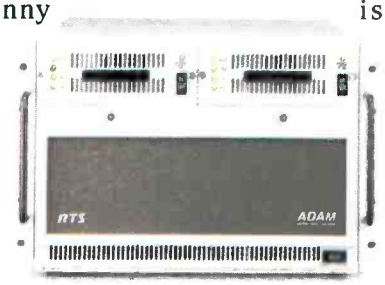

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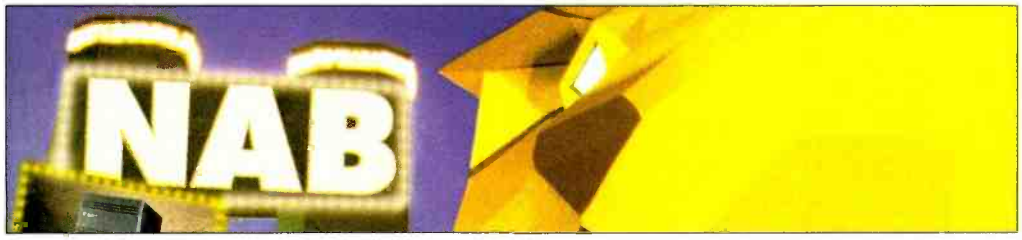
THIS MONTH...

DEPARTMENTS:

26

COLUMNS:



ON THE COVER:
Cover design by Stephanie Masterson. Night photo by Douglas Schwartz. Highlighted Products from the 1995 NAB Convention shown include the Avid/Ikegami CamCutter, SCI Challenge and Grass Valley's Video Desktop Personal Production Suite.

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HARRIS ALLIED

By Dawn Hightower, senior associate editor

NAB names developer for set-top TV antennas

NAB has named MegaWave Corporation, Boylston, MA, as the developer for NAB's improved set-top antenna project. This industry project represents the first major improvements for set-top TV antennas in 30 years.

NAB initiated this project because more than 50% of all TV sets in the United States depend on set-top antennas to receive TV programming. Therefore, there is a large installed base of TV sets that rely on over-the-air reception through some type of antenna.

Development of a new TV set antenna is a technology spin-off from work performed by MegaWave for the Advanced Research Projects Agency (ARPA) of the Department of Defense, under the Small Business Innovation Research (SBIR) program. ARPA funding supported the original research work of the NAB antenna project.

Using this technology, NAB and MegaWave hope to develop a passive, small, TV set-top antenna. The technology will provide a carefully controlled current distribution over the antenna. The benefits will be a low VSWR over a wide bandwidth along with a controlled radiation pattern.

The development work will be in two phases. In phase one, MegaWave will model and evaluate a number of candidate antenna configurations using computer analysis. In phase two, when a suitable configuration has been identified, MegaWave will construct and test a prototype antenna.

Once the final prototype is completed, MegaWave and NAB will work to bring the antenna to the consumer market. NAB expects the prototype to be completed by this summer.

SBE takes steps to guide EAS implementation

The SBE has announced the formation of the SBE Emergency Alert System (EAS) Committee. Leonard J. Charles of Madison, WI, is the chairman. This committee will act as a leader in the evolution from the Emergency Broadcast System (EBS) to EAS.

The mission of the committee is to educate, and its primary concerns are technical. The SBE will help guide the implementation of the system in a cost-effective manner with a realistic timetable. The society will act as an important resource to its members and the industry. It will also act as a resource to the FCC on behalf of broadcasters, in areas of EAS technical concerns.

HD Digital VCR Conference agrees on specs

The HD Digital VCR Conference has endorsed the recommendations of its Advanced Television (ATV) Working Group for a new digital HDTV standard for consumer VCRs. The conference represents more than 50 participants in the worldwide VCR industry.

The ATV Working Group began developing the recording and special-feature specifications last year to enable digital HDTV VCRs to record and play back the transmission signals of the Grand Alliance digital HDTV system, which is now under final test.

The HD Digital VCR Conference was established in September of 1993 in order to determine technical specs for consumer-use high-definition digital VCRs. The conference is open to industry participation. Fifty-five companies from around the world have taken part in five working groups, each responsible for a particular aspect of the specifications. The five working groups are: 1) SD Compatibility Working Group; 2) HD Baseband Working Group; 3) ATV Working Group; 4) Editorial Working Group; and 5) European DVB Working Group.

The technical documentation of the Grand Alliance System was completed this past February by the Advanced Television Standards Committee (ATSC) under the guidance of the FCC's Advisory Committee on Advanced Television Systems (ACATS).

Last April, the HD Digital VCR Conference announced agreement on specs for baseband recording of conventional standard definition and high-definition TV signals following standards recommendations from appropriate working groups of the conference. The SD specs govern recording of conventional analog TV baseband signals now transmitted as 525/60 and 625/50 systems and the HD specs recording of HDTV signals, such as the decoded MUSE signal being broadcast in Japan.

Netvideo helps businesses tap into Internet

Netvideo, a central resource for business use of video over the Internet, has launched its video storage and compression services over the Internet. It's located at http://www.netvideo.com and is now available.

As a video service provider (VSP) for the Internet community, netvideo allows businesses to capitalize on the multimedia potential of the World Wide Web. Netvideo uses a dedicated video server to assume the burden large video files can place on Web sites. The company eases the strain of multiple downloads and allows central corporate servers to continue distributing information quickly. Netvideo also provides efficient transmission of files through a high bandwidth connection to the Net and is able to monitor and control video file download through its own proprietary tracking and access software.

With the constraints of the Internet, netvideo is educating customers on the best use of video over the Net. Netvideo also supports the Motion Picture Experts Group (MPEG) standard for video compression.

Mark your calendars for the 1995 Broadcasters Clinic

Make plans now to attend the 41st annual Broadcasters Clinic and Midwest SBE Conference. It will be held Nov. 14-16 at the Holiday Inn S.E. in Madison, WI. On Tuesday, Nov. 14, there will be radio presentations, equipment exhibits and an engineering forum. On Wednesday, Nov. 15, there also will be radio and TV presentations and equipment exhibits. Thursday, Nov. 16, also will feature additional TV presentations. ■

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Bureaucrats never seem to learn

Bureacrats never seem to learn. Despite the ground swell of voter calls for change in the business-as-usual attitude in Washington, some bureaucrats apparently don't yet feel the need to change their ways.

At last month's NCTA Convention, Federal Communications Commission Chairman, Reed Hundt, urged cable, broadcast, telephone and other companies to cooperate in the development of new receiver technology. He noted that it would be in everyone's best interest for the parties to solve compatibility issues. However, he warned that if the industry doesn't work together, then his commission is willing to take the necessary steps. He said, "We don't need economists to tell us that if consumers believe the digital conversion is overpriced, the private and public sectors will feel the heat." Tough talk from the nation's top communications cop.

However, when questioned about recent efforts to make the FCC more efficient, he admitted that the commission "needs to be trimmed down and beefed up." He went on to say that the trimming down was already taking place with the computerization of the commission. Maybe so, but I haven't seen any evidence of it. So where's the beef(ing) up going to take place? What we need, Hundt continued, is to hire more *economists* and *statisticians*.

Please allow me to borrow a line from our President, "No, no, no, no, no, no, no." The FCC does not need more bureaucratic statisticians or economists. What it needs are more engineers and technical experts who understand the industries the FCC is supposed to regulate!

On the surface, we hear harsh warnings about looking out for the consumers and that his commission "is willing to take the necessary steps" to bully the broadcast, telco and cable industries into submission. Yet closer examination suggests that he merely wants to bloat the FCC even more with bureaucratic number crunchers and estimators.

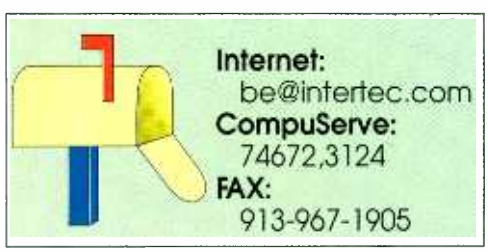
Be honest Mr. Hundt, the FCC is increasingly being perceived as a hindrance rather than a promoter of deploying new technology and lower consumer prices through competition. You've made it clear by your hiring and appointing practices that you want technical decisions made by political appointees and lawyers — not qualified engineers. (See *BE's* Editorial, "Qualifications be Damned," September, 1994.)

Chairman, your agency is charged with regulating *technical* industries, not *social* programs. The methodology for accomplishing this should be increased efficiency, not more bureaucracy. I've talked with a number of long-time FCC staff members and to a person, they complain about the political atmosphere within the FCC and lack of attention you're paying to engineering expertise.

In an era when billions of dollars of investments ride on the commission's actions, it's well past time when technical decisions need to be influenced by technical experts. Hiring more statisticians, economists, or God forbid, more lawyers, is certainly not the answer.

Brad Dick

Brad Dick, editor



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Video portion of TV signal to be used for digital data

The FCC is proposing to amend its rules to allow digital data transmission within the video portion of broadcast TV signals. By allowing such transmissions, the existing spectrum could be expanded and enhanced. The FCC already permits data transmission in the non-video portions of a TV signal, i.e., the vertical blanking interval (VBI line 21) for closed-captioning text depiction. Under the proposal, digital data providers would also have access to the video portion of the TV signal.

Digital data can be imbedded in a TV signal using either "overscan" or "subvideo" technology. Overscan inserts data at the top, bottom, right or left edge of the video picture. Subvideo systems insert digital signals throughout the visual picture, but at amplitudes sufficiently low that they are invisible to the viewer. Several versions of each of these systems have been developed. However, the commission wants to resolve the following issues before authorizing use of the video signal for new data services:

•How should the agency define "discernible degradation" of picture quality, especially with respect to subvideo digital data insertions?

•How can the public be protected from signal degradation when a combination of different digital data transmissions are being simultaneously transmitted?

•How can broadcast licensees maintain control over data transmissions accompanying video programming?

•In the latter connection, should the commission consider it sufficient that licensees can reject an entire program, or must broadcasters be able to strip out specific obtainable data?

DATELINE: Aug. 1

On or before Aug. 1, 1995, commercial TV stations in the following states must file their annual ownership reports or ownership report certifications with the FCC: California, Illinois, North Carolina, South Carolina and Wisconsin. On or before July 10, 1995, all stations must place their April-June quarterly problems/programs lists in their public files.

•Should technical standards be established for all digital data transmissions within the video signal, and should one mode of transmission (overscan or subvideo) be preferred?

•Should the commission, before rules are adopted, consider interim authorizations of individual digital data transmission systems?

The FCC said that before any standards are adopted, it will consider the recommendations of the National Data Broadcasting Committee, which is the industry group currently studying these issues.

Emergency Alert System update

Replacement of the Emergency Broadcast System (EBS) with the new Emergency Alert System (EAS) is to be implemented in the following timetable:

•**July 1, 1995:** All stations are required to have modified their existing EBS decoders to handle the shortened, 8-second 2-tone alerting signal. Transmission of the shortened 2-tone signal will be permitted beginning on the same date.

•**July 1, 1996:** All stations are required to have replaced their EBS equipment with EAS equipment.

•**July 1, 1997:** The 2-tone signal may be transmitted only as part of a monthly EAS test or in an actual emergency.

Low-power TV stations must modify their decoders by July 1, 1995, but they are not required to have encoders.

Cable operators will be required to participate in the EAS in accordance with the 1992 Cable Act, but are not required to install EAS equipment until July 1, 1997. ■

Harry C. Martin is an attorney with Reddy, Begley, Martin & McCormick, Washington, DC. Respond via the *BE* FAXback line at 913-967-1905 or via E-mail to be@intertec.com.

Plan proposed to eliminate the FCC

The Progress and Freedom Foundation, a conservative thinktank, has proposed plans to replace the Federal Communications Commission with a smaller Office of Communications. The new Office of Communications would operate out of an executive branch agency.

According to the 88-page report, the regulation by the FCC has repressed competition and innovation. The plan recommends the repeal of laws that stifle competition and the creation of jobs.

Under the plan, many of the FCC's duties would become the responsibilities of the federal courts and state regulators. The main responsibility of the agency replacing the FCC would be the collection of technical information to help federal courts resolve disputes among companies over airwave interference. The federal government would lose its power to determine who receives licenses to use the airwaves. Current FCC license holders would receive permanent "property rights" over their frequency allotments, free of charge, and remaining rights to the airwaves would be auctioned.

The Progress and Freedom Foundation is a non-profit Washington group that was assisted in drafting the plan by the Heritage Foundation, American Enterprise Institute, Citizens for a Sound Economy, the Manhatta Institute and the Hudson Institute. ■

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By Rick Morris

Managing a budget, part 1

Managing a budget can be one of the most critical and challenging tasks that an engineering manager has to perform. And, because performance reviews are partially based on budget results, it behooves the engineering manager to understand the basics of budgeting.

To achieve the station's goals, the budget should represent a reasonable projection of annual expenses. This process begins with a pre-planning stage that will help set up the current budget.

The budget should represent a reasonable projection of annual expenses.

Projecting a budget from the past

When taking over a budget, you need to find out what has been projected in the past. Look over the budget and expenditures from the last three to five years. Scrutinize these records for the following information:

•Check for trends in expenditures. (What to look for in trends is described later.) Look for the direction each budget category was going. Calculate the year-to-year percentage change of each category and save this information.

•Look for significant deviations from budget amounts.

•Look at the budget in terms of changing circumstances. Check for items that have changed or are changing.

•Determine what the past budget was like and then establish your baselines for the present budget.

•Research equipment parts, labor rates and equipment vendors.

What to look for in trends

It is important to track trends in equipment costs, purchases and predicted maintenance costs. You need to look for several things; the first is year-to-year operating changes. Utility company charges are the most common. It will be easier to forecast new budgets if you have past records. For example, you can predict that electricity for the transmitter went up an average of 4% to 5% over the past year.

Budget trends can either be positive or a cause for concern. For example, the budget for plumbicons may show a decrease, which is a sign that you are replacing your cameras with chip models. This budget should be adjusted each year as the station begins to switch to chip cameras. This type of trend is a good trend. However, an upward trend in replacement part costs could also mean that the equipment is breaking down more often and needs to be repaired. It is important to watch these trends.

What to look for in deviations

A deviation is more than a trend; it's an aberration from plan. A deviation is something that exceeds or comes in significantly under budget and is cause for concern.

One example could be that tape costs are 30% less. The savings came from a new tape supplier that gave you better service and quantity discounts. This is a good deviation that you will be able to use as you plan next year's budget. A second example could be that no expenditures for transmitter tubes were made over the last couple of years. This could be a sign that tubes will start failing soon — time to plan on replacing them before you are off the air. Both examples are deviations, but one is good and the other is potentially bad.

Whatever the reason for any significant deviation, you must find an explanation. If you don't, what is only a deviation this year can be a big problem next year. For example, suppose costs for replacement parts are high. You need to find out why. One explanation could be that when the station added the newscasts after switching affiliations this year, the engineering budget was not increased to cover the new expenses. Whatever the reason, you need to find it and use the information to resolve a problem, plan for the future or incorporate it into your next budget.

Changing circumstances

Line items must be considered in light of changing circumstances. For example, camera tubes are becoming obsolete, and tape consumption is going down as stations move to disk-based production. What are your projections for tape? How about projections for increases in other items? Replacement hard disk drives used to be an incidental expense, but will probably move to a major category as stations move toward video servers. Look at every category. What is the amount? What was spent in that category last year? Did it come in close to budget? Or did the line have a significant deviation, which needs explanation?

Establish your baselines

Another goal in the budget pre-planning stage is to establish baselines. It is important to find out how your predecessor left the budget. Carefully track all budget entries during the last year to determine outstanding commitments. You will use these baseline figures for your reports to your boss. Accurately establish what the budget was like so if you have decreased expenses they can be tracked from past records. Also, this will protect you from unauthorized charges if the budget was unattended for a period of time between engineering managers. Look for errors and make corrections so you won't be held accountable for someone else's error.

Research costs

In addition to budget trends, deviations, changes and baselines, it is time to figure out how much the station is paying for each major equipment purchase. It's also important to know what the labor rates in your area are for jobs (in-house and contract) that your department is responsible for. Know who your suppliers are and make sure you are getting the best prices.

A well-planned budget will come close to budget every time. To establish a budget, it's important to learn from past budgets. This pre-planning will help you forecast and make reasonable and accurate projections of upcoming expenses. ■

Next month: Constructing a budget

Rick Morris is an assistant professor of radio/TV/film at Northwestern University. He is a former chief engineer and a former manager of engineering and maintenance for a major TV network. Respond via the *BE* FAXback line at 913-967-1905 or via E-mail to be@intertec.com.

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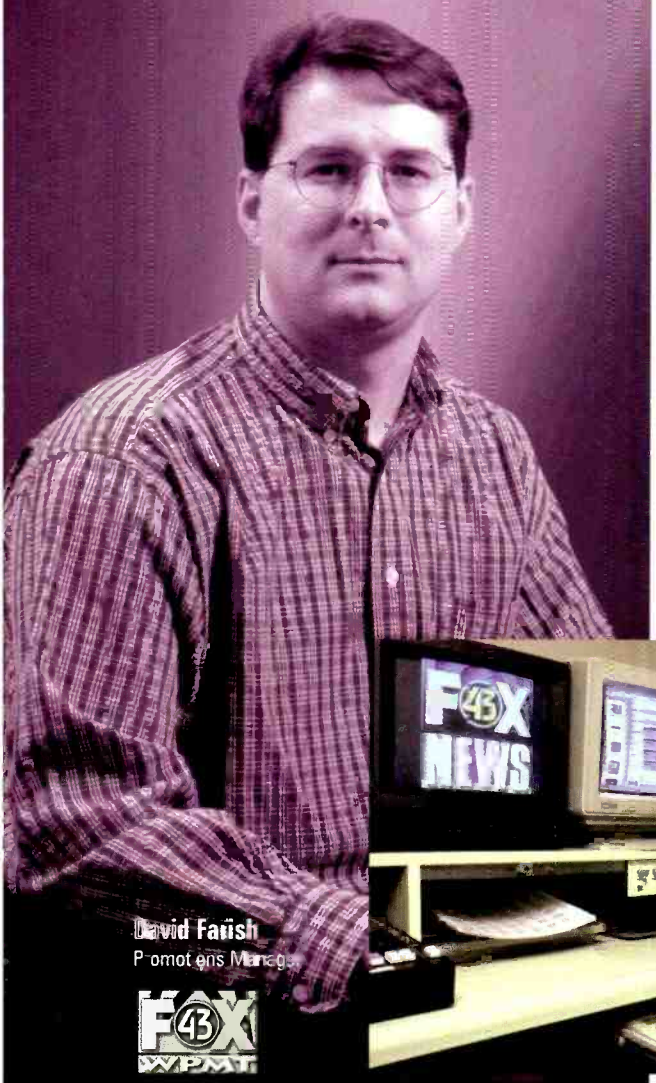

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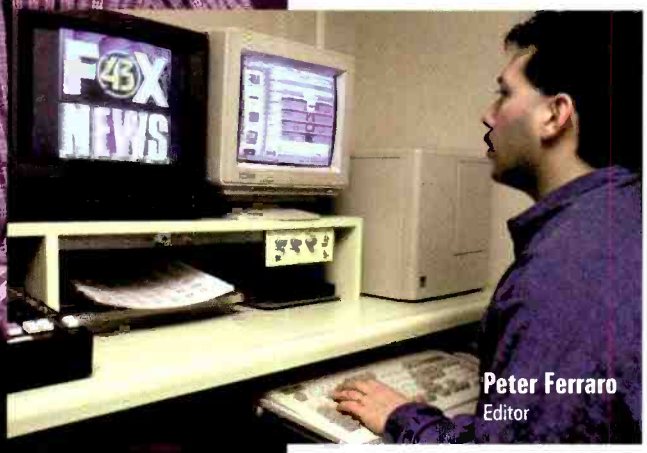

Peter Ferraro
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MATROX STUDIO

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By David Cox

Managing multiformat signals, part 2

Last month's column dealt with the challenges of handling multiple video formats within a facility. This month, we will take a quick look at the audio side of the equation along with other issues that affect routers, including the control systems. In many ways, handling the various audio formats is easier than dealing with video format differences. But as any audio engineer will tell you, quality audio is an art in itself. In today's world, audio signals can be multiformat and must be dealt with as such.

Properly handling format differences is as critical in audio as it is in video. However, with today's software-controlled systems, many of the format conversions can be performed transparently by the routing system, keeping audio quality high and operational headaches to a minimum.

Control systems are available today that can accommodate primary and redundant controllers along with power supplies within a single rack unit.

AES-EBU (Audio Engineering Society - European Broadcasting Union) digital audio is establishing itself as the new digital audio format and consequently often must be routed throughout TV facilities. AES-EBU audio consists of two digital audio channels multiplexed into a single digital datastream. These multiplexed signals could have been originally digital or derived from an analog stereo signal via an analog-to-digital (A/D) converter. If derived from an A/D converter, the converter could have been placed in tie lines between analog and AES-EBU matrices. Conversions done in this manner can provide format conversion transparent to the user.

Signal processing

Generally, digital audio matrices can be broken down into three separate processing areas: input, crosspoint and output blocks. Digital source equipment generally provides balanced digital audio outputs and is connected to the router's input module. Many high-quality input modules provide an isolation transformer, the output of which feeds the equalizer circuit. Router equalizers should be capable of equalizing input cable lengths in excess of 1,500 feet. In some units, the input circuitry will provide an input reclocking circuit, which can be used to provide some signal condition monitoring (bit errors and signal presence). The digital audio signal is then passed to the crosspoint circuitry and then to the output stage. Some routers also include an output isolation transformer.

Some manufacturers provide an output monitor as standard, which allows monitoring of any output of the matrix. Status monitoring can often be accommodated in this module, which can inform the user of bit-rate errors, output amplitude, lock, etc. The display could be in the form of LEDs or even integrated by the system control software to provide the appropriate alarm. Because it is possible to distribute digital audio signals using 75Ω video coax, many manufacturers offer either 75Ω unbalanced or 110Ω balanced matrix input options.

Signal path timing

Digital audio delay lines are essential for preserving the phase relationship between audio and video and can also be included within the system if handled carefully. Loss of lip sync provides easy indication that phase has slipped. The relative timing of audio and video signals varies as video processing equipment is inserted into the signal path. Equipment such as DVEs and color correctors insert delay into the video path which must be compensated for to maintain the original phase relationship between audio and video signals. Fixed or adjustable audio delay can be included, external to the matrix, to account for some if not all of the delay required.

Control issues

Issues beyond matrix size and format concerns fall into the category of control systems. When choosing a routing matrix, consider the following:

•*Redundant controllers*: It is beneficial to have an on-line redundant control system. In the event of the primary controller failure, the redundant controller is automatically switched into service, triggering an alarm to indicate primary controller module failure. The failure may not be immediately obvious because of the automatic changeover. Control systems are available today that can accommodate primary and redundant controllers along with power supplies within a single rack unit.

•*Control panels*: Although many control panel applications may be similar, there will always be user-specific requirements. Therefore, it is useful for manufacturers to offer a wide range of control panel options. In many cases, control panels are programmable and easily re-configurable. It should be possible to define the levels of all inputs and outputs that each panel is to control. Furthermore, when configuring X-Y control panels, it is highly probable that the input and output names would be different (cameras would be router inputs, not outputs, and production switcher inputs would be router outputs, not inputs). Therefore, you should not be limited to one set of names shared between the inputs and outputs.

In today's world, audio signals can be multiformat and must be dealt with as such.

When dealing with multilevel systems, control panel status reporting for breakaway operation can be simplified. The control panel should simultaneously display the output name it is controlling and each individual level assigned to the source. This provides the operator with an instant visual representation of what is selected to that particular output of the matrix. More sophisticated control panels can be configured using a graphical user interface. These could provide soft-key programming and a large LCD display for the operator.

•*Control options*: Other various control options could also be considered. These could range from a distributed video status display, a tally matrix, an RS-422 port matrix, a relay matrix, third-party control, external serial control (RS-232/RS-422), remote operation via single or multiple control panels (via telephone lines) or router automation software or signal output monitoring.

Remember that routing systems are expected to have one of the longest life cycles within a facility.

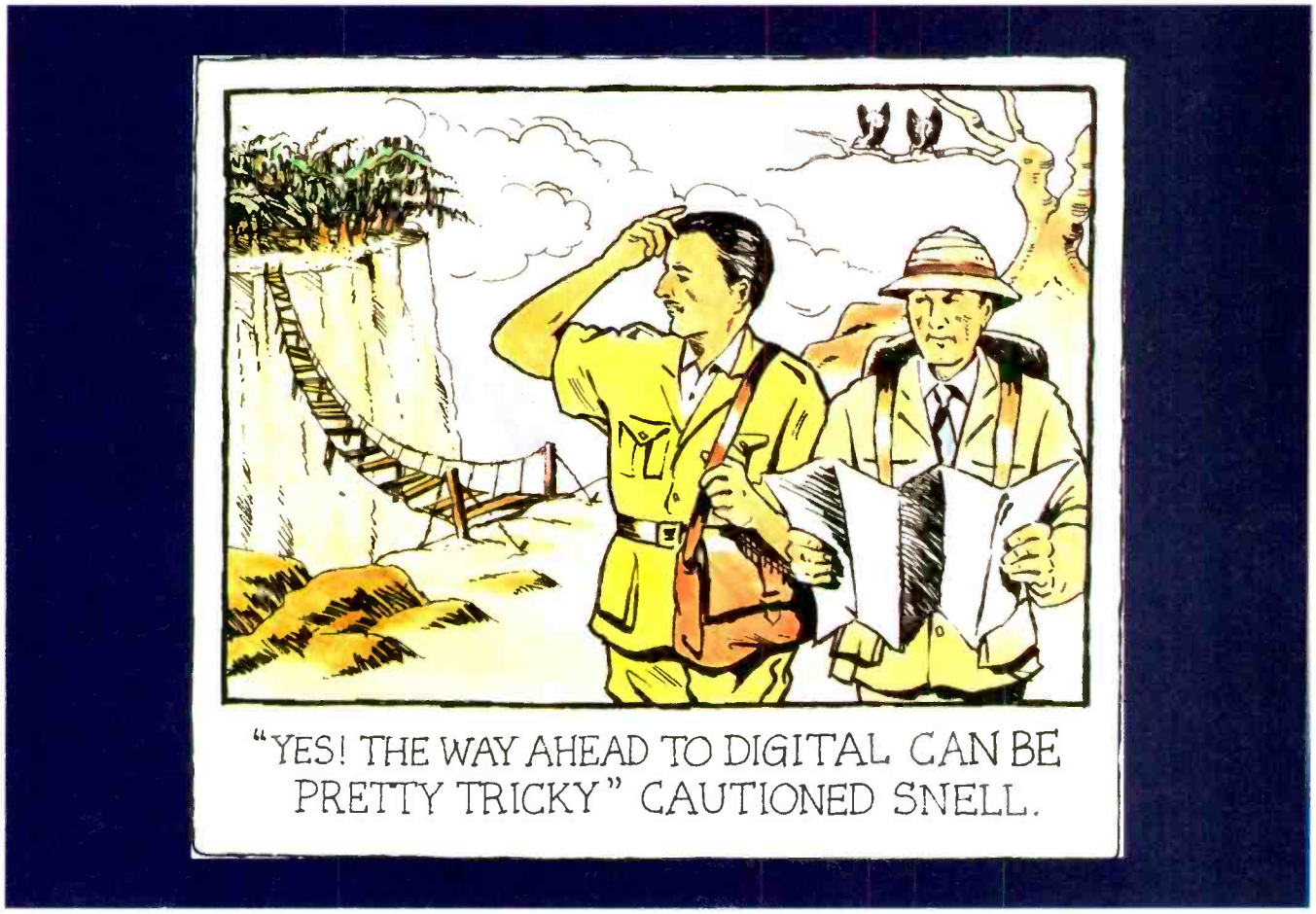
•*Backward compatibility*: One issue that needs to be addressed is backward compatibility. Some manufacturers provide simple and easy upgrade paths to their new product. This could eliminate the need to make an existing system obsolete. This would also allow the user to fully utilize all the existing matrices, control panels and other current options. Upgrade paths should include the ability to add new, more sophisticated control systems or digital matrices to a current switching system. Remember that routing systems are expected to have one of the longest life cycles within a facility.

•*Power supplies*: In many applications, redundant power supplies may be required. In some cases, separate dedicated power supplies will be needed for the video and audio matrices. Some manufacturers offer frames that use a common power supply for both the video and audio matrices.

•*Maintenance issues*: Some routing switchers have consumable parts (fans, for example) and should be designed with this in mind. When fans fail this can potentially cause problems (downtime) if they are hard-wired within the frame. Several solutions exist for this problem. One is to apply forced air cooling externally, but this may require extra rack space. Another approach is to have plug-in, easily removable fans, thus making fan replacement relatively easy.

Alarm indicators are often provided in routing systems, and may include contact closures to indicate power supply failures. In some cases, diagnostics are available from the maintenance terminal. These functions allow the user to monitor the control panel bus and report activity, which could include takes, input and output names and the originating control panel. Such a terminal also could be con-

The ability to toggle between mnemonics and numerics is useful, especially if it can be performed on the system terminal and control panels.



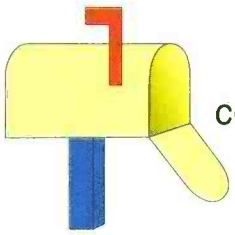
figured to show matrix bus and serial port activity. The ability to toggle between mnemonics and numerics is also useful, especially if it can be performed on the system terminal and control panels.

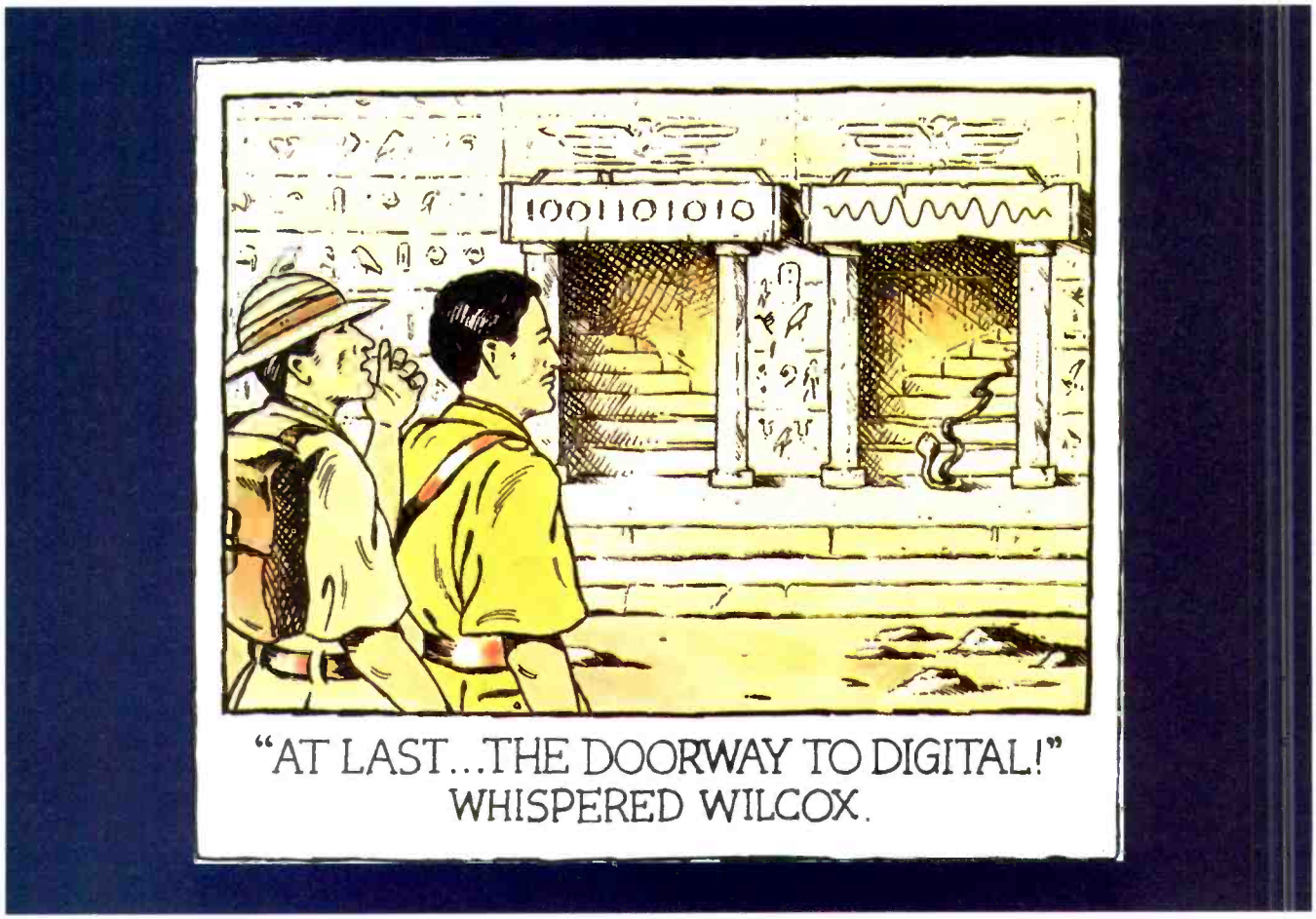
Conclusion

Facility routers have great expectations placed on them. These include managing analog and digital formats today with the probable long-term objective to go completely digital. The control capabilities offered by routing systems are the all-important issue, especially where multiple format and intermatrix tie lines are concerned. Furthermore, analog matrix frames purchased today should be capable of accommodating digital modules in the future. ■

David Cox is a senior product specialist with Dynatech, Newbury, Berkshire, England. Respond via the *BE* FAXback line at 913-967-1905 or via E-mail to be@intertec.com.

For more information on multiformat routing systems, circle (190) on Reply Card. See also "Switchers, Routing" on p. 74 of the BE Buyers Guide.





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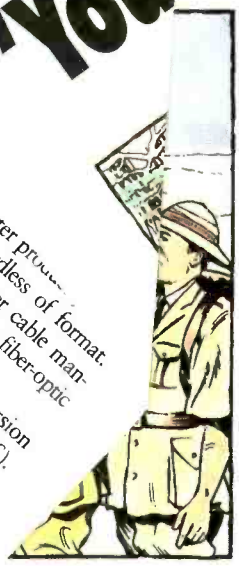

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By Christopher H. Sche
rry Skelton and Terry Baun

NAB 95 audio highlights

This year's NAB convention featured many new audio recording and effects products. What follows is a rundown of these products as uncovered by *BE*'s reporters at the show.

Studio audio processing

Eventide presented the DSP4000B broadcast/production ultraharmonizer, containing processing programs. Presets include high-quality reverb, pitch shift and time-compression/expansion programs, along with digitally sampled sound effects and background ambiences.

Ramsa/Panasonic offered the WZ-DE40, a digital multiprocessor with compression, limiting, graphic EQ, parametric EQ, spectrum analyzer and an automatic notch filter for feedback suppression. Also displayed was the WZ-DM30, a 1-input/4-output version that adds 4-way crossover.

Roland showed the AP-700 advanced equalizing processor. It also provides a spectrum analyzer.

Sony introduced the DPS-V77 multi-effects processor that offers EQ, delay and reverb effects, and includes AES/EBU and S/PDIF digital I/O.

Lexicon presented the PCM-80, a multi-effects processor. (See "1995 NAB Pick Hits," p. 30.) The company also announced the Artist series Preset Program for the device.

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Audio recording/playback systems

Denon debuted the DN-80R, an MD recorder for portable use. Features include a 40-second RAM input buffer, battery operation and built-in speaker. Also new were the DN-790R studio cassette deck and the DN-740R double-well cassette deck.

Fostex displayed the PD-4 portable time-code DAT recorder featuring a 3-input mixer, phantom power, confidence monitoring and a 2-hour battery.

Henry Engineering premiered the TeleStor digital actuality recorder. It answers a phone call and after password detection begins recording the phone line audio for up to 80 seconds. The unit includes end-of-message signaling and an insert point for audio processing.

Otari announced RADAR View, a graphics software package for the RADAR hard-disk multitrack recorder. It provides a workstation-like display of track contents, levels and time code to an SVGA computer monitor. Also shown was the ADAT Link that enables digital porting of ADAT audio tracks to RADAR.

Pioneer New Media Technologies exhibited a line of computer-controllable CD jukeboxes, ranging from 18-CDs to a 300-CD system.

Roland showed the AR-2000, a 1RU digital audio recorder/player. Also on display was the MS-1, a small sampler capable of storing 32 samples internally.

The Instant Replay was unveiled by 360 Systems and features access to 500 individual audio cuts of any length, which are stored on an internal 4- or 8-hour hard disk. The company also presented enhancements to the DigiCart/II, including the D-NET high-speed file-transfer network, which allows transfer of digital audio between 360 Systems' products at 8x real time.

Sony introduced the PCM-800 digital multitrack recorder using the Hi8-based DTRS format, and the PCM-2600 DAT recorder with a 4-motor transport, super bit-mapping and parallel remote control. The DTC-A8 DAT recorder features unbalanced analog I/O and remote foot switch control.

Nagra has developed the ARES-C, a solid-state recorder. On-board, non-destructive editing is possible, and a built-in ISDN interface allows data-compressed transmission.

HHB showed its time-code portable DAT recorder, the PDR1000TC. A time-code back-up feature allows the internal time-code generator to continue running while the user changes batteries. A 4-bay battery charger for the Portadat line was also shown.

Tascam premiered the DA-20, a rack-mount DAT with multiple sampling rates, S/PDIF I/O and wireless remote control. The RA-30M stereo mini-disc recorder offers editing, a jog wheel and a link capability for extended recording. Tascam also unveiled the CD-201 and CD 301 rack-mount CD players.

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Audio recording media

Ampex premiered the 489 EP, its S-VHS cassette for the ADAT format that features 60 minutes. The 488 Hi8 tape is for use in DTRS recorders and is available in 30-, 60- and 113-minute lengths. Ampex also introduced a recordable CD and a Data DAT, the DDS.

Maxell showed its CD-R media, the CW-63 and CW-74, with 63-minutes/580MB and 74-minutes/680MB of storage capacity. Also on display was a 3.5-inch magneto-optical disc and a T-160 VHS cassette in two formulations.

Denon also added CD-R blanks to its line of recording media.

Sony showed the DARS 116 Hi8 cassette optimized for use with DTRS format digital multitrack re
cassette for u
3M presente
mastering casse
ers. Also presen
and 74-minute le

Circle (19

Audio routing

ADC Telecommunica
integrated digital routin
router and LightLink con
handle all digital signals
Also shown was the FL20
agement system. ADC also s
transmission system called Si

NVISION displayed the e
of its Digital Audio Processing
DAPS II allows a user to route 1
mix, amplify and attenuate cha
audio to correct sync and conver
sample rate to the desired output sa

Aphex Systems introduced the mo
dual-channel thermionic microphon
amp featuring a transformerless soli
front-end followed by a tube circuit.

