



IN THIS ISSUE



**NAB Meets Amid Changing U.S. Market**

NAB Preview

6



**Getting Creative With SoftImage**

by Bruce N. Goren

22



**Wharf Cable Relies on Magni**

Buyers Guide

29

**Panasonic Taps D-5 Acquisition Format**

*New Consumer Digital Component Format to Supplant D-5 Camcorder, For Now*

by Chris Dickinson

LONDON

Japanese equipment giant Panasonic has unveiled the prototype of a new, low-end, eight-bit digital component tape format that will be the acquisition means for D-5.

DVC (Digital Video Cassette) is a new 1/4-inch (6.35mm) digital format that uses 5:1 intra-field/frame compression. One of the main features of the system is it can record both 525-line and 625-line video on the same tape. It will also record HDTV pictures by running the tape at double-speed and using an increased compression ratio of 10:1.

The full specifications of the format have been agreed upon by Panasonic's parent, Matsushita, as well as Sony, Philips, Thomson, Hitachi, Mitsubishi, Sanyo, Sharp, JVC and Toshiba, all of whom intend to launch consumer versions of DVC. But Panasonic's announcement for

professional applications, in addition to a consumer line-up, appears to have caught the other manufacturers off their guard.

Gordon Rafferty, managing director of Panasonic Broadcast Europe, said the company's consumer versions of DVC would start to be delivered in January, 1995 — while the first professional product, a camcorder, would be delivered in the first quarter of that year.

Rafferty said DVC would be ideal as an acquisition format for transferring to D-5, or one of the other digital component formats, for editing.

"There is more interest in recording on a product like DVC and transferring to D-5 than having a D-5 camcorder," he said. "There is a development plan for a D-5 camcorder, but whether it comes about is not yet decided. The cost of that is going to be high."

In contrast, the cost of the DVC camcorder is expected to be about US\$10,000, which is about a quarter of the cost of Sony's planned Digital Betacam camcorder.

**TWO TAPE SIZES**

Steve Owen, Panasonic's general manager of engineering, said there would be two main tape sizes for DVC. The standard size, about as big as a standard audio cassette, will record up to four and a half hours of video, while the small cassette, half the size of the standard, will record up to one hour.

Owen said the system utilizes 4:2:0 digital component recording, in which the vertical color resolution is reduced by half, the luminance sampling frequency is 13.5 MHz and the recording rate is 25 megabits per second (Mbps) or 50 Mbps for HDTV. The

bit rate reduction system uses the discrete cosine transform (DCT) technique, as does Digital Betacam and Ampex's Digital Component Tape format.

"DVC is digital component recording, designed for consumer and professional applications," Owen said. "It is better than both M-II and Beta SP video quality, and it has CD digital audio quality. It is designed to have very low hardware costs and low running costs in terms of maintenance and tape."

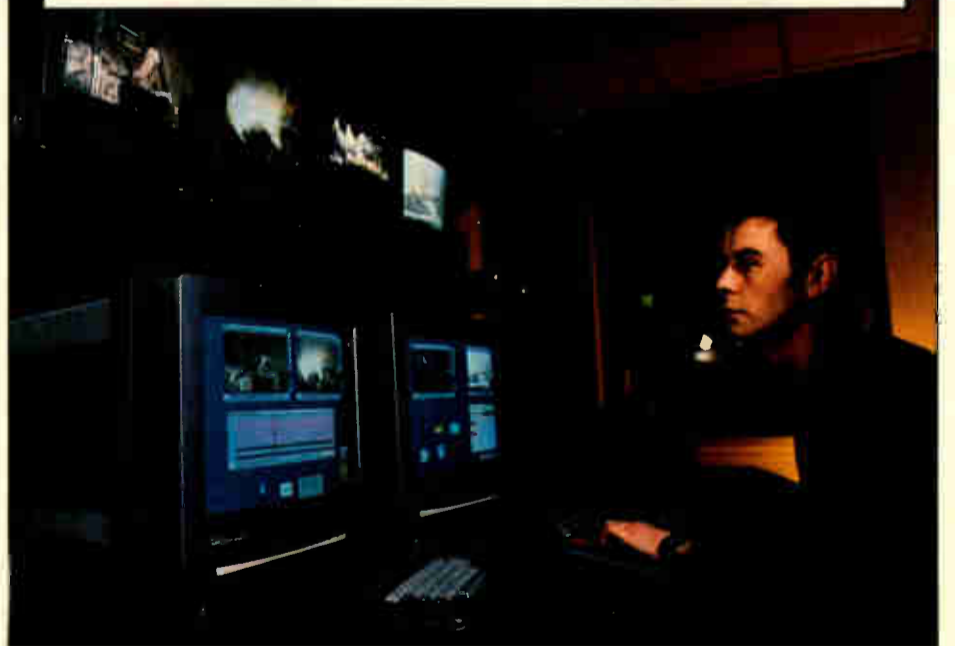
"Because there is lower sharpness in color, the format is less suitable for post production," he added. "But because there is 25 percent less data to record, it is cheaper."

**SMALLER AND CHEAPER**

Owen added that the DVC camcorder should weight about 5 kg and have a power consumption of 15 watts, which represents about a 30 percent reduction compared to existing products. There will also be a studio VTR, which Owen said would not be

(continued on page 4)

**Heavyworks At Work:**  
The companion to the Lightworks editor features a higher throughput. For a review, turn to page 11.



**Going On-Line With the ImMIX VideoCube Page 16**



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## PROFESSIONAL

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**C O N T E N T S**

**NEWS**

**Panasonic taps D-5 acquisition** 1  
**Sony HD gives riders a thrill** 4  
**U.S.: OFDM not ready yet** 4  
**NAB meets amid changing market** 6  
**'94 NAB product highlights** 6

**FEATURES**

**Special Report** 11  
 John Watkinson  
**Masked Engineer** 12  
 Mario Orazio  
**Editing Technology** 16  
 Jay Ankeney  
**Audio for Video** 17  
 Ken Hahn  
**Computer Video** 22  
 Bruce N. Goren  
**Focus on Videography** 27  
 John Premack

**EQUIPMENT**

**Product Showcase** 13  
**Marketplace** 28  
**Equipment Exchange** 37-38  
**Advertiser Index** 38

**BUYERS GUIDE**

**User Reports** 29  
 Magni, Hamlet, Snell & Wilcox,  
 Audio Precision, Tektronix, AAVS,  
 Wohler, FM Systems

3 NEWS



**BUSINESS**

**TEK ALLIES WITH SNELL & WILCOX, ROHDE & SCHWARZ**

**BEAVERTON, OREGON**

Oregon-based manufacturer Tektronix has entered into strategic alliances with two European equipment makers for marketing broadcast test and measure devices.

The first, with Snell & Wilcox in the U.K., is for Tektronix to market and sell the TPG20, Snell & Wilcox's top-end test pattern generator.

Paul Dubery, Tektronix's TV division market development manager in Europe, said the deal was beneficial to both companies.

"Because Snell & Wilcox's main business is standards conversion, they asked us to market and sell the TPG20," he said.

The TPG20, which gives access to all digital formats and operates in NTSC and PAL, was originally developed by Snell & Wilcox's Electrocraft division to test its own equipment.

The second alliance, with Rohde & Schwarz, is for the German company to market Tektronix equipment in Eastern Europe and the Middle East. In exchange, Tektronix will sell Rohde & Schwarz products in the U.S.

Dubery said the alliances were part of a wider strategy by Tektronix.

"We are actively seeking out partnerships and alliances in the TV and audio market," he said. "But that does not mean we are cutting down development on our own products."

He added that the company launched new ranges of audio test and cable TV test equipment at the AES in February.

**BUSINESS**

**NTL, PACE TO DEVELOP DIGITAL RECEIVERS**

**WINCHESTER, U.K.**

NTL and Pace Micro Technology Ltd. have reached an agreement to jointly develop digital television receivers, with the first products to roll off the line later this year.

Under the agreement, NTL will contribute its digital compression technology to the new system while Pace will provide design, manufacturing and distribution.

The products are intended to be developed in time for the new breed of digital satellite delivery services expected to be introduced in early 1995. A number of those systems are expected to be using NTL compression, according to the company.

By using NTL compression, the receivers

will be compatible with the ISO MPEG 2 digital compression standard, which has been adopted by the European Commission's Digital Video Broadcasting project, of which both NTL and Pace are members. The DVB project is an attempt to develop a common framework for terrestrial, satellite and cable digital television.

"NTL is very much at the forefront of digital compression...but we are not a volume manufacturer," said Alan Watson, NTL's business manager for advanced products. "This agreement will get our technology into the domestic market."

**DESKTOP VIDEO**

**BTS LAUNCHES DESKTOP VIDEO GEAR**

**DARMSTADT, GERMANY**

Philips subsidiary BTS has released its first products designed for the desktop computer video market from the company's recently established Computer Video Systems (CVS) unit.

The company has released two products: the BTS Video Gallery graphics system and the Rio and Rio Quatro editing system.

The Video Gallery is a US\$50,000 broadcast-quality graphics system that incorporates 3-D animation, modeling, painting and image retouching, digital layering, character generation, high-speed rendering and high-capacity storage.

The basic Rio system, priced at about US\$6,000, is an A/B edit controller, while the Rio Quatro, US\$10,000, is an A/B/C roll edit-controller. Both versions are able to control S-VHS, M-II, Betacam 2000 Pro, Betacam SP, D-1, D-2 and D-3 machines.

The two products are the first of what BTS officials say will be a long line of desktop products. The company is currently working with a number of computer software and hardware companies, including Adobe Systems, Apple, CoSA, Fractal Design, Kodak, Intelligent Resources, YARC Systems, Truevision, VIDI and Wacom. In addition, BTS will also support Philips technology, including the CD-I format.

In other news, BTS has named Lutz Leyser general manager of marketing, sales and service for Europe, Africa and the Middle East. Lutz is a former Ampex executive with 20 years in the video industry.

**PEOPLE**

**BBC CE DEPARTS; NETWORK CUTS STAFF**

**LONDON**

Peter Marchant, former BBC network television chief engineer, has been appointed as a senior technical adviser at NTL, the privatized engineering arm of U.K. commercial television watchdog, the ITC.

Marchant will work closely with NTL's chief executive, John Forrest, developing new forms of digital technology.

Marchant's departure from the BBC further undermined the network's commitment to in-house engineering. As chief engineer of television, he was closely identified as the engineering spokesman for the corporation and, as such, sat on a number of international panels.

A spokesman for the BBC said Marchant

was made redundant when his job disappeared in a restructuring of the engineering resources department.

"The whole thing has changed now," the spokesman said. "All TV operations and maintenance are under a general manager of resources for both TV and radio. This is Mike Lumley, who was controller of operations."

In addition to Marchant's departure, the BBC confirmed there had been a cutback in staff in the engineering projects department. But it stressed that the research and development operations, based at Kingswood Warren, were largely unaffected by the changes.

"There has been a staff reduction, but this is due to staff relocation. The research and development operation is still at the same level," the spokesman said.

The changes at the BBC are apparently an attempt by senior management, under pressure from government, to open the BBC up to market forces. The objective is for roughly 40 percent of work across the board to be provided by outside companies.

**IBC**

**IBC SETS DATES FOR 1995 SHOW**

**AMSTERDAM**

The IBC Management Committee has scheduled the 1995 show, the first of its recently announced annual conventions, for September 8-12, 1995, at its traditional location in Amsterdam.

The IBC ruffled the feathers of the International Teleproduction Society recently by announcing that the IBC show will now be an annual event. Previously, the two groups held shows in alternate years so as not to saturate Europe with video equipment exhibitions.

With the IBC now an annual event, some industry insiders have been speculating that only one the shows will survive.

For its 1994 show, IBC is reporting strong bookings of exhibition space, especially from first-time exhibitors.

**NEW STANDARDS**

**DVB AGREES ON DIGITAL SATELLITE SPECIFICATIONS**

**GENEVA**

The European Commission's Digital Video Broadcasting (DVB) group has agreed to a basic technical specification for digital satellite broadcasting.

The agreement is one step in the group's overall goal of defining a common framework of satellite, cable and terrestrial digital delivery.

The satellite specification will now be converted to an ETSI (European Telecommunications Standards Institute) standard, a move which is likely to provide digital satellite broadcasting in 1995.

The satellite spec utilizes the International Standards Organization's MPEG 2 coding standard, combining it with other technologies designed for satellite and cable delivery.

The DVB group consists of 110 European broadcasters, manufacturers and government authorities.

In other news, Panasonic Broadcast's European Research and Development Center (PERDC) located in Langen, Germany, has joined the DVB project as a founding member.



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# Sony HD Gives Riders a Thrill

by Chris Dickinson

LOS ANGELES, California

A roller coaster car filled with nervous passengers climbs the first great hill of the terrifying Thunderlooper ride at England's Alton Towers theme park.

As the car reaches the top of the hill, the riders see the steel track disappear under the car just before they

are plunged straight down at dizzying speeds. With the sound of wind racing by their ears and the screech of metal on metal, they are tossed from side to side as the car hurls around hair-pin curves and screams through the ride's giant loop.

## HD ILLUSION

When it is over, the passengers step out of the car onto the floor

of the small room in which they have just spent the last few minutes at a recent Los Angeles amusement park trade show. In front of them, the giant screen, that moments before had led them plummeting down treacherous hills, has gone dark. Below them, there is no track; and rather than wheels, the car is outfitted with a series of hydraulic lifts.

Simulated thrill rides such as this one by Hughes Rediffusion Simulation of Sussex, U.K., are becoming a common sight at theme parks. What is different about the Hughes ride is that it is the first one to be entirely originated on high definition video.

The ride, an authentic simulation of the Thunderlooper roller coaster at Britain's top theme park, Alton Towers, was shot and posted by The London Studios, the facilities arm of the U.K. broadcaster LWT.

The project utilized Sony Broadcast International's High Definition Video System (HDVS), using the portable HDC-500 CCD camera and the HDV-10 UNIHI cassette recorder. The camera was loaded onto a support bar on the front carriage of the roller coaster car, with the recorder and a power generator strapped behind.

Camera set-up, including decisions on focal length and iris aperture settings, were performed on the ground using a Sony HME-1730E HDVS monitor. Motion control software to integrate the

images was written and perfected by Hughes.

## PLEASANT SURPRISE

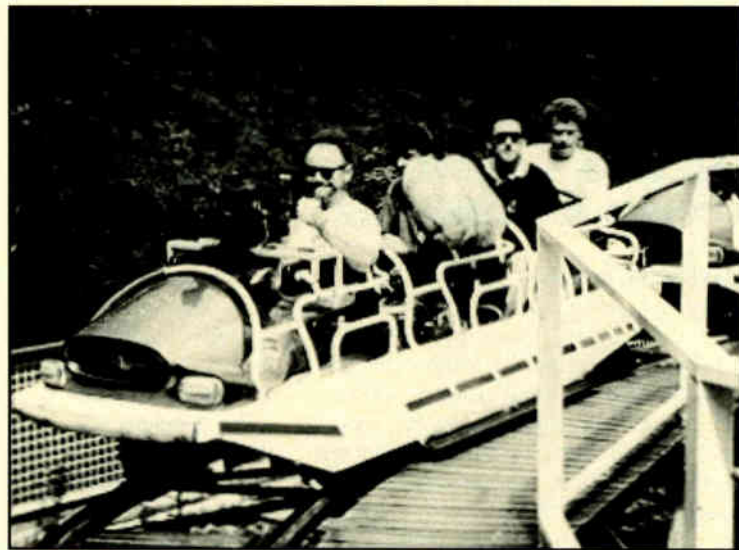
Iain Russel, of The London Studios and director of the project, said the Sony system performed flawlessly.

"To be honest, I was a bit skeptical about using hi-def," he said. "The

know how the tape would stay on the heads (during the loop). But when it came back, it was still recording, with lovely stable pictures. I have to say I was pleasantly surprised."

The resulting pictures were combined at Sony's HDVS edit suite in Basingstoke, U.K., before being integrated into a Hughes 14-seater Venturer simulator.

Usually, live-action ride sequences are shot with standard 525- or 625-line cameras. HDTV equipment offers much clearer resolution for a



Sony's HDC-500 gets a bird's eye view of a rollercoaster.

camera is slightly larger than a 35mm film camera, the recorder is about the size of a D-2, and it is all powered by the mains, so we had to take along a petrol generator. All this had to be strapped in securely.

"We had to do four different rides, but the system's biggest test was...the Thunderlooper. I did not

more realistic experience, but was considered by many to be too cumbersome to such uses.

According to Janet West, senior manager of marketing for HDVS in Europe, that is no longer the case.

"The roller coaster ride is evidence that a crew can go anywhere with Sony's HDVS," she said. ■

FROM PAGE 1

## Panasonic Ties D-5 to Digital Consumer

"over-engineered." Features will include insert and assemble editing, auto editing and slow motion, plus serial digital interfaces and RS-422 and RS-232 control for connection to other devices.

DVC will also feature two or four channels of PCM digital audio: two channels of 16-bit 48 kHz audio or four channels of 12-bit 32 kHz audio.

The specifications for the HDTV recording have still to be finalized, though it is expected that the format will be standard independent, being able to record 1250-line, 1050-line and 1125-line video.

In Europe, other manufacturers supporting DVC seemed unprepared for Panasonic's announcement.

Sony said it was "very surprised" and had "no plans for the moment" to launch its own professional version of DVC. Thomson Broadcast said its preliminary timetable to launch professional DVC products was several years behind Panasonic's.

"The first consumer units will appear in 1995, with delivery in 1996," said a Thomson spokesman. "We will be ready for professional applications three or four years after this."

Separately, Panasonic said that it did not intend to launch an optical-disc-based camcorder until the end of 1997 or the beginning of 1998.

"I do not think there will be any disc camcorders this year," Owen said. "The transfer rate is a problem and vibration is a problem. A 2 gigabyte (GB) disc only holds ten minutes of DVC video, which is not really very useful, except perhaps for a few news applications. These problems can be solved, but the cost, weight and power consumption go up."