The Matchbox was updated to Matc
II by Henry Engineering. Improvements
clude more gain, level adjustment on unba
anced outputs, gold-plated isolated RCA
jacks, a 3-wire AC cord and reduced noise.

Up to 80 channels of audio may be automatically monitored for loss of signal or polarity inversions on Wohler's ACM1, which requires only 1RU. An audible alarm and LED tell you which channel has gone bad. Wohler also showed ARS series AES/EBU digital routing switchers and the SDAE-1, a serial digital audio extractor option for Wohler audio monitors. The DLM-1 and DLM-2 LED meter panels provide AES/EBU level indication in 10- or 20-segment displays.

ESE showed the ES-217/XLR, a 1x4 audio DA in a small metal box with XLR connectors, balanced or unbalanced operation and separate level controls on each output.

Wheatstone showed the Audioarts 8400 high-quality audio DAs with a 2x8 or 4x4 configuration, 15 turn pots, 3-conductor connectors for each input and output and frequency response from 20Hz to 20kHz +/-0.1dB.

Press distribution boxes occupied center stage at Opamp Labs. Another problem solver included the AV-14/SUM6, a 6x1 active combining audio amp with RCA connectors.

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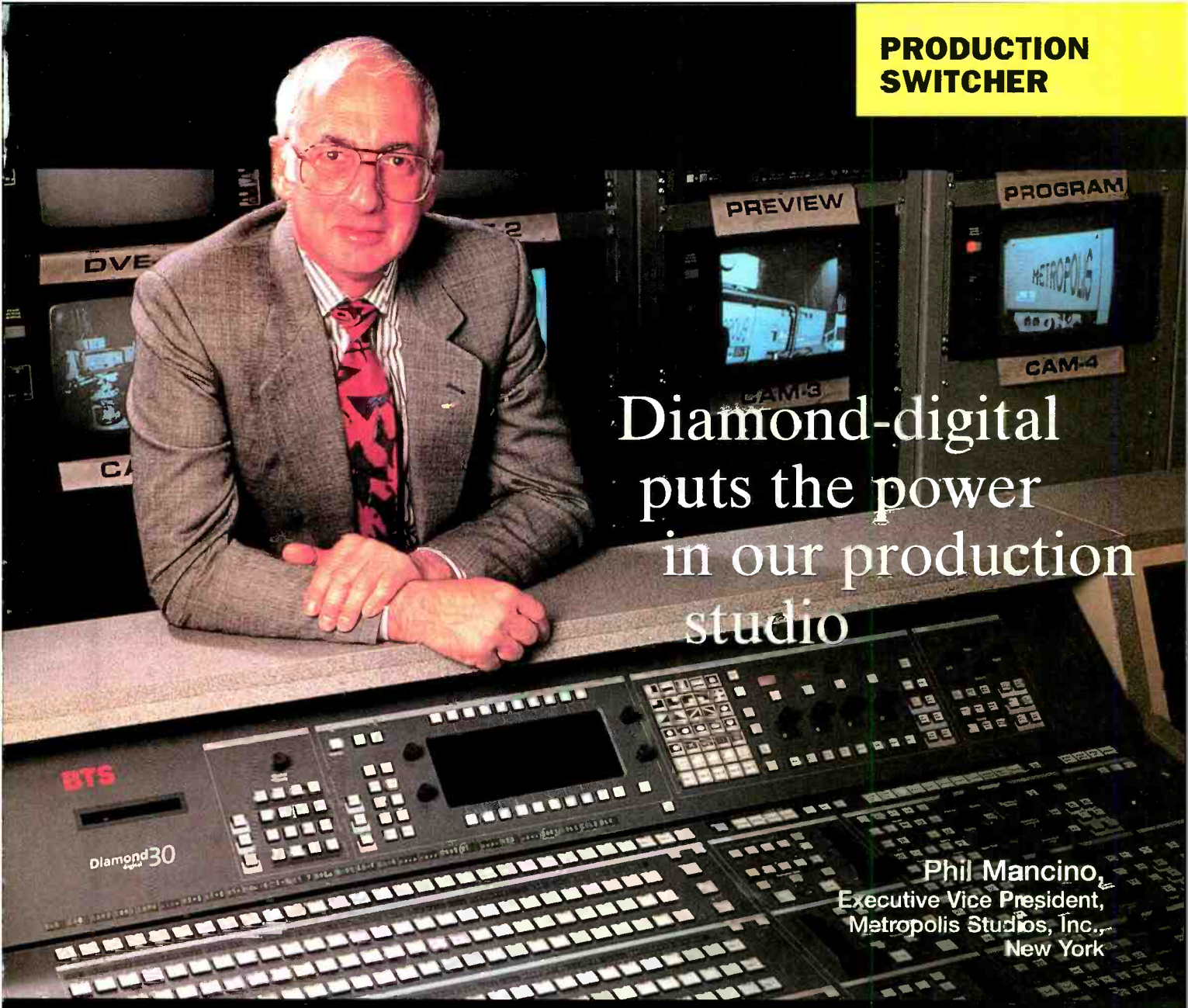
Christopher H. Scherer is chief engineer of WMMS-FM, Cleveland. Terry Skelton is an audio consultant and trainer based in Bucks County, PA. Terry Baun is president of Criterion Broadcast Services, a broadcast contract engineering firm in Milwaukee. Respond via the *BE* FAXback line at 913-967-1905 or via E-mail to be@intertec.com.

PRODUCTION SWITCHER



Diamond-digital puts the power in our production studio

Phil Mancino,
Executive Vice President,
Metropolis Studios, Inc.,
New York

"We built Metropolis Studios from scratch as an all-digital video production studio. Our operation 'talks' digital, from cameras to VTRs. It takes a special switcher to give us the flexibility to handle the demands of this unique operation.

"That's why I'm so delighted with our Diamond-digital switcher.

"Architecturally, it's the most competent switcher we've found. For example, it has a user interface that can emulate the operating characteristics of other popular switchers.

"Since free lance operators use our facility every day, they can set up the Diamond the way they want it, and go to work almost immediately. Saving those setups is a snap, via Diamond's set-up card feature.

"The keying is fabulous. In the past, we needed a separate special effects keyer. With the Diamond's built-in Chromakey, it works as well or better than a stand-alone system. It also offers an auto-setup feature which makes it a 'no-brainer' to operate.

"I'm also impressed with its ability to switch instantly between 4:3 and 16:9 aspect ratios. Because our facility is set up to produce shows daily in both standard and wide-screen formats, we needed a switcher that could change modes as quickly as our projects dictate. The Diamond was the only switcher we found that could do it well.

"To say we're pleased with our Diamond-digital is an understatement. Thanks, BTS, for this terrific switcher."

Shown: The BTS Diamond-digital DD 30. Photographed at Metropolis Studios, New York N.Y., an all-digital video production facility

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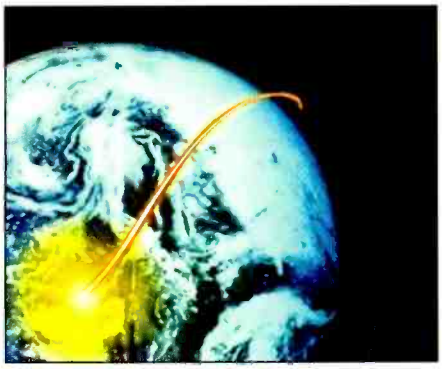
By Mark Dillon

Tools for the Internet



Software tools available to the on-line adventurer have evolved from modest beginnings into a remarkably diverse and powerful set of instruments. In this period of accelerated evolution, detectable patterns and directions are emerging. Tools, like other cultural artifacts, evolve as the toolmakers themselves become more experienced and more ambitious in their tasks.

This discussion centers on the Internet, not the commercial on-line services (AOL, CIS, Prodigy, etc.). As front-end integrators for on-line data retrieval, communications and entertainment, their value-added is to obviate the issues we'll discuss below. It is not my purpose to compare these integrated on-line services.

However, if you are one of 5,000,000+ subscribers to one of these services, this discussion should interest you. As you may have heard, all commercials promise they will soon gateway you into the Internet itself.

Conventional wisdom divides the population into two classes of Internet users:

a. those who use it a lot, and
b. those who've never used it.

Those in group "a" will either already know what I'm about to say and agree with it, or more likely, disagree and freely share this with me (mdillon@cts.com). The cause of these disagreements is the reason for this article: the building-block quality of Internet applications allow each person's "Net-view" and experiences to vary greatly and be highly individualistic.

If you're in group "b," I hope the following suggests what can be done on the Internet and software tools that will enable you to do it. (Most introductory books on the Net are one to two inches thick. To see what I may have left out, pick up one of these volumes for greater detail.)

Client-server architecture

Internet applications are client-server based. What runs on your desktop anticipates a compliant server-side application out on the Net. Each of the applications listed is the client side of an existing Internet application. All server applications function equally well with millions of client apps regardless of operating system — be it DOS, MacOS or UNIX.

Given the difficulty I have with PC applications when I merely change versions of DOS or MacOS, the relatively seamless exchange of data between different client and server versions on the Net is truly a wonder.

File transfers

The Internet began as a wide area network. From one site you could either download files from some other site or remotely operate a distant computer.

An enabling download standard called File Transfer Protocol (FTP) created the hooks that permit access and retrieval of files between servers and client computers on the Internet. The big trick soon became simply finding a file you might want to download from amongst the millions of files out there. These files might contain anything from executable code, to instructions for pruning rosebushes, or pictures of naked people. In response to this problem, a number of database search engines that locate and then download FTP files has grown up. They go by names such as Gopher, WAIS, and Archie, among others.

Communications

Internet founders and early users realized communicating with one another was also valuable, so they established different communications environments for one-to-one, one-to-many, and real-time communications. Many feel the ability for individuals to communicate is what makes the on-line experience so compelling.

• ***E-mail.*** Electronic mail allows private one-to-one communications. It is estimated that more than 30,000,000 people are linked by E-mail through the Internet. If your office E-mail program has a gateway to the Internet, you can exchange mail with any of these 30 million people (check with your system operator regarding gateway access and procedures). Prodigy, AOL and CompuServe have opened Internet mail gateways, thus permitting mail to be exchanged between these services and anyone else on the Internet. If you get mail directly through your Internet access provider, then you're probably using Eudora by Qualcomm.

• ***Usenet.*** The public "postings" on a computer BBS may be the first truly unique form of human communications since radio or television. Unlike these 1-way broadcast mediums, bulletin boards are 2-way. Groups weave multithreaded discussions on topics as wide ranging as the armed militia or defects in software/hardware products from specific manufacturers. On the Usenet, these forums are called Newsgroups. Currently, there are more than 11,000 Newsgroups. (It was these Newsgroups that provided information channels out of China during the Tien Amen Square riots and helped illuminate the Intel Pentium flaw.)

To access the Usenet and its thousands of Newsgroups, you can use NewsWatcher or InterNews on the Mac or Trumpet Network News Reader or NewsExpress in Windows.

• ***Chat.*** Internet Relay Chat (IRC) allows two or more individuals to chat in real-time. IRC applications are mostly text-based windowed programs that allow you to find a chat group, enter the group, and then invite individuals for private side conversations. (Though occasionally profound, hanging around the IRC can be a cross between citizens' band radio and a teenage boys' locker room.)

The Windows-based IRC is a straight text-in-window program, while Homer on the Mac is a more graphically oriented design.

Where do I get it?

How do I start? With a few exceptions, you will not find the necessary Internet software in a computer store or catalog. You'll have to get it from the Net.

First, get connected to the Internet. A good book is a big help. The one I used was *Internet Starter Kit* by Adam Engst — though there are lots of books out there to choose from. A good book will help you find a local access provider who can provide you with a connection.

Second, check out the home page on the World Wide Web of your access provider. This will usually be a varied menu of all the kinds of software I've mentioned previously — and a lot more — available for download, usually for free or as shareware.

My access provider is CTS (www.cts.com). Below is a sample of the software tools page for the Macintosh. The Windows page looks almost the same:

Electronic Mail
- Eudora 1.5.1

Usenet News
- NewsWatcher 2.0b24
- InterNews 1.0.2

World Wide Web
- Netscape 1.1b3
- MacWeb (latest version)
- NCSA Mosaic

Telnet
- Comet 3.0.8
- NCSA Telnet

File Transfer Utilities
- Anarchie 1.2.1
- Fetch 2.1.2
- StuffIT Expander

IRC
- Homer

Other Mac Resources
- Info-Mac MacTCP Archives

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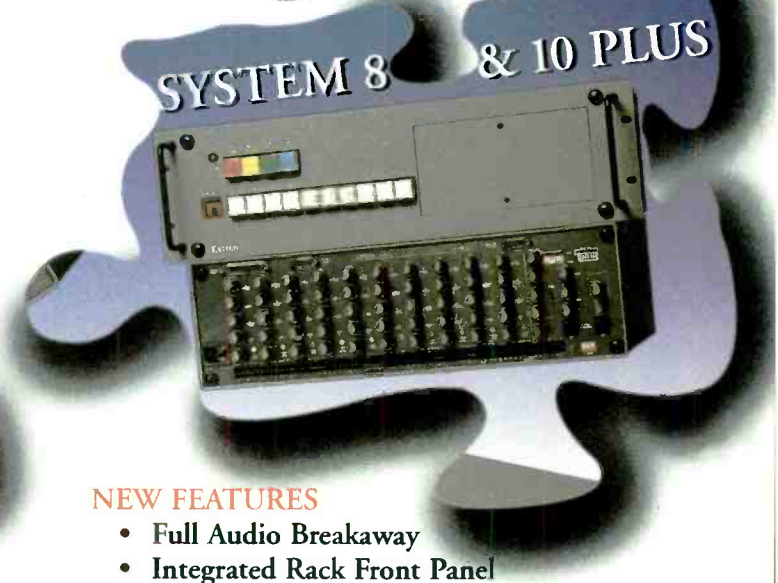

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BOOTH # 3725

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Click on any of these software tools and it is immediately downloaded to your computer. The real treasure is the last line — "Info-Mac MacTCP Archives." Click here and a directory of more than 200 FTP files of Internet applications for new and exciting things like video-conferencing (CU-See-Me) and weather reports is available.

World Wide Web

The Web is composed of thousands of sites, each running it own hypertext application. Each application has one to thousands of hypertext pages. Each page can display text and graphics, some of which are "hot." If you position your cursor over a hot spot and click, it will jump to another page or another web site. This process is known as "Surfing the Net" and requires a Web Browser.

The Internet has been changed remarkably by Web Browsers. In just a few minutes you can download new software, display text and graphics (news from San Jose), view images (paintings from Paris) and watch a short video (underground rock in New York). Browsers perform traditional FTP downloads and they launch helper applications that act as viewers of video files or permit real-time chat.

The two most popular Web Browsers are from *Netscape* and *NCSA*. Other companies are working hard to create newer more powerful browsers or plug-ins to browsers that will fold in the E-mail and chat while offering the functionality of stand-alone applications. Although this may sound like a backdoor into becoming a commercial service, there is one major difference: the browsers do not own or control content; they only make it possible to access it.

Silicon Graphics (VRML) and Sun Microsystems (HotJava) are both promising means of navigating through 3-D space in real time over the Internet at 14.4k baud. KA Worlds has created 3-D chat rooms that enable participants to move around in 3-D space and converse with "avatars," 3-D graphic stand-ins for the other person.

Several companies plan to offer 2-way voice transmission capability over the Net — permitting almost free long-distance calls for the price of your monthly Internet access charge.

As long as the monochrome monitor remained the computer's only display device, the keyboard remained the sole input device. Today, with millions of multimedia PCs out there, users demand graphics, images, audio and video. And users are being accommodated — for a price. While tool development reached several tipping points in history, i.e..., the Bronze Age, the Industrial Revolution, the Internet appears to be entering such a period of rapid change and reconfiguration. ■

Mark Dillon is director, on-line products for GTE Interactive Media, Carlsbad, CA. Respond via the *BE* FAXback line at 913-967-1905 or via E-mail to be@intertec.com.

D-5. When quality is your absolute first priority.

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To compensate, the competition must resort to dithering or rounding to mask 8-bit's artifacts, which reveal themselves as contouring and pooling. This is most noticeable when keying, creating graphics or computer-generated video, and during transitions and fades—in short, under many critical video production conditions.

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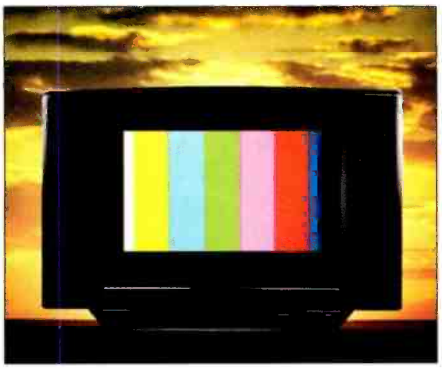
By Louis Libin



ATV signal strengths

Last month, we looked at NTSC signal strengths and how they were derived. It is now important for us to understand how ATV signal strengths are determined and understand the differences.

ATV signal strengths

ATV reception requires a certain minimum signal strength. ATV is a digital system; in simple terms this means that the picture and sound information is encoded into a data-stream of binary numbers. So long as there is sufficient signal strength for the decoder to decode digital data, a perfect picture will result. If the signal strength falls below that level, the system crashes and no reception is possible. There is no gradual deterioration of picture quality with increasing distance from the transmitter as with NTSC television. Thus, there are no grades of coverage. It is either all or nothing.

Based on the reception-planning factors used by the ATV Field Test Subcommittee in calculating ATV service, minimum signal-strength levels for ATV service were calculated for each channel from 2 through 69. The propagation disparities between the different channel groups is easily seen. Channels 2 through 6 require signal strengths in the 20-30μV microvolt per meter (μV/m) range. For Channels 7 through 13, the requirement is around 60μV/m, and for UHF it varies from 120 to 200μV/m.

There is a trade-off between the size of an ATV service area and the amount of interference that co-channel NTSC stations may experience. Most stations are in locations where spectrum is generally available to support 90km to 105km ATV service areas and where interference from ATV should not exceed 16km penetration into existing NTSC Grade B areas. Allocations for the remaining stations will have to be made with care to maximize ATV service areas while minimizing interference into NTSC.

There is a trade-off between the size of an ATV service area and the amount of interference that co-channel NTSC stations may experience.

Co-channel separation

Studies by the FCC and others have shown that the major constraint on spectrum availability for an ATV service is the NTSC-ATV co-channel separation distance. This is the most important constraint on spectrum assignment for ATV. That 160 kilometers (100 miles) is the minimum co-channel separation for full accommodation of NTSC stations with simulcast spectrum from the existing TV bands is a geometric conclusion that follows from the geographical distribution of NTSC stations.

NTSC/ATV interference

The second important constraint on ATV coverage area is the potential for ATV to interfere with NTSC co-channel reception. The amount of power that an ATV transmitter may use must be restricted so as to not cause unacceptable interference to NTSC. This factor is quantified by the desired to undesired signal ratios.

The FCC Advisory Committee WP-3 showed that the ratio of co-channel desired signal to undesired signal for ATV reception must be reduced to about 15dB D/U to retain service areas of approximately the present size with 160km co-channel separation. The corresponding D/U ratio for NTSC broadcast is 45dB D/U ratio with no carrier offset. The corresponding D/U ratio is 28dB D/U ratio for NTSC/NTSC with *precise* carrier offset.

Protection of vacant allotments

At spacings of 255km, this would be a major constraint on spectrum. At 160km co-channel spacing, this is not a significant factor. The reason for this is that the unassigned allotments are mostly in rural areas. In congested areas, the allotments have general-

Channel	FS (dBu)	HAAT (m)	ERP (kW)	Average Xmtr Pwr. Out (kW)	Xmtr Peak Pwr Rating (kW)	Est. Annual Power Bill ($1000's)
3	27.1	300	6.58	2	8	2.8
9	35.6	300	44.2	6	24	8.4
14	41.6	300	2830	85	340	120
14	41.6	600	207	6	24	8.4
69	46.2	300	15922	500	2000	700
69	46.2	600	1148	36	144	50

Table 1. *HDTV replication requirements for 105km radius coverage. Calculations made for representative channels as shown. For a full-service station at Channel 69, 300m HAAT is not considered a practical option; it's shown only for illustrative purposes. (Based on FCC F (50-90) field-strength/distance curves.)*

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ly been filled and therefore are already part of the "160km problem."

Power requirements for ATV

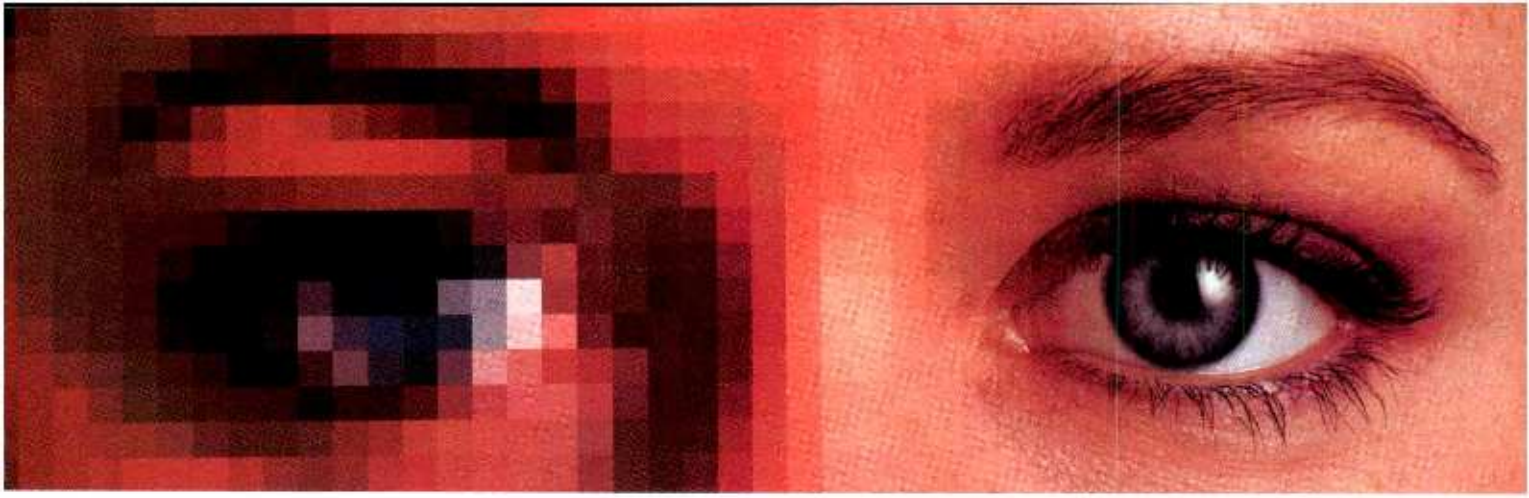
The allowable power for a new ATV signal will depend primarily upon the degree to which it interferes with other TV stations. The amount of power required to achieve coverage areas comparable to NTSC will depend upon the ATV system's immunity to noise and interference. To achieve full coverage, the required power must be equal to or less than allowable power. Less than is better. An important practical advantage of this criterion can be met at a low absolute power level. Low power improves the possibility of using existing towers. Co-location is an important factor for keeping receiving antenna requirements simple. The signal-to-noise ratio for acceptable service will depend upon video processing as well as RF characteristics.

Power measurements for ATV are based on average transmitter power, while measurements for NTSC are based on peak power. However, ATV signals can produce random peaks 6dB or four times the average power. That is to say, in order to handle an average ATV signal power of 100kW, a transmitter with a peak power rating of 400kW must be employed. In order to estimate the power requirement for replication of NTSC service areas, a coverage radius of 105km was assumed. This was based on the Grade B service radii of the maximum-facilities Zone I stations previously discussed. Sample calculations were made with HAAT of 300m for channels 3, 9, 14 and 69. The calculations were repeated for the UHF channels with HAAT of 600m. The calculations assumed reasonable values of antenna gain and line loss for each channel group. (See Table 1.) The peak power ratings of the transmitters are also shown, as well as estimated annual power costs based on an overall plant efficiency of 50% and power costs of eight cents per kilowatt-hour. With HAAT of 300m, ERP values vary from about 6.5kW (avg. 2kW) for Channel 3 to 2,830kW (avg. 85kW) for Channel 14. With HAAT of 600m, the power is reduced to 207kW (avg. 6kW) for Channel 14.

At Channel 69, HAAT greater than 300m would be a necessity for ATV coverage to 105km. In order to provide ATV service to 105km with HAAT of 300m, ERP more than 15MW (avg. 500kW) would be required. (For a full-service station at Channel 69, 300m HAAT is not considered a practical option; it's shown only for illustrative purposes.) With HAAT of 600m, this is reduced to 1,148kW (avg. 36kW). Otherwise, assuming the required 2MW peak-rated ATV transmitter could be obtained, the capital cost would likely exceed the cost of building a 2,000-foot tower, to say nothing of the annual power bill. A much less expensive way of extending coverage into the fringe areas is to use a receiver pre-amplifier mounted on the mast of a high-performance receiving antenna. Manufacturers report improvement in gains of up to 32dB.

Next month, we will discuss the ATV channel assignments and the details on how they are assigned and how they should be evaluated. It is important for station personnel, especially technical staff, to understand the basis for their assignment and to understand how their new coverage should be interpreted. ■

Louis Libin is the director of technology at NBC, New York. Respond via the *BE* FAXback line at 913-967-1905 or via E-mail to be@intertec.com.



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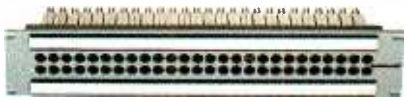

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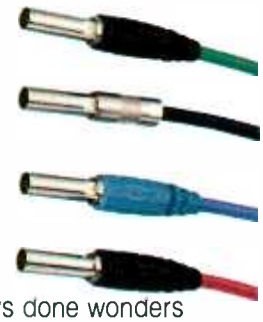

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The big picture for consumer television

Pushing the limits of NTSC

By Marjorie Costello

While broadcasters nervously await word from Washington on the introduction of advanced television, many TV set makers are enthusiastically anticipating the arrival of HDTV. Grand Alliance members are promising HDTV sets within 18 months after the FCC authorizes the system standard. Under this timetable, actual sets could reach consumers by spring 1997. Zenith and Thomson estimate that HDTV sets will cost $1,500 more than comparable televisions, translating into models ranging from $3,500 to $5,000, depending on screen size and audio capabilities.

Skeptics wonder whether American consumers will pay the price for better pictures. HDTV supporters cite the strong sales of projection televisions and the huge success of the all-digital DSS direct broadcast satellite service as evidence that the public will.

There are some who attribute the push for HDTV as part of a consumer electronics "plot" to sell more TV sets. However, a review of recent TV sales statistics and new trends in conventional televisions is evidence that TV manufacturers are doing quite well for themselves with NTSC models.

Big-screen sales surge

More than 20 million televisions have been sold annually since 1988, with sales reaching nearly 25 million for 1994, according to the Electronic Industries Association. During 1994, sales of color 25-inch sets and larger accounted for 42% of the total, passing 19- and 20-inch sets for the first full year. Sales of direct-view, 30-inch models and above grew 33% during 1994. Not to be outdone in the big-screen area, projection-TV sales increased by nearly 40% in 1994 and are poised for possibly a 30% push for 1995.

Above photo: Silicon Graphics digital interactive platform using MIPS Magic Carpet technology.

Flatter, darker, bigger and Invar

The picture that finally reaches the home screen today is being tweaked, corrected and modulated to deliver more of the quality that originally left the TV studio. TV sets are getting flatter and larger. Larger screens are comprising more of direct-view lineups, with several companies adding the 32-inch screen size as an intermediate size to big-screen 35-inch models.

Today, the largest direct-view set is sold by Mitsubishi, which now offers four 40-inch models. Dark tint tubes, for higher contrast pictures, with more depth and color are common in sets that are 27 inches and above.

Projection television, using rear-screen technology, is also getting bigger and better. The largest screen, offered by Thomson, tops off at 80 inches. Projection televisions offer brighter pictures, displayed with almost no distortion from the center to the corners. Cabinets are getting slimmer, while offering surround-sound systems.

Flatter tubes are the standard in better direct-view TV sets today, marketed by companies as Ultraflat (Hitachi), Diamond View (Mitsubishi), SuperFlat (Panasonic), Super Trinitron (Sony), FDT (RCA) and FST Perfect (Toshiba). These reduced-curvature tubes minimize room reflections, providing more of a movie-screen experience. Flatter screens also offer a better field of vision, regardless of the viewing angle. More sets are using Invar Shadow mask tubes containing a metal alloy that is more resistant to thermal expansion than iron masks. When heat warps a mask, it's more difficult for the beam to consistently excite the phosphors, which leads to red areas in the corners of the picture. While the glass cathode ray tubes (CRTs) provide the core for direct-view televisions, this is a situation that is likely to change shortly.

Circuitry wizardry

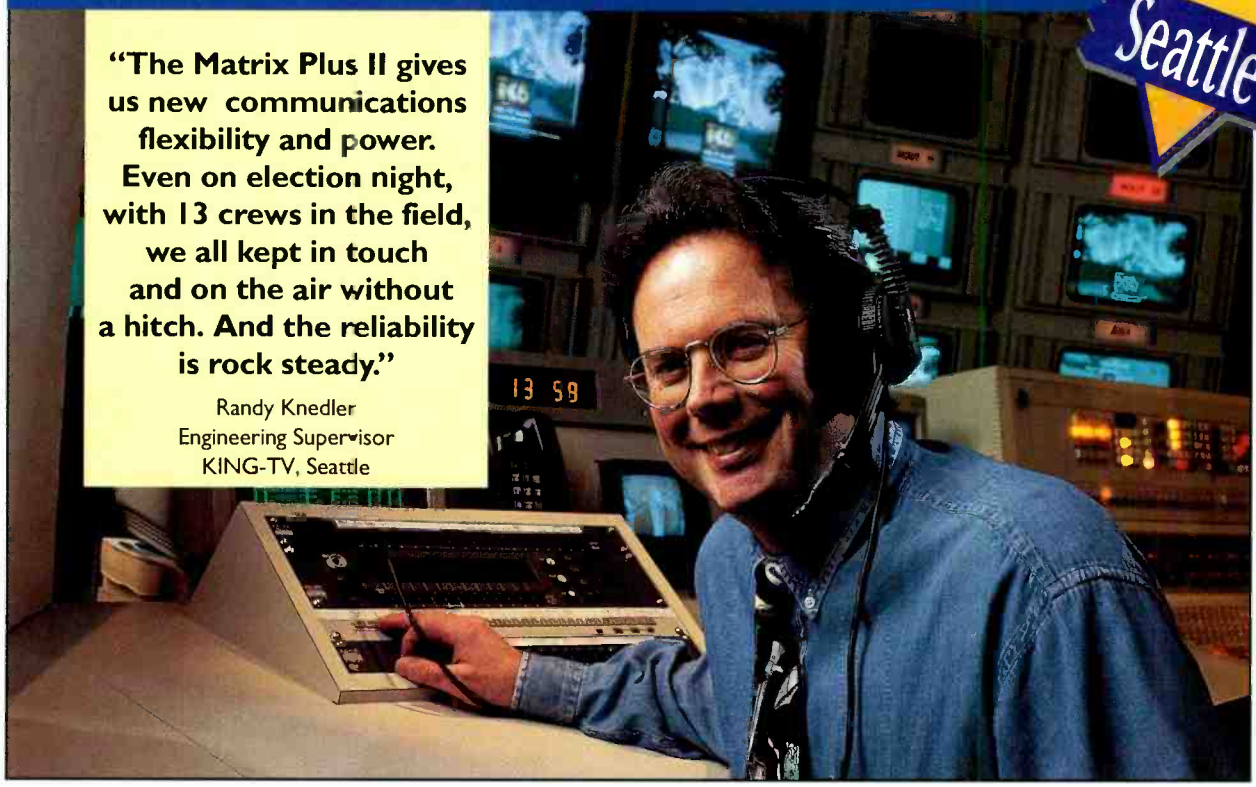
Companies such as Thomson/RCA, Toshiba and Zenith are upgrading their TV chassis, which are today more circuitry-filled and capable of pumping out more current for driving the beam that creates the picture.

More companies are including circuitry for monitoring and adjusting color. This "artificial intelligence" circuitry measures the amount of noise and automatically makes corrections as needed. Velocity scan modulation is also featured in many of the same high-end models. This feature varies the scanning speed of the beam to emphasize differences in brightness. Comb filtering is pervasive on most 27-inch and above models, with some direct view and many projection models upgrading to digital comb filters. The benefit is better separation of color from the luminance signal for purer pictures.

Black level expansion for blacker blacks and video noise reduction for reducing "sparkles" and "snow" from rented videos and in weak reception areas is also included in many deluxe

THE TALK OF THE TOWN

Seattle



Everybody's Talking About the Power of the Matrix Plus II Intercom System.

KING-TV is the king of Seattle broadcasting; the market's news leader. A team of dedicated broadcast pros puts more than 4½ hours of live TV on the air everyday. At any given time, staffers are in the station, on the street, up in the chopper, or beaming in via microwave and satellite. While they rely on state-of -the-art equipment, they depend on one thing even more: each other. No matter what the situation, they have to stay in touch.

That's why Randy Knedler relies on the Matrix Plus II intercom system. Fully integrated, the system ties everybody together easily and neatly, whether they are on-site or calling in on the phone, the wireless, or via the bird. Many of the system's powerful intercom stations have bright electronically-labeled displays to let everybody know who's on-line and in-touch so that broadcasts go off without a hitch. And since there is no telling what the next broadcast will bring, the system reconfigures quickly to let anybody communicate with anybody...in just seconds.

"Station Identification" is easy with electronic or paper labels

No matter what news breaks in Seattle, Randy knows he can rely on the Matrix Plus II, just like broadcast engineers from San Francisco to Miami and from London to Tokyo. The Matrix Plus II. It's the talk of the town.

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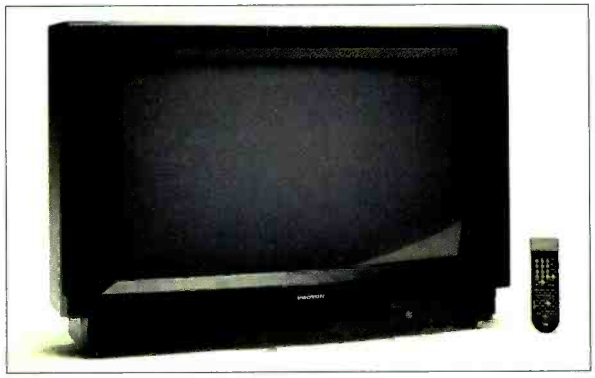
models. Another circuit that's been added improves broadcast reception by broadening the TV tuner's frequency bandwidth.

What's up with widescreen?

Although widescreen tubes will be standard for HDTV, most companies are not currently expanding their direct-view models in 16x9. Instead, they are concentrating on widescreen projection models. The one exception in direct view is Proton, a company noted for its videophile line of monitor/receivers.



Proton widescreen direct view slated to arrive this summer.

The major reason companies are holding the line on widescreen for direct view is the lack of programming broadcast in this aspect ratio, coupled with the high cost of importing widescreen tubes. While most televisions sold here feature tubes made in the United States, there is no widescreen tube manufacturing in this country. On the other hand, it's predicted that 40% of the larger size direct-view sets sold this year in Japan — where there is widescreen broadcasting — will be 16x9 models.

Studio pictures and surround sound

Picture purists are clamoring for color pictures on the home screen that more accurately reflect what the director saw in the TV studio or film transfer room. Companies, including JVC and Toshiba, are responding by adding color temperature controls that, in a growing number of cases, approximate the 6,500°K NTSC broadcast studio standard.

With the increasing popularity of home theater, companies are offering direct-view and projection sets with built-in surround-sound systems. Select models — from JVC, Panasonic, Toshiba, Thomson and Zenith among others — offer Dolby Pro Logic. Virtually all big-screen models feature audio outputs for connection to an audio/video receiver, where Dolby Pro Logic is becoming standard in an increasing number of models.

On-screen displays

With the growing number of programming choices, set makers are adding electronic on-screen navigation and information systems. These range from the simple extended data services (XDS) to full-blown interactive guides like StarSight. Another technology, Guide Plus, based on Gemstar's Index Plus system for VCRs, is anticipated for 1996.

A new bit-mapped navigation system for accessing operating and setup functions is featured in new high-end 35-inch RCA Proscan models. A version of this colorful, graphical user interface will also be incorporated in the next generation of Thomson DSS receivers.

Ghostbusters and instant replay

To overcome a reception problem caused by the reflection of signals off large buildings or mountains, consumers can now have ghost cancellation. Magnavox has taken the lead in this area now that parent-company Philips' ghost cancellation reference (GCR) signal is the industry standard. The signal, which is transmitted on line 19 of the vertical blanking interval, is broadcast by nearly half the TV stations in the United States. GCR signal-processing circuitry will be incorporated in several Magnavox TV models and a Magnavox stand-alone decoder box.

To give consumers final control of instant replays, Magnavox is now offering an instant replay function in select models. It stores the last eight seconds of programming in memory for real time, slow motion or stop-action playback as a PIP (picture-in-picture) insert on the screen.

Televisions that are like computers

Another evolving trend is the transformation of the TV set into a computer, and in some cases, an MPEG-2 decoding and display device. The huge success of the all-digital DSS has not only boosted big-screen sales, it has also presented new possibilities for televisions with built-in digital compression technology.

Thomson has been the most public with its plans in this area. The MPEG-2 compression scheme is central to Thomson's DSS technology and several other planned systems it is backing: the Grand Alliance digital HDTV system, the Toshiba-Time Warner DVD (digital video disc) and D-VHS (datastream VHS recorder). Thomson has already shown prototypes of televisions incorporating DSS technology and will likely market these models within the next few years. The company also intends to introduce televisions with built-in D-VHS and DVD players by the year 2000.

Other companies, such as Zenith and Toshiba, are expected to offer televisions with built-in DSS receivers or DVD players in the next few years. Toshiba is also promoting the convergence of the computer and TV display in one screen through its 20-inch Toshiba Integrated Multimedia Monitor (TIMM). Toshiba has plans to make TIMM available in larger and smaller screens in the future.

Thomson, working with Sun Microsystems on Open TV, and Silicon Graphics, through its MIPS Technologies' Magic Carpet architecture, are working on new multimedia platforms for interactive digital television. First available in set-top boxes, these new systems will expand the range of information that can be delivered to the home screen.

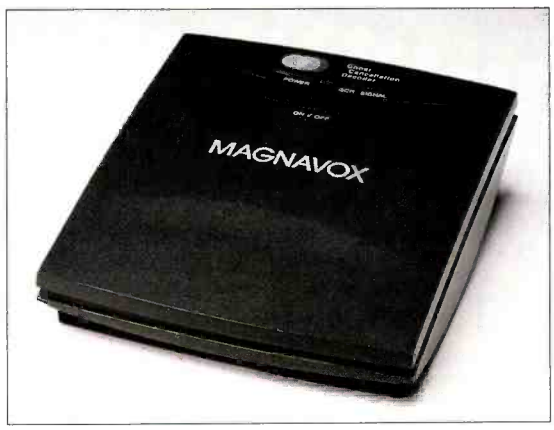
Going on-line to access information will be arriving in some Zenith big-screen models by mid-1996, when the company introduces the first televisions incorporating the AT&T TV Information Center. The system, which is currently rolling out in set-top boxes, delivers news, weather, telephone messages, and stock updates via phone line for display on the home TV screen.

Going tubeless and putting away the rabbit ears

Although the cathode ray tube (CRT) has been the heart of televisions since they were introduced, the age of the flat-panel television is upon us. Mitsubishi has announced that by fall 1996, it will be selling 40-inch flat-panel televisions using plasma display technology.

The company claims it has overcome plasma's brightness and heat dissipation problems. Its revolutionary product, promises company president Jack Osborn, "Will exceed current performance and offer no distortion from [any] viewing angle." The product is geared toward 30% of Mitsubishi's customer base, which for this premium TV set maker, translates into the high-end of the consumer TV market.

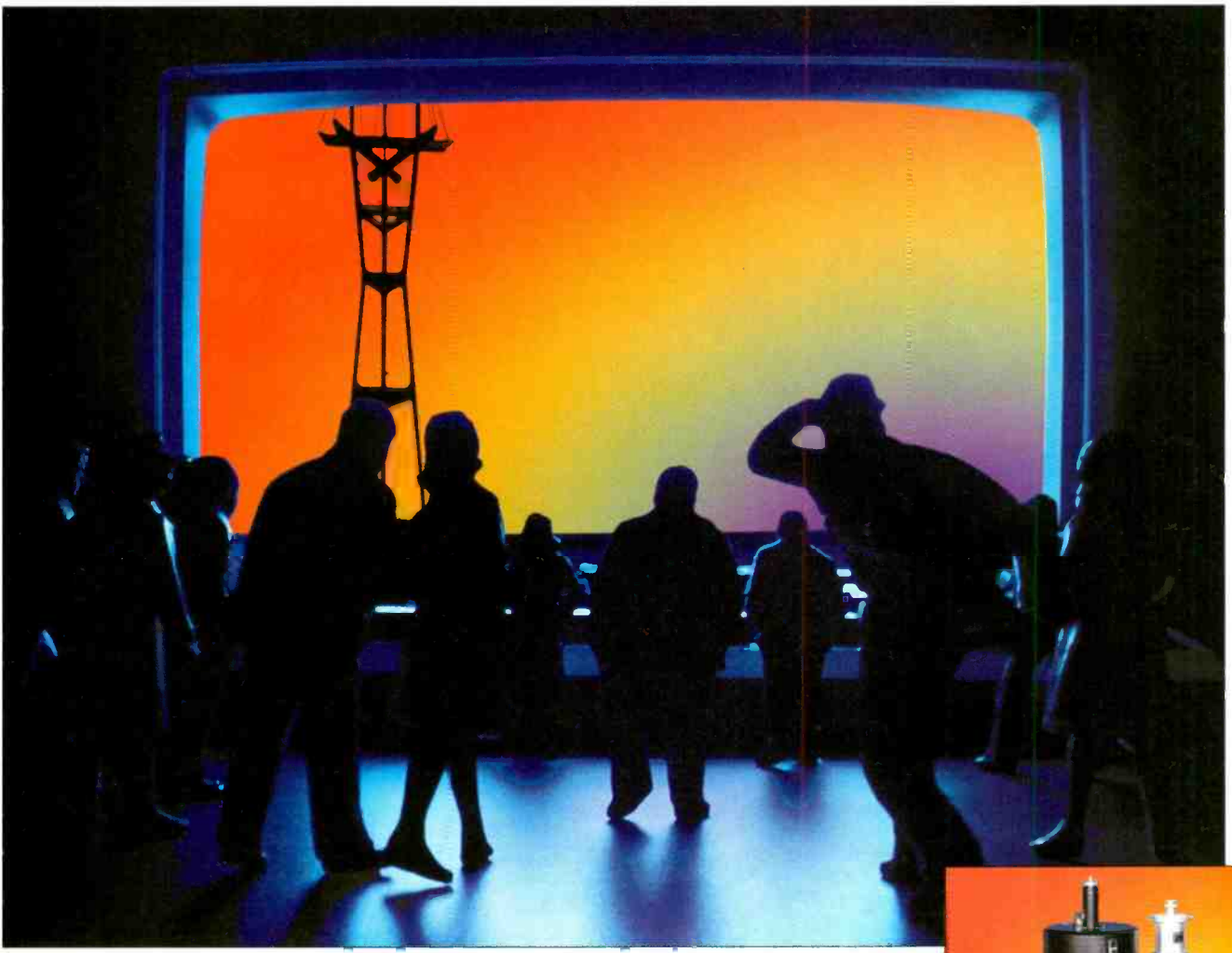
MegaWave is designing a better way to receive TV broadcasts. The company recently introduced a joint technology program with NAB to develop the next generation of TV set-top antennas. According to NAB, the project was initiated because, "More than 50 percent of all TV sets in the U.S. depend on set-top antennas to receive TV programming." Using technology it developed working in the defense industry, MegaWave plans to complete a prototype this summer for the first improvement in "rabbit ears" in 30 years. Once the prototype is complete, MegaWave and NAB will bring the new antenna to market, presumably with the help of TV set makers and other consumer electronic companies. ■



Magnavox set-top box for ghostbusting.

Marjorie Costello is a broadcast and video industry consultant and *Broadcast Engineering* contributing editor based in New York. Respond via the *BE* FAXback line at 913-967-1905 or via E-mail to be@intertec.com.

A New Generation.



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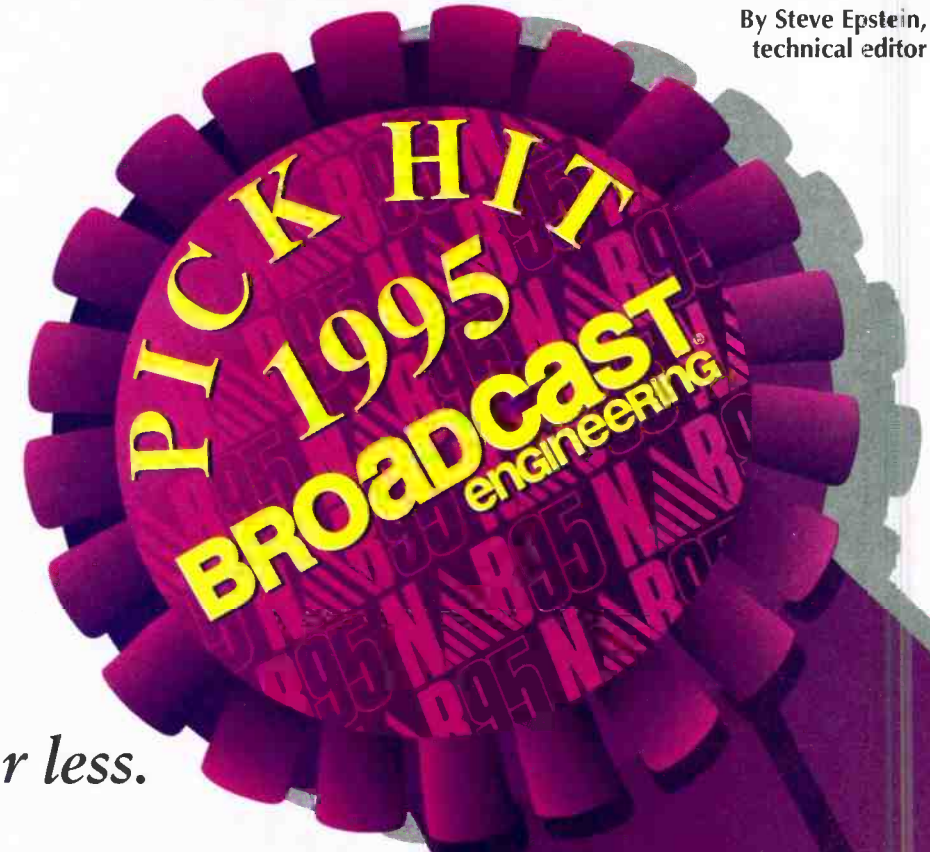
1995 NAB Pick Hits

By Steve Epstein,
technical editor



This year's Pick Hits do more for less.

This year's show, as those who were there can tell you, offered a little bit of everything. Exhibitors and products covered a wider range than ever. Much of this was due to the computer industry finding its way into areas throughout the professional video market. In keeping up with these changes, the panel of Pick Hits judges was also chosen from a variety of areas.

If you had to pick a single theme that applied to all of this year's Pick Hits, it would have to be "doing more with less." Contrary to years past when budgets were cut due to the economy, attendees seemed to have plenty of money to spend. Unfortunately, rather than spending it on one or two big projects, it had to be spent on five or six equally large projects. Value and cost-effectiveness were a high priority.

Professionals hoping to modernize facilities were faced with a myriad of choices. Digital equipment was everywhere, but few facilities are able to start from scratch and go totally digital. Most are faced with the task of building digital while still keeping one foot in the analog domain. Conversion scenarios were everywhere, but complete solutions were harder to find. With that said, here, in no particular order, are the Pick Hits of NAB 95.

Digital Visions: *Brick Wall Filter*

As the name implies, the Brick Wall Filter (BWF) provides an extremely sharp cutoff beyond a user-defined point, providing spectrum-shaping for MPEG mastering. The BWF is a portion of the pre-mastering mode of the DNVR system, an image-processing system available in a variety of standard or customized formats. The BWF offers extremely sharp horizontal and vertical cutoff frequencies. The H and V cutoff points are adjustable from 1.95MHz to 4.70MHz, with 16 filter selections each. Additional filter types are available for specialized processing. Properly used, the BWF can offer considerable improvement in the final quality of compressed images. Remote control is available using Windows software, MSP control systems, the Pogle or DaVinci Renaissance.

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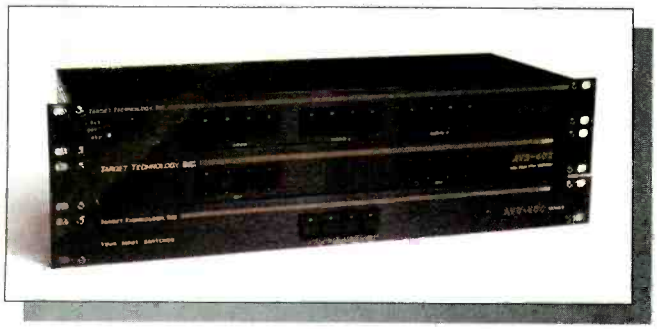

Target Technology, Inc.: *AVS-400 series 4x1 switchers*

This low-cost family of switchers offers 4-input, single output switching in various audio/video configurations. These switchers offer 30MHz video bandwidth, vertical interval switching and +24dBv audio as standard features. Front panels unplug and can be used as remotes. The AVS-403 has three rows of four buttons for independent selection of video and two audio channels, a toggle switch provides AFV. The 404 offers video and a single audio with AFV operation only. The 405 has separate control of one video and one audio channel. The 407 and 408 are 4x1 audio-only switchers. The 407 offers a single control for two channels, while the 408 offers separate control of each channel.

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Avid/Ikegami: *DNG camera system with digital disk recorders*

This portable disk recorder is designed for professional use and features RetroLoop, which continuously records a predefined length of time on a loop. Once the desired event occurs, simply push the start button and the already recorded loop footage is added to the clips stored on the disk. In addition, simple non-linear edits can be performed without the need for a computer monitor or a mouse. Three versions are being offered, the DNS-11, DNS-101 and the CamCutter recorder. The DNS-11 uses three 2/3-inch FITs with 400,000 pixels. The DNS-101 uses three 2/3-inch FITs with 380,000 pixels. Both offer 700 TV lines of resolution with 62dB S/N. Both are 1-piece camcorders with the disk recorder built-in. The CamCutter unit is a dockable disk recorder designed to dock with Ikegami's 79-pin cameras. Avid's FieldPaks contain the storage drives and are removable. Currently, each FieldPak provides 2.4GB of storage, but that is expected to increase as disk technology improves.

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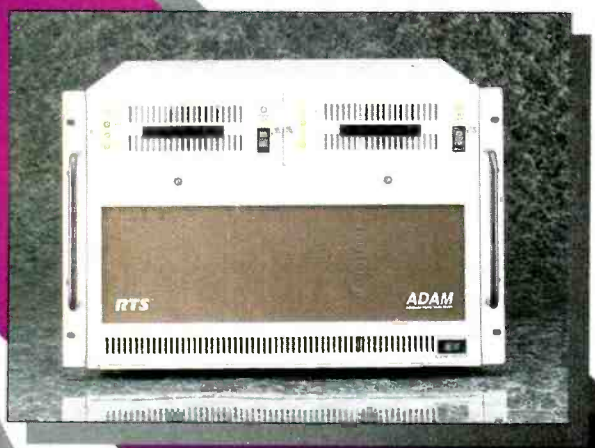


Telex: *ADAM intercom system*

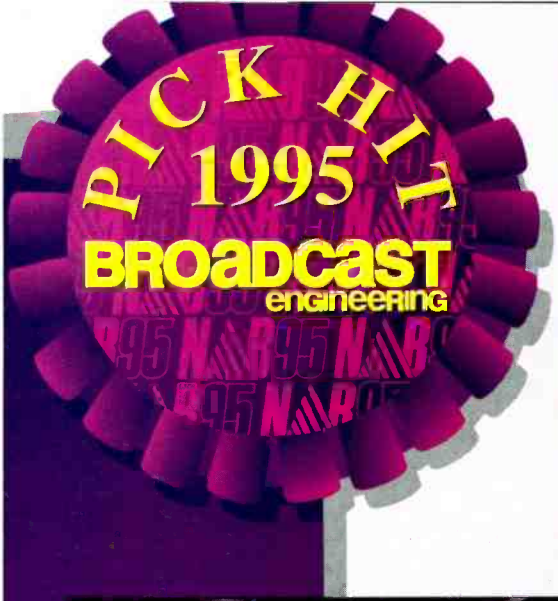
Telex's RTS ADAM (Advanced Digital Audio Matrix) intercom system uses a proprietary implementation of time division multiplex architecture for signal switching. System capacity is in excess of 1,000 users. Other features include individual level controls per crosspoint, linear expansion and full compatibility with the RTS CS9000 series intercoms. A 7RU frame holds 16 cards, each with eight inputs and eight outputs, providing a 128 x 128 matrix. Frame interconnect cards provide a full-bandwidth bus for interconnecting multiple frames. Adding a second frame yields a 256 x 256 matrix, a third increases that to 384 x 384 and so on. The control system is housed in a 3RU frame and can be configured using a 386 (or greater) PC. Audio signals throughout the system are 16-bit, sampled at 44.1kHz (CD quality).

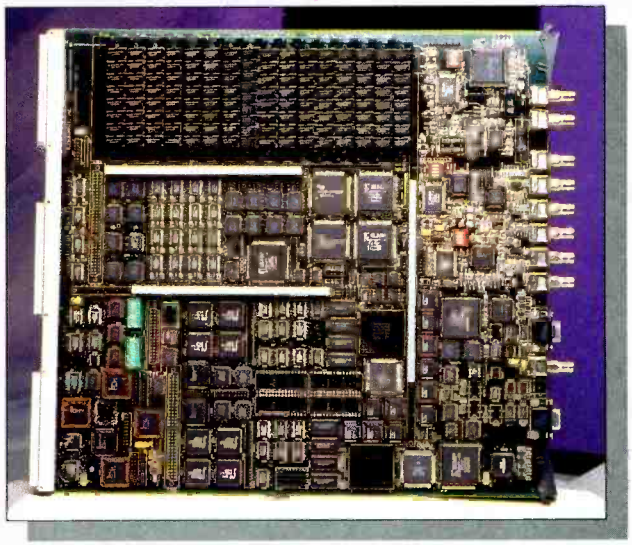
Circle (103) on Reply Card

Tektronix: *VM100 automatic video measurement set*

The VM100 makes standard video measurements at the touch of a button and provides quick verification and on-line monitoring of composite video signals. It allows non-technical operations personnel to verify proper signal levels. Measurements are stored in non-volatile RAM and can be printed to a serial printer. Time and date of the measurement are automatically inserted in the test readings, simplifying later analysis. A "signal ID" feature automatically scans video signals for VITS. All test signals, as well as their field and line positions, are automatically identified for use with the selected measurement. The VM100 is particularly suited for operations that may not have the need or budget for a VM700, and for multichannel operations. Channel memories allow users to store test results for each channel of a multichannel system.

Circle (104) on the Reply Card

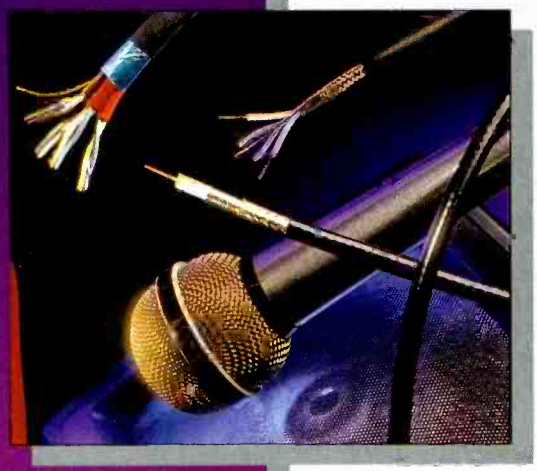




Viewgraphics: *Dataview SDA-21*

The SDA-21 adapter plugs directly into an SGI Onyx or Challenge chassis and provides a range of video and data transfer options. The SDA-21 provides data on D-1 or 4:2:2 video transfer modes (software-controlled 8- or 10-bit modes). In data on D-1 mode, users can selectively backup and restore computer data files between a host computer and a D-1 VTR. Read-after-write and on-board error correction ensure data integrity. In the video mode, component digital video (SMPTE 259M) can be input and output in real time. The unit features data transfer rates of 20MB/s, and allows storage of up to 1GB on a D-1 L-size cassette. Included is View Manager software, a graphical utility that simplifies the transfer process.

Circle (105) on Reply Card



Belden: *1694A cable*

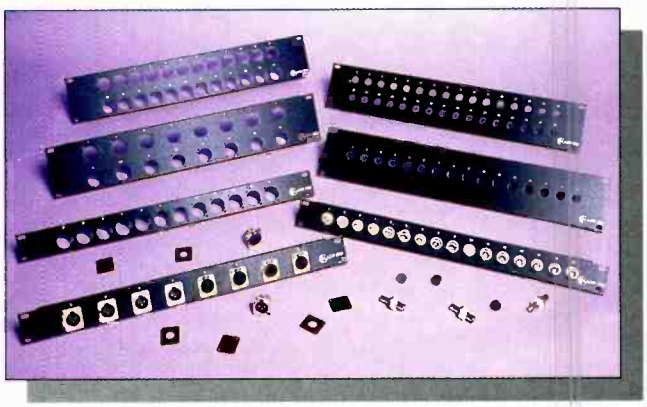
This RG-6-type 75Ω low-loss precision coax is designed for serial digital video applications. It provides 20% lower attenuation than traditional precision video cables and as much as 30% lower attenuation at 1GHz. A high-density foam insulation provides improved crush resistance. Shielding is provided by duofoil (100%) and tinned copper braid (95%). The jacket is PVC and available in several colors. A plenum version (1695A) is available with a Flamarrest jacket and foam FEP Teflon insulation. Connectors are available from most major connector manufacturers.

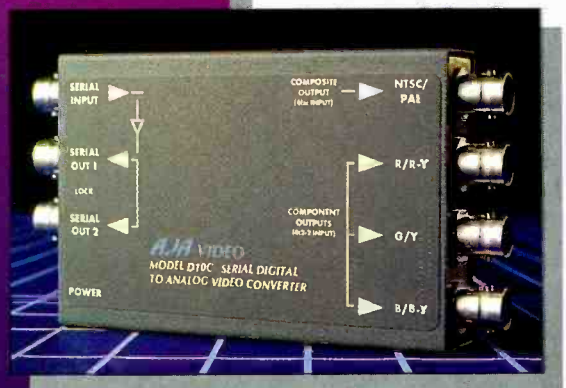
Circle (106) on Reply Card

Clark: *Pre-punched rack panels*

Tired of drilling holes in rack blanks? So were the judges. These pre-punched rack panels caught their eye. Pre-punched panels are made from 0.068-inch black anodized aluminum with 0.5-inch flanges for added strength. Panels are numbered using a available. The XLR panels accept Neutrik M/F XLRs and locking 1/4 inch. BNC panels are stocked in sizes for 50Ω and 75Ω feedthroughs. As an added bonus, if you purchase stock panels and connectors from Clark, the company will load the panels for free.

Circle (107) on Reply Card





AJA Video: *D10C serial digital-to-analog converter*

The D10C allows low-cost, high-quality analog conversion of 10-bit serial digital video signals for monitoring. It provides component analog outputs when fed a component serial input. For 525-line composite serial inputs, it provides an analog NTSC output, and for 625 composite inputs, an analog PAL composite output. In addition, two equalized and re-clocked loop-through serial outputs are always active. The compact unit can be easily attached to monitors or other equipment with Velcro. Component analog outputs are user-configurable to cover a wide range of formats including Y/R-Y/B-Y, RGB, Beta and MII. Sync, setup and 8-/10-bit input resolution are also configurable. In the composite mode, the Y component output is active and can be used to feed a signal to a black-and-white monitor.

Circle (108) on Reply Card

Acrodyne's New Diacrode® High Power UHF Television Transmitter Is On The Rise.

Introducing Our New Single Tube 40kW-60kW System. High Efficiency With High Reliability.

If you're considering a new 40kW to 60kW UHF television transmitter, Acrodyne has exciting news! The success of our tetrode equipped water-cooled transmitters from 10kW to 30kW output has spurred the development and introduction of a new transmitter featuring a Diacrode® (double-ended tetrode) capable of producing up to 60kW in common amplification using just one tube.

The New TH 680 Diacrode High Power Tube

Our high efficiency tetrode transmitters perform superbly and are the lowest cost transmitters to operate and maintain. The tetrode is the most linear UHF amplifying device type and, combined with our high-end TR Series exciter and "super linear" solid state driver, makes it an excellent choice today and ideal for future digital broadcasting. Water-cooled tetrodes have routinely exceeded 20,000 hours of life. The Diacrode, constructed of the same grid material and similar, yet improved cooling system, will meet and exceed these life times.

If you have concerns over the reliability of other high efficiency transmitters, or their complexity, or their cost to operate, consider the Acrodyne alternatives– Diacrode and tetrode transmitters. All Acrodyne high power transmitters are built and fully tested at our factory in Blue Bell, Pennsylvania.

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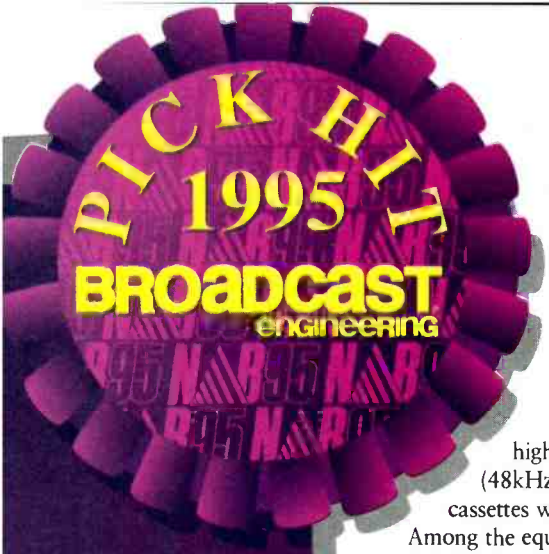


Panasonic: *DVCPRO*

DVCPRO uses 6mm (1/4-inch) tape and offers professional quality in an extremely small package. Equipment in the DVCPRO line uses a component digital 4:1:1 recording format that includes a 5:1 intraframe compression scheme. Bit rate is approximately 25Mb/s, which allows a reasonably high level of quality throughout several generations. The format offers two digital audio channels (48kHz sampling, 16-bits/sample) and one channel of cue audio as well as time code. Two sizes of cassettes will be available, a 63-minute and a 123-minute. The 123-minute cassette is less than 5"x 3 3/16." Among the equipment in the DVCPRO line are three camcorders, a portable field edit package, a palm-sized player and a studio VTR. In addition, a "Smart-Cart" multicassette library will be available in a DVCPRO version. DVCPRO technology is also being used on the LQ-D5500 digital disc recorder.

Circle (109) on Reply Card

Audio Precision: *System Two*

System Two features true dual domain architecture. An analog hardware generator and analog analyzer for testing analog devices are separate from a digital generator and analyzer for digital devices. This allows devices to be tested in their native format. The unit is designed for use with an external computer. A PCMCIA adapter allows for portable operation with a laptop computer. The user interface for System Two is Apwin software that runs under MS Windows (Windows 95 or 3.11 Versions). Because it uses Windows, the software is easily customized. Tests can be stored to disk and the results saved and/or printed. For multistep testing procedures, a learn mode provides an easy way to input keystrokes. Once input, the script files can be edited using BASIC. In addition to providing the tools to test high-quality audio, System Two also has the capability to accurately test microphones, multimedia sound cards and low bit-rate codecs.

Circle (110) on Reply Card

Lexicon: *PCM-80 digital effects processor*

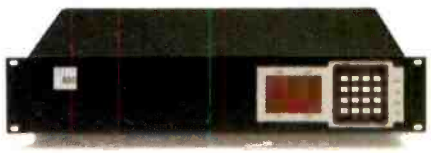
The PCM-80 has a true stereo signal path, balanced analog I/O and standard digital interfaces. It has the ability to mix analog and digital signals together and offers a wide range of effects possibilities. Entirely new effects include reverb, delays, chorusing and dynamic spatialization. A dynamic patching matrix enables signals from internal and external sources to control any aspect of an effect. Every effect can be driven by tempo information from MIDI, a front-panel tap control or a foot switch. The tempo can also be subdivided and used to fire time switches to actuate an effect. The unit includes SIMM slots for additional effects memory and a PCMCIA slot for adding new algorithms or memory.

Circle (111) on Reply Card

Tektronix: *764 DAM digital audio monitor*

The 764 is a monitoring tool that combines the features of a phase and level monitor with a digital audio data monitor. In addition to the unit's display, an auxiliary output allows a VGA monitor to be connected for remote viewing. The Lissajous display is supplemented with a mathematical phase correlation meter as well as selectable sum and difference bars. The unit has a time-code input and can display LTC and VITC. A digital audio reference input permits timing relationships between digital audio signals to be determined. Users can monitor input audio through a front-panel stereo headphone jack. A "session screen" provides a detailed list of a session's compiled statistics. Along the same lines, a logging mode time stamps the occurrence of important events. A serial printer output provides for hard copy results that can be included with the audio material.

Circle (112) on Reply Card



Constant Change.

Constant.

ADC's New LightSwitch™ – The "Future-proof" Digital Router.

As digital formats come and go, so does a lot of expensive equipment. But while changing formats often requires upgrading cameras, decks and other source equipment, it doesn't have to affect your switching system.

Introducing the new LightSwitch digital router from ADC. A switching system that literally doesn't care what format you use. By avoiding internal reclocking, the LightSwitch router is able to switch any true digital signal, regardless of format–even ones that don't exist yet! It can interface with either coax or fiber and features on-site matrix mapping, group takes, chop mode and RS232/RS485 control panel interfaces.

So, regardless of what digital format the future holds–from D1 to HDTV–turn on the LightSwitch router from ADC. For more information about LightSwitch or our digital video and audio fiber optic links and DAs, call us at **1-800-726-4266** or circle the reader service card below.

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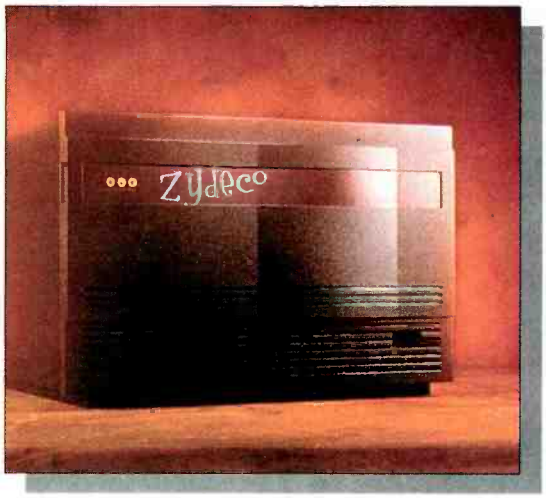
Circle (23) on Reply Card



KUB Systems: *Zydeco*

Zydeco is a stand-alone compositing system that uses a PowerMac 7100 to provide its user interface. It provides two live foreground and one background input with full key and machine control capabilities. The intuitive, object-driven Pick & Place user interface makes every object and layer available for instant manipulation in 3-D space. Features include the ability to do XYZ rotation and perspective along with user-definable XYZ spline path control. Processing is all done in real time with access to Macintosh and QuickTime graphical resources. It comes standard with component analog I/O. SMPTE 259M inputs and outputs are optional. Internal processing paths are 10-bit uncompressed for video and key signals. Machine control is provided using V-LAN, RS-422 or GPI triggers.

Circle (113) on Reply Card

Hamlet: *302WVR rasterizer*

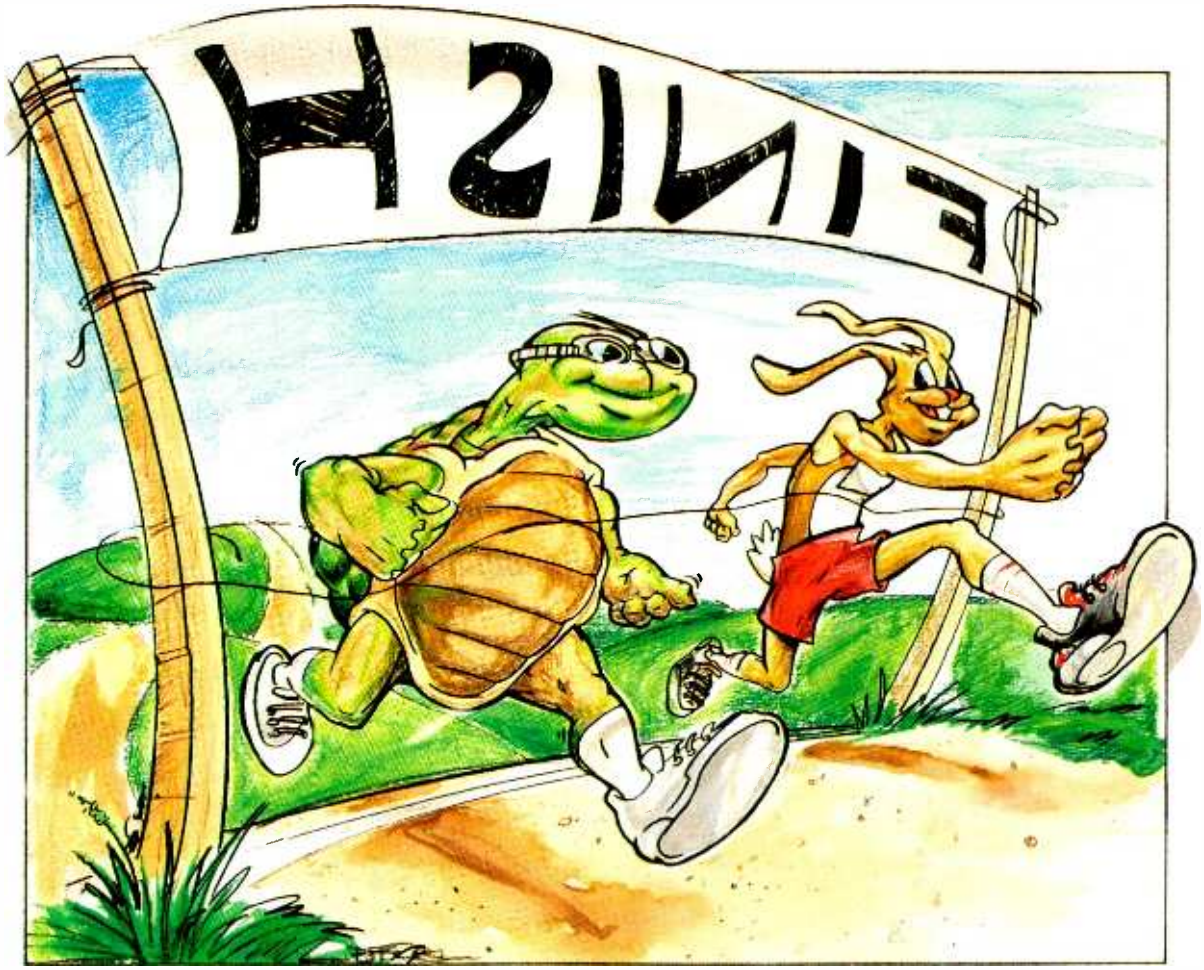
The 302WVR is a half-rack unit with four BNC video inputs, one Y/C video input and two audio inputs. The four BNCs can be used for four composite inputs or one component (RGB or YUV) and one composite. Output is composite and Y/C. External reference and Hamlet's proprietary HFT (hands-free timing) make it easy to time single or multiple sources quickly and accurately. The generated digital waveform displays can be transmitted and displayed on any standard monitor or LCD screen. An 8-function memory allows for storage of common scales and four return-to-center or set positions in horizontal and vertical modes. Selectable display screens include full-screen individual displays, full-screen combined displays or split-screen displays in one-half and one-quarter screen sizes. Split screens may be positioned on top or bottom of the screen and all displays may be inserted or mixed over an input or black.

Circle (114) on Reply Card

Telex: *CamLink 100/200 wireless field monitoring system*

The CamLink 100 and CamLink 200 are two separate systems for wireless transmission of video, audio, time code and tally signals. The CamLink 100 provides RS-250C signal quality over a range of 100 yards, line of sight. It does not require a license and its range can be extended using an optional external receive antenna. The transmitter (T-100) attaches to the camera's battery mount, and the receiver (R-100) is a hand-held recorder/monitor that records the signal on 8mm tape. The CamLink 200 operates under your existing ENG microwave license (Part 74). It offers a transmission range in excess of 1,000 feet, line of sight. A triple-diversity receive antenna helps eliminate multipath. Multiple channels are available and each unit can be switched between two factory-set frequencies. Like the T-100, the T-200 transmitter attaches to the camera's battery mount. The R-200 receiver is a rack-mount unit. If desired, the hand-held R-100 receiver can be used with the CamLink 200 system to provide portable monitoring of the signal.

Circle (115) on Reply Card



With HVM They Both Win!

Random Access Playback *and* Cost-Effective Library Storage

Sometimes you don't have to choose! Especially when you need both the rapid access of disk, and economical archiving. Now, with hierarchical video management (HVM), you can have it all.

HVM puts every penny you spend where it does the most good. Your valuable spots are downloaded from a secure tape archive to a high-performance disk "cache" for replay to air. Spot inventory is economically maintained on tape in the format of your choice, so you're not using disk space until you need it. And programs are played direct-to-air from tape. All automatically.

Since HVM reduces both the size of your disk array and wear and tear on the VTRs, it's a price/performance winner for single- and multi-channel operations.

HVM is the technology of television's future – today. And the product that best embodies HVM is the Odetics CacheMachine™. The CacheMachine keeps your entire spot inventory on-line. A whole library of spots and programs can be instantly available. Plus modular design of the CacheMachine lets you use the same library for more than one on-air channel.

So bet on the sure winner. HVM, the technology that saves you time, money and manpower. And the Odetics CacheMachine, the system that puts your station across the profit line first. Call us today at (800) 243-2001.

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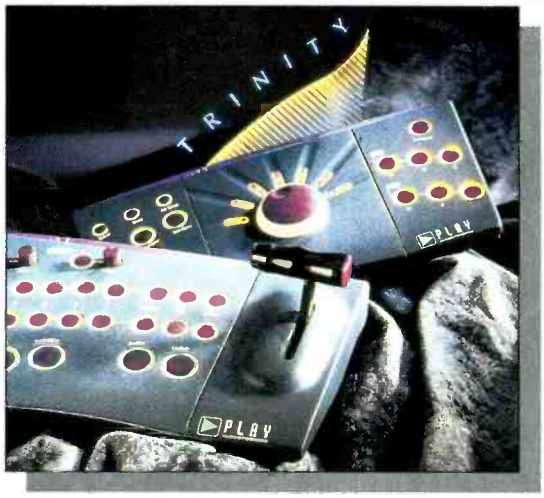

PLAY: *Trinity*

Trinity is a ready-to-edit system that includes two composite+Y/C input modules and one composite+Y/C output module. It runs on a Pentium PC with Windows 95 or Windows NT 3.5. Also required is one free PCI slot, 16MB of RAM, a 2x CD-ROM drive, 75MB of free hard-drive space and an 800 x 600 x 24-bit SVGA display card. The system supports CCIR-601 resolution (4:2:2:4) and can be configured for either 8- or 10-bit operation. Options include the Preditor dual-channel, non-linear editor and a warp engine for real-time 3-D digital effects. External control panels are available, as are component and/or composite digital input/output modules. A 24-frame film sync module is also available. Users can configure the system with up to eight video input modules, eight digital video processors, four downstream cards and three data processors.

Circle (116) on Reply Card

Miranda: *Espresso SCSI-to-digital video interface*

Espresso is a stand-alone platform independent gateway that allows digital information to be moved from the video world of SMPTE 259M to the computer world of SCSI-2 or vice versa. It features a sustained throughput of 68MB/s on four SCSI-2 fast and wide ports (17MB/s per SCSI-2 channel), supporting real-time 4:4:4:4 video transfers. Along with allowing real-time input of 4:2:2 video into computer systems, raw computer data can be archived on D-1 or D-5 VTRs. Combined with a companion drive array, Espresso allows small workstations to handle video transparently. It offers full support of the CCIR 601 hierarchy, including 4:2:2, 4:2:2:4, 4 x 4 YCrCb and 4 x 4 GBR. Resolution-independent architecture accommodates video, film and HD applications with 12-bit color space conversion between RGB and YCrCb.

Circle (117) on Reply Card

Faroudja: *VP400 line quadrupler*

Designed mainly for use with today's video projection systems, the VP400 video processor provides significant picture improvements by increasing the number of horizontal scan lines by a factor of four. Along with line quadrupling, processing included in the VP400 includes adaptive decoding, bandwidth expansion and noise reduction. Inputs to the unit are composite, Y/C, RGB and Y/R-Y/B-Y. A composite sync input is also provided. Output is RGB at 0.7Vpp along with 4.0Vpp horizontal (62.94kHz) and vertical (59.94Hz) sync. Remote control is available through an RS-232 interface.