Other manufacturers are also known to be working on disc-based camcorders, although no one has yet announced a product. ■

## U.S.: OFDM Not Ready Yet

by Arthur Cole

WASHINGTON, D.C.

Although OFDM technology clearly offers superior resistance to multipath interference than other transmission systems, it has not yet been sufficiently developed for the U.S. to consider its adoption for HDTV delivery.

That was the conclusion of a group of U.S. representatives who visited several European research organizations to get a first-hand look at OFDM.

Still, despite the fact that the U.S. Grand Alliance is likely to select either a QAM or vestigial side-band (VSB) component for its HDTV system, U.S. broadcasters are hopeful that OFDM technology can be adopted before the final system is approved by the Federal Communications Commission late next year.

Lynn Claudy, vice president of science and technology at the U.S.'s National Association of Broadcasters (NAB) and a member of the group that visited Europe's OFDM research sites, said that although the benefits were clear, there were a number of questions about OFDM that could not be answered.

"It is fairly uncontested that the technology offers better immunity to strong multipath than other transmission techniques," he said. "However, the technology is not developed to the extent of the other techniques."

"There were a number of questions about practical receiver circuitry and how the channel is acquired, synchronized and equalized," he added. "These are relatively practical issues that have been investigated quite thoroughly with QAM and VSB. The technical development in Europe has not reached that point."

Nearly a dozen different OFDM projects are currently underway in Europe, and it is expected that all

the developments will be integrated into a single system by the end of 1995.

That would make it too late to be included in the Grand Alliance system, which is expected to be submitted to the FCC earlier that year. However, since the FCC is not expected to make its final decision until late 1995, incorporating a working OFDM system might only result in a slight delay.

The NAB has called on researchers to continue investigating OFDM technology to develop a working system as quickly as possible.

"Certainly, for broadcasters, there is a continuing interest in OFDM because multipath is such a big problem," Claudy said.

The biggest perceived benefit in the U.S. would be OFDM's ability to provide a more robust signal within the broadcast coverage area. With single-carrier systems, such as QAM and VSB, retransmission to dead spots within a coverage area require on-channel repeaters utilizing directional receiving antennas, which are unlikely to be cheap or easily available at the onset of HDTV transmission.

OFDM technology, however, does not require a directional antenna, allowing broadcasters to offer uniform coverage more cheaply and easily.

With the U.S. broadcast community having a strong influence over the HDTV selection process, it appears likely that OFDM will continue to have a chance to be included in the final system. However, because of its lead in OFDM development, it will largely be up to Europe to produce a working system in time.

"There is a great interest in moving forward," Claudy said. "But there are also a number of hurdles to be cleared." ■

**"I've personally tested Sony D-2 machines with the Video Gainesville D-2500 through 600 Generations with absolutely zero loss."**

*Dan Stark, Chief Editor - Video Post Productions: Quoted from an article in TV Technology, December, 1993. Mr. Stark is discussing the features of the VGV D-2500 and DX-300 digital production & post-production switching systems.*

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# Compression Drives World Video Market

## GUEST COMMENTARY

by John Forrest

Ever since the home computer market gave a massive thrust to the development of digital electronics, there has been a relentless move toward digital audio, radio and television. CDs were the most obvious manifestation of digital technology as far as the public was concerned, bringing a real benefit in sound quality and durability of the recording.

We might next have expected to see digital radio, or DAB, with its potential to carry CD-quality sound over the VHF or UHF wavebands and give flawless reception in cars. The system has been demonstrated in prototype form many times over the last few years, but has not really caught on yet. While DAB is undoubtedly an improvement on existing systems, the economic case for its introduction, with the need to replace existing radio receivers, is less clear.

### SOUND SUPPORT

Digital television, which is even more complex than DAB, is set to arrive in the marketplace earlier, for very good economic reasons. Television is a very hungry user of radio frequency spectrum, each channel typically occupying the space used by several hundred radio channels. Yet, a large part of the information in the television signal is very repetitive and thus wasteful in its use of spectrum. Digital techniques enable the frequency spectrum to be used for more channels and hence achieve lower transmission costs per channel.

Successive television frames usually contain very little change from one to the next — mostly just minor modifications in areas of movement. All that is needed is to transmit the information about the changes. Likewise, quite a few areas of the picture (a blue sky, for example) are uniform in color; information about this area can be transmitted as an entity rather than having to send the same information about every tiny picture dot in the area. It turns out that as much as 99 percent of the information in a television signal can actually be made redundant.

The process of sifting out the non-redundant information, called compression, is carried out digitally in real time with fast computer chips. Other chips in the digital television receiver carry out the de-compression process to restore the picture to a quality so close to the original that it is difficult to detect even the most minor difference.

Although the digital compression process can economize on the use of frequency spectrum or compress high definition television pictures into more easily accommodated bandwidth, the economic driver for its initial use is the delivery of more channels in the same amount of frequency spectrum. With current transponder rentals ranging

from about £2 million to £5 million per year, each carrying only one or two analog TV channels, there is a lot at stake. Using digital compression, programmers can send many channels (typically eight or more with present technology) over one transponder, reducing their delivery costs per channel in proportion to the number of channels.

A satellite with, say, 18 transponders could perhaps deliver up to 200 individual services, depending on the quality level chosen. With capacity like this, operators could contemplate "near video-on-demand" movie channels, where start times are staggered to suit the viewer, or impulse "pay-per-view" on a wide variety of new services. More sophisticated conditional access systems will enable the program provider to keep track of who watches what.

### MAJOR IMPACT

Video compression, therefore, has drastic implications for the economics of television; this is already happening in the distribution field and will soon impinge on the domestic environment. Digital bearers will encompass the earth with capacity undreamed of just a few years ago. These data paths, already dubbed "digital super-highways," will form the basis of a global media and communications revolution.

Given enough foresight, there is — with any new technical development — the possibility of standardization. World standards are rare, but we have notable examples in the compact disc and the fax. Television presents huge problems in this connection owing to differing line and frame standards. But an outbreak of common sense seems to have engulfed the major digital players on both sides of the Atlantic.

In Europe, the Digital Video Broadcasting group, consisting of over a hundred industry members, is well on the way to agreeing on many standards for digital TV via satellite, cable and terrestrial means. The worldwide adoption of the MPEG 2 digital compression scheme looks likely, with the promise of a high degree of interoperability, if not total standardization.

Commonality in the digital domain will enable easier exchange of material and may make standards conversion problems a thing of the past. Standardization of conditional access systems, however, looks most unlikely; it is not particularly in the interests of program providers. However, this should not matter if "standard" receivers can accommodate more than one system by taking extra modules and/or smart cards. A global media structure under the control of one organization would clearly not be a healthy situation.

A video compression system, known as System 2000, designed and built by NTL, is already being bought by many European satellite channels and is being used in the delivery of multi-channel programming to cable head stations. Within two years, we shall see the extension of this system directly into homes with domestic versions of digital compression suitable for the home television set. For this to happen, mass produced receivers need to get below the domestic price threshold of a few hundred pounds.

To this end, NTL has entered into a partnership with Pace Micro Technology, probably the world's largest manufacturer of satellite receivers, to produce a range of digital products for the domestic market. This will genuinely bring an environment

of 100 to 200 channels to the home by cable or direct reception from satellite by 1995. Programming to fill so many channels with different services is unlikely to be available, and we will see television being used in a very different way from what we are accustomed to today.

### TERRESTRIAL ROUTE

What of the existing terrestrial television systems? Clearly, the current PAL, NTSC and SECAM transmission must continue for years. But work at NTL has shown that digitally compressed television signals can also be accommodated in existing congested European television bands using OFDM (spread spectrum) transmission. The SPRETTRE project, as it is called, has used transmitters in the southwest of England during the last two years to demonstrate wide-screen television pictures of near high definition quality alongside existing analog PAL services. The route is therefore open also for terrestrial television to provide a greater choice of channels or equally to use the technology to provide services of higher definition picture quality rather than to rush for a vast multichannel environment.

There is another reason why terrestrial systems are unlikely to be left behind — there will always be a need for portable, mobile and local reception. These are requirements that are not easily met by cable and satellite delivery. Digital television transmitters operate at much lower power levels than today's large PAL or NTSC transmitters, and it is natural to think of a much closer integration of mobile communications with terrestrial radio or television systems in the future.

The personal digital assistant (PDA) of the future, the evolution of the present palm-top computer, will undoubtedly have telephone, fax and data connection to cellular telecommunications networks, but it will also receive digital radio and television broadcasts, both for entertainment and information services. The concept of "video on the move" is therefore spawned from the hierarchical application of digital TV to terrestrial transmitters. With appropriate modulation schemes, a high definition service could be received on fixed rooftop antennas, and a lower-grade but rugged picture would be receivable on the move; all this derived from the same transmission.

Digital compression is set to revolutionize communications and broadcasting and play a leading role in setting up a new global information infrastructure. It will change the nature and economics of all video-related industries. Like it or not, the viewing public will be faced with an explosion of information, communications and entertainment on a scale that was never imagined even a few years ago. For those of us in the industry, the prospect is exciting and irresistible, but the introduction of the digital era must be handled responsibly. ■

*Dr. John Forrest is the chief executive of NTL, a Winchester, U.K.-based provider of transmission services for numerous terrestrial and satellite television channels. A member of the Royal Academy of Engineering, he is also a fellow and vice president of the Institution of Electrical Engineers and a fellow of the Royal Television Society, Royal Society of Arts and the Institute of Directors.*

## SHOW LISTINGS

**Editor's note:** The 1994 edition of *Broadcast in Madrid, Spain*, originally scheduled for 10-13 May, has been post-poned until 1995. For information, contact show organizers at telephone: +34-1-722-5000 or FAX: +34-1-722-5792.

### 22-25 March — NAB 1994

Las Vegas, Nevada. The 1994 National Association of Broadcasters Convention, with exhibits and sessions, will be at the Las Vegas Convention Center. For information write NAB at 1771 N. Street, N.W., Washington, D.C. 20036-2891 USA, or contact at telephone: +1-202-429-5409; FAX: +1-202-429-5343.

### 25-29 April — Africa Telecom '94

Cairo, Egypt. Organized by the International Telecommunication Union. For information, contact Tom DAHL-HANSEN or Suzan Hee-Sook LEE at the ITU at Place des Nations, CH1211, Geneva 20, Switzerland, telephone: +41-22-730-5811; FAX: +41-22-730-6444.

### 25-28 May — KOBA '94

Seoul, Korea. The '94 Korea International Broadcast & Audio Equipment Show sponsored by the Ministry of Trade, Industry and Energy and eight other government and trade groups. For information, contact the Korean Broadcast Engineers & Technicians Association, 14-11, Yoido-dong, Yeongdeungpo-ku, Seoul 150-101, Korea; telephone: +2-780-0361; FAX: +2-780-0362.

### 1-4 June — Broadcast Asia 1994

Singapore. The broadcast show returns to Singapore after a successful run in 1992. For exhibiting information contact: Overseas Exhibition Services in London at telephone: +44-71-486-1951; FAX: +44-71-413-8230. Also, contact Singapore Exhibition Services Pte Ltd. in Singapore at telephone: +65-338-4747; FAX: +65-339-5651.

### 14-17 August — Video Expo-Set, Broadcast South America '94

São Paulo, Brazil. The Sociedade Brasileira de Engenharia de Televisão will present the show at the Anhembi Convention Centre, accompanied by the first South American Multimedia Show. For information, contact organizers at Rua México, 11slj, 01-CEP20031-144, Rio de Janeiro, RJ, Brasil, telephone: +5521-220-3386; FAX: +5521-240-8195.

Send announcements and updates to *TV Technology International*, P.O. Box 1214, Falls Church, Virginia 22041 USA, or FAX: +1-703-998-2966.

# NAB Meets

# Amid Changing U.S. Market

## LAS VEGAS, Nevada

The 1994 National Association of Broadcasters convention rolls into this resort town this month amid a U.S. video market that is gearing itself for rapid change over the next several years.

The show will take place March 20-24 at the Las Vegas Convention Center.

As digital technology invades all forms of communications, including video and audio, the once dominant terrestrial broadcast market - and even the more recent cable television industry - has come under increasing pressure from new distribution means, namely telephone companies and satellite services.

Add to this the rapid changes that digital technology has brought to the post production industry, such as non-linear editing and increasingly sophisticated graphics and special effects, and it is clear why the NAB has proven to be such a big attraction in the past few years.

## RECORD CROWDS

Last year, NAB drew its highest crowds ever, 65,510, thanks largely to the addition of Multimedia World, the concurrent exhibition and conference highlighting computer video technology.

NAB is also drawing more overseas interest. Last year's 11,523 international attendance marked a 33 percent increase over the year before.

Although the NAB is the trade representative for U.S. terrestrial broadcasters, the show has become broader in scope, drawing representatives from the production, post production, cable, satellite, telephone, computer, manufacturing and medical industries.

This year's keynote speaker is Reed Hundt, recently appointed chairman of the Federal Communications Commission, which regulates the broadcast, telephone and other communications industries. Also speaking will be Ray Smith, chairman of Bell Atlantic, one of the largest telephone companies in the U.S. and which recently agreed to a merger with the largest cable television company, Tele-Communications Inc., in an effort to establish the next generation of wire-based interactive television.

On the exhibition floor, NAB officials are anticipating more than 800 manufacturers from around the globe, making it one of the largest trade shows in existence. Among the major names in attendance will be Sony, Panasonic, Ampex, Avid Technologies, Harris Allied, Pesa, Siemens, Thomson and Philips. In addition, Multimedia World, which will take place at the Las Vegas Hilton, will showcase the latest technologies from IBM, Apple, Silicon Graphics, NEC, and a host of peripheral and software manufacturers.

The exhibit floor is only half the convention, however. NAB '94 will also present 12 conferences on numerous aspects of

radio and television management and engineering. Among some of the engineering topics are digital audio processing, HDTV and digital broadcasting, data broadcasting, non-linear editing, automation and others.

## ALL-DAY EVENTS

NAB will also be preceded by several all-day seminars and tutorials. On Saturday, March 19, the Society of Motion Picture and Television Engineers (SMPTE) will present "The Post Experience," an in-depth look at the latest post production techniques. Also on Saturday, the Institute of Electrical and Electronics Engineers will conduct a tutorial on digital transmission that will examine modulation techniques, test methods and other topics.

At Multimedia World, conference topics include in-depth examinations of the vari-

ous computer platforms, as well as multimedia development and marketing techniques, and other issues such as intellectual property.

NAB '94 will also include HDTV World, a special exhibit and conference devoted exclusively to high definition television. This year's exhibit will feature developments from the Grand Alliance group of companies that is developing the U.S. HDTV system. Also included will be the HDTV World Production Conference, a series of sessions featuring wide screen presentations of HDTV production and post production techniques, as well as emerging technologies.

For the U.S. video industry, NAB has become the premiere event. And with the industry evolving at such a rapid pace, it appears likely that it will continue to be a strong showcase of emerging technologies. ■

## 1994 Show Highlights Numerous New Products

### LAS VEGAS, Nevada

The 1994 NAB convention will offer a number of new product announcements from companies from around the world.

The following is a brief listing of some of the product introductions at NAB that should appeal to the international market.

### AUDIO

Audio Technologies Inc. will debut its NanoAmp series of low cost utility amps with XLR and TRS connectors. Also shown will be the MX100 three-input mic/line mixer and the XP100 four-input expander, both with low-noise balanced inputs and protected 600 ohm outputs.

Audio Precision will show a new line of reduced bit-rate digital audio testing products.

In the wireless field, take a look at Swintek's new Mark 200D intercom, Mark

1L wireless microphones and the Mark QDC wireless ENG mic series.

Telex will show the new FMR-450 UHF wireless mic system, which can operate up to 50 systems at once in the 524 to 746 MHz range. Also new is the HT-450 UHF handheld transmitter, the WT-450 UHF belt pack, HT-200 handheld transmitter, the BP-1000 single-channel beltpack and the BP-2000 two-channel beltpack.

Sony will have a number of new microphones, including the F-780, F-740 and F-710. Also shown will be the DAE-D5000 digital audio workstation and the MXP-700 mixer.

Zaxcom will unveil the DMX100 hard disk audio storage device, a RAM recorder with an on-line effects library. Zaxcom will also show the RTS100 32-input stereo AES/EBU router and the SRC100 sample rate converter.

### AUTOMATION

Alamar will debut the MC-2075 multi-channel, multitasking system for total station automation. The system's Media Manager software will also be available.

BTS continues its line of master control systems with the new Saturn system, available in digital or analog models.

Dynatech's new D<sup>2</sup>S<sup>2</sup> company will highlight new capabilities for its disk-based system, which now integrates Hewlett Packard magneto-optical rewritable cartridge autochangers.

Odetics will show its TCS90 cart machine in the Digital Betacam format, as well as new library management tools.

Sony will show the BZC-180 database software for the Flexicart.

Zaxcom will present the HUB2000 TBC/machine controller with the HCP2000 control panel. Also shown will be the VTR100 studio control system for VTR control.

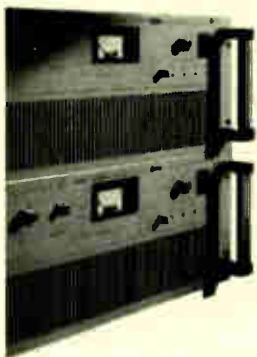
### CAMERAS

BTS will highlight a new range of cameras, including the LDK 10 studio and LDK 10P portable models, as well as the new FT-11 CCD sensor and the LDK 9000/1080 HDTV camera.

Hitachi will release the SK-2600 studio/field camera, a 13-bit LSI model that utilizes RGB processing.

(continued on page 8)

NEWS



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- VHF BIII TV diplexers.
- VHF-FM diplexers.
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CONTINUED FROM PAGE 6

# NAB Highlights New Products

Ikegami will show a number of new cameras, including the HK-366 2/3-inch, 3-CCD FIT wideband studio/field camera, and the HK-366P portable version.