Circle (118) on Reply Card

Will-Burt: *Mechanical telescoping mast*

The heart of this mechanical mast is the drive system. The drive train incorporates a durable, heat-treated stainless-steel thin foil column. The mast drive system is powered by a 115VAC 3/4HP motor. The motor has an internal braking system that allows the mast to be stopped at any height. Mast position is maintained with or without power. Abrasion-resistant mast surfaces, combined with positive extension and retraction, reduce the possibility of winter icing freeze-ups. In the event of power outage, the unit contains a manual backup system. The self-supporting unit can be extended to a height of 38 feet, and has a top-load capacity of 200 pounds.

Circle (119) on Reply Card

Now you don't have to scramble during the game.

Gone are the days of fumbling for those elusive video tape cassettes during live broadcasts.

With Pioneer's VideoDisc Recorder, you can access footage literally at the speed of light. No sweat. How can it be so fast?

Well, the VDR-V1000A's High Speed Dual-Head System allows for non-linear search and play. So you can instantly jump to any piece of footage you want.

For example, let's suppose you're broadcasting a football game and you want to refer to some clips from previous games. Your VideoDisc Recorder will allow you immediate access to any of your catalogued footage.

In addition, with our FastFile™ software, locating and retrieving clips is as simple as a point and click. It's also perfect for indexing, organizing, and accessing stills, video segments and graphics.

And as if that wasn't enough, the VDR-V1000A is rewritable so you can re-record over a million times.

For more information, call one of our regional offices. East: 201-236-4180, Central: 214-580-0200, West: 310-952-3021.

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Pioneer New Media Technologies, Inc.

The judges

Steven Blumenfeld, vice president of technology
GTE Imagetrek, Carlsbad, CA

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

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

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

Joe Hickey, director of engineering
Interface Video, Washington, DC

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

Phil Mendelson, vice president of engineering
Hollywood Digital, Hollywood, CA

Karl Renwanz, vice president
Video Transfer, Inc., Boston, MA

Dick Stephen, senior engineer
IMMAD Broadcast Services, Laurel, MD

Rich Schmeltz, manager/system architect
Tele-TV Systems Digital Service Bureau, Reston, VA

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

Peter Zawistowski, senior engineer
Target Enterprises, North Reading, MA

The rules

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

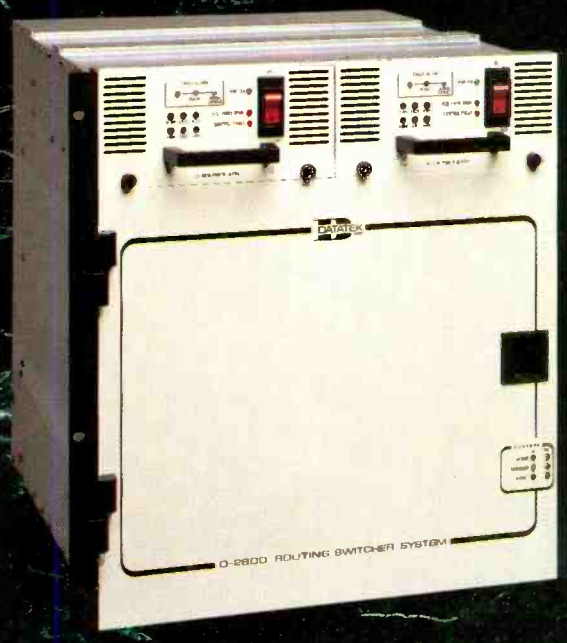
1. They must be new products—not shown at a previous NAB. In some cases, distinguishing a new product from a modified old product is difficult. For our purposes, a new product is one with a new model number or new designation.

2. They 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. The 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. The products must be available for purchase within calendar 1995. 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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D-2800 Series, systems 32x32 to 1024x1024

D-2600 Series, systems 16x8 to 32x32

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At Datatek, we've been supplying leading-edge routing switchers for large and small broadcast systems for over 25 years. That tradition continues with our newest additions, the D-2800 and D-2600 series. These new switchers support all signal formats: serial digital video, AES/EBU digital audio, data, analog video, analog audio, and time code. The D-2800 and D-2600 also deliver a number of other advantages:

- Total Upgradability—Each switcher uses a common control system, so the smaller D-2600 can be integrated into the larger D-2800 system...when you're ready.
- You can mix formats and levels...in the same rack frame
- An advanced virtual tally system
- Serial digital video to 400 Mb/s and auto equalizing and relocking
- Tie-line control management, your gateway to mixed digital/analog facilities
- Central control panel management with no system interruption
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DATATEK CORP

Circle (38) on Reply Card

Wow, what a show!

This year's NAB was bigger than ever. More exhibitors, more floor space and certainly more visitors. In fact, NAB ought to be called the "Super Bowl" for the broadcast and production industries. I usually allow two to three days for winding down (and gearing back up for this issue) after the show. That wasn't long enough. I'm still recovering and it's been three weeks! Based on my conversations with about 20 other media types, they felt the same way. The NAB show has simply become so big, it's impossible for any one person to cover it all.

First-class challenge

We at *Broadcast Engineering* magazine knew we faced a real challenge when plans were developed back in January for our show coverage. In preparing for the coverage, we knew that more experts would be needed to cover the expanded exhibit halls and all of the new technology to be shown. Through the eyes and ears of our technical experts, we planned to give *BE* readers the most thorough and detailed coverage ever of the convention floor. This issue proves we've again been successful.

Second to none

What follows represents the hard work of some of this industry's most knowledgeable individuals. They, like you, are charged with helping their stations, production houses and networks operate profitably. With that in mind, they canvassed the floor from opening bell until closing whistle. Not willing to settle just for public demonstrations, our reporters also peeked into some private showings of tomorrow's products.

Our exclusive Pick Hits product coverage begins on page 30. Here are the 20 hottest products as judged by our expert panel. See what they thought were the best and most innovative picks for this year's convention.

Need more information?

We've even made it easy for you to get more information on the products you're interested in. Look for this symbol at the end of each product section. By circling that number on the reader service card, the companies mentioned in that section will rush more information direct to you.

So, for those of you that attended, here is your complete review of the monster event. And for the many who stayed home and kept the transmitters and edit rooms working, here's what you missed.

Brad Dick

Brad Dick, editor

NAB 95 New Product Highlights Table of Contents

Storage systems

By Karen Mills

NAB provided a virtual smorgasbord of storage options from traditional videotape, to computer systems and peripherals, to new hybrid solutions. The evolution of many of these storage technologies for video began in data applications. How do these newer video storage solutions address the needs of broadcasters? Are video servers all that new or a variation on an older theme?

ASC's Virtual Recorder (VR) and Virtual Disk system drew a large following. Adding targeted application software and hardware options, the VR's application base has quadrupled. With random access, RS-422, recording of on-line quality video, two channels of audio and SMPTE time code, the VR can act as a spot inserter, slow-motion deck, non-linear editing source/master, DAW companion, animation recorder, time lapse recorder and archival recorder. Inputs include Y/R-Y/B-Y, S-VHS and composite. Storage includes Fast, Wide SCSI-2, Raid 0 or 3 for up to 28 cascaded devices.

BTS's Media Pool provides expandable multichannel tapeless video and audio recording, editing and playback. Images can be compressed and/or the system supports 10-bit full-bandwidth CCIR-601 video along with multichannel AES audio. New software allows the Media Pool to use the digital video storage capabilities of Storage-Tek's MediaVault. The software allows for the retrieval of large amounts of archived video. A typical system may hold 1,000 cartridges, each of which can store 50GB of information.

Leitch Technology Corporation announced the signing of a major contract with Digital Equipment Corporation to design and manufacture a broadcast quality, real-time 10-bit digital video, audio and time-code PCI interface for Digital Alpha 64-bit family of computers, which includes the AlphaStudio. The system has digital video production capabilities and uses integrated high-performance computing technology for full-motion digital imaging.

Hewlett Packard was there with its Broadcast Video Server. Shown last year, several systems have been sold, and one is on the air at KOLD in Tucson. Another unit that has been in operation at CBS headquarters in New York is to be installed in the CBS owned-and-operated KCBS-TV in Los Angeles. The HP server provides full network capabilities, a fault-tolerant architecture, support for MPEG-2 and an open platform. Also on display was the new HP 4:2:2 video disk recorder. It can record up to 24 minutes of uncompressed video. It can be menu configured for 8- or 10-bit, 525 or 625 operation. A digital audio interface provides for two stereo pairs of AES/EBU audio to be recorded along with the video.

JVC introduced one of the two new tape formats. Digital-S is downward compatible with S-VHS, allowing customers with extensive S-VHS libraries to continue to use the older tapes with the new machines. Digital-S employs 4:2:2 component signal processing combined with a 3.3:1 DCT-based, intraframe compression system. Digital-S uses ½-inch metal tape in a VHS-sized cassette that provides 105 minutes of digital recording on each tape. Recorders accept composite, Y/C and Y/R-Y/B-Y signals as well as component serial digital signals.

Micropolis was there with its AV Gold drives. These units use SCSI-2, Fast and Wide to offer sustained transfer rates of 4MB/s with maximum burst rates of 20MB/s. Three units were introduced, a 2GB, a 4.3GB and a 9.1GB. Also on display were the Micropolis AV servers. The AV Server 50 incorporates VideoNet and VideoShare software management tools. These units offer up to 64 output channels that are MPEG-1 and MPEG-2 compatible. Each channel is capable of data rates up to 15Mb/s. Each server can store up to 240 hours of material at 1.5Mb/s. Multiple servers can be connected.

New systems at Odetics included the Prophet Automated Video Library, which is a scaled-down version of the TCS90 library. It uses HVM (hierarchical video management), which manages video storage. HVM seeks to include the needs of the video industry into a video archival system that uses the best of tape and disk storage methods. Also on display at Odetics was Spotbank, a family of format-independent digital disk-based spot insertion machines. Another disk-based unit, MicroSpot, is a low-cost replay system intended for limited budget and LPTV stations.

Panasonic had the other new tape format. Based on the yet-to-be-unveiled consumer DVC format, DVCPRO offers digital 4:1:1 processing with a 5.5:1 compression in a small package. (See "1995 NAB Pick Hits," p. 30.) Tape is 6mm wide and one camcorder featured the tape transport in the handle. The unit was slightly larger than the lens assembly of a traditional camcorder. Other DVC products include a palm-sized playback unit complete with a color LCD display, a laptop-sized editor and two camcorders. Panasonic also announced an agreement with StorageTek to provide hybrid disk/tape storage of video. Also introduced was the LQ-D5500, a re-recordable digital optical video disc recorder/player.

Tektronix was back again this year with the Profile, a disk-based audio and video storage system. Profile, introduced last year, is an open system for storing and manipulating video and audio information. Its modular architecture provides four simultaneous I/O channels. More than 100 Profile recorders have been shipped worldwide since its introduction. Tektronix also announced an agreement with NBC, in which NBC will utilize the Profile in the GEnesis Project. GEnesis is a project designed to replace NBC's television network origination facility with an entirely new, state of the art facility. Profile recorders will be used to provide both commercial playback and insertion for NBC's outgoing networks and their derivative regional feeds.

Pioneer's booth showcased some practical technologies that are timely and cost efficient. One was a broadcast digital laser disc for automated storage of video libraries. The Digital LD system employs a write-once read-many (WORM) disc system that uses a real-time MPEG-2 encoder, a digital LD DiscWriter, a digital LD videodisk drive, a 4-head digital LD player, an MPEG-2 decoder, a digital disc autochanger (252 discs) and a disc cart machine capable of holding up to 504 discs. Each module has a built-in robotics system and a built-in transfer port to facilitate the transfer of discs between adjoining modules.

Storage Technology Corporation, or Storage-Tek, showcased a storage system based upon a highly modified D3 transport (RedWood) and using a true data mode for flawless data integrity. The automated library system, dubbed WolfCreek, holds up to 25TB (Terabytes, 1,000GB) in the footprint of one VTR cart machine. WolfCreek can be an integral part of a broadcast server system offering near-line performance in multiple applications including NVOD, programming, spot playback and image/element archival. The library storage system can provide from 500 to 1000 cartridge capacity.

Rorke Data announced the AVR (audio/video rack) series of customized SCSI peripheral enclosures. The series includes the AVR 35, the AVR 05 and the AVR 410. Customized CD-recordable rack-mount and desktop configurations also were introduced in addition to magnetic media.

Recognition Concepts, Inc. (RCI) offered an audio feature to its large-format, uncompressed line of digital Video Disk Recorders (VDR). It provides for non-linear synchronized playback of up to eight channels of AES/EBU audio. RCI also made available a high-definition digital-to-analog board set. Digital HD data is input to the assembly via a SMPTE 260M-compliant 50-pin D-subminiature connector and output as analog video in either RGB or Y/Pr/Pb format.

Sierra Design Labs introduced the SCSI Framer. When the framer is linked with the Quick-Frame family of high-capacity digital disk recorders, the SCSI Framer provides concurrent access to uncompressed component disk storage for up to 12 workstations. Sierra Design Labs also announced the Quick-Frame EX48, a high-endcomponent video storage solution. The recorder can store

just under 48 minutes of uncompressed 8-bit 4:2:2 component digital video in 5 1/4 inches of rack space. Sierra Design Labs also announced the Digital Audio Adapter that offers four channels of AES/EBU digital audio storage.

Sony's DVW-250 portable videotape recorder offers 10-bit 4:2:2 component digital video and four channels of 20-bit digital audio. The VTR records for up to two hours using a single battery and a single cassette.

Asaca introduced the ACL-400 automated tape library system designed to accommodate approximately 40 cassettes (depending on the format) for S-VHS, D-2, D-3, D-5 or Betacam. A robotic handler system automatically retrieves scheduled video cassettes, inserts the tapes into the VTRs, then selects program recording or playback.

Although not really a storage product, the Viewgraphic's Dataview SDA-21 makes the transfer of video data a piece of cake. The SDA-21 provides data on D-1 or 4:2:2 video transfer modes (software-controlled 8- or 10-bit modes). (See "1995 NAB Pick Hits," p. 30.)

Reply Card 150

Cameras, lenses and accessories

By Peter A. Douglas

For me, this was the first time I stayed until the final gong. In many ways, this reflects on the size and nature of this year's show. Each year we are all faced with a challenging array of new products. Let's look at some of the new product highlights as well as some favorites that keep appearing.

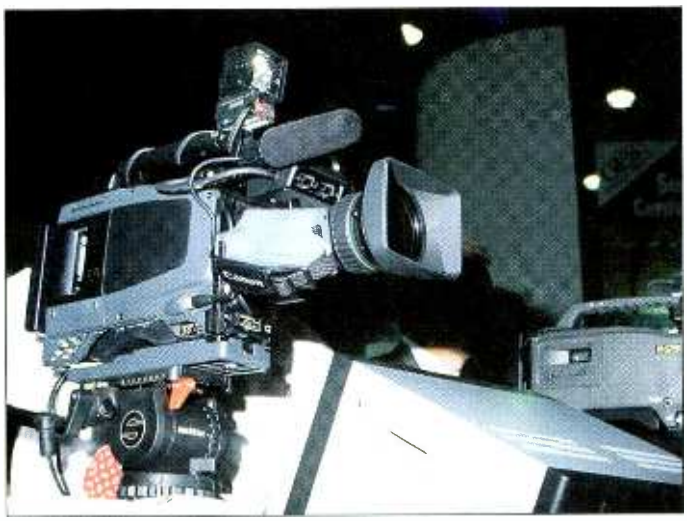
The highlight of Ikegami's booth was the DNS series of camcorders. Incorporating an on-board disk recorder compatible with several non-linear editing systems, these cameras allow for video to be recorded to a removable disk that can be directly loaded into systems such as the Avid NewsCutter. The DNS 11 is a high-quality camera with 62dB S/N and a 400,000 pixel FIT CCD pickup. The DNS 101 uses the 380,000 pixel IT chip. Both cameras offer 700 TVL of horizontal resolution. (See "1995 NAB Pick Hits," on p. 30.) Other cameras shown include the new HC 390, a dockable IT chip camera offering high performance and low cost. The new HK 477 studio camera is essentially an old faithful HK 377 with a new switchable aspect ratio. This camera offers full resolution in both modes through the use of a new 4-CCD system. Also available with this switchable feature are the HK 477P, HK 366 and HK 55.

Sony was showing the BVP 500 studio and BVP 550 portable cameras. Both incorporate Sony's DSP processing and are available in either 16:9 or 4:3 aspect ratio. The image capsule is field switchable. They include the 520,000 pixel Hyper-Had CCDs, DSP processing and wideband triax. As an added convenience they share the same CCU Sony has used for the BVP 700/750. The BVP 700 high-end production camera is in full production. The BVP 700 and its companion portable the BVP 750 can also be changed from 4:3 to 16:9 in the field. For high performance at lower cost, the new DXC 637 dockable camera and its PVV 3 dockable recorder are available. This combo offers surprising quality at a reasonable price.

This year JVC introduced the KH 100U HDTV camera. Touted as the world's first affordable HDTV camera, the KH 100U features 1,000,000 pixels with a sensitivity of f7.0 at 2,000 lux. It is lightweight and has a selectable output format. At $62,000, this truly is a breakthrough for HDTV producers. Also from JVC this year is the KY 27C low-light camera. Sensitivity is down to 1 lux with full 800-line resolution, no smear and 100% video output. The KY 27C is available with a new triax control system. JVC also introduced the GY-X2B, and an advanced version of the GY-X2U, a full-size 3-CCD integrated S-VHS camcorder. The X2B-camcorder features all new CCDs, better low-light performance and a new contoured shoulder pad.

BTS offered no new developments in the line of LDK cameras that continue to be popular in remote and studio applications. This year BTS is expanding its disk-based server and editing technology.

There were two new items from Hitachi this year. First is the SK 2000 series of low-cost digital cameras. The SK 2020 is a portable digital camera for ENG/EFP use with a 400,000 pixel CCD IT chip and wideband triax, an S/N of 62dB and full 700 TVL resolution. Second is the all-digital transmission system for its digital cameras. The system offers either digital triax or digital fiber.



With optical fiber up to 10,000 feet of cable can be used. The CU 2000 CCU works with all 2000 series digital cameras and outputs a variety of digital formats.

The star of the Panasonic booth has to be the new DVC line of products. These products include three cameras. The AJ D700 ENG camera is lightweight and sports 1/2-inch FIT chips, low-power consumption. The new DVCPRO EFP camera is a 2/3-inch FIT camera designed for field applications. Last and certainly the least (size wise that is) is an impressive 1/3-inch CCD camera/recorder weighing less than five pounds. This is a full-featured camera that appears to be no more than a lens and viewfinder. The recorder is in the handle. All these products use the new DVCPRO digital tape format.

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Lenses

Fujinon introduced the Ah70x9.5 field production lens. It has a focal length of 9.5 to 665mm (1,330 mm with 2x). Fujinon now offers an optional ratio converter (for 16:9) in the extender turret. This feature allows use of the same lens with the new switchable ratio cameras without sacrificing performance. Other new products are the A8.5x5.5DEVM, A15X8DEVM, and A20XDEVM V-grip lenses. These lenses compensate for view angle when used in switchable 16:9 ratio hand-held cameras.

Nikon's new, extremely lightweight ENG/EFP lens was impressive. The S20X8 lens weighs 3.42 pounds and is eight inches long. This lens complements the S15X8.5 and new S9X5.5 superwide lens offered by Nikon.

Angenieux completes its range of Assisted Internal Focus lenses with the introduction of the 62X9.5AIF lens. This lens has a zoom ratio of 62x and focal length of 9.5 to 589mm (19 to 1,178 with 2x). Also featured was the 15X8.3AIF lightweight lens for ENG/EFP. All new Angenieux lenses are compatible with 16:9 aspect ratio.

Canon's entry into the zoom ratio contest is its new Digi-Super 70 lens. This lens offers a zoom ratio of 70x with full 16:9 compatibility, as well as a redesigned control system.

Reply Card 152

Camera/lens accessories

Century offers a line of adapters and lenses. Its wide angle adapter line is comprehensive and extremely cost effective. The adapters feature little edge distortion and light loss. Other Century products include a line of adapters for placing a 35mm camera lens onto video cameras and adapters to mount lenses back to back for extreme macro videography.

Camplex pioneered the field of third-party, cost-effective camera control systems. The new VTU 320 video signal timing unit fits nicely into the line of control systems. This device can adjust the subcarrier and H phase of video signals to compensate for distance variations of up to 5,000 feet. Camplex offers several systems, such as the CP 301A S4 that combines return video with basic signals into a camera control system. Camplex systems use small camera-mounted adapters connected with coax. Functions such as iris, power

Continued on page 48

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Continued from page 44

and intercom are available and interface with virtually all cameras.

Innovision offered two new products. The first is the Probe II lens, intended for tabletop photography. By using a 15-inch lens barrel 1.7 inches in diameter, the Probe II lens reaches creative points of view previously unreachable. Probe II was demonstrated using another new product, the Shuttle, a 360-degree motion-control track that can be custom assembled to match the configuration of the miniature sets being shot. Used in combination with the Mini-Mover pan-and-tilt head, the shuttle is capable of a variety of complex, repeatable camera moves in upright and underslung modes. The camera can also be moved inside, around and through larger objects.

Other neat products included the new Schwem GX-4 camera image stabilizer. A vibration table demonstration was impressive. The Schwem Gyrozoom continues to be a favorite of aeronautical video fanatics as well as news directors.

All in all this was a great show. Attendance was way up, the mood was good and people were buying. My favorite moment was at 2 p.m. Thursday, as the crowd of weary sales and technical people cheered the demise of NAB 95, I walked by the Enco Systems Booth and heard the salesman continuing his presentation to an interested customer. For some, NAB is just another sales call.

Reply Card 153

Editing systems

By David Leathers

1995 was the largest NAB. More than 83,000 attendees representing everyone from broadcasters to CD-ROMers all converged on more than 1,000 booths spread across four exhibit halls. Barriers between traditional video manufacturers and computer-based companies were showing serious erosion. Tektronix announced the acquisition of Lightworks, a major non-linear editing system manufacturer. Grass Valley introduced the VideoDesktop, an OEMed version of Data Translation's Media 100 non-linear system. Non-linear on-line systems have come from being on the fringe to center stage in the last year.

Avid Technology has played a major role bringing tapeless broadcast into reality, with more than 40 stations using Avid broadcast equipment. NewsCutter is a non-linear editing system for news that features a streamlined user interface designed for fast, creative news production. It interfaces with a other Avid products to enable a tapeless newsroom environment. Also, Avid's Media Composer 1000 and 8000 systems were showing their highest picture quality yet, with resolution AVR27.

D-Vision Systems announced a family of broadcast-quality on-line systems, the D-Vision PostSuite, based on single and dual Pentium processors running Windows NT and supporting various video and audio cards and drive configuration. The top-of-the-line model, the D-Vision On-LINE-XED, will provide CCIR 601 I/O using low compression ratios. Delivery of the first systems is expected in the third quarter. Also showing was the D-Vision Pro 2.2, a powerful, cost-effective off-line system based on the PC platform. It's available as a board and software set or in fully configured systems.

Lightworks has a PC-based news editor called Newsworks, which is designed for on-line news cutting. The company also has a direct-from-disk playback system called Airstation. Also available from Lightworks is the Heavyworks Two system. It goes beyond the original Heavyworks system's multicamera non-linear off-line approach and boosts the resolution into on-line compression ratios.

Grass Valley announced the Sabre system is now shipping. Sabre provides on-line control of up to 30 devices as well as switchers, mixers, TBCs and other external devices simultaneously from the keyboard and/or mouse. It uses a graphical time line interface that can show the editing information numerically, making it easy for current "Super Edit" users to transition to the system. Grass Valley was also showing the VideoDesktop Personal Production Suite. For this product, Grass Valley has teamed up with Data Translation. The VideoDesktop is a fully integrated non-linear on-line system that includes the Media 100 integrated into an Apple Power Macintosh 8100/100 CPU, with a monitor and disk array. One of the principle advantages to this system for many users will be the availability of Grass Valley's after-sale service.

Panasonic introduced WJ-MX1000 Postbox non-linear AV workstation. It offers M-JPEG image quality and features real-time 2-D and optional 3-D effects.

Matrox was showing Version 3.0 of its software for the Matrox Studio. Delivery is projected for the second quarter. The software features a 6MB/s non-linear video quality level, a separate graphics layer with an alpha channel, four tracks of digital with enhanced crossfade, mix and volume control and frame-accurate editing between non-linear and linear elements. Also, a big feature of 3.0 is its support for one or more DDRs and video servers. Matrox was also showing the Super F/X option. In addition to providing soft-key features, it has an interface for the Pinnacle Aladdir 3-D effects system. Using the Aladdin, the Matrox Studio can produce a wide array of 3-D digital video effects.

German manufacturer, FAST Electronic, maker of the Video Machine Non-Linear Studio with the Digital Player/Recorder, announced it has teamed up with Compaq to provide two turnkey versions of its linear/non-linear hybrid editing systems. The "Studio Quad," which is aimed at broadcast and higher-end post environments, comes with a Compaq Proliant rack-mount 486 PC and the Video Machine, including Digital Recorder/Player, YUV component inputs and outputs, a jog shuttle knob, balanced audio, two SVGA monitors, 8GB of video storage, a CD-ROM drive, a Roland sound card and Inscriber Character Generator software. The "Video Quad" is a slightly scaled down version, without the component I/Os, less memory and storage and is intended for cost-conscious customers with lower performance requirements, such as corporate video departments and smaller post houses. FAST editing systems also have an interface for the Pinnacle Aladdin 3-D DVE system.

ImMIX was showing its new 3-D DVE for the VideoCube and TurboCube workstations. Fully integrated with these editors, it offers full real-time X, Y and Z positioning. Using wavelet technology, the TurboCube is a complete preconfigured workstation for real-time non-linear finishing.

Night Suite from Adcom was one of the most powerful new systems out there. The company was showing a version that is close to units that will ship in the coming months. Night Suite uses MS Windows for its user-interface. All the signal processing bypasses the computer's bus structure. Its high-speed processors are capable of providing 8-bit lossless 4:2:2 CCIR-601 video with real-time effects. The compression is scalable and can be handled at either 30fps or 60fps. The system comes with a SADiE 8-channel digital audio workstation built-in. It also has a control panel that provides editors easy access to jog, shuttle and editing functions as well as motorized flying

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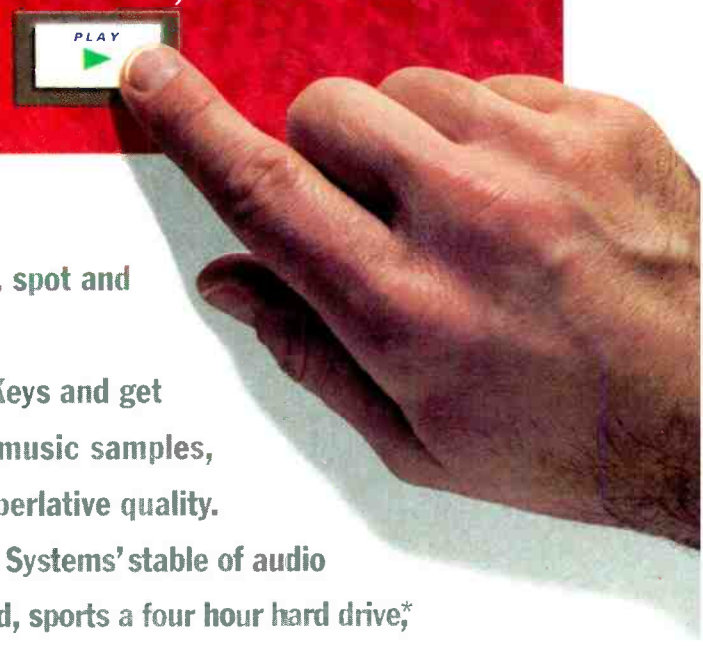

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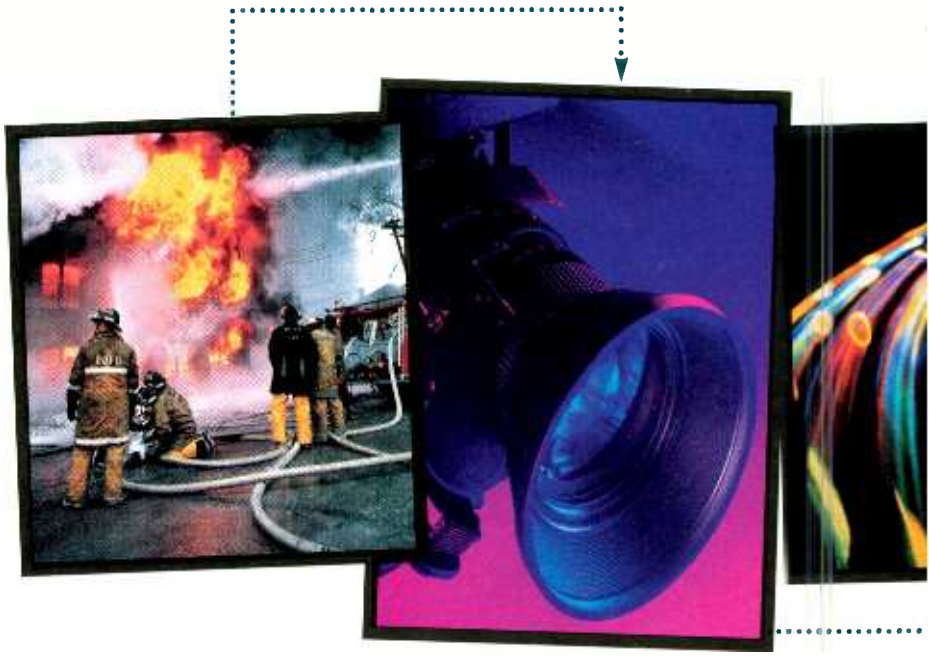

Avid presents the first lens-to-transmitter disk-based solution.

Broadcasting has never been more competitive. So it comes as no surprise that hundreds of broadcasters have turned to Avid Technology's disk-based solutions for news, post-production and playback.

Remember ENG? Avid has revolutionized it with DNG (Digital News Gathering), the only fully-integrated system that takes you from recording to on-air playback, without ever using tape. Avid DNG even includes the world's first disk-based full-motion camera, developed in conjunction with Ikegami Tsushinki Co., Ltd. Lens-to-transmitter, all on disk.

The benefits are enormous. When news breaks, you can beat the competition to air with higher quality, better-looking stories. Disk-based editing is so fast and easy, you can create fresh versions for every newscast, thus growing your audience. And because Avid DNG helps you streamline operations, you'll find production costs tumbling. That goes straight to the bottom line.

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Avid AirPlay®
Disk-based playback for news and commercials

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Avid Media Composer®
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Avid CamCutter™
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Avid Newsroom Automation
Advanced solutions for LAN and WAN environments

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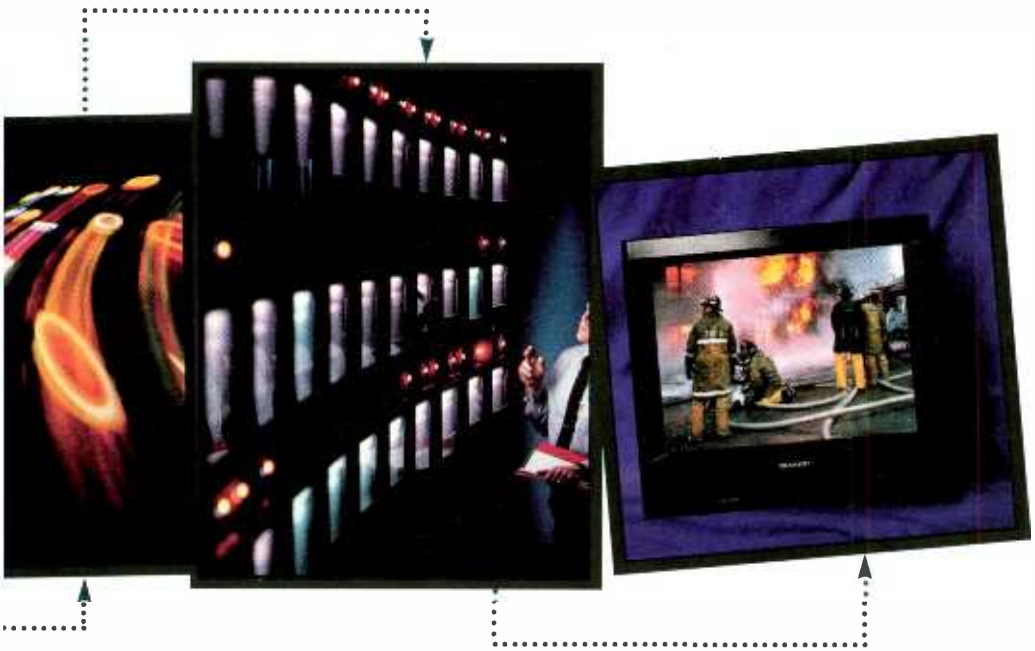

Avid's newsroom automation systems are also helping broadcasters improve the quality of newscasts. Fully-featured, advanced systems increase control, reduce costly errors and most importantly, allow people to work together more efficiently and creatively.

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Continued from page 48

audio faders. The company's previous experience with non-linear is apparent in the product's straightforward design. It has virtually all the effects possibilities available in traditional edit bays. It controls external machines through V-LANS and can pack video on up to 35 SCSI drives.

The Accom RAVE (Random Access Visual Editing) combines the Axial 2020 editor with an interface to Accom's 10-bit RTD real-time disk recorder. It can provide random access to almost 30 minutes of D-1 or an hour of D-2 quality video on-line. Editors can control up to 48 devices simultaneously as well as external TBCs, switchers, audio levels, router assignments and effects devices without leaving the keyboard. It has powerful routines for assisting the editor in loading and storing material and dealing with the technical parameters of on-line editing. It does this all from a graphic interface with a time line and icon-based scene manager. Accom also has the Axial WSE work station editor that runs on Silicon Graphics computers. It provides much of the same functionality of the Axial 2020, but it is designed so that users of paint, graphics, animation and compositing software can perform on-line editing.

Chyron was showing software for its OMNI 500, 850, 1000E and AEGIS editing systems with enhanced TBC controls. The software also had improved switcher interface functions, enabling the system to take advantage of switcher improvements from Abekas, BTS and Grass Valley

BTS was showing Newswave, an editing system that features a graphical user interface that ties directly to the Media Pool Server. It uses a non-linear time line interface and comes with a push-button console with a large multifunction control knob. It is designed to provide quick and simple editing of stored material. It takes advantage of the Media Pool's powerful data-handling capability and can deliver uncompressed D-1 quality or video compressed at up to 20:1. Also available are options for device control and automated capture from EDLs. BTS was also showing the Bravo VE, a Windows-based linear/non-linear editor. The non-linear editor is currently working at off-line resolutions and the on-line side provides full ABC roll linear editing as well as support for a wide range of switchers and external devices.

JVC and TAO were announcing a 12-pin interface that allowed the TAO editizer edit control system to be used with JVC's "Edit Desk" VCRs. It allows frame-accurate control of the inexpensive BR-S800 and BR-S500 decks and gives the user access to its non-destructive CTL time code. The CTL time code can be used to post-stripe a videotape with time code without having to use an audio track. JVC was also showing the new RM-G820U editing controller that supports a variety of advance motion effects and compatibility with a wide range of machines and external devices.

Video Media was showing the OZ-PCE production control environment. The system is capable of controlling an A/B/C/D roll editing environment with advanced VTR control. A wide range of options includes dedicated keyboards and shuttle knobs. Users can upgrade to the OZ-PCE from VideoMedia's "Mickey," "MICRON" or "SUPERMICRON" editing systems.

Several of the original Newtekers left to create Play Inc., along with a new desktop production tool, the Trinity. It runs on the Pentium-based PC with Windows 95, and provides D-1 quality video in a 10-input switcher/dual DVE/10ns CG/audio mixer/chroma-keyer. (See "1995 NAB Pick Hits," p. 30.)

The DNE-300 edit workstation from Sony features a dual-channel component video hard-disk drive design. The company also introduced the DES-500 hybrid editing system for off-line and on-line suites.

Data Translation released version 2.0 of its Media 100 digital video system. Now native on the Power Macintosh, the new version features improved picture quality, QuickTime codec, MotionFX, dual subsampler -- trim mode, new project and media management, real-time audio panel, Dissolve-FastFX, fast static title, machine control and the ability to import PICT files.

Pro-Bel introduced its TX-220 digital master control switcher designed for multilanguage operations. It has 20 program inputs and employs 10-bit component digital video technology with AES/EBU digital audio processing.

Dubner International's Scene Stealer is an automatic scene detector/logger that consists of a video capture board and logging software. It detects and marks scene cut points and grabs video at defined intervals or when triggered by cuts.

Reply Card 154

Production equipment

By Dave Dore

Roaming the exhibit halls of NAB were thousands of video and TV professionals wondering where the technology is going. One of the most pondered points was that of the integrated workstation vs. the dedicated box. Software-based companies will tell you that eventually everyone will work from a server on networked machines. The production equipment manufacturers, however, insist that dedicated equipment will always be more reliable and faster. Regardless, there was plenty available for all.

Switchers and such

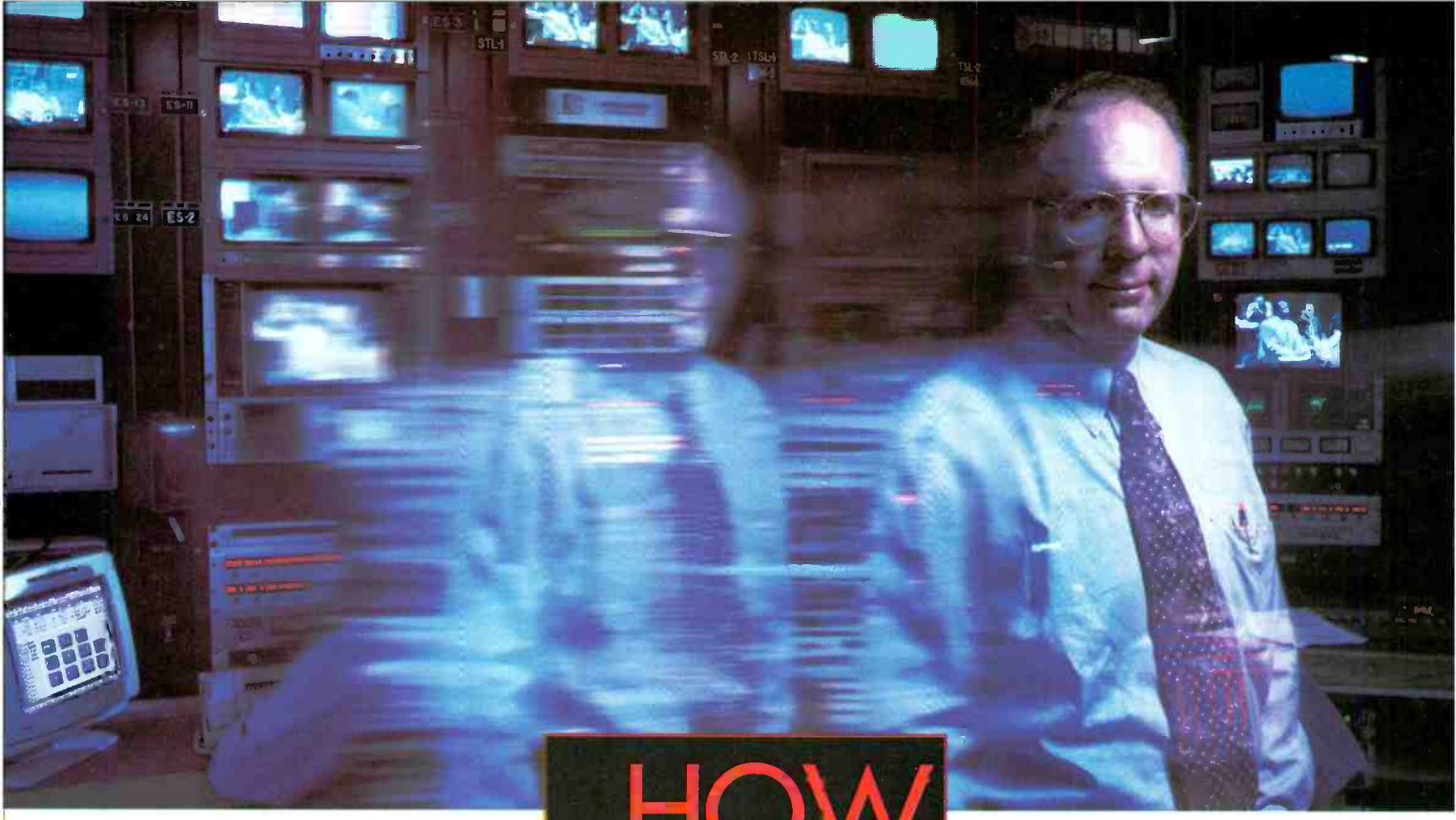
Every production facility has a switcher in some form. Video goes in, gets mixed and goes out. Most switchers today include time line controls, effects memory and effects looping options. As competition heats up, features are added to win over potential buyers. In the live category, there were several new entries.

Grass Valley has the reconfigured model 3000-3T. This is a standard 3000-3 composite digital board with 48 inputs, but in a modular design. Grass Valley also showed off the model 2200 component digital switcher. The 2200 offers CCIR 601 capability at a mid-range price with many powerful features. Options include effects send, Chromatte advanced chroma-keying, video and key framestores, linear border line edge generator, and the ability to add a key input for every video input.

BTS had its Diamond Digital family of 4:2:2 switchers. The DD30 is a 32-input switcher with the 2 M/E plus a pgm/preset bus configuration. With two downstream keyers and two keyers per M/E, a total of six keyers are available. Features across the line include automatic key alignment, paint mode masking, framestores, and a DynaChrome keyer that can add shadows and reflections to chroma-keys. The DD series also supports effects looping, allowing a DVE to function as a wipe generator or internal transition. The DD20, DD10 and DD5 are all smaller versions that come with less keyers, smaller consoles and more palatable price tags.

Sony has decided to push into the live market and is offering the DVS-7000. Easily switchable from composite to component digital, the DVS-7000 composite version accepts up to 36 digital and analog NTSC sources. With three M/Es and a pgm/pst bus plus the optional DMK-7000 digital multikeyer for downstream effects, the 7000 allows up to 10 layers of keying. Effects looping to the DME series of digital effects boxes allows for send and return of video and key signals all on one keyer using one bus. All DME and switcher settings can be recalled for each M/E with Flexi-Pad memory control. Unlike the competitors, each keyer on each M/E has its own set of buttons representing all key inputs. A subcontrol panel can be installed away from the main panel allowing another user to access part of the switcher while the main console controls the rest.

Thomson Broadcast offered the 9500 component digital mixer. It is an ergonomic console with powerful features, such as effects looping, color correction, 26 color matte generators and three video and three key framestores. The 9200 model is a smaller multilayer effects board with 12 inputs and a smaller chassis.



HOW FAST CAN YOU DISKO?

IF you want to make the move from tape to disk, Ira Goldstone has a few quick words of advice:

Q: As Director of Engineering at Tribune Broadcasting, you're in the midst of updating your entire system. How do you deal with the pressure?

A: *Carefully.*

Q: Right. So did you choose the Louth ADC-100 automation system to bridge to disk or give you future flexibility?

A: *Yes.*

Q: Meaning you liked Louth's ability to control all types of different devices?

A: *Yes.*

Q: And you weren't worried about any problems with proprietary automation software or choosing any disk vendor you wanted?

A: *No.*

Q: So if you were to give advice on how to make the transition to disk, without worrying about where your station goes in the future, what would it be?

A: *Louth.*

Q: And what about the multi-casting environment?

A: *Louth.*

Q: Of course, you'd still need a media management and traffic interface system to tie it together. Any final words of advice?

A: *Louth.*

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Echolab's MVS 6, a component member of the Modular Video Switcher series, provides up to five layers of linear keys, 12 video and six external key inputs, event memory, sequencing and more for under $20,000. Fully loaded with optional chroma-key, serial control, memory expansion, programmable output routing between buses, and rotary wipes the MVS-6 costs $26,450. A 20-input MVS 9 is new to the family, and includes a full pgm/preset bus and dedicated fader bar for each transition function (two faders per M/E).

Ross Video Systems had the RVS 316 on display. The panel looks like a Grass Valley 200-1, and operators will find most functions similar. Some features are distinctly Ross, such as a "keys only" recall mode on the effect memory, and enhanced borders including shadows above the key and glow control.

New this year in the Abekas ASWR8100 are three features; an internal SCSI drive, a 10-bit component analog input module and an analog composite input module that allows facilities to integrate older composite equipment into this powerful component digital environment.

Video Gainsville rolled out the all-new Cybervision series of component digital switchers. The CV332 is a two M/E system with 32 serial component digital inputs. With a pgm/pst bus and two DSKs, the unit has a standard set of six keyers, and can add three Digital Ultimatte keyers in addition to two chroma-keyers per M/E. Video Gainsville's Cyber Key is a key-shaping process that smoothes linear, chroma, and ultimatte keys. The CV series can also integrate a 3-D DVE (CV3300) and up to four DDRs (CVDR-100, CVDR-300) right into the switcher control. For the smaller budget, the CV132 offers many of the same features for as little as $25,000.

Dynatech's Alpha Elite series sports "superlayers," which provide many features of an entire switcher in one layer. Up to four superlayers can be built onto the system, and an additional four auxiliary layers are also available. Enhancements in the keying system include detailed chroma-key control with luma highlights and lowlights, a second layer of chroma-key for secondary foreground suppression, and additive mixing between foreground and background using Alphamatte technology.

Snell and Wilcox has made two improvements to its DVS 1000, a compact serial digital production switcher. The first is a downstream keyer and the second is a 16:9 version for digital widescreen production. The company also introduced Magic DaVE, a combined desktop DVE and switcher.

The Target Technology AVS-400 series provides a low-cost family of switchers that offer 4-input, single output switching in various audio/video configurations. The switchers offer 30MHz video bandwidth, vertical interval switching and +24dBv audio. (See "1995 NAB Pick Hits," p. 30.)

Reply Card 155

More desktop video

Newtek has all but abandoned the Amiga platform, and as Windows 95 peeks around the corner, the new Toaster is heating up. The Toaster 4.0 comes in its own case, complete with LCD monitor, hard drives and processing power. Plug

the unit into your computer and you can drive the combination switcher/still-store/DVE/non-linear editor/3-D modeler from an interface much like the current toaster. Using VTASC compression, the unit uses off-the-shelf hard drives. Detach the unit from its PC, and it can be taken out into the field, hooked up to a camera, and used to record video and audio direct to disk. With the optional front-panel control panel, cuts can be performed right on the spot.

In a similar vein, the Pinnacle Alladin integrated DVE/switcher/keyer/still-store/paintbox/character generator system is now available for the Macintosh operating system. Alladin, which was introduced for PC in 1994, operates using serial control or GPI for incorporation into traditional edit environments. It can be easily adapted to a non-linear system as a facility grows.

Designed mainly for use with video projection systems, Faroudja's VP400 video processor provides picture improvements by increasing the number of horizontal scan lines by a factor of four. Along with line quadrupling, processing included in the processor includes adaptive decoding, bandwidth expansion and noise reduction. (See "1995 NAB Pick Hits," p. 30.)

Kub Systems introduced Zydeco. It is a standalone compositing system that uses a PowerMac 7100 to provide its user interface. It provides two live foreground and one background input with full key and machine control capabilities. (See "1995 NAB Pick Hits," p. 30.)

Reply Card 156

Image playgrounds of the mind

The video desktop revolution continues in full force with compositing and graphics stations everywhere. With the speed and versatility of today's machines, just about anything can be done to twist, bend, key, move and distort each frame until a whole new world exists. As producers begin to write for these seemingly limitless abilities, projects take on a new look and feel. Here is a sampling of what is new this year in the digital playground.

Chyron's Jaleo 2.0 compositing system software showed up the day before the show, and offered improved editing functionality, DVE effects and the user interface. With the integration of a Silicon Graphics Galileo video display board and Cosmo compression option, getting quality images out of this unit should be no problem. Jaleo's combination of non-linear editing with compositing makes it an excellent platform for short-form editing and finishing. Low-resolution images are used to build complex effects in real time. Full-resolution images are later rendered to disk. Jaleo Plus allows many of the Jaleo capabilities in real time by making use of an SGI Onyx. Full-resolution video goes in and out of the system using the Sirius serial digital video I/O board. Chyron's Liberty series of graphics systems also has been extended with the Liberty 64, Liberty 32 and Liberty Paint. New features, such as motion stabilization, image tracking and corner tacking have enhanced the control of animation parameters.

Sierra Video Systems announced the Mirage Image Compositing Engine. It features full 4:4:4 internal processing. The device includes such

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nifty features as an 8-input source selector, autophasing input timing, transition mixer, color correction and a color fill generator. Best of all, it claims to be half the price of similar systems.

KUB Systems received a Pick Hit (See "1995 NAB Pick Hits," p. 30) for the Zydeco. The Zydeco is a stand-alone compositing system that provides two live foreground and one background input with full key and machine control.

Digital Graphix showed the latest upgrade to the Composium II. Version 5.03 boasts an enhanced user interface, more powerful edit control, support for the 16:9 widescreen option as well as a hardware upgrade.

Autodesk plans to support 32-bit Microsoft Windows NT in its next release of 3D Studio. The company also announced plans to add to its Plug In Partnership Program, which supports Autodesk Registered Multimedia Developers. With more than 200 available plug-ins available, this software continues to improve and gain market share.

While Autodesk improves its PC direction, Microsoft announced Version 3.0 of Softimage 3D for the SGI platform. Along with several software improvements, such as NURBS and faster polygonal modeling, the most noticeable improvement is the price, about 50% less. Microsoft also announced retooling of Softimage Eddie (now V. 3.2), a full digital compositing and special effects system, and Softimage TOONZ, a 2-D cel-animation package.

Many post houses have been embracing the Discreet Logic Flint and Flame post-production solutions. Flame is a resolution-independent effects editing, compositing, painting and image processing system, and the new Version 4.0 embraces the Stone and Wire Disk array and networking solution. Using this system, Flame has access to all uncompressed media files in real time. Flame offers new features, including Soft Clips, which represent real-time files to be manipulated in a non-linear domain, on-line 3-D texture mapping and light sourcing, batch processing, which allows various levels of effects to be created and recorded, improved digital audio, and D-1 archiving. Discreet's Flint, a lower-cost alternative system to Flame, employs many of the same features as Flame and can be operated as a Flame when networked to a system containing Flames via WIRE networking technology. Discreet also debuted the TAARNA 3-D Paintbox and the Inferno, a visual effects system designed for film applications.

Parallax Software, in its merger with Avid, brings the powerful Matador paint program to the Avid family. Running on any SGI platform, Matador provides paint and text manipulation, rotoscoping and 2-D animation. The software includes features such as Smartbrushes, which can automatically paint over a whole sequence, and Soft Zoom, which allows painting at the subpixel level. Along with Matador, Parallax also produces the Advance non-linear compositing workstation and Jester, a cel-animation program.

Silicon Graphics introduced its Reality Station graphics workstation, which allows users to get into the Onyx level of processing for less than $100,000. Reality Station is a single 200MHz MIPS R4400 microprocessor that includes the RealityEngine2 graphics subsystem for complex 3-D environments. SGI also announced an audio/serial option for the Onyx and Challenge server, which allows high-speed serial ports and four channels of 16-bit 48kHz audio.

Quantel continues to update and improve its hardware along with its software. The new Paintbox Express allows an operator to create 20 graphics in 20 minutes. The newly designed user interface and combination of stylus and what is referred to as "The Grip" make graphic production lightning fast. The Paintbox also comes with 1,085 instant fonts, a 4,000 picture still-store that will "fetch" a picture in 0.2 seconds, and a luma/chroma-keyer. Quantel also demonstrated Hippo for Henry, which adds tenfold processing power to Henry's visual effects engine. Other features include 1-, 2- and 4-point ALF for increased tracking and stabilization, as well as Lens FX, Shadow FX and Light FX, which add film and lighting effects to Henry. Henry's "one shot" keyer has been improved with deblue and accumulative "garbage" keying for mattes, Edge FX and advanced DVE control. The Hal Express graphics and compositing system is also new and adds speed and flexibility similar to Paintbox Express, along with increased processing power, enhanced 3-D tracking, Light FX and "The Grip." For lower budgets, the SGI platform may not be an option.

Intelligent Resources has improved its Video Explorer I/O board to include a broadcast-quality YC/composite output module. Facilities that want to take advantage of all of the Macintosh-based image processing tools, but have only composite equipment, can incorporate the Video Explorer into existing systems. IR has also released the MediaSwitcher, a custom software application providing CCIR 601 digital production switcher capabilities to Video Explorer users. The application allows use of real-time transition effects, such as wipes, dissolves and fades. Transitions can be programmed as sequences and triggered via GPI.

Finally, Newtek's Lightwave 3-D software has made it over to the Windows and Windows NT environments. New features include plug-in software architecture allowing third-party developers to write applications to run within Lightwave. Also, in a licensing agreement with Elastic Reality, Lightwave will include HIIP (Host Independent Imaging Protocol). HIIP provides a universal link that will allow users of Lightwave to transfer files to any format, such as JPEG, PICT, Alias, Wavefront and SGI.

Reply Card 15

Character generators

Chyron introduced iNFiNiT! II, the latest version of the standard iNFiNiT! graphic system. New features include a third channel, a 68060 processor, extended effects frame buffer, and connectivity to a graphics server called iNFiNET. Max, Maxine and iNFiNiT! also include some of the features incorporated into iNFiNiT! II, including optional TV Store, which turns any of the units into a full-featured still-store, and MakeMaster, which allows creation of master fonts from TrueType and PostScript outline fonts. Chyron's PC-Codi board provides real-time C G from both Mac and PC platforms, and now includes

Continued on page 60

Ikegami Skin
The Fountain of

Hundreds of years after Juan Ponce de León set sail in search of The Fountain of Youth, the engineers at Ikegami have invented a technology that results in a more youthful on-screen appearance.

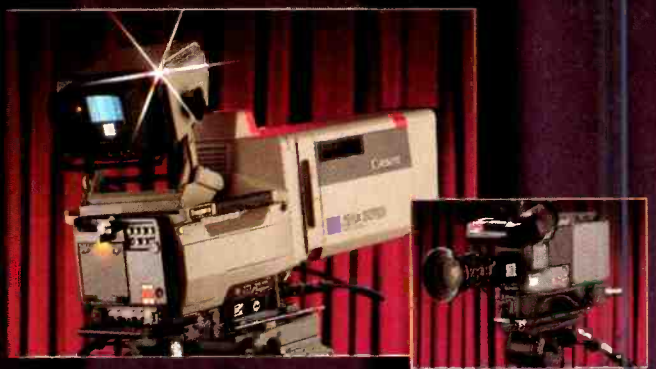
Skin Tone Detail, which earned Ikegami a 1994 Technical Emmy for the development of "Controlled Edge Enhancements Utilizing Skin Tones," removes undesirable blemishes, imperfections and even age lines for a more youthful and healthier television appearance.

Compared favorably with photographic airbrushing, this easy-to-use "electronic" airbrushing, has made Ikegami the camera name most-requested by on-air personalties and celebrities.

Skin Tone Detail is a feature incorporated in all Ikegami's current top-of-the-line cameras: the HK-377/377P, HK-366/366P, HK-355A/355PA, Field/Studio Cameras, and the HL-57 10-Bit Digital Portable Camera. There are over 700 Ikegami cameras in use, worldwide, that have this Emmy-Award winning feature.

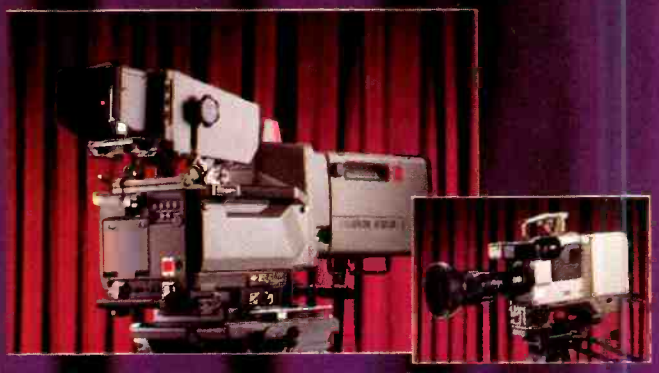
For that more youthful on-air appearance and demonstration of this important feature, call the nearest Ikegami Regional Sales Office.

Ikegami cameras shown in this ad have the Skin Tone Detail feature which received the Engineering Emmy Award for technical achievement.



HK-377 & HK-377P Ultra Wide Band Camera System.

HK-366 & HK-366P Wide Band Camera System.



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HL-57 10-Bit Digital Portable Camera.

Tone Detail:
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*disappear to reveal a more youthful appearance.**

Laugh lines and crows feet...

*are softened to take years off your age.**

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Ikegami

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Continued from page 57

multichannel capability for graphics and text, as well as control from Windows and Mac environments.

Abekas has had a powerful post CG in the A-72. Now the company is entering the live arena with its Texus digital character generator. Texus allows operators to type up to 100 words per minute, even with large, complex characters. Full-screen images recall quickly, and the system supports PC and Mac fonts. It also supports TIFF files, and logos can be imported from another computer and displayed directly. It offers a word processor-style environment rather than a row-based system. Users just point and click where they want to type.

Dynatech announced the first software character generator for the SGI platform. Antero is a real-time CG developed by a small software start-up company from Colorado and features support of TrueType and PostScript Type 1 fonts, as well as the ability to import files from numerous formats and spell checking.

The Knox PC 40 will convert your PC into a real-time CG without tying up the rest of the operating system. Up to eight PC-40s can be installed into a single computer, and video can be looped through each one to provide many channels of CG. They can also be set up to display a set sequence of pages automatically upon power-up.

Reply Card 158

Still-stores and DVEs

Abekas introduced Clipstore, which stores and plays a combination of 60 seconds of full-motion video or 1,800 stills in full bandwidth, 10-bit quality. Its open database allows for easy cataloging and retrieval, and it handles clips and stills indiscriminately. Key and image size can also be adjusted for over-the-shoulder applications.

Chyron's IMAGESTOR! uses iNFiNiT! technology to store stills and linear key signals, as well as providind database and playlist operation. IMAGESTOR! can network with Chyron's family of CGs and through iNFiNET.

Other still-store entries include: Quantel's Picturebox, which holds up to 35,000 stills; Brontostore from Accom, which holds clips, stills and audio clips; FlashFile from Pinnacle that allows three channels of still and clip playback; and Pixstore II, a clip and still-store from Thomson Broadcast on a Windows platform.

In The DVE category, Hurricane from Getris Images allows up to 10 layers of real-time DVE by using a separate hardware layer for each DVE animation. Each layer can be loaded with graphics, video and animation and tied together in the multilayer mixer. Hurricane also provides high-speed morphing and shape and font metamorphosis, chroma-key, filters and machine control.

Sony has introduced the DFS 500, which combines 3-D DME (digital multi-effects) with a 4-input switcher and title keyer. The DFS-500 will interface with Sony's DVS series switchers to provide effects looping on a single M/E. The 3-D effects include motion, trails, drop shadows and lighting effects.

Grass Valley rolled out Krystal, a 3-D DVE system with 10-bit image processing and RISC technology. With Krystal, the user can manipulate each image in source, target, world or camera space with world and camera views for ease in complex effect building. Optional curls, light sourcing and trail effects are available and systems can be configured with up to four channels.

Several other DVE systems have had substantial upgrades, among them is the Digital Graphix Impact. It is now available in a series 5XP version, which offers real-time 3-D moves with 512 polygons (formerly limited to 48.) Pinnacle's Prizm sports support for the 16:9 screen format as well as several new shapes, new set-up and operational features and 601 digital I/O.

The VIEWPLEX-2000 is one of those devices that's hard to describe, but real neat in practice. It is a video signal multiplexer that allows the display of up to 16 different channels on one screen. It uses standard NTSC inputs for 8-bit resolution.

Reply Card 159

Robotics, camera support and lighting

By Terry Fox

Terry Fox is a senior chief engineer, WUSA-TV, Washington DC.

From small, time-saving items to large, computer-based virtual studio systems on the cutting edge of technology, there were numerous new products on display. Here is a sampling of the highlights.

Lighting equipment

For 1995, Frezzolini has added the MFNP1-HC to its line. It's a combination mini-fill light and NP-1 battery mount that fits on top of ENG cameras. If you would rather mount the battery on the back of the camera, a bracket system provides for a second NP-1 to double the power available to the camera and light. Frezzolini also displayed its line of brick-style batteries, charging systems for various battery systems, and many portable lighting and power accessories.

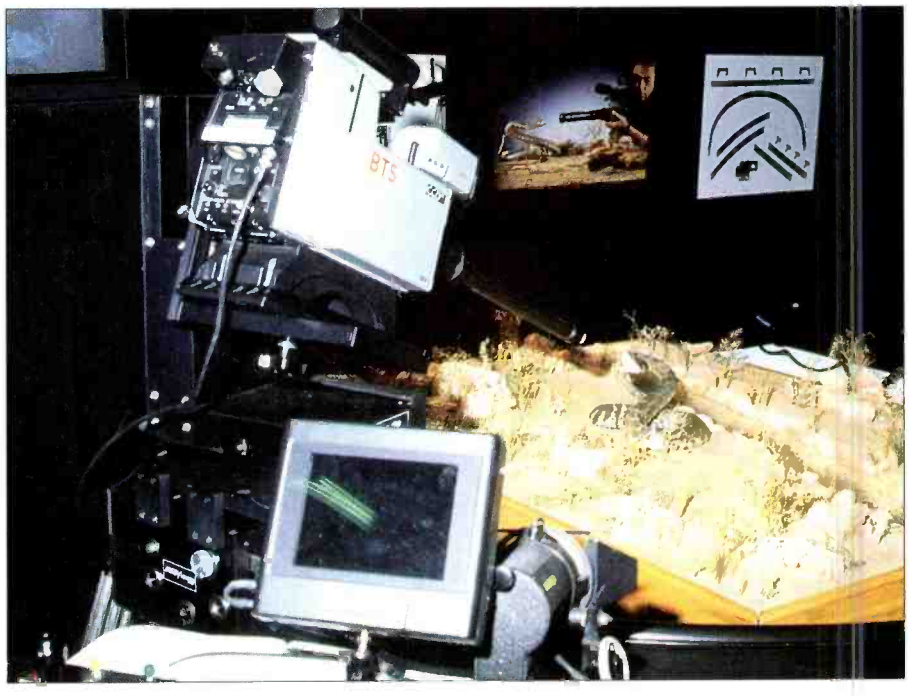
Lowel Light had two products that caught our eye. The first is the Fren-L 650, a 650W fresnel that can focus over a 7:1 range. It's sturdily constructed and accepts many of the Lowel power and mounting accessories, reducing the number of support items required in a lighting kit. The second Lowel product is the Rifa-Lite line of portable soft lights with a maximum wattage of 1,000W. These are soft lights in more than one sense. Not only is the resulting light diffused, but the instrument is constructed using a collapsible frame and soft reflective material. Even the front diffuser is made of soft material that folds away. Lowel also displayed its mainstays of field lighting: the Omni and DP lights along with accessories.

The F. J. Westcott Co. provides many accessories for the studio. It has a variety of light modifiers, reflectors, umbrellas and backgrounds. This year the company introduced Ultimatte blue backgrounds that are available as a 6'x7' collapsible Illuminator or in raw fabric of 65" by five- or 10-yard lengths. These backgrounds are made of a blue nylon fabric developed in conjunction with Ultimatte Corporation.

Reply Card 160

Manual tripod and support

The watchword for field tripods and heads is weight, but not at the expense of sturdy construction or durability. Miller Fluid Heads showed its line of tripods, fluid heads and accessories. The Series II ENG/EFP tripods come in



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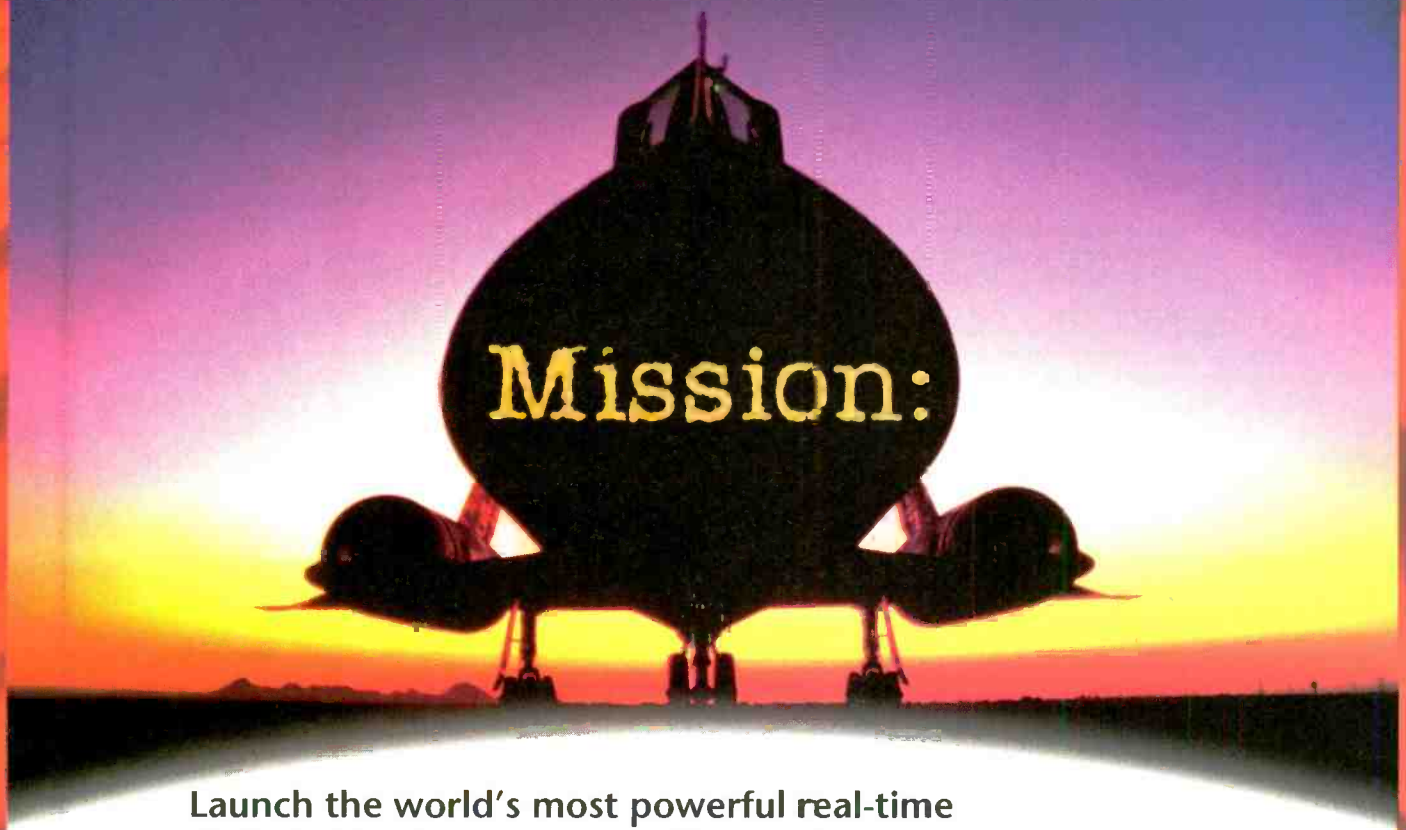

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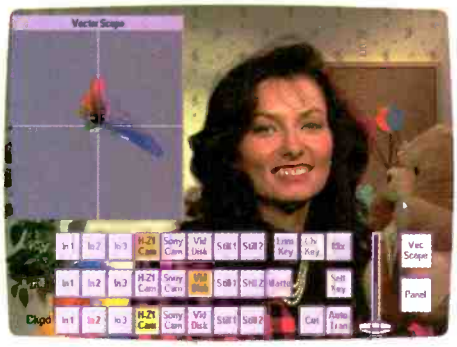

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Circle (28) on Reply Card

lightweight, single-stage, and 2-stage versions made from carbon fiber or alloy materials. One feature is the Pro-Lok limited torque locks, which provide a positive leg lock without distorting or otherwise damaging them over time. Miller camera heads are available in a variety of sizes. The Miller 25 head can be used for high-end industrial or smaller broadcast ENG cameras up to 30 pounds. For 1995, Miller has added several camera support accessories, such as above ground spreaders and telescopic pan handles.

O'Conner Engineering Labs had its line of tripods and heads on display. The new 25L tripod is a light (6.5 pound) 2-stage carbon fiber unit that has a range of 15 to 66 inches. Despite its light weight, even at full height, the tripod was stable. O'Conner has also expanded its 35L series of Quick Deployment tripods. In addition to the 35L tripod (7 pounds, 28-60 inches range), O'Conner has added the 35L Baby and 35LC. If you need a low-cost, low camera angle, the 35L Baby has a range from 8 inches up to 28 inches and weighs 5.5 pounds.

Sachtler showed models from its lightweight Panorama 7+7 ENG system to the Vario Pedestals for smaller CCD studio cameras. For newer, lighter-weight one-piece cameras, the 7+7 is a lightweight fluid head with excellent balance. The Sachtler Hot Pod tripod has a central locking system to help speed up tripod setup and tear down. A pneumatic center column is designed into the Hot Pod to help the camera operator raise and lower the camera. For studio operation, Sachtler introduced the Vario Ped 1-90 and Ped 2-75 pedestals. These are lightweight, compact, sturdy pedestals that can support up to 200 pounds.

Vinten TSM Inc. manufactures manual and robotic camera tripod heads since the merger of Vinten and TSM last year. This year, the company introduced the Osprey Elite pedestal. The Elite, which weighs 110 pounds, can handle a payload of up to 165 pounds. Using a pneumatic counterbalance system, its 2-stage column movement ranges from a low of 26 inches up to 56 inches.

Reply Card 161

Automated camera support and electronics

Camera robotics continues to be a growing field. Systems vary from simple remote-controlled cameras to virtually unreal computer-synchronized packages that can cost as much as a small station.

For those looking for a minimal-cost roof-top or tower-mounted camera and robotic head system, NS Microwave has just the ticket. The NS controller is designed to receive tones from a standard dial-up phone line or over a 2-way radio, such as a portable walkie-talkie.

The M.S. Russin Group displayed its CAM-ROBOTIC SYSTEMS line of robotic camera heads and controllers. The line starts with a low-cost professional pan/tilt head that can handle up to 18 pounds. The associated controllers are available in rack-mount or desktop form, and can handle single or multicamera systems, up to six cameras.

Telemetrics has several product lines associated with remote control of cameras, including camera trolley systems and weatherproof units for roof tops controlled using RS-232. The company demonstrated a new, 3-axis robotic camera head ideal for instructional video applications or wherever camera "leveling" might be required. The company also introduced the "Totally Integrated Control System" that provides touch-screen control of camera and robotic heads, audio and video switchers and peripherals. Using RS-232 serial control at 9,600 baud, up to 10 local or remotely located systems can be controlled from a single control panel or computer.

If you want to remotely control your ENG cameras, but don't want to separate the deck from the camera head or you use the newer 1-piece cameras, try Concept W Systems' Camplex line of bidirectional signal multiplexers. The lightweight camera adapter unit (two pounds) is a belt-pack device that multiplexes camera video, mic or line-level audio and intercom down a single coax cable to the Console Adapter. The Console Adapter is a single rack-unit device that adds gen-lock video, camera

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Circle (33) on Reply Card

tally, IFB return audio and up to 5W of power for running the camera. With the addition of a Sony RM-P3 remote camera controller, you can now operate Sony field cameras much like their studio counterparts.

The Vinten TSM ACP-8000S Control System uses a touch-controller and joystick panel to control up to eight camera systems. Up to 144 shot locations per camera can be stored, including pedestal and pan/tilt positions as well as camera CCU setups (if a CCU interface is implemented). Camera shots can be called up by picking them off a list on the touchscreen, then touching them up if necessary with the joysticks.

Reply Card 162

You are there.... or are you?

Virtual reality has come to the world of video production. The marriage of computerized camera robotics and control with computer-generated video images and high-quality keying systems has produced a method of placing people and/or objects into almost any environment. Virtual environment studios have taken the art of chroma-key at least two steps forward. The first step allows multiple camera shots at various angles and the computer-generated environment matches the camera angle. The second step allows these multiple cameras to move and the computer matches the virtual environment to the camera move. The computer even generates and alters shadows based on where virtual lighting is specified to be. Multiple levels of objects can be created, and the talent appears to move around or otherwise interact with those objects.

Ultimatte has improved the patented Screen Correction process inside the Ultimatte 8 digital 4 x 4 compositing device to further reduce unwanted artifacts resulting from uneven backgrounds. A built-in framestore averages eight frames to create a Screen Correction reference frame. In addition, users can reduce the unwanted effects of uneven backgrounds or lighting by adjusting the Ultimatte 8's matte shading, uneven effects are "painted" out of existence by shaping the matte channel signal. Ultimatte has developed two models of its Memory Head, an EFP version that accepts up to 35-pound payloads, and the film version that can handle loads up to 150 pounds. Both are designed to operate using AC power or batteries. The Memory Head and its associated control unit can memorize, store and recall camera moves based on keypad entry at the head, computer triggering or slaving to VTR time code or other Memory Heads.

Ultimatte demonstrated the German firm imp's (Innovative Medientechnikund Planungs-GMBH) Platform Virtual Studio package. The Ultimatte 8 was used to key actors and props from the blue hard-cyc studio and Memory Heads were used to control camera movements, all under control of the imp Platform software and the Silicon Graphics Onyx computer.

Probably the most advanced computer-generated studio was the Reality Tracking System at Electrogig. Using a Silicon Graphics Onyx computer, this package demonstrated an actor walking around, between and through various virtual sets and images. The Reality Tracking System consists of a series of components from Electrogig and business partners that Electrogig integrates into a complete package with the assistance of A.F. Associates.

Using A.F. Associates camera robotics, the Electrogig Reality Tracking System was able to truck the cameras as well as control the pan/tilt and zoom. This added visibly to the demonstration, as cameras were able to move in real-time under computer direction while the computer system also adjusted the background images and shadows to match seamlessly.

Reply Card 163

Compression technology

By Steven Blumenfeld
Steven Blumenfeld is vice president of Technology at C-TE ImageTek, Carlsbad, CA.

MPEG compression had a strong showing with many vendors showing new MPEG-1 and MPEG-2 units. For the most part, the encoders can be broken down into three camps: C-Cube-based MPEG-1, C-Cube-based MPEG-2 and others. In the first group, units range from $14,000 to $130,000 and have advanced encoding software. These also are some of the oldest systems out (18 months) and some are into their second generation.

Minerva's Compressionist is the most expensive but offers features including the Picture Resampler, which performs field or frame resizing and de-interlacing in real time. Minerva is marketing this as a "Human Assisted," claiming that it can generate better encoded files. It's also an accurate outboard inverse telecine detector. When encoding with SIF resolution, the 3:2 pulldown must be removed to avoid jerky motion. This can be difficult to detect because in many movies, the 3:2 changesconstantly. This is due to the movies having been edited on video with no thought of the 3:2 sequence.

Minerva also announced a proposal for the Open Media Framework (OMF) Interchange File format that will allow a link between digital video editing and MPEG distribution. The proposal must be ratified by the OMF committee.

Next are the Optimage systems, which include the Delta VC, a low-end MPEG system based on a PC host and high-end Delta VX, based on the Macintosh. The Delta VX hardware configuration is similar to the Minerva system but differs in the software. The software has machine control and uses a CS-1 media controller with integrated jog wheel. Additionally, Optimage has integrated Video CD authoring with the Video CD Toolkit.

The Optibase system has come a long way from its beginnings as the first C-Cube encoder implementation. The software is robust with many useful features. The batch mode recording software is easy to use and intuitive. Additionally, the quality of the encoding has greatly increased.

Optivision was touting its in-development, low-cost MPEG-2 encoder using a 4-chip C-Cube solution. This will be the first low-cost implementation of the CLM4400 VideoRisc chip set. Also in the booth was an MPEG-2 decoder, an MPEG video in a window decoder, an MPEG-1 encoding workstation and a digital video input board. Optivision announced a distribution deal for Video Clip, the first MPEG-1 editing software. The product uses proprietary algorithms and software for handling I, P and B frames. It's available and will be incorporated into future Optivision products.

FutureTel's Prime View system has been updated (Prime View II) to include serial digital input. The MPEG Works software is a sophisticated front-end to this encoder. Together with the TeleMux ISDN/T1 network interface card, the system is currently installed in KRON, San Francisco, and used to transmit to outlying areas. (See *BE* April 1995.)

Intelligent Resources is marketing the 3DO encoding system. The system uses a Macintosh computer and the Intelligent Resources Video Explorer for the video digitizer. Intelligent Resources is using software developed by 3DO and is in the process of updating and reworking it. The system includes a built-in 4x CD-ROM recorder/reader.

Sigma Designs showed another "First MPEG Authoring System." It uses RealMagic Producer to capture AVI editable MPEG (I frame only). The files are then imported into Adobe Premier for editing and special effects. Once complete, the files are sent back to the Producer card for conversion to fully compliant MPEG streams. The card accepts composite or Y/C video and only -10dB audio input.