JVC will introduce the KY-19 half-inch, 3-CCD camera. Also debuting is the KY-27BU 2/3-inch, 3-CCD camera. Both cameras can be outfitted with the new RM-LP35U remote operator. Also new from JVC is the GY-X2U S-VHS unit and the KY-55U 3-chip model with RGB-Y/C output.

Panasonic will also be on hand with its line of digital signal processing cameras.

Sony will continue its Digital Betacam line with the DVW-700 DSP camcorder. Also shown will be the BVW-D600 DSP Betacam SP camcorder.

## EDITING

Avid will show its existing systems in a new integrated production environment featuring the AvidNet fiber optic system and the MediaServer Unix-based file server.

BTS will be on hand with the new BTS editor family featuring four levels of editing sophistication.

Editing Machines Corp., which is now a member of the Dynatech Video Group, will show its Primetime Editor with variable resolution and random access ability.

Grass Valley Group will show a new editor utilizing a standard platform processor for linear or non-linear operation.

JVC will introduce the BR-S522U S-VHS edit feeder/player with optional TBC and noise reduction.

Matrox will roll out the Matrox Studio PC-based edit suite for linear on-line or non-linear operation.

Sony will show the new DES-560 Destiny non-linear editor and the FXE-100 integrated switcher/editor.

## GRAPHICS AND EFFECTS

BTS will debut the Video Gallery, the

company's first foray into desktop video.

Chyron Graphics will highlight new CCIR 601 capabilities for the MAX! and MAX-INE! character generators. MAX!, MAX-INE! and the iNFiniTi systems are also networkable.

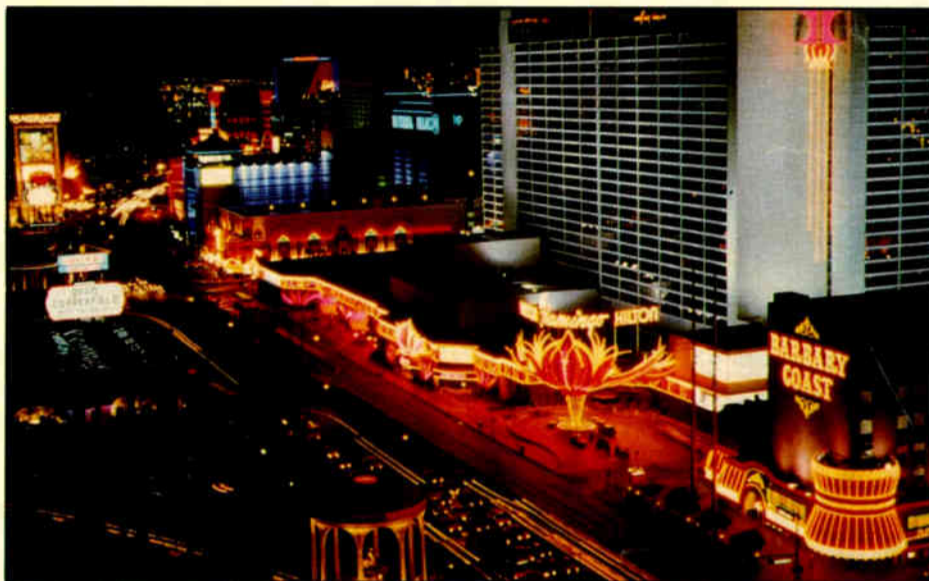
Quanta, another Dynatech company, will introduce the Delta Classic text and graphic system. Also new is the Delta Concorde, which offers faster hardware (68040 CPU), enhanced software and PAL/NTSC switchability.

DOR boasts new 3-D capabilities.

Abekas will have the new ADDR6400 10-bit digital disk recorder (DDR). Also at Abekas will be the A65 and A66 disk systems with the new RotoPhoto interface for Macintosh users.

BTS will show the new DCR 6000 gigabit recorder for the D-1 format.

ColorGraphics will have on hand its new Mosaic-360 disk array providing six minutes of uncompressed CCIR-601 or SMPTE RP-125 at 8 or 10-bit resolution.



Las Vegas has a nightlife like no other place on Earth.

Grass Valley Group will release the DPM-4300 effects generator featuring an easy-to-use control panel and pixel enhancement. Also debuting is the Folio line of Windows-based paint, character generator and still store devices for 386 or 486 machines.

Parallax Graphics will add the ADVANCE digital multichannel compositor to its line. The new DIPSS digital ink and paint software system automates the ink and paint process for animation, while the MATA-

Garner Industries will show the new CF750 Type II degausser.

JVC will debut the SR-S360U S-VHS recorder that offers insert editing, random assemble and cable compatible tuning.

Sony will show the new HMPX Hi8 metal particle tape that features a 1.0dB improvement in RF output and a .5dB signal-to-noise improvement. Also new is the HMEV Hi8 evaporated metal crystal (EVATICLE II) tape that provides a 1.0dB RF improvement

and a 1.0dB signal-to-noise improvement.

Tektronix will enter the recording market with the Profile disk recorder, an open platform system featuring Betacam SP quality, bi-directional channels, multiformat output and a mix effects board.

## SIGNAL PROCESSING

Advanced Audio Visual Systems (AAVS) will offer the new S90 video multiplexer.

BTS will bring out a new noise reducer, the MNR 10.

ESE will show the new ES-185 master clock and time code generator. Also at the booth will be the new ES-2940 1x4 audio/video distribution amps.

Leitch will showcase its new Digital Glue products, such as the DigiBus line that now includes D-1 and D-2 frame synchronizers, analog-to-digital and digital-to-analog devices, and audio multiplexers. Also at Leitch will be the CDC-3500 series of synchronizers.

At Sony's booth, attendees can see the BKPF-108 frame synchronizer, the BKPF-131 encoder/frame synchronizer, the BKPF-152 digital-to-analog converter and line synchronizer and the BKPF-132 NTSC encoder/synchronizer.

Zaxcom will show the the DMX500 digital mixer with EQ, delay, timeline operation and pan functions.

## STANDARDS CONVERTERS

BTS will show off the new FLH 1000 HD telecine, as well as the FDL 90 telecine and a 4x4 telecine booster.

Rank Cintel will show the URSA Gold, the newest in the URSA line. Also available will be the Turbo 2 analog flying spot telecine.

Snell & Wilcox will be out in force with its Alchemist standards converter with phase correlation motion estimation.

Vistek will bring out its Vector-VMC converted featuring new algorithms. Also shown will be the V4102 NTSC to PAL-M transcoder with full genlock.

## SWITCHING

Abekas will debut the ASWR8100 switcher with 10-bit CCIR 601 internal processing. Also at Abekas will be the A83 component switcher featuring three mix effects modules.

BTS will show the Series 3000 and series 300 router control panels.

Utah Scientific, a Dynatech company, will display its new VTM routers for digital or analog routing in one frame. Also on hand will be the DMC-601 master control system.

Grass Valley Group will showcase the Model 1200 component production switcher. New capabilities for Series 7000 routers include control of GVG's Horizon router, PC GUI network control and client/server control.

Leitch will round out its Digital Glue line with the X-Plus D-1/D-2 16x16 serial router.

Pesa Switching Systems will unveil new System 5 configurations: the SD5000 64x64 serial digital router; the SDA5000 64x64 serial digital audio router; the RC5500 disk-based system controller; and the RM5000/RM4000 analog audio/video routers. The Lynx II 24x16 analog and serial digital audio and video router will also be available.

Sony will bring out the FXE-100 integrated switcher/editor, as well as the DVS-V3232B and DVS-V6464B serial routers. The new BZR-1000 router control software will also be shown.

Vistek will show the D8001/4, a 4:4:4:4 system featuring sub-pixel positioning and chroma-key. The company's new V2000

(continued on page 38)

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Circle 20 On Reader Service Card

# A Heavyworks Sneak Preview

By John Watkinson

## SPECIAL REPORT

Introduced in 1991, the Lightworks editing system has established itself as a favorite with film producers, broadcasters and post production facilities alike. Now, Heavyworks, the latest offering from the Lightworks company, brings the same flexibility and ease of use to a wider range of editing tasks. This article shows how Lightworks and Heavyworks share the same approach to complementary non-linear editing applications.

Non-linear editing uses the speed, economy and flexibility of random access computer technology to make all forms of image editing more efficient and easier to use. Unlike tape, computer disk storage drives retrieve data in a fraction of a second. Text, sound, video and film can all be digitized and independently stored on a common medium. Pictures and soundtracks are edited on the same machine. Edit points can be located with reference to picture events, soundtrack events or even by searching for dialog in a synchronized text file, in addition to the use of timecode.

A further unique feature of digital storage is that several editors can have simultaneous access to the same source material using networking.

### SOUND OR SILENCE

Although audio and pictures are on the same medium, they are accessed individually and can be edited together or separately. The flexible Lightworks approach to editing appeals equally to film and video editors who can continue to work in their own individual style with complete freedom. In film work, pictures and audio have traditionally been on separate media and are cut separately so that audio and pictures edits seldom coincide on the timeline. In videotape, the sound is on the same tape and sound and picture are often edited together. When this is not done, it is referred to as a split audio edit.

The random-access editor contains a computer which is dedicated to performing a fixed range of editing tasks. The great strength of the control approach pioneered in Lightworks and continued in Heavyworks is that the human interface is designed to duplicate as closely as possible the feel of a traditional editing machine. The hidden cost of learning to use a new device is minimized and most new users feel at home within a few hours of use.

Disk storage of text is easy; one megabyte (MB) holds the equivalent of a heavy textbook. Audio is hungrier, needing about half a gigabyte (GB) for an hour of good quality stereo. Both of these are easy to put on disks.

Digitized video and film, however, are an entirely different matter. The popular 4:2:2 video production format requires more than 20 megabytes a second (MBps), while

70mm film makes even that look trivial. All of today's random-access editors use compression to make them cost-effective.

The disk subsystem of Lightworks can sustain one megabyte per second. If you want to view an edit containing a dissolve or wipe, the disk system throughput must be divided between two picture channels and a compression ratio of 50:1 or more is needed. The inevitable artifacts do not prevent edit decisions from being made, and Lightworks simply outputs an edit decision list. The original program material is conformed to it elsewhere to any required quality. When used in this way, Lightworks acts like an off-line editor.

### ON THE RISE

Disk drive development is driven by competition in the personal computer market, and the capacity of disk drives roughly doubles every 18 months, without an equivalent increase in cost. At some time the cost per bit and the throughput of disks may reach a point where compression is no longer necessary. Then there will be no loss of quality and the random-access editor will become an on-line editor.

There is no black/white division between on-line and off-line, because the two terms simply describe the ends of a price/performance scale. Lightworks and Heavyworks simply appear at different places on the on-line/off-line scale. Heavyworks is not a Lightworks replacement, and Lightworks will continue to be available.

Among its other attributes, Heavyworks initially has five times the throughput of Lightworks and is capable of addressing up to 250 GB of disk space; hence the name. The increased throughput means that Heavyworks can do more things at once. An assistant at a second, optional workstation can record one channel of source material at the same time as the editor is working. Alternatively, two input signals can be recorded at once. A two-camera shoot can be fed into Heavyworks in real time and editing can begin the moment the shoot ends.

By selecting a similar compression factor to that of Lightworks, up to six pictures can be played at once in real time, allowing the use of the on-the-fly editing between multiple sources. This was previously only possible with multiple cameras live or with multiple VTRs, but now it can be done with random access. The EDL resulting from a live cut can be imported and trimmed.

Displaying many pictures at once can clutter the graphics monitor screen, so Heavyworks supports twin graphics monitors. In addition, Heavyworks has up to six simultaneous video outputs so that conventional monitors can be used to view the sources and full screen ployout. Standard video outputs are analog composite, but component SDI outputs are available as an option.

### COMPRESSION FACTORS

Heavyworks' increased throughput means that less compression is needed, resulting in higher picture quality. The compressed picture must be good enough to allow unwanted objects in a shot to be identified so they can be edited out. If the source material is 65 or 70mm film, the final audience will see it on a huge screen, and anything in the shot which should not be there will be obvious.

Alternatively, with a low compression factor, Heavyworks can be used as an on-line editor for news and corporate work.

The twin graphics monitors option allows viewers and galleries on either screen. The graphics processing power has been increased so that the response of graphics is maintained when viewers are rolling.

Heavyworks incorporates networking facilities from the outset. Initially several machines can be linked together for material transfer. Future developments will allow editing from a central storage system.

Eight fully simultaneous audio output channels come as standard. A larger number of virtual audio tracks can exist, and the optional audio upgrade allows sixteen continuous outputs. For specialist applications, further audio channels can be sup-

ported. An option exists having 24 simultaneous outputs at the expense of a reduced number of picture channels.

Audio mixdown at the dubbing stage can be handled by interfacing to a digital audio workstation, such as the AMS Audiofile. Sound files and EDLs are compatible with Audiofile, and Heavyworks can chase the timecode output of Audiofile. EDL data can be exchanged in either direction at any time, which means that sound and picture editing can take place in parallel. ■

*John Watkinson is an independent consultant in digital audio, video and data technology and has written seven books on the subject.*

*For further information on Heavyworks, contact the company at telephone: +44-71-949-3084; FAX: +44-71-437-3570, or circle Reader Service 34.*

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# What to Love (and Hate) About HDTV



by Mario Orazio

## MASKED ENGINEER

**S**OMEWHERE OUT THERE You might not have noticed that every silver lining has a cloud. If you infer that I am about to rant on the new HDTV scanning parameters, you are right.

First, in this era of truth-in-labeling, I must confess that I have a love/hate relationship with HDTV, as shown in Table I. Actually, Table I just shows how I feel about HDTV; Table II examines HDTV's simpler relationship with me.

I also think I ought to elaborate some more on the beautiful pictures I refer to in Love I. Give me a decent HDTV camera, enough light and a seat close enough to a monitor or projector, and watch out for my drool.

Also, my problem in Hate I could be temporary. Compression is improving, so someday maybe I will see my Love I delivered to homes. But I still have a problem, because I do not think I am going to sit right on top of a monitor at home. From across the room, I have a very hard time telling HDTV from non-HDTV, and I am not the only one.

So the point of this disclaimer is to let you know that this month's ranting has a bias against HDTV; I (or we) do not have any bias against high definition video, whether it is used for theatrical presentations, medical training or what have you. What I plan to rant about this month has nothing to do with

delivery to homes, theaters or hospitals, so I do not think my bias gets in the way, but I wanted to lay my cards on the table anyhow.

### NEW AND APPROVED

This month's ranting is on 1920 by 1080, the new, improved, and even more important, approved production scanning structure. As far as this grump is concerned, we are talking about something simply marvelous.

Let me derive the numbers for you. There is currently only one global standard for video, and that is CCIR-601, sometimes incorrectly referred to as 4:2:2 or D-1 (both of which are derived from the standard). Forget the fact that the CCIR does not exist anymore; this is a good standard.

But it is a pretty weird standard, in that it allows for a mess of different, incompatible signal formats. Someone in the U.S. can make a D-1 tape complying fully with CCIR-601, and someone in Australia can do the same, and those two tapes cannot be edit-

Anyway, whether the Kell factor or combined Kell factor/interlace coefficient for HDTV is 0.2, 0.4, 0.7 or 0.9 (as long as it is anything other than 1.000), 1080 lines will provide less perceived vertical resolution than 1920 pixels horizontally.

But I did not wake up my computer this month to squirt out esoterica. Maybe someday we will all watch HDTV on non-refreshed pixelized displays, and square pixels will mean square perceptual resolution. Either way, I think square pixels are a good thing, not only technically but also politically. Computer people are in love with square pixels, and if TV people ever want to get the support of computer people, they might as well be square.

### PIXELS AND POLITICS

So far, so good, and there are more advantages on the political side. The arithmetic I have done so far is based on CCIR-601. It is not based on 525 lines or 625

**Table I.** Mario's (or whoever he, it, she or they really is's) Love/Hate Relationship with HDTV

<b>LOVE:</b>	1. Beautiful pictures pre-compression
	2. Best thing that's happened to TV technology research in decades
	3. Amazingly advanced engineering
<b>HATE:</b>	1. Less than beautiful pictures post-compression
	2. Worst thing that's happened to TV technology politics in decades
	3. Amazingly backward operations (limited lenses, switchers, effects, etc.)

**Table II.** HDTV's Simpler Relationship with Mario

1. Shut up!	2. Go away!	3. Don't come back!
-------------	-------------	---------------------

ed together, because one has 525 scanning lines and the other 625. They also have different frame and field rates and even different numbers of digital samples per scanning line. As far as pictures are concerned, about the only thing they do have in common is the number of active pixels per line: 720.

That is part one. Part two is that the non-existent CCIR said HDTV is supposed to have twice the resolution of regular TV:  $720 \times 2 = 1440$ . With me so far?

Next, for reasons that may turn out to be silly but are not tragic, just about everybody in the world of HDTV who has any clout whatsoever says pictures should have an aspect ratio of 16:9. Here is a prediction you can bank on: If and when HDTV ever gets broadcast anywhere that it currently is not established, it will have a 16:9 aspect ratio.

Are you ready for more heavy duty arithmetic? Today's 4:3 aspect ratio is 12:9.  $16/12 = 4/3$ .  $1440 \times 4/3 = 1920$ . If you want to keep CCIR-601's magic 720 active pixels per line, if you think HDTV ought to have twice the horizontal resolution of plain old TV, and if you want to have an aspect ratio of 16:9, there must be 1920 active pixels per line. I am not talking partial differential equations here; third-grade arithmetic doesn't lie.

One last brain-straining calculation: If you want to have square pixels, the number of scanning lines has to match the number of active pixels per line divided by the aspect ratio.  $1920 \times 9/16 = 1080$ .

Hey, I can count up all the ifs I just used as well as you can, and I will toss out another: Square pixels don't necessarily mean square perceptual resolution. Have you ever heard of the Kell factor? The interlace coefficient? Do you find it just a little bit strange that people talking about HDTV still refer to research on vertical resolution loss published in the 1930s?