Next up is Digital Video Systems (DVS), which showed two new systems. The ENC 50 is a full-featured MPEG-1 encoding workstation with serial digital, Y/C and composite video and AES/

EBU digital and unbalanced analog audio inputs. Encoding bit rates range from 1Mb/s to 3Mb/s and it comes with a 4x CD recorder. The ENC 200 is DVS's entrance into MPEG-2 with this MPEG-2 (main profile, main level) encoder that can also generate MPEG-1 bitstreams. It handles Dolby AC-3 and Musicam levels 1 and 2. It supports all aspects of DVD (digital video disc) authoring, including multiplexing and disc pre-mastering. It handles variable bit rate compression in a 2-pass fashion and allows for real-time program stream multiplexing.

JVC showed an MPEG-2 encoder/decoder system. The real-time MPEG-2 encoder accepts component video and analog audio and generates an MPEG-2 transport stream for distribution. At the same time the program stream is sent to a video server to be stored for later use.

Compression Labs Inc. (CLI) is back with an MPEG-2-compliant version of its Magnitude encoder. This is the first product to ship with a statistical multiplex feature, the ability to dynamically allocate needed bandwidth from one channel to another depending on picture complexity. This feature enhances the video quality of the MPEG image especially for fast-moving events.

Divicom introduced a compact, fully integrated MPEG-2 encoding system. The system includes a program encoder (DMC2), a remultiplexer (DRMX2) and a system controller (DMS2). The DMC2 includes modules for various analog and digital inputs, data inputs and conditional access. Output formats include asynchronous transfer mode (ATM). It is a fully compliant MPEG-2 encoder and is only 5¼ inches high. The quality is excellent and the encoder features wide range motion estimation and 3:2 scene detection. The DMXR2 combines various MPEG-2 bitstreams into a higher-rate MPEG-2 transport stream. The DMS2 is a PC with SNMP management software and applications for configuring and monitoring components.

Vela Research had its Encoder 2000, which is capable of real-time MPEG-1 and MPEG-2 compression. The host interface is designed to run on an X-Windows terminal. The user interface allows you to adjust bit rates, resolution and input signals, set up batch encodes, control VTRs, monitor encoded material and transfer files. It has all the standard analog video inputs and serial digital and analog or digital audio. The encoder supports 1.5Mb/s to 15 Mb/s. The unit outputs Packetized Elementary Streams (PES) and transport streams. The Encoder 2000 has a number of output options including Ethernet, Enhanced Ethernet, FDDI, CDDI, ATM and SCSI-2.

Toshiba, the most expensive in its class at $400,000, was showing a 2-piece prototype MPEG-2 encoder. The quality was fantastic at low bit rate (5Mb/s). The video encoder is an MPEG-2 encoder that supports variable bit rates. The inputs are component digital parallel/ serial or component analog RGB/YRB. The output stream is only PES over an SBUS. The audio encoder — ABR 100 — conforms to audio layer 2 and has AES/EBU inputs.

Last, but certainly not least, is Sony with its RTE 3000. This is Sony's first foray into MPEG compression hardware. The RTE 3000 will be ready for delivery in the fourth quarter of this year. Sony is still working on the algorithm and will fix some of the scene change problems that were evident. The encoder control software is still in its infancy but the device has promise. Sony also showed an MPEG-2 system (VST 1000). It only has analog inputs for the audio and video. Other than that, it is a standard MPEG-2 encoder with audio layer 2.

On the MPEG utility front, Hewlett Packard announced an MPEG-2 Protocol Viewer. As video goes through a network, time delays at various points cause jitter. MPEG has a built-in way of taking care of this problem but when the delay is too long, video quality is affected. The Protocol Viewer allows the system designer to see various fields within the MPEG-2 protocol at various stages in the transmission path making it easier to identify problems.

For-A showed two devices specifically designed for MPEG-1. The DPR-500/P and the DPR-AT are digital signal processors capable of improving the input to an MPEG encoder. DPR-500/P is a stand-alone box that has Y/C or component inputs, whereas the DPR-AT is a dual board PC processor with serial digital video input. Both have 3-D recursive noise reduction, vertical filtering for SIF images and motion-adapted field interpolation. The DPR-500/P also has a digital comb filter, auto chroma level control, color balance and gamma correction, video, chroma, setup and phase adjustments, a built-in transcoder — composite, Y/C, YRB, time base correction and dynamic tracking.

If you looked for MPEG hardware at NAB, you probably saw plenty and may have came out more confused then when you went in. This year marks MPEG's coming out party. Most of these products and some of these companies are in their infancy. Many companies use the same encoding chip set (C Cube) and must differentiate themselves by implementation and I/O quality. The user interface is something to look out for when purchasing an encoding system. If it's not friendly and easy to use ,you will have a hard time making the system perform to its potential.

Reply Card 164

Automation

By Philip A. Hallenbeck

Philip A. Hallenbeck is network supervisor for the Turner Entertainment Group, Atlanta.

The value of an automation system rests on its ability to serve your operation. Automation software found at NAB can be categorized in two forms — machine control and client/server architecture. The most familiar, and widely used, is machine control automation. Typically centered on a cart machine, the software controls the robotics of the cart machine, the internal and external decks and signal switching. It also maintains a cassette database of elements within the machine.

A good client/server system provides multiple play-out channels that allow existing devices to be assigned and shared.

New systems use video file servers to maximize the capabilities of machine control environments. File servers provide the ability to cache spots to disk, allowing cart machines and external devices to serve a variety of applications. Larger-scale client/server-based systems are more powerful than machine control and disk-caching systems. Most client/server systems use a large device server and object-oriented software to provide a higher level of device control. Depending upon the vendor, some degree of customization can be made to tailor a system to meet specific operations. To maximize potential, look for systems that fit into your existing operations. If customization is required, verify that the vendors can support your specifications.

Alamar's MC-2095 uses a distributed intelligence design to control all VTR formats, laser-

disc recorders, cart machines, still-stores, character generators, switchers, routers and satellite feeds. New at NAB was subrouted on-air channels (SRC), which control feeds to different audiences or regions using common and/or specific program material. Also, spot look-ahead is available to search the playlist for missing/conflicting events.

Avid offers AirPlay, which is modular and scalable. AirPlay does not integrate devices such as cart machines or switchers, however, control protocol is available to automation companies wishing to develop interfaces with AirPlay. AirPlay permits multiple redundancy strategies and supports buffer drives and archiving through individual channel CPUs in a multichannel configuration.

Columbine/JDS manufactures a client/server automation system, MCAS-III, which operates a minimum of three PCs using an Ethernet LAN that links a traffic system PC, an automation control PC and a file sever MediaBase PC. The configuration supports DOS, OS/2, Mac or UNIX. MCAS-III controls all switcher functions (except audio over ratios), routers, cart and disk playback/caching, external VTR's audio cart decks, character generators, still-stores and backup cart machines. It allows multiregional breakaways from the primary play out, and the LAN permits the pooling of device servers and other equipment.

Florical System's Air Boss Automation operates via a Novell LAN allowing construction of a system that controls everything from satellite program acquisition to play out. Individual pieces of software include: Showtimer, an automated satellite/program record; Validator, which verifies air material; Spot Linker, which assembles spots to cache or disk; Cart Director, which maintains the database and control of cart machines; and News Repeater, which permits a fully automated second channel of program origination. All pieces are connected through Air Boss, which warns of problems and prompts operator intervention.

For smaller scale automation needs, Leightronix manufactures event controllers for private in-house networks, local origination channels, LPTV, MATV or SMATV systems. The Mini-T-Pro, Pro-8, Pro-16 and TDC-100 provide various levels of automated videotape playback control. Request-XC adds another dimension by allowing a user to initiate a program playback via phone lines.

Louth Automation manufactures ADC-100, a client/server automation system that can control cart machines, external VTRs, disk recorders, still-stores, character generators, switchers and record incoming sources. Operating on a Net Bios LAN, Louth's system includes the main device server, client workstation(s), remote-control panel, optional traffic interface, and optional tape preparation and database station. The device server is a 32-slot 486 33MHz rack-mount PC with serial interface cards connected to devices. Updates include a Windows user interface, disk-caching software and the ability to pool multiple device servers.

Odetics was showing CacheMachine, a video file server-based machine control environment, referred to as Hierarchical Video Management (HVM). Operating on an Ethernet LAN, each channel has an independent playlist and client that communicates to the cart machine and prioritizes caching requests. CacheMachine is available for single-, dual- or multichannel systems. The Dual-Channel CacheMachine manages two channels, providing separate or regional channels. Expansion beyond two channels is possible with Multi-Channel Presentation System (MCPS), which allows control of up to 30 channels. The software option RecordList provides a fully integrated system capable of recording incoming feeds, playing them to air and automating spot insertion.

Panasonic introduced the Smart-Cart automated record/playback system, a mini-cassette library ideal for small-to-medium-sized facilities. Also shown was the M.A.R.C. system, a modular cart machine that can hold from 123 up to 1,176 cassettes. Both the M.A.R.C. and Smart-Cart systems are capable of archival storage and caching to a video file server. Smart-Cart is available with DVCPRO, D-3/D-5, MII and S-VHS VTRs. It can hold up to three VTRs and 70½-inch or 200

DVCPRO cassettes. (See "1995 NAB Pick Hits," p. 30.)

Pro-Bel manufactures two categories of automation. The Compass is a short form 3,500-event commercial broadcast system and Procion is a 512-event long form system ideal for program material. Both Compass and Procion are based on a Microsoft Windows operating environment on standard PC platforms. Compass incorporates a 68000-based central control unit with dual processors to provide main and standby operation with automatic changeover. When integrated with the TX-220 master control switcher, schedule changes are possible either at a PC workstation or from the switcher. The system can be configured to run separate schedules or breakaway segments.

Tech Electronics' family of PVC automated playback systems provides a viable means to automatically control cable local access, school media or in-house video playback needs. The PVC line is expandable to eight inputs and three outputs and supports programmable preroll, video sensing/default switching, after hours recording, programmable security codes and GPI interfaces.

Utah Scientific's TAS automation system employs client/server architecture to permit the adding of clients that perform specific applications on its Ethernet-based LAN running Novell's Netware. TAS permits control of MC switchers, playlist manipulation and log reconciliation, external VTRs and cart machines, still-stores and character generators.

Systems under development will pool together multiple cart machines, use multiple spot storage software, and service multiple networks via disk caching. Brughetti, of Montreal, is developing a version of peer-to-peer software that should automate all aspects of the broadcast facility. The system design incorporates high-end data management and template-driven software technology based on a Silicon Graphics platform. Once completed the system will consist of three modules: Pure allows you to create program graphics, Slice allows editing of program material and Air provides control of play out. Diplomat ties all three modules together by maintaining an integrated database, and play out management.

Sony introduced its BZA-8100 transmission management software that will be scalable and control multiple output channels. Many current devices can be integrated by the software, including cart machine, laser and optical disk players and hard drives. This software is designed to support an archival/caching playback environment.

Odetics developed the Prophet, a compact video library system that is cache-compatible. The Prophet includes a laser alignment and bar-code system that targets bins and VTRs. It is appropriate for hierarchical video management applications. Prophet also allows the user to trade VTRs for additional capacity.

Automation software is going to be a driving force in the future because most new technology

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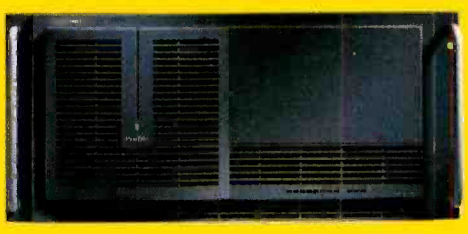

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will require some form of software control. To allow your operation to expand and still meet the bottom line, automation will be a required resource. Avoid making final decisions based on product demos alone. If your needs exceed current product availability, look into building a migratory system using equipment now that positions you for tomorrow.

Reply Card 165

TBCs, frame synchronizers and format converters

By Philip Hejtmanek

Philip Hejtmanek is director of technology for Southern Illinois University's Broadcasting Service, Carbondale, Ill.

Digital video processing equipment plays an important role in today's TV technical facility. With the increasing integration of the computer, as well as the numerous worldwide standards for program sources, conversion and synchronization building blocks are critical to video system design. These devices may not be flashy or glamorous, however, the functions performed are so important to the overall video system that a failure can cause visible consequences.

The DPS-290 from Digital Processing Systems is a TBC/frame synchronizer that provides a solution for those who wish to time-base correct, synchronize, transcode or decode component (Betacam/MII), S-video and composite video sources. It features a 3-line adaptive comb filter, a recursive chrominance/luminance noise reducer and a 3-D dropout compensator. Also new from DPS was the MicroSYNC-X line of modular video synchronizers. Based in the VS-2410 10-bit 4-field video synchronizer card, each module provides dual video outputs, multiple freeze modes, variable strobe, GPI trigger and vertical line advance. Adding an AS-2400 16-bit stereo audio synchronizer card results in a fully capable video/audio combination synchronizer for less than $4,000.

The Hotronic AR41 is a low-cost 8-bit TBC/frame synchronizer. It features Y/C and composite inputs and outputs, full-frame memory, video input selector and full proc-amp controls. Upgrades include a wide bandwidth comb filter, S-VHS output, freeze frame/field and strobe effects. Also available is the 10-bit Hotronic AS61 family that can be configured with analog and digital video inputs and outputs, freeze frame and a 20-bit, 48kHz audio companion delay, with analog or AES-EBU inputs and outputs.

Feral Industries offers the Advance Series of integrated TBC/frame synchronizers featuring digital comb filtering. The A-4:2:2 model is available in PC board or stand-alone form, with single or dual-channel configurations. They feature multiple inputs and outputs, 8-bit 4:2:2 processing, freeze, variable strobe and proc-amp controls. The Feral Compact Series is positioned as a low-cost solution for desktop video, ENG and studio applications. The LC 4:2:2 model features an infinite window TBC, 8-bit 4:2:2 processing, composite/S-VHS transcoding and strobe effects.

IKON Video has introduced a line of digital TBCs, available in single- or dual-channel models. The IXT-7 "Super Seven" is a full-frame infinite window TBC that accepts and transcodes composite, Y/C, component and RGB formats. It features proc-amp controls, remote-control capability, drop-out compensator, full Y/C delay control and modular construction allowing for multiple TBCs per rack frame.

The DS4200 digital synchronizer from Pixel Instruments accepts a 10-bit, 270Mb/s serial digital signal input and automatically detects the standard of the input signal (525 or 625 line). The gen-lock signal can be analog composite or serial digital. Two synchronized 270Mb/s serial outputs are provided, as well as a buffered output of the unsynchronized input. It can also be coupled to a companion audio synchronizer in systems not using embedded audio. The VS2100 series features analog inputs and outputs, 10-bit quantizing and a storage buffer of eight video fields, allowing transparent synchronization of composite NTSC or PAL signals. Oversampling and digital filtering eliminate phase distortion and reduce quantization errors. The VS2100 and DS4200 series can be configured in single through 12 channel rack-mount assemblies.

Snell and Wilcox has broadened its product

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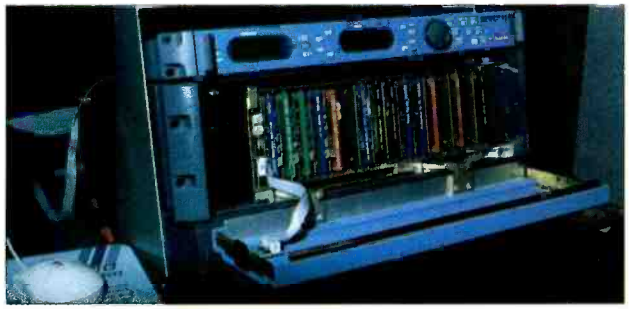

base through the Kudos IQ line of intelligent interface products for the digital environment. As part of this line, four transcoding synchronizers were introduced to facilitate program interchange between the PAL-M/PAL-N and the NTSC/PAL broadcast standards. These modular products feature full broadcast-quality 8-bit, 4:2:2 processing, a comprehensive range of features and controls and a wide tolerance time base corrector.

Avitel Electronics was showing off the VS100 multistandard frame synchronizer. Other products highlighted included the 3300 series analog and digital DAs, RGB to YUV transcoders. Worth seeing were the compact A-to-D and D-to-A converters.

Reply Card 166

Standards conversion

Standards converters translate video signals from one standard (NTSC, PAL, SECAM, etc.) to another. They have evolved from massive, multirack monsters to, in some cases, single-rack unit devices. These units are becoming increasingly important in the video world as program sources become international in nature.

The Advantage, by Feral Industries, is priced at less than $3,500 and combines standards conversion with a full-frame TBC/frame synchronizer. It features 8-level line interpolation, a comb filter decoder and switchable image enhancement. It also offers multiple composite and S-Video inputs and outputs, with an RGB component output optional.

Probably one of the most interesting standards conversion products shown was a single-chip solution shown by Video International Development. This 256-pin ASIC chip (known as SCOG) was combined with video memory, a microcontroller and encoder/decoder hardware to form the compact DTC 1600P6 standards converter. This model features 4-field/4-line motion-adaptive interpolation, frame-based recursive noise reduction and full 4:2:2 processing. It has composite, YUV and Y/C inputs and outputs, with D-1 serial I/O and a companion stereo audio delay as options. Prices start at less than $7,000.

The $6,600 Penta standards converter from Prime Image introduced a 5-field interpolation system that reduces motion artifacts by up to 50%. This 1RU device converts virtually every known standard to NTSC, PAL, PAL-M or PAL-N. The Penta also includes a built-in TBC/frame synchronizer, full proc-amp controls, freeze frame/field and variable-rate strobe effects. The company also introduced a versatile broadcast delay. The self-contained delay delays audio and video for up to 30 seconds without data compression. It is also capable of inserting alternative audio and or video feeds as required.

Snell and Wilcox offers a line of standards conversion products, ranging from less than $10,000 up to $200,000. The top-of-the-line 10-bit Alchemist Ph.C. produces judder-free output video using a phase-correlated motion-estimation unit mounted below the basic converter chassis. It also features full-color correction and proc-amp controls. The advantage of motion compensation is seen while viewing moving titles in the source video; uncompensated output video shows distinct judder artifacts while the motion in the compensated output is smooth.

The Vector and Vector VMC standards converters from Vistek are easy to operate and produce high-quality output video. The Vector features 4:2:2 processing, noise reduction and input and output video format options. The Vector VMC adds a Motion Vector Estimator unit to the

200 kHz DDS Function Generator

0.001% THD
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DS360.....$2395 (U.S. list)

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- SPDIF/EIAJ and AES-EBU digital outputs
- GPIB and RS-232 interfaces (standard)

The performance of a low distortion signal source and the features of a digitally synthesized function generator are combined in a unique new instrument, the DS360 from SRS. With 0.001% THD, 25 ppm frequency accuracy and functions that include sine waves, square waves, sweeps, and bursts, the DS360 delivers unparalleled precision and versatility. To make it complete we added two-tone (including SMPTE, DIM, CCIF), bandwidth limited white noise, SPDIF/EIAJ and AES-EBU digital outputs, and computer interfaces.

The DS360 – the one source for all your audio frequency needs.

SRS

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basic standards converter. This system, based on the proprietary PHAME (Predictive Hierarchical Advanced Motion Estimation) algorithm, compensates for motion by reconstructing moving images in their correct spatial positions. The result is clean, judder-free video output.

CYRUS and CYRUS PRIME are the high-end standards converter products offered by Tekniche. CYRUS is a high-quality 10-bit converter featuring a full range of input and output format options, RGB color correction and noise reduction. CYRUS PRIME offers the full capability of CYRUS with the addition of a motion compensation system for smooth, judder-free standards conversion. The motion compensation within CYRUS PRIME is also based upon the PHAME algorithm, pioneered by Vistek and Digital Vision.

The TK3:2 Image Translation system from Tekniche allows judder-free conversion to PAL from film-originated 3:2 pulldown NTSC program material. It automatically detects the NTSC 3:2 sequence and returns to the original 24 frames per second for the PAL output. The resulting 625/24 signal may be recorded on a PAL VTR modified to record at 24/25 speed, which is then played back at normal 625/50 PAL rates. The TK3:2 can detect interruptions in the 3:2 sequence caused by NTSC editing, and compensates through either single or 4-field interpolation.

Miranda introduced the Espresso SCSI-2 to digital video interface, which when combined with a workstation and disk array, allows high-speed real-time recording and playback of images in native RGB format for optimum picture quality. SGI, SUN, PC and Macintosh workstations can all use Espresso as an effective video gateway. (See "1995 NAB Pick Hits," p. 30.)

Reply Card 167

Digital audio workstations

By Tom McCarthy

McCarthy is a systems engineer for National Public Radio, Washington, DC.

NAB 95 was massive in terms of digital audio workstation products. Almost all DAW manufacturers introduced software upgrades and some vendors released redesigned or new workstations.

Fostex Corporation of America released Time-Flex time compression/expansion capability and Version 4 software for the line of Foundation 2000 digital audio workstations.

Orban presented Version 5.0 software for the DSE-7000 workstation, adding pitch shift, time compression/expansion, vari-speed, reverse audio, improved screen display and an expanded help package. The DSE-7000 interfaces with ENCO Systems' DAD486x and Broadcast Electronics' AudioVAULT systems.

Avid Technology demonstrated Version 3.1 software for its AudioStation and AudioVision digital audio workstations. Features include enhanced compatibility with Avid's Media Composer and Film Composer non-linear editing systems. The 3.1 upgrade also includes enhanced hardware and software integration between Audiovision and AudioStation and the Yamaha DMC 1000 digital mixing console.

Digidesign presented an upgrade of Pro Tools III to Version 3.1, which includes punch-on-the-fly and improvements to its ADAT interface, including external synchronization and support for the Fostex RD-8. Another release from Digidesign was a product for the Power Mac platform called Session Software 2.0. Using the audio capabilities of the platform, this inexpensive software package adds numerous production, synchronization and import/export features.

Meanwhile, several of Digidesign's third-party developers (numbering more than 60) produced an array of plug-in modules, including Lexicon's NuVerb, Steinberg's Virtual FX rack and products from Waves, Jupiter Systems, QSound Labs and Gray Matter.

The DM-800 was introduced by Roland. Its most striking feature is its size, considering the number of features that the 26" x 11.25," 12-pound package contains. The DM-800 includes eight tracks of hard-disk recording with 100 layers per track, full dynamic automation and

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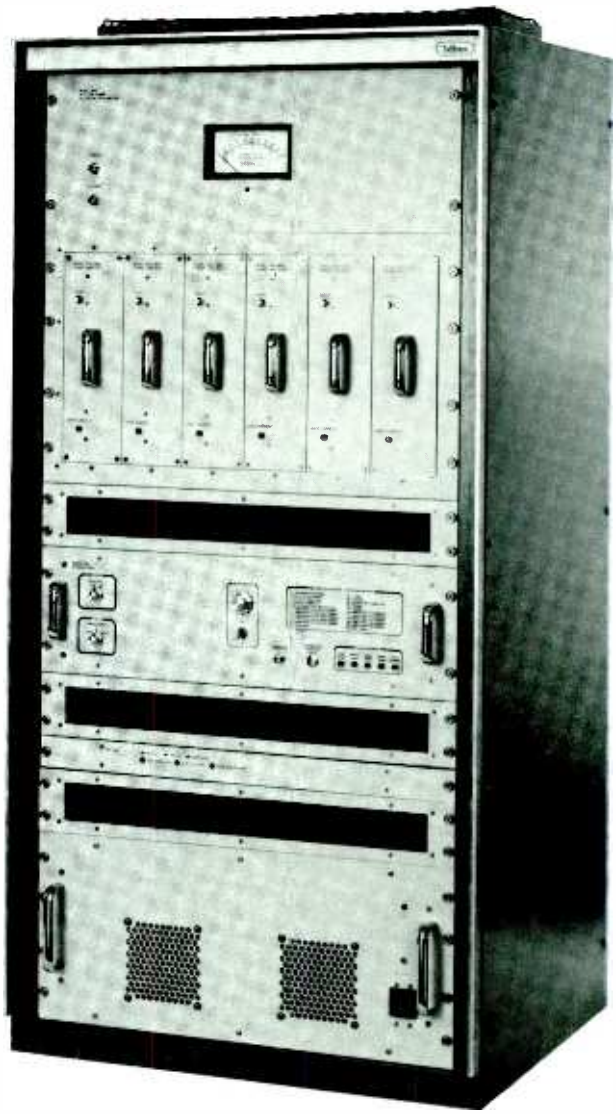

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Circle (66) on Reply Card

eight dedicated faders. Up to 3.5 track hours of recording at 48kHz can be stored inside the unit, and 24 more track hours can be accessed outboard via SCSI ports.

Studer Editech introduced the Dyaxis IIbv digital audio workstation, essentially a Dyaxis II minus its synchronization and expansion capabilities. It is geared for the broadcast production market and features a built-in automated digital mixer with dynamic level control, panning, metering and 5-band parametric equalization. Also new was the Edit Controller, a dedicated transport and edit control panel and the Dyaxis IIi InterMix processor, a self-contained digital studio that includes all the basic requirements for recording, editing and automated digital mixing. The Post Trio was Studer Editech's premiere product at the show. Geared toward the post-production facility, it combines the Dyaxis II workstation with hardware control panels, a digital meter bridge and an integrated communications and monitoring package. The VideoMix system was also shown, which offers digital video playback synchronized to Dyaxis audio.

Axiom, Solid State Logic's first fully digital audio production system, made its debut. The system allows up to 96 tracks of simultaneous access to SSL's DiskTrack hard-disk storage, which can be shared by multiple Axiom consoles (available in frame sizes from 48 to 96 channels). There are 24 internal reverb channels available, each with adjustable delay of up to 1.3 seconds. SSL also introduced the Axiom Preparation Station (APS), a desktop unit geared toward recording, editing, EDL auto-conforming and prelay. Software Version 4 for SSL's Scenaria was also released, incorporating many new features.

Nagra Lysis introduced an array of digital audio workstations and an integrated approach for the formation of an entire digital network. Three workstation models are offered: a consultation/news editing unit, a pre-production workstation and an on-air unit tailored for broadcast control room use. The workstations run UNIX on 486 and Pentium platforms to achieve true multitasking.

Studio Audio & Video demonstrated the latest SADiE software release, Version 2.2. Upgrades include The Speech Editor, which has the ability to automatically find, mark and remove areas of silence based on user-definable level-threshold and duration settings, providing high-quality time compression for speech recordings.

A software update was announced by Lexicon for Opus that takes the system to Version 5. Enhancements include support for standard SCSI hard drives (including low-cost 2.2GB removable drives) and an overall increase in system performance.

Sonic Solutions introduced the Journalist/News System to accommodate basic editing and sequencing of news clips and short programs cost-effectively.

TimeLine Vista announced that effective immediately all of its TimeLine DAW-80 digital audio workstations will contain upgraded Intel Pentium processing power, without a price increase.

ABC Digital introduced a graphic user interface (GUI) for its D-CART system, which allows it to be accessed on a standard Windows-based PC.

Pacific Recorders & Engineering (PR&E) introduced the ADX Ensemble workstation featuring A/D and D/A conversion technology and 20-bit linear PCM recording and mixing; three bands of real-time digital parametric equalization for each track; twin stereo sends and returns for effects processing; AES/EBU input and outputs

Big News About Something Small.

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Our new Compact Medium Power Amplifier (CMPA) is big news in the portable satcom market. It's ideal for SNG, flyaway and small earth terminals.

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for digital domain interconnectivity.

Although not a digital audio workstation, the Lexicon PCM-80 digital effects processor has a true stereo signal path, balanced analog I/O and standard digital interfaces. It has the ability to mix analog and digital signals together and offers a wide range of effects possibilities. (See "1995 NAB Pick Hits," p. 30.)

Reply Card 168

Microphones, audio mixers and telephone interfacing

By Chip Morgan

Chip Morgan owns Chip Morgan Broadcast Enterprises (CMBE), a broadcast design, systems management and engineering firm based in Sacramento, CA.

New digital systems notwithstanding, there is still plenty of need for microphones, mixers and related products in broadcasting—as evidenced by the number of new products in this category, and the number of people in these exhibitors' booths at NAB 95.

Microphones

Electro-Voice showed the RE2000 studio condenser microphone. It's a short-D, high-efficiency unit with the high output of a large-diaphragm mic, but the tighter polar pattern and faster transient response associated with small-diaphragm designs. The RE2000 features a true balanced-output transformer designed for the microphone by Jensen.

Shure Brothers announced the VP Wireless System, a low-cost VHF line comprised of three battery-operated receiver/transmitter combinations. The units run on 9V batteries, up to seven hours on a single battery. All operate in 10 frequency designations between 169 and 216MHz.

Sennheiser introduced the MD431 II, an update of its MD431 supercardioid dynamic shock-mounted microphone, featuring improved frequency and polar response. A UHF diversity wireless microphone receiver, the EM2004-UHF was also presented. It can be tuned to any one of 16 preprogrammed channels, and has a total bandwidth of 24MHz. Another product was the ME67, a long-shotgun addition to the K6 modular condenser line.

Sony introduced the WRT-860A, a UHF synthesized transmitter for wireless microphone bodypack applications. It's the smallest unit Sony makes in the 800 series, yet it supplies 20mW of power and offers a broad spectrum of operating frequencies.

Telex Communications introduced the ENG-500 wireless microphone. It combines the low-noise performance of crystal control with much of the frequency agility of synthesized PLL designs. An interchangeable module holds crystals for three different UHF frequencies, selected for their compatibility with each other. A similarly configured VHF version, the FMR-150, was also shown.

Lectrosonics demonstrated the 195 series of wireless microphone systems. These units are designed for maximum battery life feature dual-band companding, ratio-diversity reception with dynamic audio combining, wide deviation with no pre-emphasis or de-emphasis and machined aluminum construction. The series has metering and control capabilities and is designed

for critical applications.

Vega introduced the T-678 synthesized miniature bodypack transmitter with internal dip switches for 1,600 frequencies in 25kHz steps over a 42MHz range (seven UHF-TV channels). Vega also showed the SU-620 series of synthesized wireless mics.

Audio-Technica presented the AT873R, a small hypercardioid vocal mic that is phantom-powered and includes internal shock-mounting. The high-SPL capsule can be replaced with omni, cardioid and subcardioid capsules. AT also showed the ATR65, a unidirectional electret mic that can be used as a lavalier or slipped into its silver-dollar-sized base, and the AT858, a wide-range cardioid on a gooseneck with dip switches in its tabletop base to mate its output with almost anything.

Posthorn was showing a Schoeps "Compact" condenser mic, the CCM-U. Also new was the WMS, a windscreen built to slip over two mics for M-S coincident use.

Crown showed two announcer headset mics with brackets made to mount on the Sony MDR-V6 and MDR-7506 headsets. The CM-312HS has a hypercardioid pattern and the CM-311HS uses Crown's Differoid noise-canceling technology.

Reply Card 169

Audio mixers

Sony presented the MXP-700 series of cost-effective analog audio mixing consoles. Features include talkback functions, mix-minus, four mono and two stereo clean feeds, multiple aux sends, fader start control, reverse talkback, up to eight group modules with 3-band EQ, assignable dynamics and VCA grouping.

Otari Corporation introduced the Status family of digitally controlled analog mixing consoles. The consoles feature flexible on-board automation and status-recall. Options include moving faders, dynamics-processing software and patchbays. In an agreement with TG Systems, Otari also presented the PicMix line of hardware and software peripherals that can add mix-to-picture capability to any audio mixer.

Harris Allied showed two versions of the Zaxcom audio digital mixing console, the DMX1000 for TV applications and the audio-only DRC1000. They handle multiple sampling rates, 32-bit precision and extensive processing capability, along with audio and control I/O, compact size and simple operation.

Ramsa debuted the WR-C4500 series of portable mixing consoles, featuring 12-input and 20-input mainframes. Each includes four stereo line inputs, four bus-outs plus a stereo mix output and four aux buses. A larger console, the WR-SX1, was also shown. Available in 44- or 52-input versions, this mixer includes 20 subgroups and VCA control, with 4-band parametric EQ and automation capability.

The highlight of Graham-Patten Systems' booth was the new D/ESAM 820 digital edit suite audio mixer. Derived from the D/ESAM 800 series, the upgraded 820 features a master processor board, audio output module, digital input module with integral sample-rate converter, full 20-bit converters and I/O, plus Version 4.0 software. The new Model 854 and 858 digital input cards handle four or eight, 20-bit AES/EBU-format digital sources, with continuous sample-rate conversion from below 30kHz to above 50kHz, including asynchronous sources. All channel level settings, channel/machine assignments and audio crossfades can be stored as snapshots and instantly recalled.

Studer showed the 980 series of analog broadcast consoles, an upgrade of the 900 series that includes a redesigned input section and snapshot automation using PCMCIA storage cards for personal set-up memory.

Wheatstone Broadcast Group showed the D-500, a digital on-air console that looks like a traditional analog unit. Digital compatibility allows mixing of 32, 44.1 and 48kHz data rates simultaneously, and the console can produce output signals at any of these rates or in analog form. RS-232 ports for each channel provide intelligent communication to outboard devices. Operators can save and recall personal console layouts or select different layouts for each part of a show. A master RS-232 port allows remote operation, future software upgrades and diagnostics via modem.

Euphonix unveiled the CS2000B, a digitally controlled analog audio mixer designed for broadcast applications in on-air and production situations. It features comprehensive snapshot automation, extensive mix-minus busing, surround-sound capability and compact size.

DDA showed the Network 7 console, the company's first dedicated broadcast mixing console, which is designed for on-air use. It includes audio limiters built into mono and telephone inputs, a separate record bus and an

automatic ducking system.

In automatic mixers, Shure Brothers took a good product, the Model 410, and turned it into a great product by doubling the number of mic inputs to eight, adding insert points, EQ and some features from its AMS automatic mixer line—all without increasing the price. The SCM810 will operate with any professional microphone and can be ganged to handle up to 400 mics.

Reply Card 170

Telephone interfacing

Gentner Communications showed its latest refinement for telephone interfacing, the TeleHybrid. Gentner also debuted several enhancements to the TS612 digital telephone system, including PC call-screening software, a network interface that allows up to 10 TS612s to share a set of telephone lines, a 1A2 key-system interface, and TS612 control panels configured as drop-in modules that fit into on-air consoles.

Telos Systems showed its line of digital hybrids, including the ONE-x-Six Talk Show System, the ONE plus ONE dual-hybrid and the 100 Delta interface with dynamic equalization. Call Screen Manager talk-show software was also demonstrated.

Reply Card 171

Audio backhaul and distribution

By Steve Kirsch
Steve Kirsch is president of Silver Lake Audio, a remote engineering and equipment rental firm in Baldwin, NY.

ISDN has stepped to the forefront of the audio backhaul business. It has become the focal point for new product development, and was a hot topic of conversation on the floor at NAB 95.

Codecs

Telos Systems announced that it will incorporate ISO/MPEG Layer II coding into its Zephyr digital transceiver. Telos recommends Layer III coding at lower bit rates (56 or 64kb/s). Layer II software upgrades will be supplied at no charge to Zephyr owners. Telos also introduced Zephyrnet, an ISDN multipoint audio distribution system. Zephyrnet uses an ISDN Primary Rate Interface (PRI) to access and feed program audio to as many as 23 different sites, on a manual, emergency backup or scheduled basis. Different audio signals can be routed to different sites. Each remote site is equipped with a Zephyr transceiver connected to an ISDN BRI or Switched-56 circuit. Multiple Zephyrnets and PRI circuits can expand system capacity to 200 sites.

Corporate Computer Systems (CCS) introduced its third-generation codec, the Prima. It is designed as a codec "platform," allowing the user to configure a codec to a given application and budget. Prima supports earlier CCS codecs (Musicam and G.722), standard Layer II codecs, and CCS's latest, MUSICAM '95. An array of options are available, including modification of coding parameters via Windows software. CCS also unveiled its Fieldfone, a MUSICAM-based codec that operates over POTS lines. It includes a 2-input mixer and headphone amp, front-panel LCD display and built-in DTMF keypad. Audio bandwidth extends to about 7kHz, full duplex.

Intraplex unveiled a compact and lightweight portable ISO/MPEG Layer II codec. The Series 4400 weighs in at less than 10 pounds and contains a built-in ISDN TA. Nine ISDN configurations can be stored in memory and activated via a front-panel selector. An optional external keypad is used to program the unit.

MPR Teltech showed its Capella codec, an ISO/MPEG Layer II device designed as a PC-expansion board. The unit is also featured in MPR Teltech's Polaris reporter terminal, which includes I/O hardware and digital editing software for a notebook computer.

Comrex presented its Layer II codec, the DX200. It includes a built-in BONDING inverse multiplexer (IMUX), enabling the user to create channels of up to 256kb/s. Comrex also announced that its G.722 codecs have been upgraded to provide audio bandwidth of 15kHz mono over a 112 or 128kb/s line. This application retains G.722's advantage of low delay time and low cost. For use in the field with any codec, Comrex introduced a field mixer, the Codec Buddy. Key features include a 4-channel slide-fader mixing section, four headphone feeds with customized cue selection and a separate

PA mix of local and return cue audio. An analog telephone section is included with a single-line frequency extender for communications or backup.

Audio Processing Technology (APT) featured the DRT 128, a codec/reporter terminal that includes mic, line and data inputs and headphone output. The DSM 100 uses three ISDN lines for 20kHz stereo on 336 or 384kb/s. Also new were the RMC 240, which adds machine-control capability to APT codecs, and the MCE/MCD 800, which allows transmission of up to eight channels of full-bandwidth audio on a T1 circuit.

Dolby Laboratories' 520 series codecs support the company's AC-2 and AC-3 algorithms. (AC-3 operates with up to 5.1 channels for surround-sound applications, but these codecs handle only its 1- or 2-channel modes.) Between the two algorithms, these codecs will support transmission data rates from 56 to 384kb/s and digital audio sampling rates of 32, 44.1 or 48kHz, plus auxiliary data rates of 600, 1,200 and 9,600b/s.

One product not intended for ISDN came from Lightwave Systems, which showed the FIBOX digital fiber-optic audio transmission system. This system puts up to 12 channels of uncompressed 20-bit digital audio on a fiber-optic cable of up to 2.5 mile length. Output is available as analog or AES/EBU digital.

Reply Card 172

Satellite distribution for audio

LNR Communications was promoting its DAVSAT system, a modular design capable of being expanded and configured for the specific needs of a user's network.

On a global scale, Orion Atlantic is distributing SCPC audio through its Orion 1 satellite to subscribers in Europe and North America, via a high-performance, small-antenna package. The company specializes in turn-key systems, handling all hardware, licensing and installation.

Reply Card 173

Audio wire/cable

By Terry Baun

Terry Baun is president of Criterion Broadcast Services, a broadcast contract engineering firm in Milwaukee.

As the audio hardware and programming becomes increasingly digitized, so too must the in-house distribution and monitoring capabilities of the audio facility. NAB 95 provided a number of giant steps toward this end.