I guess no one wants to do fresh research, because, as long as they do not, they can say, "Well, Kell's research is 60 years old," and use any made-up numbers they want to.

lines. If you go along with all my ifs, you end up with 1920 x 1080 whether you normally shoot in NTSC, PAL or SECAM, at 25 frames per second, 29.97 or 30.

The original Japanese HDTV system was supposed to have 1052 active scanning lines, I think. When SMPTE formalized it, it ended up with 1035. This was not an arbitrary number; it is divisible by 23, as are 483 and 575, the number of active scanning lines in 525- and 625-line TV. That meant downconverting from that form of HDTV to 525 and 625 required simple digital coefficients of 15:7 and 9:5, respectively.

Technology aside, it was not politically nice for Europe to go along (officially) with something the Japanese had a head start in, so even though there are more 1125-line HDTV cameras in BTS's Germany alone than in all of the U.S., the official European line was that HDTV should have 1250 lines (twice 625). Never mind that an even number of scanning lines is an interlace nuisance and that doubling 575 active lines to 1150 is no more square, relative to 1920, than 1035.

### CHANGING DIRECTION

Around the time 1080 was first being batted about, someone in New Zealand, I think, tried to tackle the square pixels problem from the vertical direction instead of the horizontal. If you count half-lines differently, you could say 625-line TV has 576 active lines. Twice that for HDTV is 1152, and  $1152 \times 16/9 = 2048$ .

Shazzam! That sure looks like a digitally friendly number. Well, it is not.

Not much happens in video processing on an active pixels per line basis, but plenty happens on an active pixels per picture basis: frame syncs, frame stores, digital effects, etc. It is true that 2048 is the 11th power of two, but, to continue this exercise, the 16th power, familiar to those who work in digital audio, is 65,536. But don't stop there; the 21st power

(continued on page 14)

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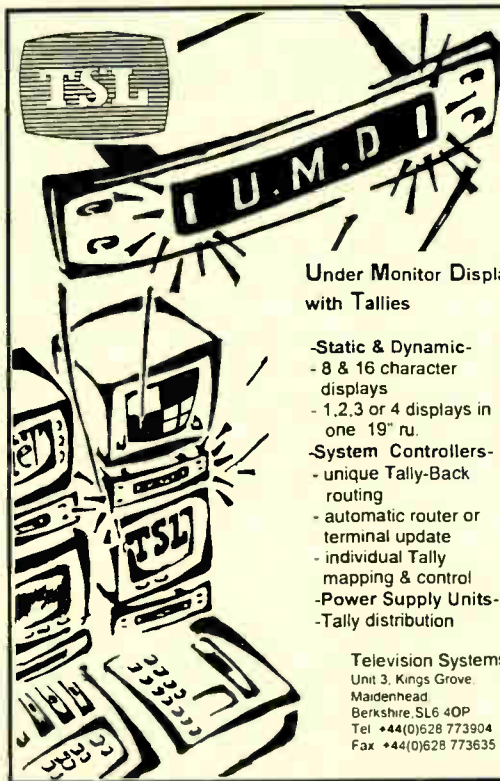
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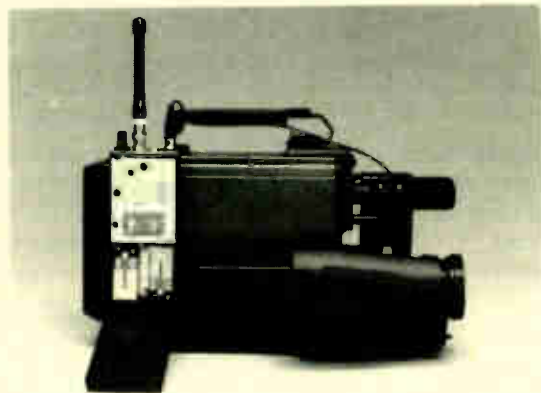
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CONTINUED FROM PAGE 12

# Making the Most of HDTV

is 2,097,152, or two megabits for short.

The proposed 2048 x 1152 square pixel format yields 2,359,296 pixels. That does not fit into 2,097,152, which could mean (remember, I said "could," not "will") doubling the amount of silicon used in HDTV production devices (and the associated hardware size, power and heat load). But accepting 1920 x 1035 was not only unsquare, it just did not fit into official European policy.

Enter 1920 x 1080. It has square pixels, and since it has only 2,073,600 of them, it fits into 2 megapixel (MP) memory arrays.

Most important, from an official European point of view, it is not 1,035. That means some pain for Japanese production equipment manufacturers, which is a good thing when you are trying to make European manufacturers happy.

For the first time in about a decade, there is light at the end of the tunnel of a worldwide HDTV production standard, and it does not look like an oncoming train. The light is our silver lining — square pixels, two MP arrays, CCIR-601 derivability, a setback for existing 1125/60 manufacturers (giving

more equal footing to European manufacturers), a possible global standard and easy downconversion to 625 (1080/576 = 15/8).

## STORMY WEATHER

Now the cloud: Remember all those German 1125/60 HDTV cameras I just told you about? Add the ones in Philips's Holland, all the other ones in Europe, all those in the U.S. and all those in Japan (I hope I have not left anyone out). They were designed for 1035 active lines, not 1080. The best of those cameras, Sony's HDC-500s, have chips squirting out 1920 x 1035. If there is an easy way to convert them to 1920 x 1080, I sure do not know what it is; replacing hyper-expensive CCD arrays is not my idea of cheap.

In VTR land, things might be only a little easier. You cannot wrap tape 360 degrees around a head drum; there must be a gap, and the VBI is where that gap lives. The head-wrap gap was calculated for 1035 active lines. Getting the guides close enough together for 1080 is going to be tight, to say the least. There are just 45 lines between 1125 and 1080. Maybe that sounds like plenty, compared to NTSC's 41, but it is only 4 percent of the frame time versus NTSC's (or PAL's or SECAM's) 8 percent.

So adopting 1080 is not only something that will set back today's 1125/60 manufacturers; it is also screwing today's 1125/60 facilities. And then there is that downconversion.

There is not any question that 1080/576 is a nice, neat 15/8. That is the easy part of a downconversion from 1125 to 625; the tough part is the frame rate conversion. But over in 525 land, the coefficients do not work out quite so neatly: 1080/484 = 270/121; 1080/483 = 360/161. If we reinvent NTSC's active line count to just 480, there is a super-simple downconversion from 1080: 9/4. So, once again, we're making NTSC viewers accept something worse (increased VBI) for HDTV. I am not saying this is worse than making monochrome viewers accept a dot pattern in the 1950s, 1960s and

1970s; I am just pointing things out.

Anyway, all of these number crunches do not take into account the problems of down-converting from a 16:9 aspect ratio to 4:3. If we decide to keep the wide aspect ratio, 576 becomes 432 (5/2 from 1080) and 480 becomes 360 (3/1 from 1080; 484 would become 363, 360/121 from 1080). I have already ranted about the problems of the black stripes that result; I will leave you to wonder this month about pictures with a third of the vertical resolution of the original.

Whatever my problems with HDTV and home broadcasts (and I am perfectly willing to admit that they are my problems), I happen to think 1920 x 1080, 2:1 interlace (for a good long while), and 60.00 fields per second is a great way to go.

## POISON PEN

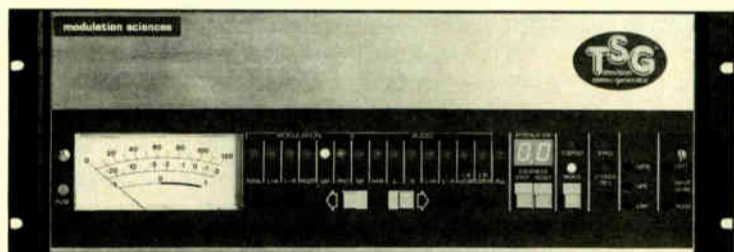
I think I have probably managed to anger everyone with that statement. I have upset U.S. broadcasters by calling for 60.00 instead of 59.94 and European broadcasters by calling for 60 instead of 50. I have upset certain computer factions by calling for interlace (which, I strongly suspect, is the only way HDTV will appear this millennium), and I have upset existing HD facilities (sorry, chaps) by calling for 1080 instead of 1035. I have probably even angered Kiwis and Gary Demos by calling for 1920 instead of 2048.

What the heck. I might as well anger everyone else by calling for 1175 lines total instead of 1125 to maintain today's VBI proportion, but I do not think I will do that. First, I expect that in the last 52 years we have learned how to live with smaller VBIs. Second, I do not want to screw up the new universal HD recorders, all based on under 1.2 Gbps. (Don't be surprised, by the way, if you see Panasonic at NAB demoing HDTV being recorded on D-5 with 4:1 compression — it is not as though they did not say last year they were going to do just that.)

Gee, I wonder if HDTV, when all the bugs are worked out, will be just as successful as Imax is in the film world. I wonder if I have just angered someone else. ■

*Mario Orazio is the pseudonym of a well-known television engineer who wishes to remain anonymous. Send your questions or comments to him care of TV Technology. Or drop him a note on e-mail 581-6729@MCIMail.com.*

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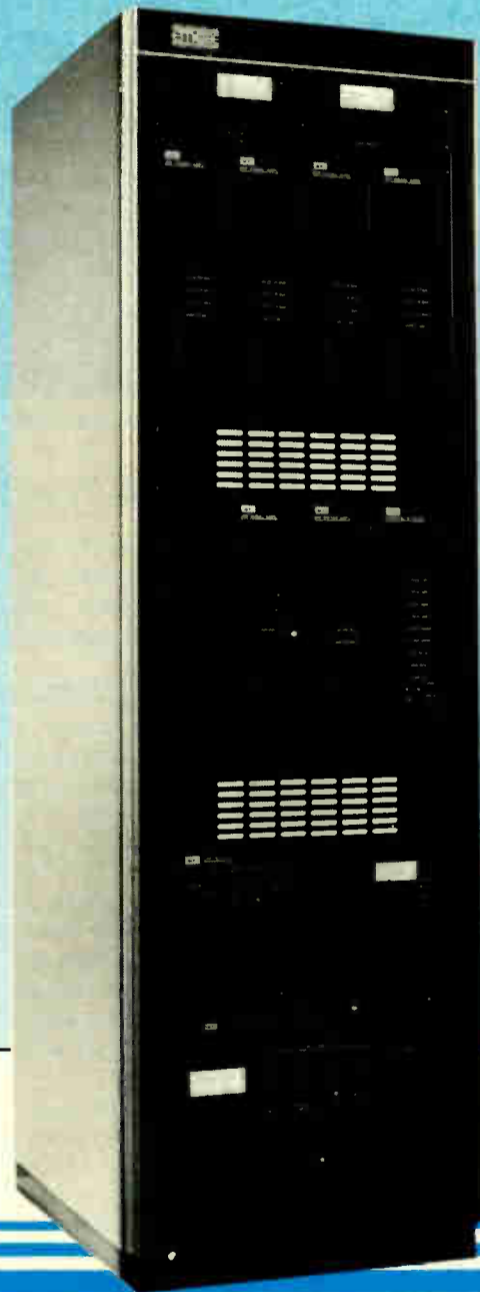
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# Going On-Line with VideoCube

By Jay Ankeney

## EDITING TECHNOLOGY

The VideoCube is a new entry in the disk-based editing sweepstakes, and it is a system worth looking at not only for its innovative technology but also because of the way it is being marketed.

At a relatively low cost, the VideoCube is an interesting approach to a truly all-encompassing digital post production system capable of producing a finished, on-line, audio/video product all out of one box — hence the appellation “Cube.” We are going to chat with some executives from ImMIX (pronounced “I-mix”) and also with an aggressive production company in the U.S. that recently accomplished the amazing feat of uplinking to satellite a finished half-hour show directly off the VideoCube’s disks within a little over two

hours after the show’s final shot was recorded.

“The VideoCube is a complete digital video post production workstation,” ImMIX Co-founder and President Randy Hood starts out, “providing disk-based, non-linear editing of 30 fps, 60 field ‘finishing’ quality video. It offers real-time digital video effects creation, high resolution character generation and four independent, editable channels of CD-quality stereo audio with real-time digital signal processing on every edit.

“Most importantly,” Hood continues, “the VideoCube comes as a turnkey system complete with monitors, speakers and cables, for just US\$40,500. You just add the VTR of your choice for source input and/or linear master recording after a project is completed.”

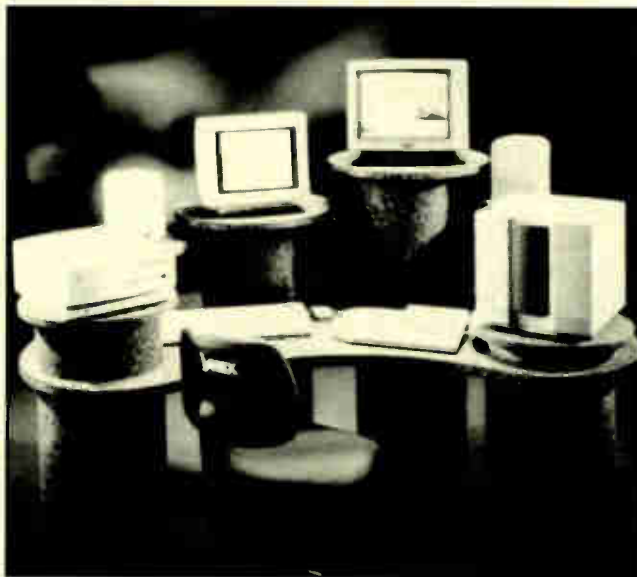
### MACINTOSH FOUNDATION

Built around a Macintosh Quadra 650 with a custom editing control panel, the heart of the VideoCube is the ImMIX-designed Media Processor, which houses a three-disk storage array. Two 2.6GB drives provide one hour of digitized video and one 490MB drive gives two hours of audio. Capacity can be expanded, with additional modules, to six hours of video and 12 hours of audio.

“We also offer the VideoCube PLUS with more RAM and larger hard drives for users incorporating extensive Macintosh graph-

ics in their productions,” Hood adds.

One of the key benefits of the VideoCube’s random access editing speed is its implementation of real-time effects creation. Many other digital systems make you wait while dissolves or DVE moves are “rendered” inside the computer and then combined with the edited sequence as a finished chunk of video.



The ImMIX VideoCube

With the VideoCube, it all happens instantly.

“We achieve this by having multiple streams of video and audio coming off disk simultaneously,” Hood explains, “and we process the data in true real time.”

### MULTIPLEXED VIDEO

Richard Jackson, vice president of engineering for ImMIX, told me that the system actually multiplexes the incoming source video onto the two 2.6GB video storage disks during the digitizing process.

“We split the video stream between the two disks,” Jackson said, “to provide twice the bandwidth while utilizing only half the potential of each disk. That way each disk is just responsible for providing its part of both video streams, while a buffer permits the editor to combine them in creating real-time effects.”

Perhaps the main reason the VideoCube display gathered such large crowds when it was premiered at last year’s NAB was the remarkable quality of the video displayed off of those disks. As Jackson lays it out for us: “Instead of JPEG, MPEG or DVI compression, we use a Discrete Wavelet Transform algorithm and DWT processor from Aware Inc., always running at highest quality of resolution.”

Basically, wavelet compression works on an entire picture rather than on a block of pixels. This makes it simpler to process the data. The result is a better video image, free of the artifacts associated with JPEG.

### UNDER THE GUN

But the real test of this kind of technology only comes from editing under the tight production schedules with which we all live. Down in the heart of the U.S.A.’s bluegrass country, Bob Manning, president of Videobred Inc., in Louisville, Kentucky, has had some experience along those lines.

“We do a lot of work for the Churchill Downs (horse-racing) track here,” Manning says, “including a weekly half-hour racing show for them called ‘In

Season,’ as well as a full complement of commercial and corporate work.

“In fact, our D-2 suite with a GVG 3000 digital switcher and CMX Omni controller has been running almost 24 hours a day. So our need for a second suite became pressing when clients literally could not book time in on-line.

“While visiting NAB 1993,” Manning continued, “I was determined to step into disk-based editing systems, but I was turned off by the fact that most systems were slow doing effects. I liked the fact that the

VideoCube did not rely on off-the-shelf disk drives that had not been optimized for video work, and that the user interface did not rely on a mouse. In fact, the simplified control module, with faders conveniently built in, made it seem inviting to use. So we went with it.”

### AT THE RACES

“We quickly started editing segments for the Churchill Downs show on the VideoCube,” Manning explains, “and most people could not tell the difference between pieces shot on Betacam and those from the VideoCube. We actually

find the video output to be somewhere between 3/4-inch and Betacam quality, but under the right conditions, it is definitely acceptable for broadcast.

“Our VideoCube’s most demanding test under fire came just a month after we got it. There is a big race in Lexington called the ‘Kentucky Futurity’ and we were contacted to do a half-hour show that had to be uplinked the night of the event. I figured that our cuts-only field editing systems couldn’t give us the graphics or effects we wanted, and you sure cannot move a D-2 suite, so we packed the VideoCube into its original boxes, put it in the back of my Explorer, and drove down to Lexington.

“We pre-packaged our open and two features for the show. The morning of the race we shot some stand-ups and digitized everything onto the disks. Then we input the races and winner’s circle interviews as they happened, and about 6:30 that evening we uplinked everything to satellite right off the hard drives,” Manning said.

“Neither the guys in the truck nor the folks at SportsChannel America had any problem with the image quality, and considering this was sent to the bird within two and a half hours after the last race, everybody was pretty much blown away by the experience. I know I would not have been able to do the job if I did not have the VideoCube,” Manning said.

There are lots of intriguing disk-based editing systems out there, but not many that include as high a level of video output with such easy operation all in a single turnkey package at a price as low as the VideoCube. ■

For more information on the ImMix VideoCube, contact the company at P.O. Box 2980, Grass Valley, Ca. 95945; telephone: +1-916-272-9800; FAX: +1-916-272-9801, or circle Reader Service 48.

Jay Ankeney is a staff videotape editor at KTTV in Los Angeles. Write him at 220 39th St. Upper, Manhattan Beach, CA 90266.



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ITALIAN TECHNOLOGY FOR WORLDWIDE MARKETS



# New Ways to Fix Problem Audio

By Ken Hahn

## AUDIO FOR VIDEO

In audio post production, inevitable circumstances dictate the use of sub-standard audio tracks in a program. The source of the track may be obscure archival footage, a distorted, unique recording of historical significance, an interview captured at an excessively noisy location or maybe a contemporary recording that is technically flawed.

Each of these cases can prove to be particularly troublesome. Everyone involved would prefer to include the problematic audio track in the program, but there is concern that its poor quality might outweigh its contribution to the piece. In these instances few options are available.

Recent advancements in digital audio technology are presenting new, accessible and affordable options for just these types of situations. Manipulation of problematic soundtracks is made possible through specialized digital signal processing (DSP).

### PROBLEM AUDIO

Problematic audio tracks are encountered regularly in video productions. Each is unique but many share common traits with other problematic tracks. The circumstances leading to a problematic audio track are often unusual. Unusual problems demand special remedies.

Materials of this type are generally classified as noisy. There is often less of the desired signal (program audio) than of the unwanted signal (noise). Dialogue may be rendered unintelligible and hence unusable because of an unusually high level of ambient or background noise. The type and quality of noise is as significant as the level when determining how distracting and annoying the undesirable noise is. A high pitched, low level tone is more problematic than a low frequency tone at the same or even higher level.

Noisy audio may also be characterized as distorted, rendering it unpleasant to listen to. Problematic tracks in this category include those that are over-modulated, over-compressed or otherwise suffering from an assortment of artifacts generated through excessive use of other types of processing.

An audience can be distracted and quickly lose interest if a soundtrack is noisy, distorted or

unintelligible. All efforts should be pursued to procure the best possible sound elements. When an audio track is marginal, the avenues available for correction of the condition are few.

### AVAILABLE OPTIONS

The first option is to discard the track. However, assuming that the particular track must be used, the remaining options are: 1) Use the audio as it exists and try to rationalize the unsatisfactory quality. 2) Subtitle the unintelligible dialogue. 3) Use traditional analog

equalizers (including notches, filters and dynamic noise reduction) to reduce the offensive qualities. 4) Utilize digital signal process-

ing noise reduction processors. Many of the digital processes carried out are emulations of analog ones. DSP allows for much more powerful and sophisticated varia-

**Manipulation of problematic soundtracks is made possible through specialized digital signal processing (DSP).**

collection of audio processes that are carried out in the digital realm by special programs specifically designed to eliminate noise.

tions of these processes than are normally available via analog or specially designed filtering.

Programs such as these have been employed by the military and government for many years. Their uses vary from filtering sonar signals to cleaning audio captured from surveillance tapes and wiretaps. The computational power required to run the sophisticated programs was once only attainable in large and expensive main frame computers. However, it is now available to the professional audio community. Often DSP noise reduction programs are a component of non-linear digital audio editing and process-

(continued on page 18)

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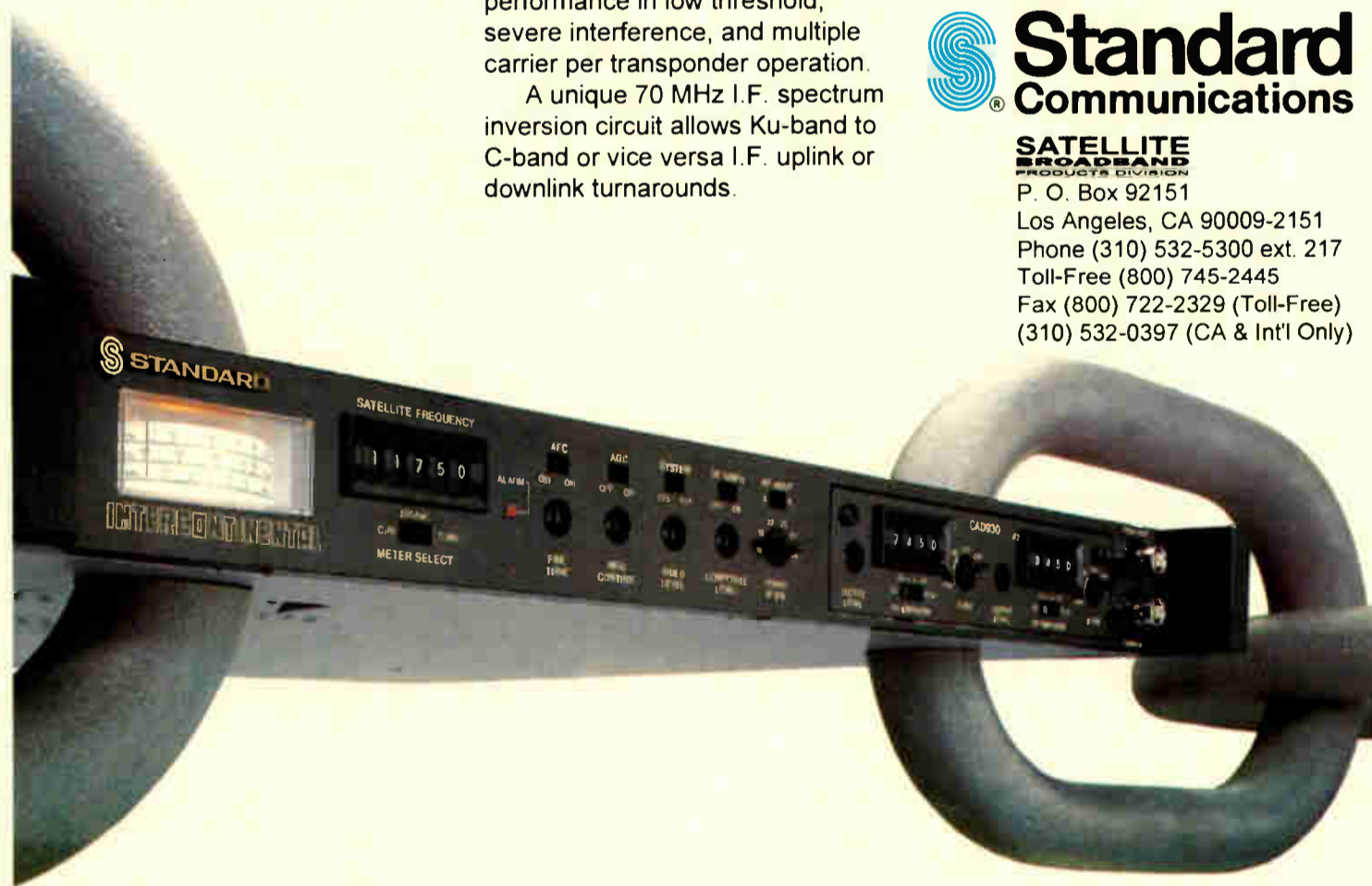
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CONTINUED FROM PAGE 17

## Digital Technologies Can Help Clean Up Bad Audio

ing systems.

The first applications of DSP noise reduction addressed some of the typical conditions encountered when previously released music materials were scheduled for reissue on compact disc. Many record companies felt that the sonic quality available via the compact disc necessitated attempts at improving the quality of the audio tracks found on the existing analog master tapes. DSP systems were designed

to alleviate hiss, hum, general ambient noises (air conditioning, room tone, etc.) and even clicks and pops. A whole new niche industry was born. It was devoted to cleaning, reprocessing and even remixing analog tapes for reissue on CD.

As might be expected, not all parties are happy with the results of the "rejuvenation" process. Some felt the original product was better left untouched and that the noise-reduction was removing more than just

"noise" and was altering and corrupting the program content. It is true that negative artifacts can result from such "cleaning up," and only through careful and judicious implementing of noise reduction techniques is the process considered successful.

More recently, the DSP programs have improved, resulting in higher quality, more "intelligent" processing. The market has increased and pricing has become more competitive. All of this has contributed to increased accessibility and the likelihood that a program you are involved with or encounter will use some type of DSP noise reduction.

While certain early noise reduction processes were designed to be as "automatic" as possible, others were extremely labor intensive and time consuming. Few actual systems existed and processing on these early

systems was charged by the program minute. Usually, this was prohibitively expensive for most audio-for-video applications.

### ON THE MARKET

Commercially, systems are currently available from three manufacturers (Sonic Solutions's "No-Noise," Cedar Audio's "Cedar-2," and Digidesign's "DINR"). The majority of material processed continues to be archival music masters. Therefore, the

**... DSP programs have improved, resulting in higher quality, more "intelligent" processing.**

majority of systems are found at record companies and CD mastering facilities. More recently, systems have found homes at the major television networks and facilities that specialize in post-production sound. These particular systems are employed to clean tracks for broadcast, home video and film.

As is true with any manipulation of sound, the amount and type of processing that one prefers to apply is subjective. How well a job of noise elimination a processor performs is a matter of personal judgement. In the hands of an experienced operator, the DSP can be a very powerful and flexible tool.

The final quality of a processed track can be affected by many things. Budget and time constraints can govern how successful the DSP operation is. Program content and final broadcast medium are also factors. The quality demanded by a documentary airing on cable television is not the same as that necessary for a laserdisc program that is, for example, a historical retrospective of a famous classical music conductor.

In any case, the results of a particular process cannot be guaranteed. Each problematic situation should be considered individually. There are some problems that can only be improved marginally, if at all. Some problematic tracks may be 50 percent better after the first hour of processing, 5 percent the next, and 1 percent or less for each hour after that. Many problems are time intensive and require a high degree of concentration.

In future columns, I will continue to examine DSP noise reduction, including manufacturers of the systems and the systems' configurations. ■

For information on the DSP products mentioned above, contact the following:

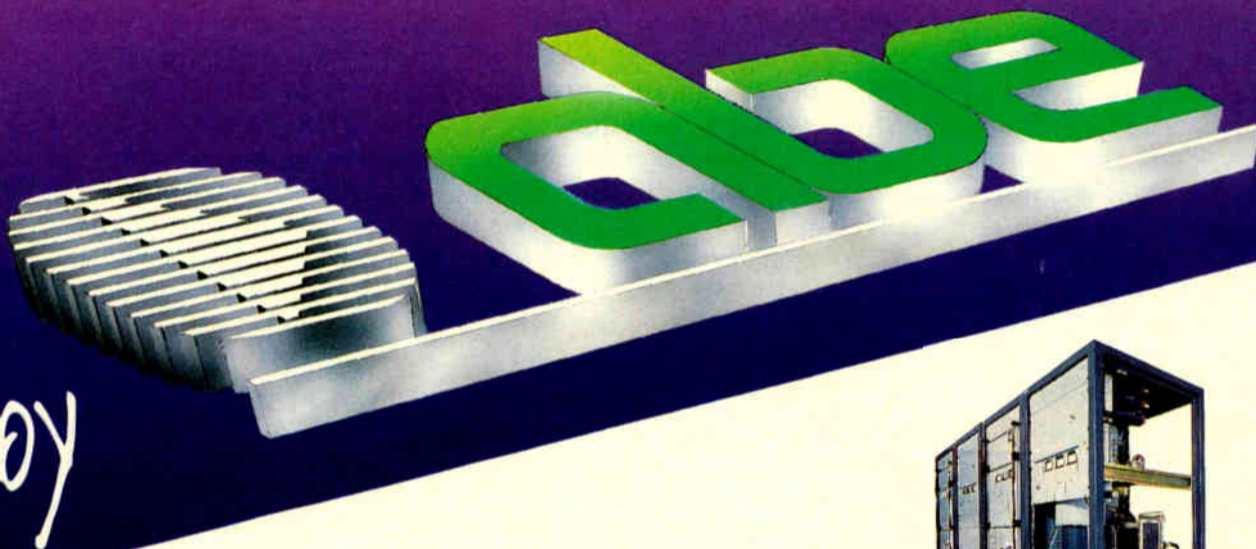
CEDAR Audio, 5 Glisson Road, Cambridge, CB1 2HA U.K., telephone/FAX: +44-223-464117, or circle **Reader Service 40**.

Digidesign, 1360 Willow Road, Suite 101, Menlo Park, Ca. 94024, telephone: +1-415-688-0600, or circle **Reader Service 83**.

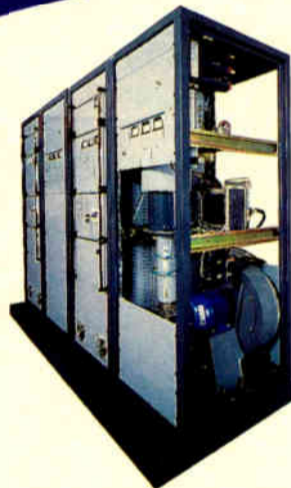
Sonic Solutions, 1891 East Francisco Blvd., San Rafael, Ca. 94901, telephone: +1-415-485-4800; FAX: +1-415-485-4877, or circle **Reader Service 107**.

*Ken Hahn is co-founder of New York's Sync Sound and has received three Emmy awards and 12 ITS Monitor awards for his work. He may be reached care of TV Technology.*

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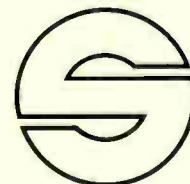
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# Maintaining A Mountaintop Transmitter

By Doug Lung

RF

TECHNOLOGY

If you do not do much work on mountaintops, you will probably think I have gone crazy after reading this. If you have worked at high elevations, you still might think I am crazy, but I think you will at least agree with me.

While transmitter days tend to be long, the views and natural surroundings of mountain locations help compensate for middle-of-the-night schedules. Because of this, the last thing I want to do is mess up the surrounding countryside. Unfortunately, most transmitter manufacturers do not consider this when shipping parts.

What am I talking about? Plastic pellets! Open up a box anywhere at the site and the wind that always seems to be blowing at those elevations (or the transmitter blower) will send the parts all over the landscape.

## NO MORE PELLETS

I know most of the U.S. transmitter manufacturers read this column, and I am hopeful that European and Asian companies will follow this advice as well: If you must use plastic pellets, put them in small plastic bags first, so they do not blow away.

NEC has used this approach for some of their studio equipment, and the expanding foam packaging works nicely as well, but it is not practical for small shipments. Big pieces of closed cell foam rubber should work well for items like filters, and one company, Microwave Filter, used cardboard and bubble wrap to pack a 1 kW bandpass filter I bought recently.

At the same mountain site, I unpacked another manufacturer's notch filter that was shipped in a wooden box with pieces of foam rubber and wood securing the filter. That would have been fine by itself, but they also filled the entire long box with small, non-biodegradable plastic "peanuts," which we chased all over the mountain top.

You may think I am unusual, but I do not believe that a well packed box needs peanuts. I am thinking about putting a line on purchase orders for transmitter gear saying "Plastic peanuts or pellets are unacceptable packing material and will be returned, freight collect." What do you think? I will mention any manufacturer here that will swear off peanuts for transmitter items.

Besides wind and plastic peanuts, another thing mountaintop sites seem to attract is lightning. Actually, lightning can be a problem even on flat ground if a tall tower is present. I could use an entire column talking about grounding and power line protection (and probably will sometime), but for now I will limit my discussion to phone line protection.

Most phone lines have some sort of spark gap or gas tube at the service entrance. When new, they work quite well. But after a few lightning bolts hit, performance deteriorates. If they short, they may be removed as a

"quick fix" if no replacements are available. It is not wise to depend on the phone company to protect a remote control or modem line. Gentner Communications Corp. of Salt Lake City, Utah, has realized this and provides a phone line surge protector with each of their VRC-2(XX) remote controls.

## BETTER PROTECTION

I have tried a number of surge protectors at our Midland Texas low power television site. The phone line is near the end of the line with all wires above ground and a cou-

ple towers in the area. I have had good luck with the TrippLite 4 outlet ISOTEL (TM) in the office and at home, but it has not worked well in Midland. I destroyed two ISOTELs before replacing them with a phone line protector made by PolyPhaser.

The PolyPhaser protector comes in an impressive metal box and uses screw terminals instead of RJ-11 jacks. So far, it has survived. The ISOTEL is a good unit, and to TrippLite's credit the modem was never damaged. However, two ISOTELs cost as much as a modem.