Audio cabling

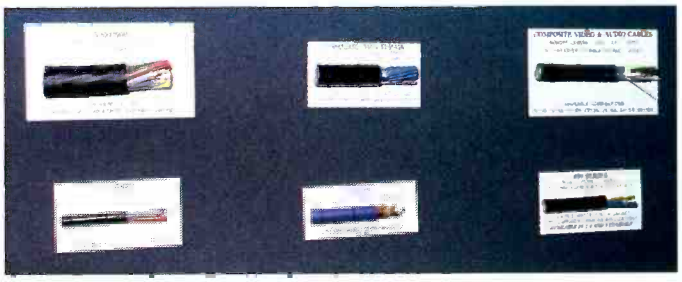
Gepco International added to its lineup a dual-channel, low-profile, shielded-pair cable (D72401EZ) and a 2-pair supplement to the existing GA724M series of audio cables (GA724302M). Also on hand were some examples of the company's custom-built and engraved panels, fabricated in 1/16- and 1/8-inch aluminum, anodized or laminate, in a variety of colors.

New from Canare Cable was a series of impedance transformers that

convert AES/EBU 110W XLR-type inputs to 75Ω BNC outputs. The devices also come in a 1Vpp version with a built-in attenuation pad.

Nemal Electronics highlighted its specialty of supplying short runs (<1,000') of specialized cables, either with or without terminations. Custom audio/video patch panels were also exhibited.

Switchcraft showed new TT jack panels and TT plugs (Model TT253N). Also new was the 3502 series of heavy-duty RCA phono plugs, in nickel and gold, with nickel-plated or black epoxy handles.



Reply Card 174

Studio support equipment and field accessories

By Terry Skelton

Terry Skelton is an audio consultant and trainer based in Bucks County, PA.

NAB is always a good place to hunt for those hard-to-find but extremely helpful little products that can best be classified as "miscellaneous." Here's a look at what turned up new in this wide-ranging category.

Intercoms and IFB

Telex introduced 14 RTS intercom products, two Audiocom intercom products and one Radiocom wireless IFB system. Most noteworthy among the new RTS products were the ADAM and ADAM CS intercom systems, digital audio matrixes that provide CD-quality audio, level adjustment on each channel at each intercom panel and backward compatibility to work with CS9000 components. ADAM is also expandable to more than 1,000 ports. (See "1995 NAB Pick Hits," p. 30.)

Clear-Com expanded its product line for the Matrix Plus II computerized intercom system by showing the ICS-52 and ICS-92, 1RU intercom stations with bright, easy-to-read LED labels over every key. Also on hand was the AP-22 assignment panel providing push-button routing of any audio source to any IFB destination. Other new products were the AB-100 on-air announcer's console and several additions to the PL-Pro line of intercom stations.

Digital audio workstation users can get routing, monitoring and communications in a 1RU package from Studio Technologies' Model 60 and Model 61 Studio Comm products. The company also demonstrated IFB Plus, a 2-channel IFB system for mobile units.

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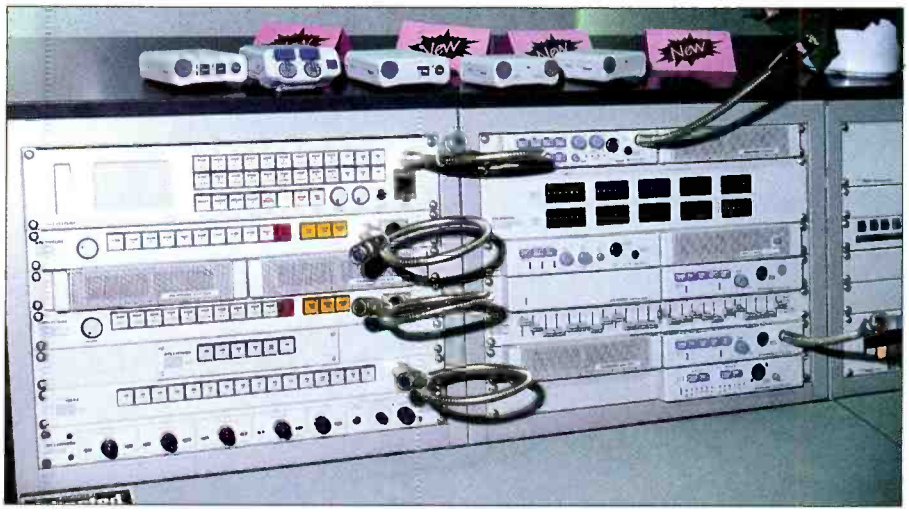
Video accessories

Beck Associates showed a level-matching line amp, the LM2+2, and a version with remote level control, the LMVCA. Also new were the SCP-10, a 10 x 10 RS-422 control patch panel, a 4-in, 8-out RS-422 switcher with gang roll, and a line level stereo tone generator, the LM STG. All are rack mounted.

The Video Accessory Corporation (VAC) has added three Video Bricks to its line. The VE/BBG is a miniature black-burst generator with correct SC/H phase and conforms to RS-170A. The LTVB/VDA-AA is a miniature video DA that will run on



8VDC to 36VDC. The CVB/VDA is a new clamping video DA created to clean up poor video signals from computers or other poorly designed equipment, and to get rid of 60Hz hum and other low-frequency interference. A versatile video squelch, the VS-3, is designed for translator duty or an S-VHS option can put it to work blanking screens in stores or museums. VAC also has a new gen-lockable color pattern, blackburst and sync generator with an audio test tone output, the SG2PG4.

The AJA Video company released one of those types of boxes that just solve problems. The C10PS and C10SP are parallel-to-serial and serial-to-parallel converters for 8- or 10-bit video. When you need to convert from one to the other, these boxes are just the right thing. (See "1995 NAB Pick Hits," p. 30.)

The Elantec booth was complete with just about every type of IC an engineer could desire. The company produces some innovative devices for OEMs and facilities that need to build custom equipment.

Multidyne's newest product is the VAS-1000, a 10 x 1 video and audio switcher with front-panel gain adjustments, three audio LED meters, an internal 12W audio monitor amp, and an Auto-Comp feature that switches between two video sources to compare the level, horizontal phase and subcarrier phase. Also shown was a fiber-optic video, digital stereo and data transmission system, the FTX-95, with a video S/N of more than 70dB.

Four new products were shown by Broadcast Video Systems Ltd. The SA104 is a safe-area generator designed to plug directly into a GVG or Leitch video DA frame or it can be used as a stand-alone device. The Masterkey 6D is a digital linear keyer and the EN 450 is a multiformat broadcast encoder. The Bugtrap is a self-contained logo-capture and display unit with storage and keying capability.

Mirror Image Teleprompters announced the delivery of new software for Macintosh platforms that will increase storage capacity. The company's computer-based prompter systems are aimed at production houses, schools and EFP operations. VGA monitors provide readability for the TV and speech prompter systems shown.

A 15 oz. transmitter and receiver can give you full-motion color video and audio for up to several miles clear line of sight with a new unit from Premier Wireless. Shown by Systems Wireless, these little no-license units can mount on the camera. The BE-300 system offers 4-channel operation in the 2GHz band.

Trompeter introduced 45° and 90° BNC connectors for use in tight quarters. These are true 75Ω and use the standard tool for assembly. Other new products included high-frequency digital and analog normal-through dual-patch jacks, normal-through dual patch jacks with a 20dB monitor jack, an RGB patching system for component video, and an improved version of its electric coax cable stripper.

The Tally Display Corporation (TDC) presented its line of display modules, which mount under a video monitor. They incorporate LEDs with red/green/yellow colors and three levels of brightness. The system includes intelligent display modules and sophisticated software, and offers error detection, tally status and machine assignment in addition to its ID functions. TDC also showed a new Router Video Menu System and announced the pending development of an interactive system to display the ID information from video servers.

Horita showed six new products, including a palm-sized battery-powered time-code generator, the PG-2100, designed for multicamera shoots, which can be jam-synced. The PR-232 is a palm-size time-code reader designed to plug into a laptop PC, which outputs RS-232. The AM-50 inserts audio level bars over a video signal for an on-screen display. Also shown was a time-code-driven dual GPI, the GPI-50, and a matte generator with an on-screen readout, the MG-50, as well as a VITC reader with on-screen display, the VWG-50.

ADC Telecommunications introduced a true 75Ω BNC connector with a positive locking center pin.

Videotek offered its DDA-108 and the RDA-108. The DDA-108 provides eight outputs from its single self-terminating input. The input may be any serial digital video signal including 143, 177, 270 and 360Mb/s signals for composite digital, component digital or HDTV. The RDA-108 with reclocking provides eight reclocked outputs from its single self-terminating input. Videotek also announced the TAD-101 component analog-to-

digital transcoder. It will take any component analog video format and generate parallel and serial digital component video outputs with EDH data.

As the name implies the Brick Wall Filter from Digital Visions provides an extremely sharp cutoff beyond a user-defined point, providing spectrum-shaping for MPEG mastering. (See "1995 NAB Pick Hits, p. 30.)

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Battery products

Anton/Bauer presented its lithium-ion Dionic battery system. At half the size and weight (or double the capacity) of NiCad, the batteries are controlled in use and charging by microprocessors in the batteries and their chargers. Agreements with major camera-makers allows accurate display of battery condition in the viewfinder. The battery uses the Anton/Bauer Gold Mount System, which allows automatic switching of the Automatique camera light with a camcorder's record function. The company also introduced the MP-2 fast charger, a smaller version of the MP-4D.

PAGs new 4-channel battery management system for NiCad batteries, the MC124, includes an automatic revitalizing program for batteries that have been subjected to abusive discharge, along with automatic polarity protection, a large LCD data screen, autoranging fast charging and numerous other features under the control of PAG ACS, a microcomputer program. A serial port allows connection to a PC for control and monitoring. Power supply input can be anywhere between 100V and 250V, 50Hz to 60Hz.

United States Broadcast had four new battery chargers, beginning with the Night Lite, designed for overnight or longer charging of single NP, Brick or ProPak batteries. The Wiseguy, also for single batteries, has a 1A charge rate, a 50, 75 and 100% charge indicator, and an elective discharge function. The Lightning series has models holding three or six batteries. It's designed for fast charging and will run off any voltage from 90VAC to 260VAC. The Power Plant has five positions for charge and discharge, and one position for analysis and conditioning. This unit will also charge walkie-talkie, computer and cellular batteries.

The Energy Gage built into Frezzolini NiCads for cameras can show you what the available charge is at the push of a button. This system automatically calibrates itself after a full discharge and is temperature compensated so you'll even know in the cold how much shooting time you have left. Frezzolini also showed a new NP bracket for mounting on a Sony camera's battery box, which allows the Frezzi battery to power camera and light. For travel to remote spots the OP-177/U charging charges just about anything from any power outlet, hand-cranked generator or folding solar panels. Also on hand was the M9400 military field charger.

Christie Electric introduced the CASP/1200 universal battery support system. The microprocessor-based instrument has six channels that process up to six batteries of any type sequentially.

Reply Card 177

Storage media

By Curtis Chan

Chan is president of Chan and Associates, a marketing and public relations company for audio broadcast and post production facilities in LA.

At NAB, Ampex rolled out three new videotape products: Ampex 398 Digital Betacam SP videotape, Ampex 288 Hi8 and a new generation VHS product called Ampex HG. The new product rollout begins immediately with deliveries of the 288 Hi8 and HG series tapes and concludes in July with the launch of the Digital Betacam videocassettes. In addition, a long-time leader in the field of audiotape, Ampex is introducing five new audiotape products. These include the Ampex 489 extended play S-VHS cassettes for ADATs, CD-R, Hi-8 audio cassettes, DDS backup prod-

ucts and certified R-DAT cassettes.

Not to be outdone, Maxell showcased the T-160-length version of its highly popular HGX-Plus and P/I Plus videocassettes. The extended play (EP) mode will record/play a full eight hours and is ideal for time-lapse recording and long play applications. For pro EFP/ENG and studio applications, Maxell's Digital Betacam series tape uses an advanced Ceramic Armor MP formulation, a special backcoating and precision shell that results in a claimed 2dB S/N improvement over most SP-based tapes. The tape shell is made of electroconductive resins to resist heat and shock that is sealed to minimize contamination. To compete on the audio end Maxell introduced 100% certified R-DAT tape. On the optical side, a new CD-R offers 680MB of storage and conforms to the Orange Book Part II standards in unrecorded form and Yellow Book after recording. The company is also producing a 3.5-inch rewritable MO targeting the desktop publishing and graphics markets.

Sony's island was like walking into an adult toyland... well conceived and executed; an interesting glimpse of what could and might be a possible direction for broadcasters. But despite all the dazzling hardware, tape is still one of the cornerstones of our industry and Sony was not lax in its commitment. One of the outstanding products in view was the Hi8 DLC editor (diamond-like carbon coating) videocassette. This product proports to combine the high-resolution, low-noise performance of ME technology with a DLC layer to protect the tape against the rigors of heavy editing. The DLC coating process applies a protective carbon layer for durability and a new lubricant for smoother running. Sony claims that using the high-density Evaticle II metal ingots improves video and color S/N by 1dB. Sony's new S-VHS series tapes offer a new RF binder and surface-processing additive for longer life. Its audio cousin, the DASV series, offers digital audio users an alternative that touts a new packing technology resulting in a retentivity figure of 1,900 Gauss (190mT). Last, Sony has upped the ante for Betacam with its BCT-MA metal series that offers a binder system with 50% higher cross-linked density for higher durability.

The 3M company debuted its BC-digital videocassettes. Using a polyurethane binder and a matrix lubricant system in conjunction with special processing methods, the cassette offers 1,000-pass durability with low headwear. It has a smooth tape surface that allows for high output, low error rates and reduced debris.

Reply Card 178

Short-haul fiber and wiring

By Les Brown

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

Perspective certainly colors perception! Makers of distribution equipment report interest in digital continues to grow, yet sales of analog distribution products aren't falling off dramatically. Cable and fiber suppliers, on the other hand, say customers are describing their primary application as analog but are seeking out products designed to shift easily to digital somewhere down the road.

Wiring

Gepco introduced a cable optimized for digital applications, the VSD2001. Canare Wire and Cable showed a serial digital cable, its L-5CFB. Both are foam core with foil and braided shielding, and both claim to push the 270Mb/s limit to the 400 meters. As with all foam dielectric cables, attention has to be given to bend radius.

Connector availability is no longer a cause for worry. True 75Ω BNCs are available for new cables from most major suppliers. Be sure the BNCs you buy will match the cable you're using.

Belden brought a family of pre-timed plenum-rated RGB cables for analog component video applications. They're available in bundles of three for RGB transmission, four for RGB/sync, and five for RGB/sync/hold applications. Timing is said to be accurate to less than 5ns per 100 feet of length. The series 1824A, 1825A and 1826A is built around RG-59-style coax but with stranded center conductors for flexibility. The series is likely to find its heaviest use in multimedia situations, linking computers and projectors.

The 1694A cable from Belden is an RG-type 75Ω low-loss precision coax designed for serial digital video applications. (See "1995 NAB Pick Hits, p. 30.)

Pre-punched rack panels from Clark are made from 0.068-inch black anodized aluminum with 0.5-inch flanges for added strength. (See "1995 NAB Pick Hits," p. 30.)

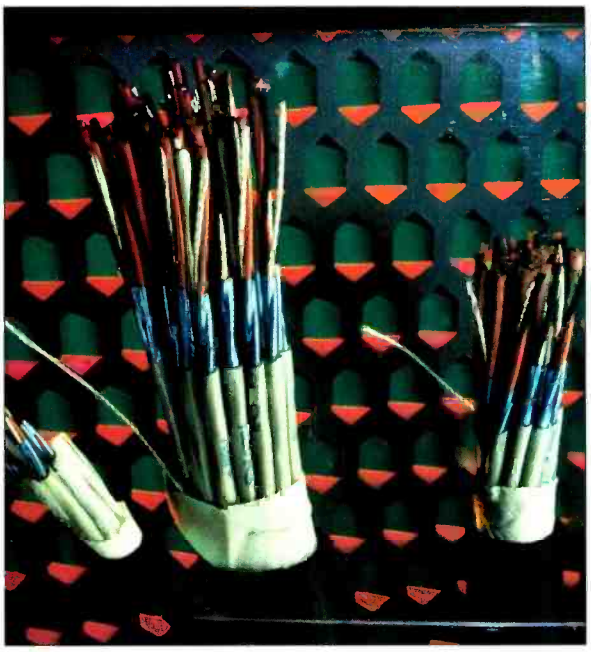
Short-haul fiber

Though coax is the answer for most serial digital applications broadcasters were pressing manufacturers about distance. The standard "300 meter" answer wasn't always accepted as gospel and reassurance that new digital cables push the maximum closer to 400 meters left some uneasy. In the absence of experience there's skepticism and a feeling that the figures are based on perfectly clean installations with the threat that patchbays, sharp bends and other elements that are of minor consequence in analog will bring unexpected failure in a digital system. There's also concern about future data rate needs as HDTV advances. At the station level distances are normally such that most of the worry is unlikely to be realized. Larger facilities, especially those dealing in program production, have a more legitimate concern.

In some instances, serial digital component video sources (VTRs, servers, incoming feeds) are concentrated near street level with editing and production on each of several floors above. Combine the physical issues with the concerns about distance, potential for AC problems and uncertainty about future standards and it's difficult to imagine a choice other than optical fiber. Still, it isn't certain that fiber will be the solution.

The production situation just described isn't far off the mark for many broadcasters. Network affiliation changes have driven the development of extensive news facilities where there previously were none. The split location scenario isn't just between floors; it's often between buildings. LMAs are also driving the short-haul need.

When you don't own the right of way between sites, the video transport situation is simple: Call your local common carrier. In most locations, they'll already have a service available at a fixed monthly price. They supply the equipment and you supply the video and audio. In fact, worldwide service is a phone call away if your video is analog composite and you're not opposed to the use of compression. If you want to transport a digital signal or if your application demands full bandwidth, it's more complex and may not be possible at all at this time. It wasn't possible to find a service provider at NAB who would commit to transport of a non-compressed 270Mb/s signal anywhere at any price. The contention was that compressing to 45Mb/s provides adequate quality even though a few major post-production users were still pressing for non-compressed 270Mb/s transmission. Even when offering to purchase their own transmitters and receivers, it wasn't always possible to get access to "dark" fiber. The most commonly proposed solution was physical delivery of a tape. In fairness, for most users there's no issue over compression; it's mild enough that a viewer of the decompressed signal isn't aware of any change in quality. The switched services featured at NAB by Vyvx, AT&T and Alcatel are proving popular with most users. Picture quality is more than adequate for transmission to the home and even for critical evaluation of program "dailies."



When you own the right of way or can obtain right of way permission without involving a common carrier your choices are broader. The economics are on the capital side of the ledger; you'll purchase fiber and transmission equipment. It changes the equation considerably. When you're "renting" service, you don't have to worry about future developments; it's up to the provider to make the upgrades. When you're going to own the equipment, you have to project your needs so that capital goods aren't obsolete before they're written off.

Before discussing service with any provider consider your level of understanding of fiber-optic transmission. Fortunately, many makers of fiber terminal equipment offer free booklets that cover the basics.

Fiber Options offered a variety of individually packaged transmitters and receivers for video, audio, data and various combinations. The company also added to its tray-based line the model 1244B, for video plus four audio channels over a single fiber.

Dynair and Leitch offered individually packaged analog fiber transmitters and receivers. At Dynair the transmitters and receivers had also been configured for tray mounting. At Leitch, analog fiber transmitters and receivers were available as input/output modules for the DigiBus line of translation products, though not for simple transmission.

If you didn't get to the S6 hall, you missed several smaller, but rapidly growing, fiber-optics suppliers. British-based Techniche had short-haul individually boxed transmitters and receivers for non-compressed digital video (with multiplexed audio) up to 270Mb/s as well as similar units repackaged for rack-mounting tray installation. Not far away was Force, Inc., which offers its own line of transmitters and receivers and provides optical devices to several other vendors. Because Techniche also supplies products to more well-known vendors there is good potential for mixing and matching according to application and price.

Ipitek showed its Imtran CQ-410 system for up to 50km transmission with single-mode fiber or 2km via lower-cost multimode fiber. The system accepts up to four analog video signals with companion audio for uncompressed 10-bit digital transmission over a single fiber. There's also an 8-bit version (CQ-508) for five signals.

In the radio/audio hall was Lightwave Systems whose products centered on transporting audio, either analog or digital, by fiber. The company offers a modular system that multiplexes up to eight AES/EBU digital audio signals plus a full-bandwidth SMPTE 259M composite video signal onto a pair of fibers. Lightwave is related to Lighthouse Digital whose main hall booth included an expanded array of fiber video products. Transmitters and receivers for up to and beyond 400Mb/s were shown in stand-alone form as well as packaged for installation of up to 16 units in a 2RU frame. Lighthouse also reported growing demand for its routing switcher with fiber I/O.

At the Grass Valley booth, serial digital interface capability for its multichannel fiber (MCF) line was introduced. The analog version supports a mixture of formats (NTSC, PAL, SECAM) up to a total of six channels with as many as 24 18-bit audio sources. Used with digital signals, it'll handle up to three 270Mb/s serial digital component

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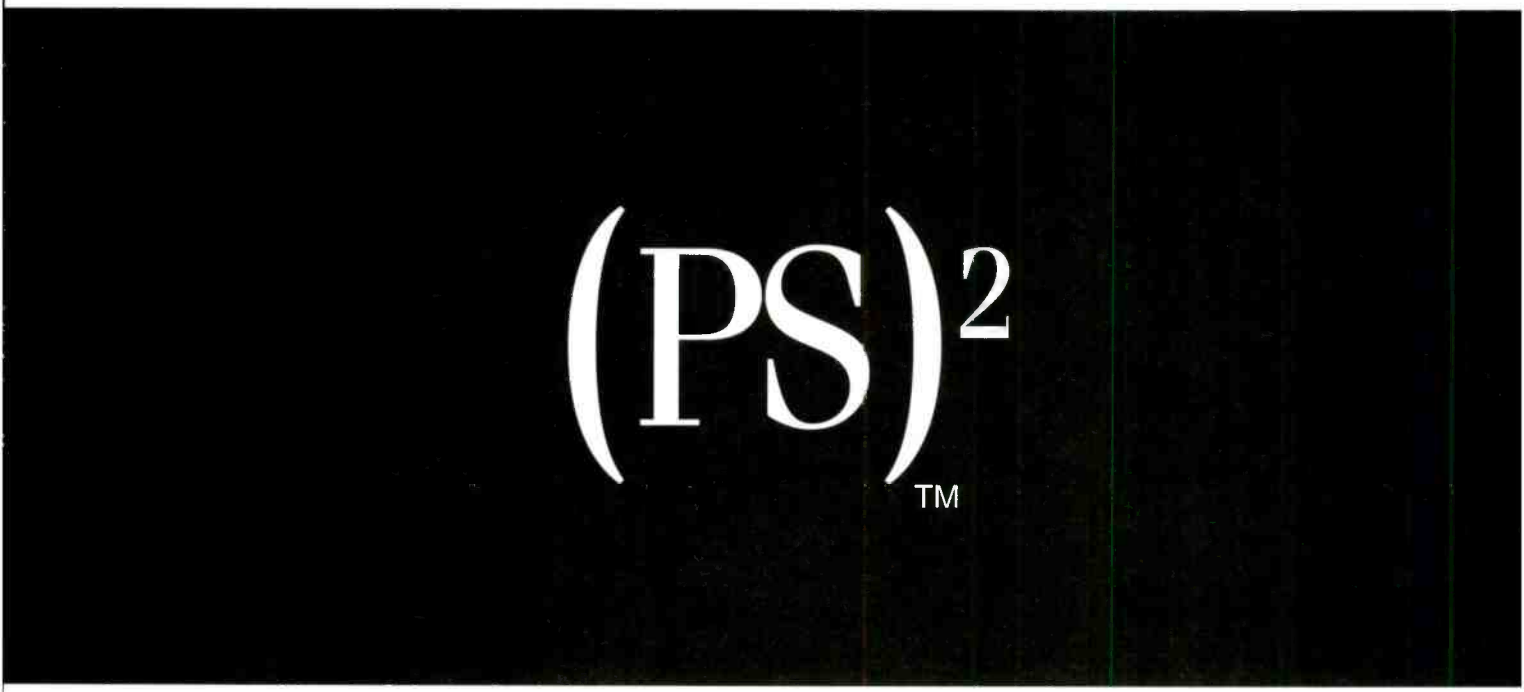

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signals or six digital component signals (143Mb/s or 177Mb/s). For SONET applications, Grass Valley also showed a modular product, SVP155, with RS-250 short-haul quality. There's a 2RU version for a single channel and a 6RU frame that supports modules for up to five channels. Each video channel accommodates two stereo audio pairs. Versions are available for analog or composite digital video I/O. Also on display was a short-haul fiber-optic transmission pair designed for compliance with the proposed SMPTE studio fiber standard. The transmitter and receiver modules plug into the MAX-900 series trays; up to six modules per 3RU frame in any mixture with other distribution or format translation products. There's density advantage in that receivers and transmitters are packaged four per module, but that's a cost factor to be considered when all you have is a single signal. Transmitters are laser offering 2km performance over single-mode fiber. Connectors are snap-in SC type located at the front of each module.

Several suppliers of fiber transmission gear are watching industry acceptance of the proposed SMPTE standard with an eye to adapting existing products to conform. Because the standard calls for logic high to be represented by full light intensity and logic low corresponding to turnoff, there's little to get in the way of mixing the products of various manufacturers.

As to economics, cable and fiber are drawing closer, though it still takes a strong technical argument to tilt the scales to fiber. A year ago a single fiber link could be expected to cost $3,500 to $4,000 per signal/per end. Now, with laser transmitters, it's down to $1,000 or $750, perhaps slightly less when an LED transmitter and multimode fiber are adequate to the distance. Some who are close to the standards process were disappointed not to see digital source devices (VTRs, servers, etc.) with fiber ports at NAB, yet remained hopeful they'll appear, at least as options, before another year has passed.

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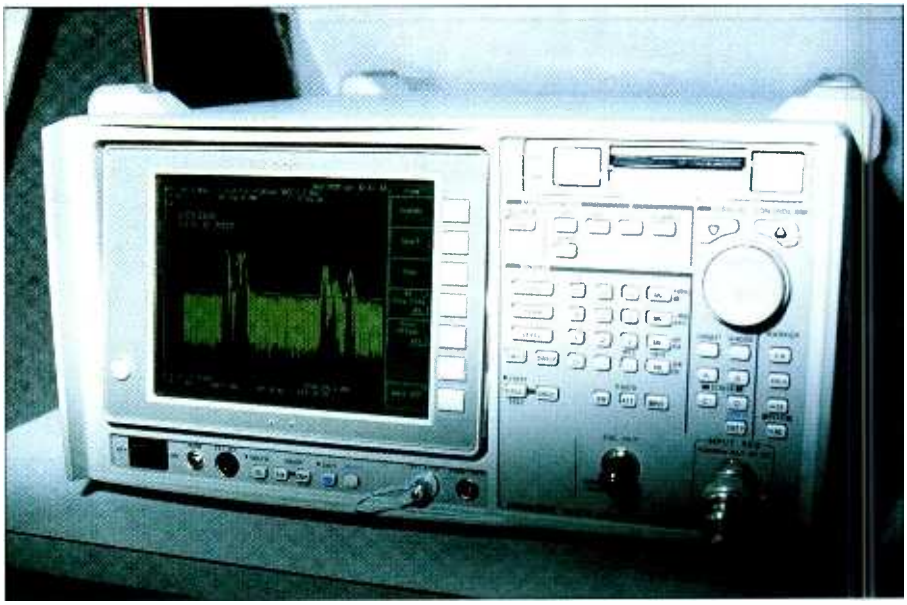

Test and measurement

By *BE* Staff

In the field of TV test equipment, numerous manufacturers were showing test equipment designed to work with component video or with digital video systems. Tektronix was showing a line of hand-held equipment. Units ranged from a digital audio analyzer/generator and a serial component and serial digital analyzer to a hand-held waveform/vector/audio/picture monitor. The WFM 90 series monitor has an excellent quality color picture display. The unit can show full screen, waveform, video or vector displays. In addition, it's possible to show a video display with vector display cut into the picture.

BTS was demonstrating its echo cancellation or correction systems. This system operates by generating a signal in the vertical interval used to correct echo distortion in the picture. The receive portion of this system will be in the top-of-the-line Magnavox receivers starting this fall. This will eliminate many of the problems seen in the homes, especially in areas where the receive sites are less than optimum or where indoor antennas are used. Currently, these systems are primarily used by stations in off-air pickups and for feeding translators from a primary station. The system is relatively inexpensive and offers a quick solution to receive problems where clear paths are not obtainable.

TFT was leading the charge for new EAS regulations and equipment. Officials were quick to point out the results of their research showing up to 44% of a radio station's audience could tune away during regular EBS tests. Wonder if similar results might be expected for our TV audiences? The company demonstrated a full line of EAS-compliant receivers, decoders and encoders.

Reply Card 180

Audio test equipment

Audio Precision (AP) introduced System Two, a dual-domain audio testing system. (See "1995 NAB Pick Hits," p. 30). As with AP's System One, System Two is designed to be used with an external computer and can be connected to a laptop via a PCMCIA card. The company also announced APWIN Windows-based software for the System One, with versions available for Windows 3.1 and Windows 95.

Neutrik Instrumentation USA featured the A2/A2-D audio measurements system for analog and digital audio analysis. This portable, self-contained unit features an LCD screen, a 4-graph memory and a printer port. The A2-D offers analysis of AES/EBU, consumer and optical digital formats.

Tektronix presented the 764 digital audio monitor, which operates as an audio phase and level meter as well as a digital data monitor. (See "1995 NAB Pick Hits," p. 30.) The self-contained unit features a built-in CRT display and a VGA port. Data can be stored and errors can be time stamped with the 764's internal clock or external time code.

Bird Electronics showed its familiar power meters, but took pains to point out that it also makes a varied line of RF filters.

Reply Card 181

TV test equipment

Videotek introduced the VTM100D digital test instrument. The unit displays waveform and vector information on a picture monitor from a 601 digital signal. With two inputs, it accepts either 525/60 or 625/50 serial digital component signals at 270Mb/s. Also shown was the VMA-10 monitor adapter, which allows any composite analog video monitor to be used as a picture monitor for a serial digital component signal.

AAVS by Sencore introduced the DSA309 digital studio. It's a half-rack-mount analyzer that includes component and composite digital video monitoring testing for 525- and 625-line standards in one package. The unit provides continuous real-time, on-line measurements for serial jitter, signal amplitude, color levels, non-recommended value errors, EDH errors, parity bit errors, TRS errors, bit activity and reserved code errors.

Leitch demonstrated its EDH Status Monitoring System (ESM). It automatically checks the CRC and EDH check codes in all signal paths and combines them into one monitoring system. The system supports any mix of composite or component digital paths.

Tektronix previewed four upcoming products: MTS100 MPEG-2 test system, the TG2000 signal generator, the RFM90 hand-held signal level meter and the VM100 video measurement set. The devices are scheduled for release later this year.

Hewlett-Packard previewed its 8VSB measurement device for future ATV transmission systems. Also shown was the 85942A video signal monitor. Designed for unattended monitoring of broadcast transmitters and cable headends, it provides measurement of 13 parameters.

Tektronix introduced the VM100, which makes

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standard video measurements at the touch of a button and provides quick verification and on-line monitoring of composite video signals. (See "1995 NAB Pick Hits," p. 30.)

Hamlet's 302 WVR is a half-rack unit with four BNC video inputs, 1 Y/C video input and two audio inputs. The rasterizer has external reference and proprietary hands-free timing that makes it easy to time single or multiple sources quickly and accurately. (See "1995 NAB Pick Hits," p. 30.)

The WVM-710 from Magni Systems features stereo audio display capability. The audio display shows amplitudes of left and right channels relative to a user-set reference level. If the amplitude exceeds the reference by 5dB, the level indicator turns red.

The LV 5100D waveform monitor from Leader Instruments handles two serial digital inputs and one analog 3-channel input for use in mixed digital/analog facilities. An EDH system based on SMPTE RP-165 provides transmission-error monitoring and analysis of signal status using the equivalent line-length technique. Leader also introduced the LT 425D, a 4:2:2 digital video generator that features EDH functions conforming to SMPTE RP-165 as well as embedded, internally generated audio test tones.

Ascaca/ShibaSoku introduced the ShibaSoku CM207 (20-inch 900 Line CRT) and the CM147 (14-inch 700 Line CRT) digital control monitors with auto setup for critical video signal monitoring applications.

Reply Card 182

TV RF equipment

By Don Markley

Don Markley is president of Markley and Associates, Peoria, IL

The RF portion of the TV industry continues to hold its breath waiting for the other ATV shoe to drop. Most new equipment is a slightly modified version of last year's. There is no significant change in the VHF industry and UHF equipment is showing some new changes with a few major ones. Test equipment continues to become more exotic and smaller.

In transmitters, a new system was shown by Acrodyne. The Au series transmitter uses a tetrode-type device, the Diacrode from Thomson. It operates essentially in grounded grid and delivers 60kW peak visual output with aural in combined amplification. Acrodyne states that the transmitter will provide intermodulation distortion products of -54dB or better.

Harris Corporation was showing its 60kW IOT transmitter in its latest version. This is a mature design that is well-established in the industry. Rather than being a negative, mature design in this instance refers to the fact that the base transmitter has been around for a while. All of the demons have been exorcised and the user can anticipate there will be no surprises.

Larcan/TTC was showing its HDR series of IOT transmitters. These have been available for several years with the IOT output tube. In addition to the high efficiency, Larcan TTC uses a ramp start on all voltages. The company suggests it is gentle on the IOT and extends the overall tube life. Larcan was also showing a new design in solid-state low-power transmitters. The unit shown was a 100W UHF transmitter with the same basic exciter found in its big brother. A 1kW version about the size of a short equipment rack will soon be available.

Comark Communications was demonstrating transmitters using the new pulse step power supply. This system uses eight controllable high-frequency power supply units that are switched on and off as needed to provide the necessary voltage to the IOT. Due to the significant control that such technology gives the operator, there is no need for fast-acting circuit breakers or crowbar circuits to protect the IOT. This technology also provides a high degree of regulation, allowing the use of simpler high-voltage power supplies. In the event one of the power supplies fails, a shunt diode bypasses the failed unit and the majority of the total voltage necessary for the IOT continues to be provided.

Sira Systems showed a complete line of RF transmission products. One new item was the 8-bay omnidirectional UHF antenna.

The BMT55-7P transmitter from Broadcast Microwave Services is for use in the 1,990MHz to 2,500MHz band. The required input power range is +11 to +32VDC, which will provide 3W nominal output power if the high-power mode is selected or 0.75W nominal if the low-power mode is selected.

EEV introduced a 20kW IOT. Its compact design is air cooled and features plug-in replacement. The frequency range is 470 to 860MHz and the output power is 22kW + 2.2kW common amplifications single carrier sound.

The CST II series of transmitters from Advanced Broadcast Systems incorporates a new generation of TV transmitter design. Using the integral Computer Supervision Terminal, remote control can be accomplished with a set of modems and a remote terminal from almost any site.

Varian Associates introduced the 4CM1000KB, an Eimac superpower broadcast tube. The multiphase-cooled tetrode has pyrolytic graphite grids and the anode is cooled with a high-efficiency design. The tube is for use in the 500kHz to 30MHz frequency range and is capable of generating output power of up to 800,000W.

In the antenna area, most manufacturers were showing basically the same equipment as the last few years. Dielectric had a new elliptical function filter that it claims will provide better performance for common mode transmission in UHF transmitters. The company was also showing its digitLine, which is a rigid transmission line usable on any of the UHF frequencies.

Andrew was showing a number of improvements on its coaxial connector series. One antenna item was the result of a cooperative effort between Andrew and ERI. It was a new tower section designed by ERI for supporting side-mounted TV antennas. It is designed for minimum impact upon the antenna. Patterns demonstrated that the pattern change between a side-mounted antenna on this special tower section and a top-mounted antenna is minimal. It should help in the mounting of ATV or LPTV antennas.

Burle Industries was touting that it received the hard-to-get ISO 9001 certification. And, if you need broadcast power tubes, the company probably has them.

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General RF

Users with a C-band uplink will be interested in the Varian VKC2936R24 fast-tune klystron. This device makes it possible to retune a transmitter in seconds.

On the Ku-band side, EEV featured Stellar, a range of Ku-band satellite communications amplifiers.

With the increased emphasis on RF radiation, the Loral Microwave-Narda 8718 survey meter will come in handy. The company also presented a catalog of RF-environment data.

Reply Card 184

Satellite transmission, remote backhaul and SNG vehicles

By Kenneth Hunold

Kenneth Hunold is an audio/video project engineer at the ABC Engineering Laboratory, New York, NY

Smaller, lighter and cheaper have always been the rules of the road in the ENG, EFP and SNG services. Now, through compression, smaller, lighter and cheaper can also be applied to the bandwidth requirements of the link between the remote camera and the studio. While there will always be a need for the large combination production/transmission SNG vehicles, the push is on for smaller go-anywhere, do-anything systems that can operate just as easily in a crowded city street as they can in the middle of nowhere.

BAF Communications Corporation showed its SNV19 with a new, lightweight 1.5m antenna. The antenna is positioned by a zero backlash drive system originally developed for space-borne operation. The drive system is said to be almost maintenance-free, and the entire positioner/antenna combination weighs less than 250 pounds. The vehicle is also available in the ENG19 configuration, outfitted with a telescoping mast.

Frontline Communications showed its fleet of vehicles including the SNV207. The large size of the 207 makes it possible to equip the vehicle for EFP applications as well as SNG.

Harris Allied continued to show its S-23 ENG vehicles. Harris Allied also offers turn-key solutions to SNG requirements, and introduced a digital SNG exciter with MPEG-2 compressed video and audio.

Will-Burt introduced a mechanical telescoping system. The drive train incorporates a durable, heat-treated stainless steel thin foil column and the drive system is powered by a 115VAC 3/4HP motor. (See "1995 NAB Pick Hits," p. 30.)

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Satellite backhaul

LNR Communications introduced the Safari Digital Video Flyaway Earth Station. Billed as the smallest, lightest SNG flyaway system, it is

available in either C-, Ku- or dual-band configurations. The unit operates using compressed digital video with data rates from 3 to 9Mb/s. Three reflector sizes include 1.2m, 1.9m and 2.4m. When packaged with the appropriate HPA, sufficient link margin is claimed for most Intelsat C and Ku beam patterns, as well as various regional C and Ku satellites. The MVC-10 mobile video/data communications option can also be used with this system to provide up to eight voice/fax channels and six data channels.

Harris Allied Systems introduced its DSE1400 digital satellite exciter and companion DSR1400 receiver. It is targeted for Digital SNG operation with two audio channels per video feed. It can be integrated into a traditional SNG vehicle or be configured as part of a portable fly-away package. An outboard HPA is required for the desired operating band. The DSE1400 uses an SCPC (single carrier per channel) design. An MCPC (multiple carrier per channel) system is being developed that puts four 8Mbs digital signals on a single 36MHz transponder.