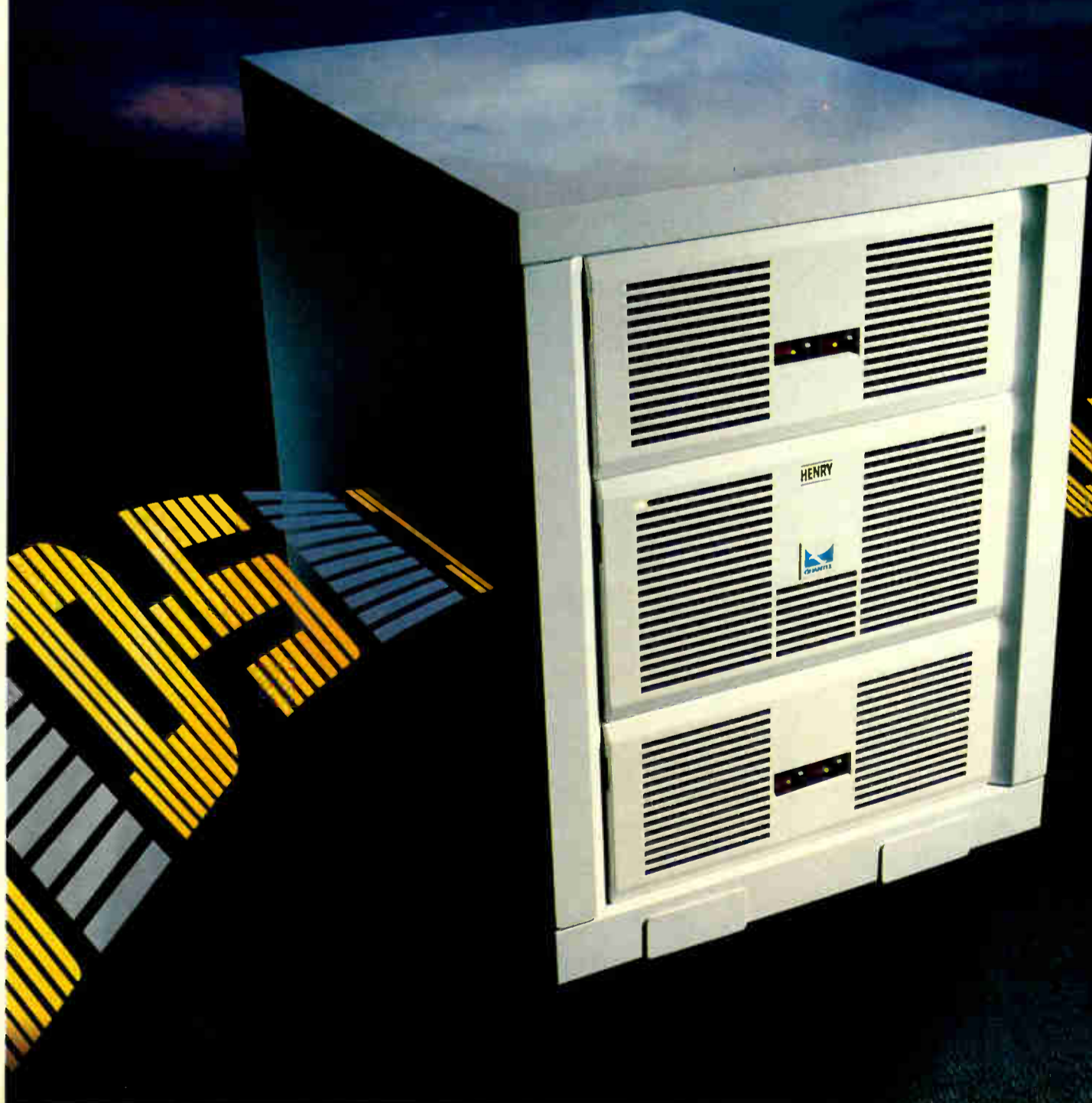
In the U.S., PolyPhaser distribution is not

too friendly to small users — you will have to call the company to find a regional distributor, establish credit or send a company check and wait for the unit. PolyPhaser's telephone number is +1-702-782-2511; FAX: +1-702-782-4476, or circle Reader Service 25.

I have found that two-way radio technicians enjoy using PolyPhaser equipment. The company also makes AC power line surge protectors, data line protectors and even RF coaxial lightning protection equipment.

If a modem or remote control does get hit by a lightning surge on the phone line but has not

# If you want to get the best out...



been completely destroyed, it may be easy to fix. Many of these units have a limited built-in surge protector — often a pair of low value (47 ohm or less) resistors in series with the phone line and some capacitors. These can be tracked down from the RJ-11 jack on the modem/remote with an ohmmeter.

First, look for open resistors or a shorted capacitor. If these are good, check the modem's ring detector circuitry. Most government regulations require equipment connected to the phone line to meet certain minimum standards for isolating you from the phone line. The transformers that are used to do this also do a pretty good job protecting the modem's electronics.

The ring detector, however, is located

before the transformer and thus is not isolated. All the ring detectors I have seen use a resistor in series with the LED in an optoisolator, which provides the isolation. If either of these components fails, the modem will not answer. If you are lucky, the optoisolator will have a standard part number that can be cross-referenced. If not, look in one of the replacement semiconductor directories for a suitable replacement.

There is nothing critical about the optoisolator except that it provides the required isolation. Be aware that substituting components may void the manufacturer's government-type acceptance for the modem and make it illegal to use it on the public telephone system.

If all this talk of lightning and failed phone lines makes you nervous, there are a number of RF-based alternatives for transmitter remote control. Audio tones on a subcarrier of a TV microwave link are the most common. The first remote controls were analog devices in which the frequency of the audio tone was related to the voltage applied to the remote at the transmitter site. These units were difficult to calibrate and were replaced with systems that converted the remote readings to digital data.

**SIMPLE MODEMS**

Since the audio subcarriers were already there, most units contained their own simple AFSK (Audio Frequency Shift Keying)

modems. Now, most remote controls are based on microcomputers (IBM-compatible PCs are common) and require external modems to convert the computer's RS-232 data to audio tones. Usually this modem is based on the old Bell Telephone 212 standard. Although the data rate is only 1200 baud, it does work on four-wire systems (separate receive and transmit circuits) like microwave subcarrier links.

I have tried to use regular computer modems using two-wire connections on microwave links without much success. If the hybrid used to convert the two wires out of the computer modem to separate transmit and receive circuits is not precisely adjusted, feedback results.

Bell 212 modems are becoming harder to find, and the newer four-wire modems replacing them are rather expensive. However, there is an alternative — RF modems. Wegener of Georgia in the U.S. (+1-404-623-0996) is one of the biggest suppliers. Many cable and broadcast satellite operators use their modems.

The Wegener modems use FSK (Frequency Shift Keying) directly on an RF subcarrier. This is more efficient and more robust than systems that convert the data to an audio tone and then modulate the subcarrier with the audio. Wegener's 2061 modulator series and 2020D demodulator can operate up to 14.4 kilobaud, twenty times faster than the old 212 modems.

**MICROWAVE MODEM**

To connect the Wegener modem to the microwave, use the microwave's "baseband" outputs and inputs. Both units have loop through connectors, so they can be inserted in series with the microwave unit's subcarrier modulators or demodulators. Look for a lot of these demodulators to show up on the used market. As satellite operators convert to digital compressed video for transmission, the data subcarriers will no longer be required.

Two other RF data transmission methods deserve mentioning. In some areas, broadcasters are using packet equipment originally design for ham radio use. The packet nature of the data permits several stations to share one 450 MHz "P-channel" frequency for remote control. Packetizing the data slows it down, but since most older systems did not even push 1200 baud, the speed is acceptable for small remote control systems.

The second method is to encode the digital data in the vertical interval of the main video signal, like teletext. Note that I am talking about using this system on microwave links (duplex), not on the TV transmitter itself. Although several companies sell teletext equipment, I do not know anyone marketing the equipment for this purpose.

If you have information, tips or techniques that would be of interest to other RF engineers, please share them. You can reach me on CompuServe through E-MAIL at 70255.460 or on the Internet at 70255.460@compuserve.com.

On occasion, I am in my office at +1-305-884-9664. Call after 6:00 p.m. eastern U.S. local time if possible. My fax number is +1-305-884-9661. You can write me at 2265 Westwood Blvd., Suite 553, Los Angeles, CA 90064. If you mailed me anything between Thanksgiving and Christmas in 1993, it was probably destroyed when my building was burned the day before Christmas. If you have not received a response to letters or requests sent in December or late November, please contact me. ■

*Doug Lung is vice president and director of engineering for the Telemundo Group of stations.*

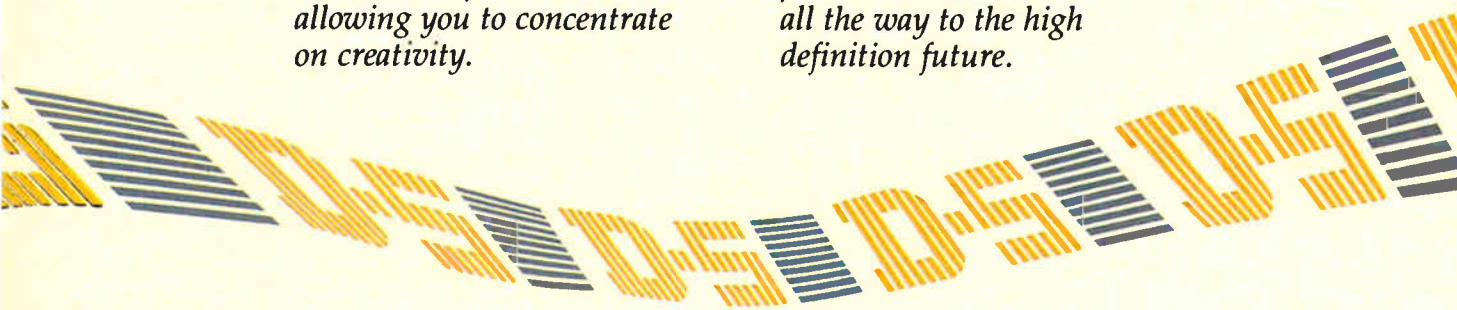
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# Getting Creative With SoftImage

By Bruce N. Goren

## COMPUTER VIDEO

**R**ecently, I had the opportunity to visit SoftImage, the Montreal, Canada-based 3-D graphics and animation company, where I was able to talk to key research and development, product management, user interface and customer support personnel.

The visit was useful in that it gave me a chance to get an in-depth look at the SoftImage Creative Environment.

### CLEAN DESIGN

As you sit down to a session with the SoftImage Creative Environment, you will immediately benefit from the uniquely clean design of the user interface. It is an easy screen to view, thanks to smartly chosen default colors and gray scale values for the working environment and menu cell buttons.

Instead of pull-down menus across the top of the screen, as in most programs (or pop-ups on the bottom on Alias), SoftImage arranges its functions vertically at the left and right sides of the screen. Functions such as Get, Save, Camera and Lights stay in the same place on the screen throughout the system. This is helpful because these functions are common to the program's main modules (Model, Motion, Actor, Matter, Tools in version 2.61, with Character to be added for 2.65). In addition, there are 35 Supra Keys to gain instant access to the most commonly

used functions of the program.

The standard four display windows for perspective and orthographic views can be resized and stretched, and any of the windows can be used to display a schematic diagram of scene hierarchy. I found the schematic display so useful for rapidly identifying and selecting geometry for editing, deletion and animation that I soon fell into the habit of keeping it open permanently, in place of one of my orthographic viewports.

Once textures are being assigned, however, things can become complicated. It would be nice to be able to interactively re-arrange common horizontal schematic elements to

enough for me to feel at ease using the orbit tool to position the camera interactively using the shades window option on our Iris INDIGO R-4000 Elan.

There is a message bar at the bottom of the screen for error prompts and warnings. A status history pop-up showing a listing of all warnings, messages and errors during the session can also be easily accessed. The onboard clock display on this line is somewhat unusual because it only updates after a mouse click; if you sit and stare at the screen for a few minutes deciding what to do next, it is as if time is standing still.

Just above the general status bar is a mouse

interface feature.

Traditional pull-down and pop-up menus can force you to exert the muscles and tendons in your fingers by requiring you to continue pressing the mouse buttons for as long as you want a menu active or while you are positioning the cursor. However, SoftImage pop-up menus stick on the screen until you dismiss them, which means that selecting menus and functions consists of light finger taps and mouse motions.

I think SoftImage's menu design makes good ergonomic sense, and I suspect this might help avoid repetitive motion injury that could otherwise occur after long hours in front of the screen. The sole exception is uniform scaling; to interactively scale an object in the x, y and z directions simultaneously, it is necessary to hold down all three mouse buttons. I find this very awkward; use of a Supra-key ought to be invoked here with a single mouse button.

### ANIMATION CREDO

At the core of the SoftImage program design philosophy is the belief that every aspect of a digital scene should be able to be animated. While most of the animation work takes place in the Motion and Actor modules (and soon Character), there are also plenty of unexpected "animatable" parameters to be found in the Model and Matter areas of the software.

The animation frame selector and playback controls stay on screen through each module. Playback options during wire tests or flip book viewing include looping, frame-by-frame or key-by-key. I would also like to see a ping-pong option added. Besides the usual camera, lights and objects in motion, animators can also mix procedural textures to create turbulated flames and glass refraction tricks.

A keyframe assignment button within the matter/texture sub-screen makes these surface transformations deceptively quick and easy to animate. The matter and texture libraries come with numerous usable surfaces, or it is possible to alter parameters with easy-to-use sliders or create your own radical or realistic shaders.

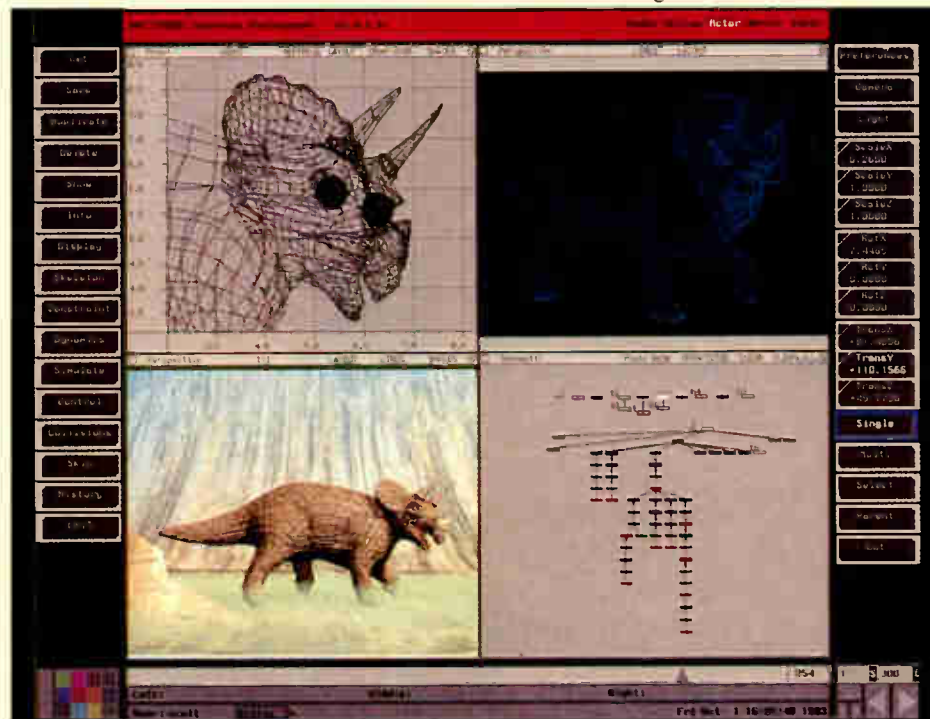
The Creative Environment comes with a terrific spiral-bound tutorial guide, which has you animating and rendering using all the general tools over the course of eight step-by-step lessons, which are about an hour long. There is also a more module-specific slipcase tutorial binder, which I found to be a bit less friendly and clear, but still informative.

The SoftImage Creative Environment, however, fails to provide meaningful tutorials for many of the more advanced and exciting features of the software, such as flocking, CIRAD AMAP, Meta-Clay, Channels, or Boolean Animation.

Learning about these advanced tools from the comprehensive reference manual's textbook-style definition, usage and procedure instructions can be difficult. But there is a nice collection of sample animations and associated scenes that more advanced users can examine and learn from by dissecting their structure. Videotaped tutorials, which I understand are in production, would be a welcome addition to the learning process.

The Model module is an excellent collection of tools to create the objects that will be lighted, assigned materials and choreographed into motion. Scenes, elements, primitives, etc. are retrieved using the general interface "Get" menu cell. A minor gripe about Get in this circumstance is that an optional feature not activated by my license, the CIRAD AMAP plant geometry library, was not grayed out of the selector. As a result, when curiosity got the better of me during my ini-

(continued on page 26)



Bringing the Past to Life:

The SoftImage Creative Environment at work on a dinosaur image

help untangle the more complicated hierarchical relationships.

There is very little display speed penalty for using the hardware renderer to quickly shade the viewing perspective. Even moderately complex geometry was updated fast

button status line that reports the functions of each mouse button for the currently picked operation. The mouse status line does not always clear off a previous condition when certain menu items are selected, but overall, it is a welcome and helpful user

22 FEATURES

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# A Software Guide to Management

By Tom Vernon

## SPECIAL REPORT

Sometimes success in engineering management is a mixed blessing. The years of hard work pay off with a higher salary and more benefits, but also with the added responsibility of supervising others. To those who have climbed the ladder by exceeding in technical and troubleshooting skills, these new management duties may seem bewildering and uncomfortable.

Fortunately, a computer-based solution is at hand.

Enter Performance Mentor (PM), from Performance Mentor Inc., a new type of computer software designed to act as a desktop consultant on selected management topics. It offers assistance in several aspects of managing employees — setting goals, evaluating, coaching and performance appraisals.

Performance Mentor includes a 74-page manual, program and data disks, a quick start guide and a tablet containing 10 types of employee evaluation forms for duplication. Both IBM compatible and Macintosh versions of PM are available, with the Mac version listing for \$395. System requirements include 1MB of system memory and a hard drive.

### STARTING UP

Your first session with Performance Mentor begins with completion of a manager profile checklist, in which you agree or disagree with a series of about 60 words to describe yourself. Are you praising, outgoing, contemplative, pleasure-seeking, organized? Performance Mentor's expert system needs to know. In a similar fashion, you select terms describing your workplace; low-key, scholarly, friendly, bureaucratic.

Next, you answer about 40 multiple-choice questions about your management practices and procedures. Responding to the first three sections is a one-time affair and takes about 15 minutes. Your responses to these queries are analyzed by Performance Mentor and summarized in the "Management Style" and "Workplace Profile."

The brains behind PM consist of an expert system program based on interviews with hundreds of personnel management experts. All were queried on how to best handle a variety of people in management situations. The results were codified and entered into a knowledge base that the program taps.

Next, PM will ask for profiles of each of your employees. Once these are completed, you can avail yourself of the program's customized appraisal advice for each employee.

Once the profiling operations are complete, the bulk of your time will be spent using Performance Mentor as an advisor. It can help you establish well-formed objectives, communicate effectively with different types of people and keep a performance events calendar. Tips for better management are available from the hints menu. A signifi-

cant time savings could be realized with Performance Mentor, if you are managing a large number of people.

### DOES IT WORK?

Of course, the most important question is whether the program works. An independent research project conducted at Gunter Air Force Base in Montgomery, Alabama, showed some surprising results. Sixty supervisors were divided into two groups. One used Performance Mentor, the other did not. Fifteen managers in each group were experienced in giving feedback to employees, the remainder were not.

A defensive poor performer was created on

PM for the supervisors to evaluate. All supervisors were assessed on how they would rate this imaginary character. Due to the defensive nature of the subject, PM's expert system recommended staying away from judgmental remarks and focusing on specific examples of undesirable behavior. Managers were free to choose their own tactics, however.

The survey showed an improvement of 400 percent when managers used Performance Mentor. Inexperienced managers showed the greatest gains, presumably because they had no bad habits to break. Experienced managers without PM were likely to threaten a poor performer or make ultimatums, which might make them feel better but does

not improve the employee's performance.

The package comes with a tablet of forms that complement Performance Mentor's "Management by Objective" format. There are forms for scheduling performance events, as well as for performance planning, documentation and appraisal.

With PM, the engineer-turned-manager can face his or her new duties in personnel management with confidence.

For more information on the Performance Mentor, call Tom Buzzard at Performance Mentor Inc. (+1-415-969-4500), or circle Reader Service 22. ■

*Tom Vernon contributes regularly to TV Technology's sister publication, Radio World. He divides his time between consulting and completion of a Ph.D. He can be reached at +1-717-367-5595.*



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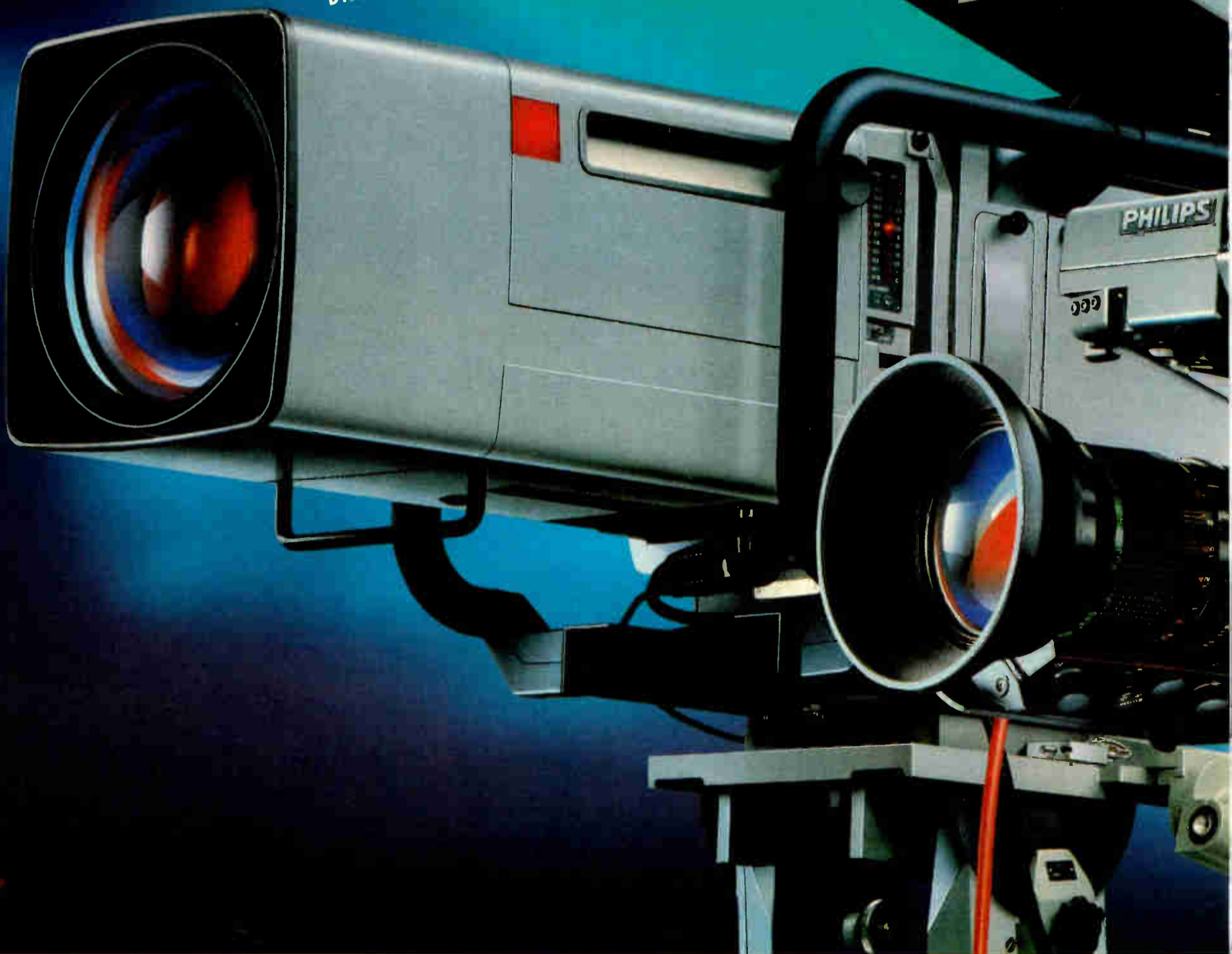


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*Creative Television Technology from BTS*

CONTINUED FROM PAGE 22

## Getting Creative with SoftImage

curiosity got the better of me during my initial interface explorations and I tried to "Get" a tree, I instead received serious looking error messages about missing databases.

SoftImage's kind and patient tech support department explained to me that I did not have access to the feature. I think it would be better to eliminate the selection by reconfiguring the menu cells on boot-up or at least prompt the user that a particular option is not available in the current configuration.

### GEOMETRY VS. SPLINE

The SoftImage Creative Environment distinguishes between geometry-based objects (consisting of the more traditional Face, Polygon Mesh, Patch and Spline objects), and density based objects. There is no shortage of 3-D primitives to build with, and there are plenty of 2-D and 3-D drafting functions, including four types of spline drawing tools offering Linear, Bezier, B-spline and Cardinal style interpolation between vertices, along with the standard extrusion and surface of revolution tools common to all 3-D modelers.

EFFECTS is a powerful set of modeling tools ranging from beveling and rounding of edges and corners to RANDOMIZE, which irregularly displaces an object's vertices. The SKIN command will set up a mesh or patch surface to cover a set of cross sectional splines.

Creative Environment does a good job of merging and cutting similar curves and

patches. The ZIPPER tool requires some practice but creates seamless joins between unlike objects. Lattice and deformation tools allow objects to be twisted, bent and reshaped interactively by vertice or automatically along spline paths or patch surfaces. As you might hope, many of these modeling operations can also be used for animation.

Density Based Objects are what have come to be known in the more common vernacular as Meta-Balls, although Meta-elements may be varied through ellipsoid, octohedron or cubic shapes and sphericals. Negative density elements can act as matter vacuums for static hollow spaces or animated as black holes.

First described by James Blinn as Bloppy

droplets of water or with magnetically charged molten metal as modeling material. As the solid cores of two distinct spherical blobs approach, their contours distort toward each other's fields of influence. When brought close enough to touch, the two meta-elements meld into an hourglass or other blobby shape. Groups of elements can be barred from fusing with other groups. Fusing multiple meta-elements into complex shapes and morphing between different systems of shapes is a challenging but stimulating new experience.

I found the controls for weight, core ratio and influence zone, which are used to define an object's shape and behavior, hidden in the

**At the core of the SoftImage program design philosophy is the belief that every aspect of a digital scene should be able to be animated**

Objects in his 1982 paper "A Generalization of Algebraic Surface Drawing," and refined into Meta-Balls by Nishimura, Hirai, Kawai, et. al., in their 1985 paper "Object Modeling by Distribution Function and a Method of Image Generation," the SoftImage MetaClay Density Based Objects are most useful for representing complex, smooth, organic surfaces such as the human form, liquids, squishy cellular structures and squirmy sea slugs.

Imagine sculpting in zero-gravity using

INFO menu cell. Interactive control of meta-element shapes and influences would probably be better served if located in a more logical place, such as a sub-menu in the MetaClay menu cell. It would also be nice to have a library of "primitives" or preset values for commonly used meta-element shapes.

Meta-Ball technology was one of this year's most exciting developments for workstation-class machines. However, PC users should not despair, you can get a taste of working with Bloppy Objects as long as you are willing to use the DOS command line, batch files and a little algebra.

The Motion module is where most of the animation work is done. Usually this involves setting, moving, adding and deleting keyframes. There are seemingly endless types of function curves whose shapes and slopes can be edited to fine tune the control of animated parameters. Besides keyframes and function curves, you can animate using Channels.

Channels recognizes up to 256 data streams from a variety of motion capture devices ranging from a simple mouse or microphone to bio feedback, face waldos or reflector tape camera-based systems. Over 120 animation parameters can be driven by the data coming in through Channels.

The possibilities with this type of system are endless. A relatively simple project would be to have the audio amplitude from a live, on-stage performer mic drive the lip motion of an animated character projected on a big screen TV at a concert venue. Or perhaps full-length feature films or a weekly network TV series would have an actor/dancer wearing a full body Waldo suit driving the software while you save the data from the best take and render the performance. If this sounds like idle cyberspace pipedreams, then wake up sleepyheads because it is all being done right now.

The ability to animate via motion capture was another of last year's custom coded secrets that became this year's hot technology. As far as I can tell, the SoftImage Creative Environment delivered it first and implements it best. Not every user can afford a full motion capture staging setup, but it would be amazing to be able to purchase a database of walk cycles from a specialized service bureau. That way, you could buy a Triceratops dinosaur model from supplier "A," a rhinoceros walk cycle from supplier "B," and get animated.

We have already talked about the WAVE effect, but there is also a FLOCK ANIMA-

TION tool in the Motion module Effects menu cell. Flock is an unfortunate misnomer, because I think Flock invokes images of Craig Reynolds's behavioral animation work at Symbolics.

He pioneered algorithms for schooling, flocking and herding rules as described in his 1987 SIGGRAPH paper. The SoftImage Creative Environment Flock Animation is actually a Particle Systems feature. Particle Systems is very useful for creating realistic looking rain, snow, fireworks, waterfalls, spurting, sprinkling and exploding effects.

SHAPE animation allows you to interpolate between two objects that share the same number of points, which is usually referred to as 3-D Metamorphosis, or 3-D Morphing in the trade. The easiest way to set this up is to perform surface of revolutions on the same spline that is deformed through several steps. This yields several objects of differing shapes yet with equal numbers of points to morph between.

### POWER TOOLS

The Actor module contains some of the most powerful animation tools in the Creative Environment. The SKELETON menu cell provides the tools required to draw, move and constrain articulated chains for inverse kinematic animation.

With the commands available in the SKIN menu cell, Chains can be automatically surfaced with an envelope or manually assigned to the innards of a model. Think of this as constructing a simple ball and socket armature, around which a realistic sculpture is built as in stop-motion clay figure animation.

There are tools for adjusting the fit of the skin over the skeleton by altering vertice assignment, and controls for the way the skin reacts with stretching and deformation to bending joints. It is even possible to oil the joints of your animated Tinman by adjusting the friction associated with movement in x, y or z directions.

Articulated chains can be animated using traditional keyframes or by applying Dynamics, which are simulations of how the mass of the animated object would behave under the influence of natural physical forces, such as wind and gravity. The most lifelike effects are achieved when both methods are combined.

The Collisions menu cell allows certain objects to be defined as obstacles. When the bounding boxes of participating objects in the animation come into contact with an obstacle object, the participants (whose physical properties of mass, density, elasticity and roughness can be defined) will obey the physical dynamics that have been set up. The result is the objects are deflected, bounced or forced to react in some other way to the collision.

Once this system has been created, you start the simulation and just let things happen, kind of a *cinema verite* for computer animators. You could build an obstacle staircase and drop a participating ball, or set up a rotating fan to blow against a model of hanging chimes containing articulated chains. The resulting animation is "found footage"; you did not keyframe it but filmed what actually happened in your little virtual world. ■

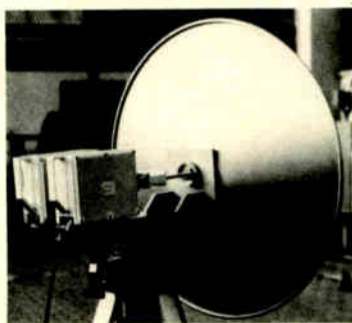
*Bruce Goren is owner/ animator of Cheap Computer Graphics in Val Verde, Calif. He is also a television engineer at KLCS-TV in Los Angeles. Contact him via e-mail on CompuServe at 71470,2767.*

*The opinions expressed above are the author's alone. For more information on the Creative Environment, contact Mike Gero at SoftImage (telephone: +1-514-845-1636; FAX: +1-514-845-5676), or circle Reader Service 112.*

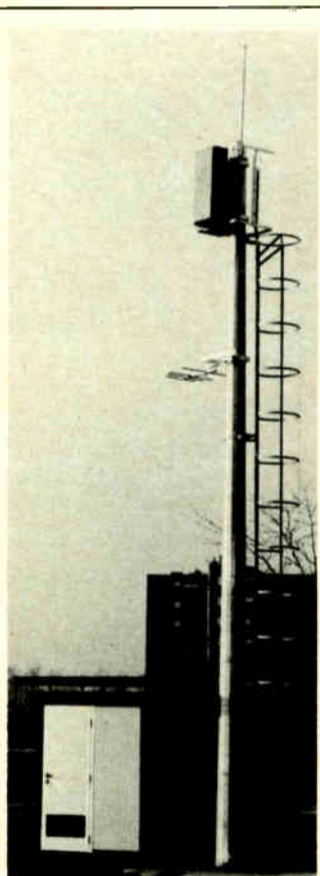


## EXPERIENCE and RELIABILITY for

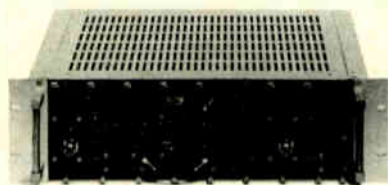
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# How to Keep Gear from Straying

by John Premack

## FOCUS ON VIDEOGRAPHY

One of the immutable laws of field production is that if you pack it, it will stray. It does not matter if you travel your city shooting weddings on weekends or circle the globe on assignment for a network; sooner or later, every videographer who ventures forth from the studio returns home with less equipment than he or she left with.

There are two basic ways to unintentionally lighten your load when you are on the road. You can either do it yourself, such as by forgetting to return a lighting instrument to your kit, dropping a coiled cable in a dark corner or slamming the trunk shut before you notice that your tripod is no longer occupying the space next to the spare tire, or you can have someone do it for you by turning your back at the wrong moment, parking your car in the wrong place or even staying at the wrong hotel.

### TRUSTING LUCK

If you are lucky, you will only leave a mic cable behind in Bombay or misplace a tape cassette in Metropolis, rather than have a camera stolen in Syracuse. And if you are really lucky, you will receive a call like I did one evening...from a police detective in another state inquiring if my station was missing a camera. Of course this kind of luck does not just happen unless you have already taken steps to prevent your gear from straying and to increase the odds that stolen or misplaced equipment can find its way home.

The first thing you should do is label every piece of equipment — every battery, bulb and cable — with sturdy, sticky metal foil labels. The New York City Police Department's Midtown South patrol officers who discovered our brand new Sony 400 Betacam in the trunk of a suspicious car did not have to do a lot of detective work before they discovered a shiny label under the camera's shoulder pad with the station call letters, toll-free phone number and the promise of a "Reward for Return." I do not know what happened to the bad guys, but it sure was nice to be reunited with a \$40,000 camera that had been swiped from the curb at Washington's National Airport the week before.

So rule number one is: Mark everything, inside and out. Put labels under the covers as well as in plain view. In addition, use an electric engraving pen or indelible ink and a stencil to tattoo identifying numbers into the skin of your most valuable equipment. Thieves may take a pass on equipment that could be hard to dispose of. Honest strangers, who can easily determine that your station belongs to an apparently abandoned tripod, can usually be counted on to at least make a phone call.

Of course, thieves are not the only cul-

prits when equipment turns up missing. A lot of equipment, particularly small items like mics, lights and cables, disappears because of our own negligence; we simply forget to pack it back up at the end of a shoot. That is why rule number two is: Develop a checklist, either mental or written, and remember to run through it as you dash from location to location.

I once left a carbon-fibre mic boom in a function room at a hotel in a small town in rural Iowa during the U.S. presidential election. Many hours and several hundred miles later I realized what I had done. Several frantic phone calls and a thorough search by the hotel manager failed to turn up my missing pole. Back in Boston a week later, having already confessed my mistake to my superiors and ordered a replacement, I was stunned to receive a phone call from a C-Span crew that had found the pole, read the label and, knowing they would eventually be in Massachusetts, packed it with their gear until they could return it in person.

Once again, a small investment in little labels paid big dividends.

### JUST REWARD

Our "Reward for Return" labels have also generated calls from police departments about tripods sitting in vacant lots, a news-maker concerned about mics found under an office couch (ouch!), citizens who have found mobile communicators in their yards and even from a few bars and restaurants where we have never shot a story.

Rule number three is: Never take your eyes off your camera. Our EFP videographer who set his brand-new Betacam down while he went to grab a couple of cases only had his back turned for a few seconds. Another local shooter, who left her camera outside a Boston Garden locker room while she stuck her head in the arena door to check the score, had a pretty tough time shooting post-game interviews; she returned to find her camera gone.

Rule number four is violated at almost

every station I have ever visited: Never leave your car with equipment in plain view. A camera under glass is an invitation some thieves cannot resist, even on their day off. Black out the windows of those trunkless wagons, vans and hatchbacks that are so popular. Install an anti-theft enclosure to seal off the cargo area from the rest of the vehicle. Your station carpenter can build one out of one-inch plywood or you can go to a company that builds metal cages that keep prisoners secure in police vans and engage them to encage your equipment.

In some areas thieves have even begun targeting television stations. An article in the November issue of News Photographer magazine details as many as eight cameras stolen recently from news vehicles in sta-

... sooner or later, every videographer who ventures forth from the studio returns home with less equipment than he or she left with.

tion parking lots in the northwestern U.S. And while it is almost impossible to thwart a determined professional thief, there are several ways to make the job so difficult that he might look elsewhere.