Comsat Laboratories featured its VideoLynx 2000, manufactured by Wegener Communications. The VideoLynx 2000 series uses MPEG-2 compression technology to transmit video and two audio channels at selectable data rates from 2 to 20Mb/s. This allows the compression ratio to be tailored to your program material or budget. The QPSK modulator provides a 70MHz IF output, requiring an upconverter and an HPA.

Tiernan Communications displayed its TE3 MPEG-2 video and audio compressor. Video and four channels of audio are compressed to output rates selectable from 1 to 15Mb/s. An optional transport layer multiplexer is available (and required for SNG operation.) At the show, Tiernan was using multiplexers provided by ComStream Corporation. Also required for SNG operation would be a modulator, upconverter and HPA.

The GALLERY

Intelsat's Digital D-band SNG service is the latest option for SNG operators. It gives operators instant global access from anywhere on the globe. The system provides any configuration including cross-strap C-band to Ku-band options and access options through gateway or customer-premise earth stations.

France Telecom, with its U.K. subsidiary Maxat, and U.S. partner Keystone Communications, announced Global Skylink. By combining key international services from France Telecom, Maxat, Keystone Communications, and its Pacific partners, KDD of Japan, Hong Kong Telecom, and Korea Telecom, Global Skylink integrates the expertise of six major carriers around the world to offer 1-stop shopping video services.

Antenna Technology Corporation, Inc. (ATCi) solves the space (and zoning) problems many stations face with its Simulsat Five and Simulsat Seven mulitbeam antennas. These can cover 35 or more satellites with a ground requirement of only 1.5 times that of a standard parabolic antenna. To control satellite dish position, the ATC PL4100/4200 antenna tracking controller stores up to 70 sets of satellite accession data.

ITS Corporation has released its UHF Exciter Plus System featuring the ITS-20A UHF exciter. The system features solid-state amplifiers, pulsing systems and signal correction.

EMCEE introduced the Site Controller, a 386 PC-based system containing hard and floppy drives, an internal fax modem, and a CRT display. It can monitor status and operate up to 34 transmitters.

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Backhaul for news

Video compression, combined with telephone communications, provides another means of gathering news. Store and forward techniques allow crews to record video and audio at the scene and transfer it later in non-real time. Because of the low bandwidth (and consequently low data rate) of the connection, it can take several minutes to transmit a single minute of recorded video. In situations where there is no other way to get the story out, and time isn't of the essence, it can be an acceptable trade off. Several companies have surfaced to serve this burgeoning "video over telephone" market.

TOKO America has introduced version 2 of its band, ISDN/Accunet/T1 or telephone landline. Operation modes include live audio and video (reduced video quality,) high-resolution still picture, and high-quality audio only. The "live" mode allows video and synchronized audio to be transmitted over links ranging from 56kb/s (Inmarsat) to 1.5Mbits/s (T1 service.) It also features bidirectional audio transmission, allowing 2-way communication between the remote site and the studio over the same connection. The "high resolution still" mode is useful for transmitting still pictures of newspaper pages, photographs or cover shots from the video that is being sent. The "high resolution audio-only" allows high-quality narration to be added to an edited package.

NewsFIRST video from Baron Services is a Pentium-based store-and-forward system. The field unit is a sewing machine-sized portable computer used to store the incoming video for later playback to the base unit at the station. Video can be digitized at 1 to 30 frames per second, and at various screen resolutions. The system is capable of interfacing with up to four cellular phone lines at once, which increases the effective throughput of the system, and also reduces the transmission time. Once the entire clip is received at the base unit, it is available for playback.

Videoplex II from FoNet, Inc. offers video over cellular or landline telephone circuits. A maximum of three cellular phone lines are supported to increase the effective data capacity of the transmission link. Video can be digitized at 1 to 30 frames/second and converted to a compressed data file. Transfer times quoted are five minutes for a 15-second clip sampled at seven frames/second or 16 minutes for a 15-second clip sampled at 24 frames/second.

The compression ratios used in most cellular phone systems are quite large, and the artifacts of reduced picture quality and/or reduced frame rate can be disturbing. However, it has been said that in newsgathering, the only bad picture is no picture. As always, try before you buy.

Fiber-optic technology has emerged as a viable alternative to copper coax and audio cable for getting the signal from the reporter back to the SNG truck. Many portable systems were shown.

Telecast Fiber Systems, Inc. showed its Sidewinder ENG/SNG systems and user-configurable Viper series. Modules are available for camera remote-control systems, allowing you to have a fiber link between the camera and the truck-mounted camera control unit.

Lightwave Systems offered its Fibox system with two channels of mic or line level audio. Three units can lock together, forming a package that can be rack-mounted, consuming one 19-inch rack unit. By combining multiple units with a proprietary cable, the system is expandable to 12 audio channels (six stereo pairs). The 20-bit audio A/D converters with continuous variable input gain controls adapt to many different program source levels.

Also in the camera-to-truck link area, Telex Communications showed its CamLink 200 (and 100) wireless ENG link. The CamLink 200 operates in the 2.0 or 2.5GHz ENG band and transmits video, audio, VITC and VTR remote start control to a triple-diversity receiver system located (usually) at the ENG/SNG truck. Alternatively, a hand-held receiver/8mm VCR combination unit is available to allow a reporter/producer to make live time-code window dubs of the video recorded in the camera. This allows the reporter or producer to get a head start on logging for any editing that may be required when the tape cassette is returned to the truck or studio. The CamLink 100 is a Part 15 device (no FCC license required) operating in the 2,400-2,483.5MHz band for hidden camera, 35mm, 70mm or Steadicam wireless video monitoring. (See "1995 NAB Pick Hits," p. 30.)

Standard Communications introduced the CAM 830 control access module. It allows the complete line of Omni Global and Omni Broadcast receivers to be controlled either from the control access module (located in the receiver) or with Windows-based software, via remote control. A spectrum display of the entire operating band or the selected channel is available when using the software-based remote control. This could be used to locate the audio subcarriers on an unfamiliar transponder. Remote control of three audio subcarrier demodulators is also available.

Varian Traveling Wave Tube Products (TWTP) introduced several wideband versions of its popular TWTs. The C-band versions cover the band from 5.85 to 7.1GHz, and the Ku-band versions cover the band from 12.75 to 14.5GHz. The company also continued to show its plug-compatible replacement TWTs for many transmitter models.

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Routing switchers

By Marvin Born

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

If one word ran through NAB 95 it was *digital*. However, there was a less obvious point about digital that only a few vendors were discussing in public — for the next several years broadcasters must live in a world that will be part digital and part analog.

Grass Valley introduced the Series 6000 Compact Signal Management System and the OmniBus Facility Management System. The 6000 is designed for small- to middle-sized requirements. The system handles NTSC, PAL and serial digital video in its various forms. The 30MHz bandwidth system is available in 16 x 4, 16 x 16 and 32 x 32 analog configurations plus 16 x 16 and 32 x 32 in serial digital. Data rates of 143, 177, 270 and 360Mb/s can be used.

The OmniBus Facility Management System switches control for products including routing equipment. It provides an Ethernet network system to control broadcast equipment from multiple workstations.

Leitch Incorporated announced a 32 x 32 router series This system has 100MHz bandwidth and dual audio. Another new product is a serial digital 32 x 32 system that uses rear loading of the input and output modules. Control is via RS-485 serial control bus and RS-232 for computer control.

Pesa Switching Systems has a line of routing products. On the small side, the new Bobcat has an extremely wide bandwidth of 250MHz. When configured as a serial digital video switcher it will pass 270Mb/s. There are two independent dual audio channels and either analog or serial digital video fed from 16 sources, switchable to two destinations.

Another new product from Pesa is the Cougar routing switcher. It is a 32 x 32 matrix that fits in 3RU with dual power supplies and single or dual controllers. It is available in analog or digital video and analog or digital audio. As a digital switcher it can be configured for 143, 177, 270 or 360Mb/s with automatic equalization. As an analog system, the bandwidth is

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Pro-Bel introduced its TX-220 digital master control switcher designed for multilanguage operations. It has 20 program inputs and employs 10-bit component digital video technology with AES/EBU digital audio processing.

Reply Card 188

200MHz.

Pesa's Panther is a low-cost control system. It is Windows-based and runs on 486 or better computers. Independent control of levels, audio follow, and mapping are all features of this control system. The computer is needed only to configure the router system, and not for standard operation.

Dynair introduced the System 2000, which is designed to build matrices to 1,152 x 1,152 using a 288 x 72 frames with up to 400Mb/s of digital video and an analog signal with a bandwidth of 120MHz. It is backward compatible with Dynair's Dynasty series switchers. The operating system is stored on ROM with operating/configuration data stored in a static RAM with backup power on the module. Dynair's other introduction was the Series 36, an analog only 36 x 36 router (video and stereo audio). It is available for NTSC, PAL and SECAM. As in the system 2000 the operating system is housed in ROM with data is static memory.

Dynatech Video Group's Utah 300 routing system features an optional swap/sum module that allows it to combine adjacent audio channels into one. Small cooling fans are built into the frame and provide efficient cooling to the matrix frames.

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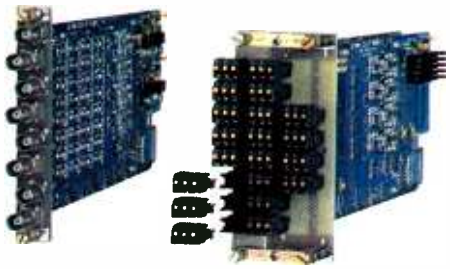

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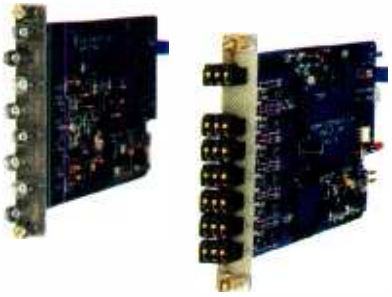

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Circle (59) on Reply Card

By John Stroman

Digital or analog fiber-optics: which is best?

After nearing a third decade of widespread commercial use, fiber-optic technology continues as a sought-after, versatile and powerful tool to transport signals. Unfortunately, there is still a lot of confusion about the relative merits of "digital" and "analog" fiber-optics. In fact, there appears to be a general misconception that digital fiber-optics are intrinsically better than analog fiber-optics. This topic deserves some exploration.

Digital and RF signals in communications systems

Optical signals are generated by semiconductor laser diodes. Historically, these signals were formed by switching the laser "on" or "off," creating binary pulses of light that carry a form of digital modulation known as Pulse Code Modulation (PCM). Beginning in the early 1970s, nearly all long-distance telecommunications traffic was rerouted onto newly constructed optical cable systems based on PCM. In Figure 1, the input/output characteristics of a PCM laser are illustrated. An input signal current is supplied to the laser. The laser emits an output light signal of an intensity that is ideally proportional to the input current. The "1s" and "0s" as an input electrical current are converted to "1s" and "0s" as light and coupled into an optical fiber. At the other end of this link, the light signal is converted back to electrical signals by a photodiode.

However, in most broadcast applications, information originates as analog radio frequency (RF) signals. RF signal transmission is key to radio and TV broadcasting, satellite communications and wireless Personal Communications Networks (PCN).

For more than a decade, a huge obstacle to the use of fiber-optics for these and other analog applications existed. Laser diodes designed for systems using PCM are not capable of the useful transmission of RF signals. To be used with analog RF signals, lasers have to reproduce the exact waveform of the original signal at every instance of time, while doing so at high frequencies and light output powers, as shown in Figure 2. These devices must be highly linear and this performance was not available (nor required) with PCM systems.

Linear fiber-optics

By the mid-1980s, lasers and photodiodes with the needed linearity were developed. Today, in addition to transporting analog signals, this fiber-optic technology is used to transmit digital and digitally compressed signals using Quadrature Phase Shift Keyed Modulation (QPSK), Quadrature Amplitude Modulation (QAM) and other modulation methods. Therefore, it is necessary to replace the term "analog" with "linear" when referring to these fiber-optic sources and detectors. Linear technology supports digital, digitally compressed and analog signal transmission.

Advantages of linear fiber-optics

The need for analog-to-digital conversion is avoided in linear systems. For example, CATV distribution systems ultimately terminate in subscriber televisions and VCRs that, for the foreseeable future, will contain analog tuners. CATV systems based on baseband digital transport would incur an enormous cost to include converters in subscriber homes or in outdoor enclosures. In the United States, this cost is estimated to be well into the billions.

Digital information conveyed using linear fiber-optics enjoys a higher bandwidth efficiency than it does with baseband PCM systems, which require much more bandwidth to convey the same signal.

In systems that transport multiple signals such as video programs, the use of linear fiber-optics provides more flexibility when adding or removing signals. Each signal is placed on a different carrier frequency, and low-cost tuners can be used to select each carrier. Users can easily add or remove carriers. This approach is called frequency division multiplexing. In baseband digital systems, the number of signals that are transported is fixed by the speed of the system components. Changing the number of signals in baseband digital systems usually involves changing system components themselves, which is more expensive and intrusive.

Advantages of baseband digital fiber-optics

In effect, PCM components produce and detect only the presence of "1s" and "0s." Therefore, non-linearities in either the source or detector do not produce an appreciable affect on the signals. The advantage of baseband digital signals is that they can be used to transport signals long distances because they can tolerate operation at extremely low signal-to-noise ratios. Their overwhelming use in long-haul telephony systems is a consequence of this attribute.

Continued on page 100

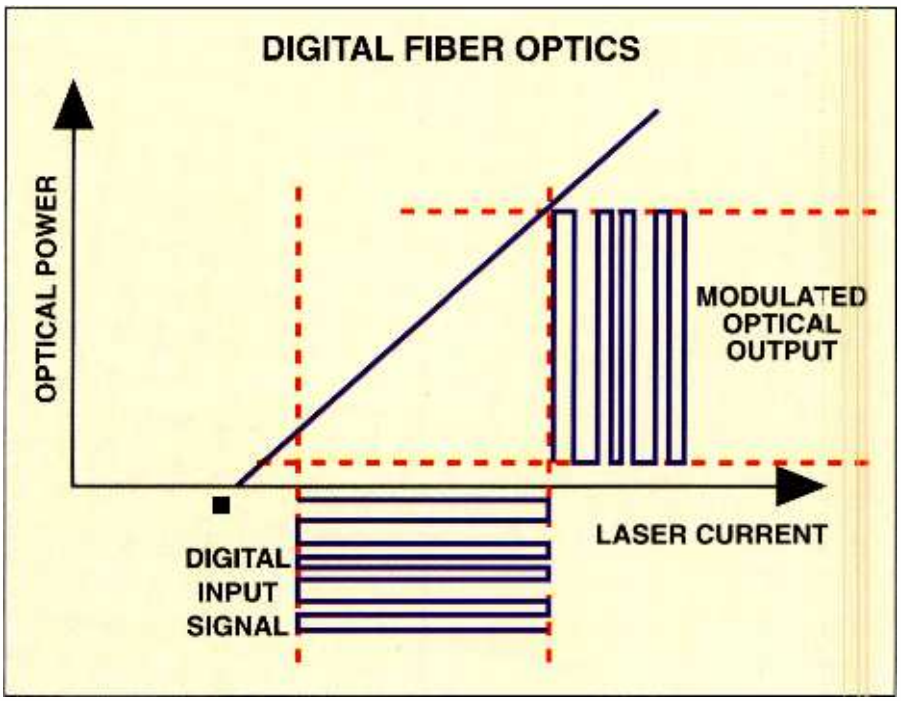


Figure 1. *Digital fiber-optics rely on turn the laser "on" and "off."*

TASCAM

DA-88 Multi-Track Recorder

The first thing you notice about the eight channel DA-88 is the size of the cassette - it's a small Hi-8mm video cassette. You'll also notice the recording time - up to 120 minutes. These are just two of the advantages of the DA-88's innovative use of 8mm technology.

- Intrinsic to the 8mm video format is the Automatic Track Finding (ATF) control system. This approach records the tracking control information, along with the program material, using the helical scan (video) head. Competing S-VHS based system record the tracking data with a linear recording head, independent of the program data. The S-VHS tape must be run at a higher speed (thereby delivering shorter recording time) to deliver control track reliability, and requires some form of automatic or manual tracking adjustment. Synchronization and tracking must be adjusted, either automatically or manually (just like on your home vcr) as the machine ages, or if the tape is played back on another machine.
- On the other hand, the ATF system ensures that there will be no tracking errors or loss of synchronization. The DA-88 doesn't even have (or need) a tracking adjustment. All eight tracks of audio are perfectly synchronized. What's more, this system guarantees perfect tracking and synchronization between all audio tracks on all cascaded decks - whether you have one deck or sixteen (up to 128 tracks!).
- Incoming audio is digitized by the on-board 16-bit O/A at either 44.1 or 48KHz (user selectable). The frequency response is flat from 20Hz to 20KHz while the dynamic range exceeds 92dB. As you would expect from a CD-quality recorder, the wow and flutter is unmeasurable.
- One of the best features of the DA-88 is the ability to execute seamless Punch-ins and Punch- outs. This feature offers programmable digital crossfades, as well as the ability to insert new material accurately into tight spots. You can even delay individual tracks, whether you want to generate special effects or compensate for poor timing. All of this can be performed easily on a deck that is simple and intuitive to use.

OPTIONS

- **RC-808** – Single Unit Remote Control
- **RC-848** – System Remote Control
- **MU-8824** – 24-Channel Meter Unit
- **SY-88** – Complete SMPTE/EBU Chase Synchronizing and MIDI Machine Control interface

FOSTEX

RD-8 Multi-Track Recorder

This digital multitrack recorder is designed specifically for the audio professional. Fostex has long been a leader in synchronization, and the RD-8 redefines that commitment. With its built-in SMPTE / EBU reader/generator, the RD-8 can stripe, read and jam sync time code - even convert to MIDI time code. In a sync environment the RD-8 can be either Master or Slave. In a MIDI environment it will integrate seamlessly into the most complex project studio, allowing you complete transport control from within your MMC (MIDI Machine Control) compatible sequencer.

- Full transport control is available via the unit's industry-standard RS-422 port, providing full control right from your video bay. The RD-8 records at either 44.1 or 48KHz and will perform Pull-Up and Pull-Down functions for film/video transfers. The Track Slip feature helps maintain perfect sound-to-picture sync and the 8-Channel Optical Digital Interface keeps you in the digital domain.
- All of this contributes to the superb sound quality of the RD-8. The audio itself is processed by 16-bit digital-to-analog (D/A's) converters at either 44.1 or 48KHz (user selectable) sampling rates, with 64X oversampling. Playback is accomplished with 18 bit analog-to-digital (A/D's) and 64X oversampling, thus delivering CD-quality audio.
- The S-VHS transport in the RD-8 was selected because of its proven reliability, rugged construction and superb tape handling capabilities. Eight tracks on S-VHS tape allow much wider track widths than is possible on other digital tape recording formats.
- With its LCD and 10-digit display panel, the RD-8 is remarkably easy to control. You can readily access 100 locate points, and cross-fade time is fully controllable in machine to machine editing. Table of Contents data can be recorded on tape. When the next session begins, whether on your RD-8 or another, you just load the set up information from your tape and begin working. Since the RD-8 is fully ADAT compliant, your machine can play tapes made on other compatible machines, and can be controlled by other manufacturers ADAT controllers. Your tapes will also be playable on any other ADAT deck.
- In addition to familiar transport controls, there are a number of logical, user friendly features. This is the only unit in its class with an on-board, back-lit variable contrast LCD display. It provides all of the information you'll need to keep track of offsets, punch points, generator functions and other pertinent data. Three function keys, combined with HOME, NEXT and UP/DOWN buttons, enable you to navigate the edit menus effortlessly. If you need to have access to the front panel controls, the optional model 8312 remote control gives you remote command of the most common functions.

SENNHEISER

RF SERIES CONDENSER MICROPHONES

Unlike traditional condenser microphones, the capacitive transducer in Sennheiser condenser microphones is part of a tuned RF-discriminator circuit. Its output is a relatively low impedance audio signal which allows further processing by conventional bi-polar low noise solid state circuits. Sennheiser microphones achieve a balanced floating output without the need for audio transformers, and insures a fast, distortion-free response to audio transients over an extended frequency range. The RF-design yields exceptionally low noise levels and is virtually immune to humidity and moisture. The comparatively low RF-voltage across the elements of the transducer also eliminates arcing and DC-bias creeping currents. Sennheiser employs RF-technology to control residual microphone noise. Optimizing the transducer's acoustic impedance results in a further improvement in low noise performance. Sennheiser studio condenser microphones operating according to this RF-principle have proven their superior ruggedness and reliability in the past decades under every conceivable environmental condition.

MKH 20 P48U3 Omnidirectional

Low distortion push-pull element, transformerless RF condenser, flat frequency response, diffuse/near-field response switch (6 dB boost at 10 KHz), switchable 10 dB pad to prevent overmodulation. Handles 142 dB SPL. High output level. Ideal for concert, Mid-Side (M-S), acoustic strings, brass and wind instrument recording.

MKH 40 P48U3 Cardioid

Highly versatile, low distortion push-pull element, transformerless RF condenser, high output level, transparent response, switchable proximity equalization (-4 dB at 50 Hz) and pre-attenuation of 10 dB to prevent overmodulation. In vocal applications excellent results have been achieved with the use of a pop screen. Recommended for most situations, including digital recording, overdubbing vocals, percussive sound, acoustic guitars, piano, brass and string instruments, Mid-Side (M-S) stereo, and conventional X-Y stereo.

MKH 60 P48U3 (Short Shotgun)

Short interference tube RF condenser, lightweight metal alloy, transformerless, low noise, symmetrical capsule design, smooth off-axis frequency response, switchable low cut filter (-5 dB at 100 Hz), high frequency boost (+5 dB at 10 KHz) and 10 dB attenuation. Handles extremely high SPL (135 dB), ideal for broadcasting, film, video, sports recording, interviewing in crowded or noisy environments. Excellent for studio voiceovers.

MKH 70 P48U3 (Shotgun)

Extremely lightweight RF condenser, rugged, long shotgun, low distortion push-pull element, transformerless, low noise, switchable presence (+5 dB at 10 KHz), low cut filter (-5 dB at 50 Hz), and 10 dB preattenuation. Handles 133 dB/SPL with excellent sensitivity and high output level. Ideal for video/film studios, theater, sporting events, and nature recordings.

MKH 416 P48U3 Supercardioid/Lobe (Shotgun)

Transformerless, RF condenser designed as a combination of pressure gradient and interference tube microphones. Very good feedback rejection, low proximity effect, 128 dB/SPL. Rugged and resistant to changing climate conditions. Ideal for boom, fishpole, and camera mountings. A long-distance microphone for video, film, and studio recording. Excellent for interviewing for reporters, podium or lecture microphone.

MKH 816 P48U3 Ultra-directional Lobe (Shotgun)

Narrow-beam pattern, transformerless RF condenser microphone. Handles 124 dB/SPL and has high output voltage. Perfect for crowded news conference, movie sets, TV stages, sporting events and nature recording.

CHYRON Graphics

PC-CODI TEXT and GRAPHICS GENERATOR

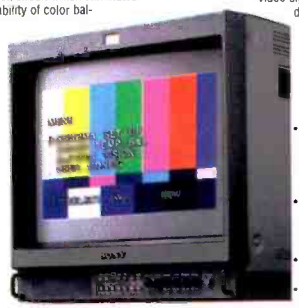
A PC-compatible (ISA bus) board, the PC-CODI incorporates a broadcast quality encoder and wide bandwidth linear keyer to provide highest quality realtime, video character generation and graphics display. Used individually or configured with multiple boards, it is a complete and affordable solution for information displays, broadcast, video production or multi-media applications.

- Standard PC/AT ISA bus interface; 2/3 length form factor
- Fully-antialiased displays
- Less than 10nsec. effective pixel resolution
- 16.7 million color selections
- Fast, realtime operations
- Character, Logo and PCX Image transparency
- Display and non-display buffers
- Bitstream typeface library selection
- Variable edges: border, drop shadow and offset
- Variable flush
- Full position and justify control of character & row
- User definable intercharacter spacing (squeeze & expand)
- Multiple roll/crawl speeds
- Automatic character kerning
- User definable tab/template fields
- Shaded backgrounds of variable sizes and transparency
- User definable read effects playback; wipes, pushes, fades
- High quality composite & S-video (Y/C) encoder
- Integral composite and S-video linear keyer
- NTSC or PAL sync generator with genlock
- Module switchable NTSC or PAL operation
- Software controlled video timing
- Board addressability for multi-channel applications
- Auto display sequencing
- Local message/page memory
- Preview output with safe-title/cursor/menu overlay
- Composite & S-video input with auto-genlock select

SONY COLOR MONITORS

PVM-1350
13" Presentation Monitor

- Employs a P-22 phosphor fine pitch CRT to deliver stunning horizontal resolution of 450 horizontal lines.
- Equipped with beam current feedback circuit which eliminates white balance drift for long term stability of color balance.
- Has analog RGB, S-video and two composite video (BNC) inputs as well as 4 audio inputs.
- Automatic Chroma/Phase setup mode facilitates the complex, delicate procedure of monitor adjustment. Using broadcast standard color bars as a reference, this function automatically calibrates chroma and phase.
- Chroma/Phase adjustments can also be easily performed with the monochrome Blue Only display. In Blue Only mode video noise can be precisely evaluated.
- Factory set to broadcast standard 6500K color temperature.
- Provides an on-screen menu to facilitate adjustment/operation on the monitor. The on-screen menu display can be selected in English, French, German, Spanish or Italian.
- On power up, automatic degaussing is performed. There is also a manual degauss switch to demagnetize the screen.
- Sub control mode allows fine adjustments to be made on the knob control for contrast, brightness, chroma and phase. The desired level can be set to the click position at the center allowing for mul-



PVM-1351Q
13" Production Monitor

Has all the features of the PVM-1350 *PLUS* -

- Is also a multisystem monitor. It accepts NTSC, PAL and NTSC video signals. NTSC 4.43 can also be reproduced.
- Equipped with a SMPTE 259M Serial Digital Interface. By inserting the optional serial digital interface kit BKM-101C for video and the BKM-102 for audio the PVM-1351Q can accept SMPTE 259M component serial digital signals.
- Equipped with RS-422 serial interface. With optional BKM-103 serial remote control kit all of the monitor's functions can be remotely controlled with greater confidence and precision.
- Equipped with input terminals such as component (Y/R-Y/B-Y), analog RGB, S-video, 2 composite video (BNC) and 4 audio terminals for complete flexibility.
- Aspect ratio is switchable between 4:3 and 16:9 simply by pressing a button.
- Underscan and H/V delay capability. With underscan, entire active picture area is displayed. Allows you to view entire image and check the picture edges. H/V delay allows viewing of the blanking area and sync/burst timing by displaying the horizontal and vertical intervals in the center of the screen.
- Color temperature switchable between 6500K/9300K/User preset. 6500K is factory preset. 9300K is for a more pleasing picture. User preset is 3200K to 10,000K.

PVM-1354Q/PVM-1954Q 13" and 19" Production Monitors

All the features of the PVM-1351Q *PLUS*:

- SMPTE C standard phosphor CRT is incorporated in the PVM-1354Q/1954Q. SMPTE C phosphors permit the most critical evaluation of any color subject. Provides over 600 lines of horizontal resolution.
- The PVM-1354Q mounts into a 19-inch EIA standard rack with the optional MB-502B rack mount bracket and SLR-102 slide rail kit same as PVM-1351Q. The PVM-1954Q mounts into a 19-inch EIA rack with the optional SLR-103 slide rail kit.

SHURE

FP32A PORTABLE STEREO MIXER

This small and rugged portable mixer is well equipped to handle the demands of EFP, ENG, live music recording or any other situation that requires a low noise high performance mixer.

- High quality-low noise electronics, perfect for digital recording and transmission
- Three balanced inputs, two balanced outputs plus tape out and monitor
- Supports all types of condenser mics with internal phantom supply
- Inputs can be switched between mic and line level
- Each channel has own pan pot
- Each channel has illuminated meter and peak indicator
- Two units can be cascaded to provide six input channels
- Internal 1KHz oscillator for record and send level calibration
- Internal (2x9V alkaline batteries) or external power
- Switchable low cut filters

MACKIE

MicroSeries 1202
12-Channel Ultra-Compact Mic/Line Mixer

Usually the performance and durability of smaller mixers drops in direct proportion to their price, making lower cost models unacceptable for serious recording and sound reinforcement. Fortunately, Mackie's fanatical approach to pro sound engineering has resulted in the Micro Series 1202, an affordable small mixer with studio specifications and rugged construction. The Micro Series 1202 is a no-compromise, professional quality ultra-compact mixer designed for non-stop 24 hour-a-day professional duty in broadcast studios, permanent PA applications and editing suites where nothing must ever go wrong. So no matter what your application, the Micro Series 1202 is ideal. If price is the prime consideration or you simply want the best possible mixer in the least amount of space, there is only one choice.

CR-1604
16-Channel Audio Mixer

In less than three years, the Mackie CR-1604 has become the industry standard for compact 16-channel mixers. It is the hands-down choice for major touring groups and studio session players, as well as for broadcast, sound contracting and recording studio users. For them the CR-1604 offers features, specs, and day-in-day-out reliability that rival far larger boards. Its remarkable features include 24 usable line inputs with special headroom/ultra-low noise Unityplus circuitry, seven AUX sends, 3-band equalization, constant power pan controls, 10-segment LED output metering, discrete front end phantom-powered mic inputs and much more.

TASCAM

688 Midistudio

The 688 MIDISTUDIO is a compact, 20 input audio mixer combined with an 8 track cassette recorder system. Designed for the MIDI-based studio, this unit will work well for both the production facility and the individual artist. In the MIDI environment, sources can be selected, destinations assigned and routing designated, all from the remote MIDI controller. With its wide input range and ability to be remotely synchronized, the 688 can be the heart of a high tech, compact 8 track studio.

- Full featured 20 input mixer (10 balanced XLR inputs)
- 8 x 2 cue monitor mixer
- Built-in dbx noise reduction system (defeatable)
- Unique "Scene Display" system to monitor MIDI-controlled setups
- Gapless auto punch in/out and rehearsal modes
- Serial interface for external synchronization

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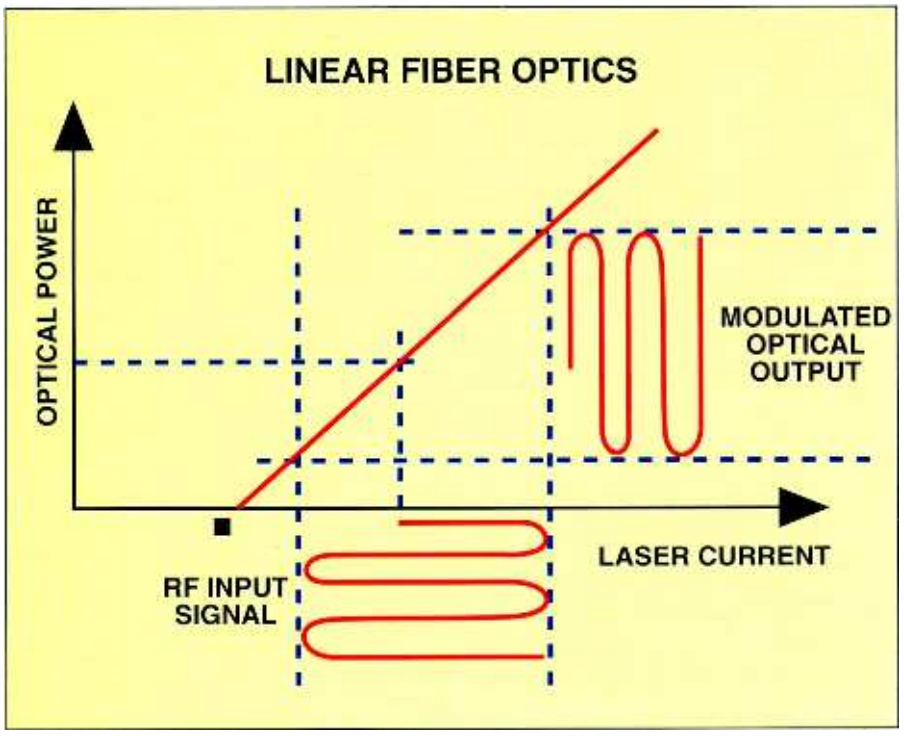

Figure 2. Linear fiber-optics accept high-frequency analog signals and modulates them onto the optical signal.

A second advantage of PCM digital fiber-optics is that the sources and detectors can be manufactured at a lower cost. However, falling prices for linear components are steadily erasing this advantage.

Linear fiber-optics applications

•*Broadband communications.* Linear fiber-optics are seeing application in the fastest-growing areas of telecommunications technology. Those include broadband communications by CATV system operators and, more recently, telephone Local Exchange Carriers (LECs). Linear fiber-optics technology is the predominant technology in networks for CATV applications. The current emphasis on interactive multimedia services places more demands on fiber-optic networks because these networks must supply lots of bandwidth in both directions between the service provider and subscriber.

•*Wireless communications.* A wireless telephone system includes a network of radio transceivers, or base stations, whose function is to receive wireless telephone radio signals and to transport them to Mobile Telephone Switching Offices (MTSOs) where they are linked to the Public Telephone Switching Networks (PTSN). Base-station signal coverage and capacity may be improved through the installation of one or more remote antennas. Although the remote antenna represents an elegant solution to coverage and capacity issues, the RF signal must still be distributed from the base station to the remote antenna. Linear fiber-optic technology provides a direct transmission path for RF signals between existing base stations and remote antennas, and supplies an efficient method for RF signal distribution inside buildings.

•*Satellite communications.* System planners have traditionally relied upon coaxial cable and waveguides to distribute RF satellite signals between antennas and control facilities. Linear fiber-optics address these requirements and enable interconnection of antennas, control facilities, and remote users through fiber-optic cable. This technology permits mounting the satellite receivers and HPA exciters at the studio, instead of at the satellite dish.

Summary

Although there is a popular perception of digital fiber-optic signal transmission as the "best" option, giant steps have been made in the past decade in the development of linear fiber-optics. While baseband digital transmission will maintain its position as an essential technology in long-haul telephony and data communications, many of the inherent advantages of analog transmission are being recognized. For instance, analog transmission is the ideal choice in areas involving RF signal distribution. As manufacturers continue to apply linear fiber-optic technology in these applications, the technology can be expected to be leveraged into new areas. The steadily decreasing cost of linear fiber-optic components will also facilitate this process. ■

John Stroman is a product marketing engineer for Ortel, Alhambra, CA. Respond via the *BE* FAXback line at 913-967-1905 or via E-mail to be@intertec.com.

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COMPUTER/VIDEO TECHNICIAN Experience with mini computer hardware, software networking and related systems. Ability to understand and maintain various analog and digital control systems. Basic knowledge and willingness to learn high-end video and audio systems is a plus. Capable of being "on-call" for systems problems. Send resume to: Engineering Manager, P.O. Box 4798, Baltimore, MD 21211. Equal Opportunity Employer.

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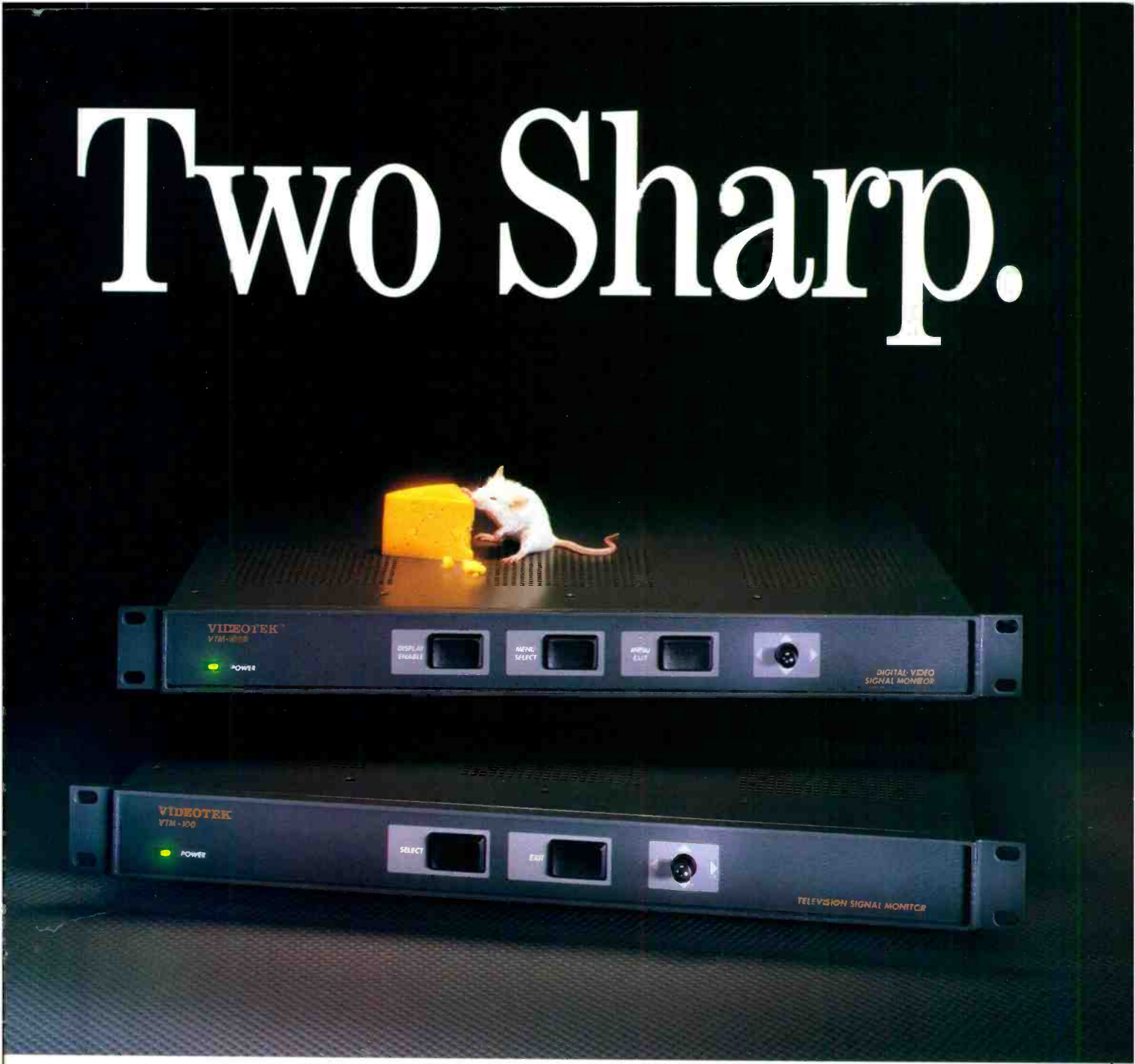

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