Boost the security of a locked trunk by disabling the push-button in the glove compartment and replacing it with a hidden switch. Make the trunk lock "punchproof" by having a locksmith bolt a reinforcing plate to the keyhole. Weld two short lengths of chain to the inside of the trunk lid and cargo floor. Padlocked together, they will keep the lid from being opened more than a few inches.

### ALARM YOURSELF

If you must leave equipment in a vehicle, invest in a good alarm, one that sets itself whenever you exit the vehicle and can only be turned off by a keychain transmitter. Do not park in public garages and ramps or on the street in "bad" neighborhoods — or even in good neighborhoods — unless they are well patrolled by private security police.

You should also install a hidden ignition kill-switch. More than one thief has simply driven off with everything a videographer owns and stripped the car of its contents at his leisure.

### ON THE ROAD

Traveling videographers need to take extra precautions when they are abroad. Prepare for that next trip by covering up the station logo on your cases and stripping them of the assortment of baggage tag stubs that chronicle your past travels. Well-traveled luggage might impress your fellow travelers while you are checking in or claiming your bags, but they also announce to thieves that here are some cases worth stealing.

Do not leave home without a three-foot length of really heavy chain and a rugged padlock, especially if you are headed overseas. Cameras whose handles are chained to spare tires or hotel-room plumbing are more likely to be there when you get back from dinner than those that can be carried off under the arm of anyone with a key to your room. When you are out of town, never leave equipment in your car. Take your camera to lunch, to dinner, to the movies, even the washroom. And do not leave anything in your rental car in a hotel parking lot overnight, ever!

Unfortunately the only time many stations notice the need for these efforts is after something expensive has disappeared. While these precautions may sound ominous, it is actually fairly easy to make them part of a station-wide standard operating procedure. A few lucky persons will continue to leave the keys on the visor, the camera on the seat, and never lose so much as a pack of gum. To some degree it is a matter of luck. But if you want to stay lucky, you will need to do more than keep your fingers crossed. ■

John Premack has been chief cameraman at Boston's WCVB-TV in the U.S. for 17 years. He may be reached at +1-617-433-4199.

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Scientific-Atlanta's 7550B/7555B satellite video exciter has a new feature called sound-in-sync. This capability allows a high-quality digital signal to be included in the video sync pulse, which allows data, high-quality audio or even multiplex stereo to be transmitted.

For more information, contact Paul McKeon in the U.S. +1-404-698-8650; FAX: +1-404-698-8651, or circle Reader Service 50.

## VIDEO DEMODULATOR

Videotek has announced the DM-154 high performance video demodulator designed for use in broadcast, cable TV and closed-circuit applications.

The unit has RS-232 remote control capabilities, a Zero Carrier Chopper, quadrature output for ICPM measurements, synchronous detection, MTS stereo/SAP decoder outputs, 4.5 MHz aural output and the technical specifications necessary to do FCC baseband video cable testing.

For more information, contact Don Taylor in the U.S. at +1-215-327-2292; FAX: +1-215-327-9295, or circle Reader Service 133.

## TAPE DEGAUSSER

Verity Systems has added the V870 to its line of erasers for S-VHS video cassettes. The V870 has a belt conveyer that enables operators to quickly handle large batches of VHS and S-VHS cassettes to be erased.

Also, the V870 incorporates a forced air cooling system, which enables the machine to erase over 2,000 cassettes per hour.

The V870 is capable of erasing other magnetic media as well, making this degausser attractive to professional duplicators of video and software programs alike.

For more details, contact David Tucker in the U.K. at +44-252-317000; FAX: +44-252-316555, or circle Reader Service 67.

## S-VHS CAMCORDER

JVC's GY-X2E camcorder records a picture with visual reality close to what the eye perceives, and beyond what the eye perceives in low-light situations.

Three half-inch Interline Transfer "lens on chip" CCDs provide a resolution of 650 lines from the camera with over 400 lines recorded to three-hour professional S-VHS cassettes.

The Lolux mode records events in such low light that it can be difficult to see without looking through the viewfinder. The

Variable Scan function makes sure you record what your eyes see on a computer screen by precisely matching the display scanning rate.

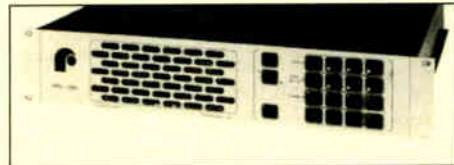
For more information, contact David Gifford in Tokyo at +81-426-60-7560; FAX: +81-426-60-7569, or circle Reader Service 103.

## DIGITAL SYNCHRONIZER

Fougerolle Video's MPV 100 synchronizes digital video at 270 Mbps serial or 27 MHz 8-bit parallel rates.

The unit features front-panel output phase adjustment, input genlock from F, V, H 4:2:2 flags, and two-field storage.

For more information, contact the company in France at +33-1-34-4100; FAX: +33-1-39-59-5131, or circle Reader Service 11.



## TELEPROMPTING SYSTEM

Designed for all Apple Macintosh systems, including desktop, PowerBook and PowerBook Duo computers, Questar's AccuPrompt is a comprehensive system for creating scripts, arranging them in run order and scrolling them for live teleprompting.

With AccuPrompt, scripts can be viewed on a stand-alone Macintosh or any NTSC monitor to provide a complete, state-of-the-art teleprompting solution for commercial production, corporate theater or television news production.

For further information, contact Mitchell Baker in the U.S. at +1-404-956-0700; FAX: +1-404-956-8781, or circle Reader Service 23.

## GRAPHICS SYSTEM

Broadcast Television Systems has introduced Video Gallery, a broadcast-quality television graphics system for professional video artists.

Mounted on a Macintosh Quadra platform, the system is preconfigured and pretested by BTS. Standard features include professional quality 3-D animation, modeling, painting and image retouching, digital layering, character generation and high-speed rendering.

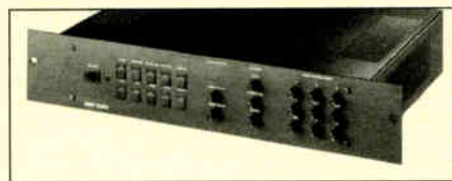
Adobe Photoshop 2.5 and Fractal Design Painter 2.0 are standard software packages

with every Video Gallery.

For further information, contact Skip Ferderber in the U.S. at +1-805-584-4757; FAX: +1-805-584-4750, or circle Reader Service 91.

## MULTI-FUNCTION KEYS

The MS-P 3000 by Satellite and Television SA is a multi-format broadcast keyer in 19-inch rack format. It is especially dedicated to broadcast and professional post production in PAL, Y-C, RGB and YUV standards.



The MS-P 3000 is compatible with all Amiga computers operating in 625-line video interlaced systems.

For more details, contact the company in France at +33-31-67-12-62; FAX: +33-31-68-96-97, or circle Reader Service 87.

## PRODUCTION CONSOLE

The Solitaire by Soundtracs is a 24 buss in-line production console, available with the latest Soundtracs ADP dynamics package providing gates, compression, limiting, expansion, modulation and autopanning.



With dual live inputs on each channel the Solitaire provides 88 comprehensive inputs on mix down.

For further information, contact Sally Haseman in the U.K. at +44-81-399-3392; FAX: +44-81-399-6821, or circle Reader Service 61.

## AUDIO LEVEL METER

Chromatek has added the TVD-35 four-channel unit to its range of in-picture audio level meters.

Like the other Chromatek meters, the TVD-35 is designed for use in broadcast television and video production where both

picture and sound need to be monitored simultaneously.

All units provide a visual display of audio levels in bargraph form, eliminating the need for separate VU or peak program meters.



For more information, contact Michael Stevens & Partners in the U.K. at +44-81-460-7299; FAX: +44-81-460-0499, or circle Reader Service 110.

## DECODIFICADOR DE AMPO

El decodificador de abonado de AMPO modelo SCR-930 D tiene incorporado el sintonizador de TV para los canales de VHF 2 al 13, de cable del 14 al 83. La señal de video, una vez decodificada ingresa al televisor en los canales 3 o 4 de VHF. Ante la posibilidad de eventuales cortes de energía, posee una batería interna que le permite retener la información del código de abonado habilitado, no requiriendo asistencia técnica posterior.

Especificaciones técnicas del SCR 930 D incluyen: rango dinámico de entrada de -6 a +20 dBmV; figura de ruido de 10 dB típico a 12 dB máximo; impedancia de entrada de 75 ohms; impedancia de salida de 75 ohms; relación señal/ruido de video de 45 dB, y una ganancia diferencial de 15 por ciento máximo.

Para más información, comuníquese con la compañía en Argentina al +54-1-290-1031; FAX: +54-1-296-4034, o marque el 49 del Reader Service.

## LA SERIE 1302 DE LEITCH

El SPG-1302 y TSG-1302 son la última adición a la amplia gama de generadores de sincronismo y señales de prueba de Leitch.



El generador de impulsos de sincronismo de NTSC/D2 SPG-1302N es muy compacto y modular y ha sido diseñado para operar como maestro o esclavo. Cuando opera como unidad maestra, provee una amplia gama de señales de referencia de gran exactitud, generadas digitalmente. El generador de señales de prueba de NTSC/D2 TSG-1302N provee una amplia gama de señales de prueba en grupos que cubren la mayoría de las normativas para 525 líneas tales como NTSC, RGB, YIQ, B-MAC, MII, D2, etc.

Ambas unidades disponen de versiones económicas para NTSC analógico y D2 que cubren la mayoría de los requisitos.

Para más información, comuníquese con Fernando Paulino en Canada al +416-445-9640; FAX: +416-445-0595; o marque el 39 del Reader Service.

Send new product press releases along with black and white photographs to: Marketplace Editor, P.O. Box 1214, Falls Church, VA 22041

USER REPORT

# Wharf Cable Relies on Magni

by James Snelling  
Director of Engineering  
Wharf Cable

**HONG KONG**

Last October, Wharf Cable began its operation serving Hong Kong as the sole provider of cable services.

The Wharf Cable system is unique in many ways, not the least of which is the supply of internally produced and/or packaged programming. Of the eight channels that we signed on with, six are locally produced, including a 24-hour News Channel.

In the next several months, three more produced channels will be introduced. The reasoning for the high local content is quite simple: Wharf made a commitment to provide a cable system of and for Hong Kong.

Most challenging was our design and construction schedule. Nine months from the design phase, the system was to be on the air with eight channels.

**DESIGN CHALLENGES**

Two decisions were made at the outset of the design. First, multiplexed serial digital would be the signal format employed throughout all facilities, with the exception of voice-overs, subtitles and edit suites. Secondly, a high degree of automation would be required.

The Sony Flexicart, which we chose as a playout device, had just become available, but no supplier had as yet developed the automation interface. However, Vistek expressed a willingness to work with us, and we have been working closely with them to develop an automation system to control tape transfers, library management, tape traffic, compilation, playlisting and playout.

All our systems use a common Windows interface running on standard PCs. This provides us with great flexibility to monitor multiple channels or sources from one location.

Although the automation system is still under development, certain modules have been implemented for testing. So far, it is the only system that enables us to develop presentation suites each controlling four channels of output managed by a single transmission officer.

Based on my experience, I was certain that multiplexed serial digital (MSD) was the most logical format for the plant. Not only would it ease our installation schedules and costs, it would also provide us with the highest possible signal quality and a basis to grow into the foreseeable future.

**MISSING LINKS**

Of course, there were obvious problems to be solved, not the least of which was the missing link multiplexers and demultiplexers. Working with Tekniche, we reached a solution for this problem, but we still wished to carry MSD right through to the presentation suites. Because no MSD master control switching systems existed, we chose a Utah-Scientific MC-601 master control system working with a transparent

Graham-Patten 800 audio system.

The results were not immediately successful, as we tried to work through the many control issues associated with the new products. But after a lot of learning and a lot of support from the companies, we achieved the goal of an MSD facility.

To enhance our "local" philosophy, we developed "fiber phone booths." These systems offer a convenient way for our field crews to send video or provide live

megabits per second (Mbps). These systems will be shortly outfitted with multiplexers to reduce fiber usage and permit higher quality transmissions.

We also have three district centers, consisting of digital audio and video remote production and broadcast systems for 270 Mbps communication to and from the main plant. These facilities use data links to share central facilities, such as Leitch still store images, character generator files and intercom and routing systems.

With the implementation of these new systems and technologies, we needed to establish a base strategy using existing technology. This applied to intercom, routing and monitoring systems.

**MONITOR SELECTION**

In the area of monitoring, we selected the Magni waveform/vector displays, specifically the WV-561. Since its introduction, the WV-561 seemed to me to be a product defined with an excellent understanding of the broadcaster's needs.

Although the plant is digital, the monitoring is typically at the analog component or composite level. As well, there is considerable NTSC in the plant due to the receipt of foreign satellite signals and programming, which must be converted.

All of these considerations are satisfied by the 561. The result of our choice has been nine months of operation without a

(continued on page 30)



Hong Kong's Wharf Cable relies on Magni's WV-561

hook-ups from throughout Hong Kong. The booths consist of a bulk-head enclosed in a weather-proof housing, which allows the field cameraman to plug and play over fiber links configured for up to 270

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U S E R R E P O R T

# Hamlet Keeps On-Video in Form

by Ron Dillard  
Field Engineer  
On-Video Productions

DALLAS, Texas

Most of us in the video industry know the importance of analyzing and monitoring video levels during video production. Doing so helps guard against a multitude of potential problems, such as hot spots, loss of picture detail and blurred images resulting from too much white or black in a picture or over-saturation.

Relying on the camera's auto iris is a common practice among video producers. But unfortunately, no matter how much of an expert you are, it is not always accurate. The only fool proof way of determining the accuracy of video levels is to use a waveform/vectorscope.

## THE SOLUTION

We incorporate waveform/vectorscopes into our editing suites for this very reason. However, in the field, if you are like me, you do not waste the effort and (shipping) cost of lugging a set of scopes to remote locations. It is not practical.

However, Hamlet changed all that with its Hamlet Micro Scope. This portable, battery-operated waveform/vectorscope fits perfectly in my travel editing pack. Not only has it become a part of my production packet, but it is an indispensable part of my operation.

Like all Hamlet units, the Micro Scope displays waveform/vector signals on any standard NTSC monitor, LCD or camera view finder. Because it does not have built-in CRTs, I can carry it with ease, display it on my field monitor, and complete all my video shoots with confidence. I know I am within specs and do not have to worry about the picture being

blown out or underexposed.

With an on-site waveform/vectorscope, you know your signal is good because you can see it and analyze it. I use the Micro Scope mostly to adjust the camera iris, as a sort of a light meter. But the unit is also ideal for multiple camera shoots to genlock the cameras for adjusting subcarriers or within mobile editing suites to ensure that the video levels are fine during both editing and transmission.

The Micro Scope is not only beneficial to the video producer, but also to the art director. Even if you feel confident not using a waveform/vectorscope out in the field, it

allow users to route the signals to multiple monitors of any size. This is an unquestionable advantage over conventional scopes.

## TRAINING ROUTE

The Hamlet units are great for training. I use them to show unqualified people how to use waveform/vectorscopes by routing the signals to a large screen for review. Our main monitor in the Beta suite is 35 inches, and it displays the test signals easily. Conventional scopes are limited, relying on five- or six-inch screens, which are more difficult to read.

With the Hamlet units, signals

tor is on the other side of the room.

If we were using conventional scopes, two waveform/vectorscopes would be necessary — one near the film chain and the other near the operator. If we had this scenario and only one set of scopes, we would have to place the scopes across the room from the film chain near the operator, resulting in signal inaccuracy and distortion (with the amount depending on the cable length).

With the Hamlet units, the operator can adjust the film chain from his location without any inaccuracy. The Hamlet unit is set up near the film chain, but is displayed on a monitor near the operator.

Hamlet offers a complete line of waveform/vectorscopes in standalone, portable, and board-level models that are ideal for training applications, multiple or single camera production shoots, and for routing signals throughout the facility and showing clients trouble spots on shoot.

Most Hamlet units offer the display modes of conventional units, including horizontal line display (H, 2H) and vertical field rate display (2V), as well as expanded versions of the horizontal and vertical waveforms (H Mag and V Mag).

In addition, Hamlet offers filters to display portions of the waveform (luminance, chrominance or both) and phase information, including SC/H phase monitoring. And they are easy to calibrate, unlike conventional scopes which require substantial time or even factory return for calibration.

Other conveniences are dual-standard capabilities on the standalone units, allowing users to switch between NTSC and PAL video formats. The portable Micro Scope and the board-level PC Scope offer one format or the other — users must specify upon

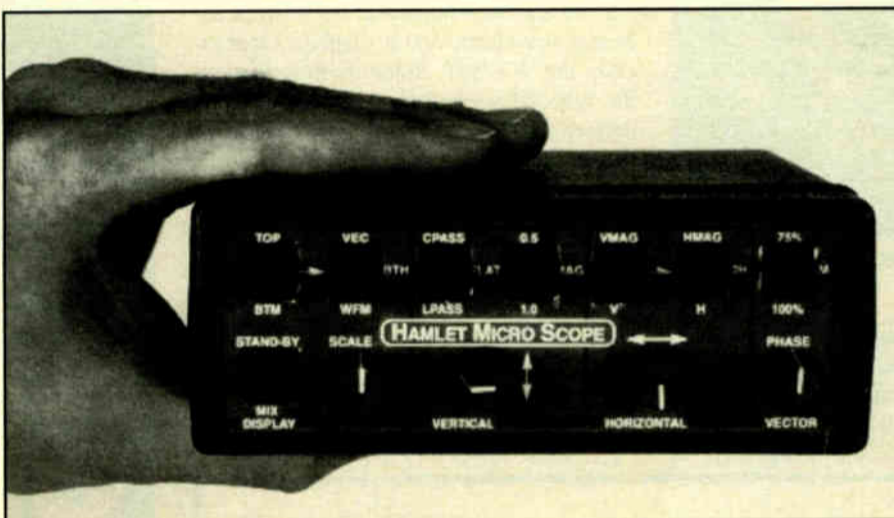
is a good idea to bring the Hamlet Micro Scope along for your client's sake. It may be your only opportunity to silence an annoying art director. After all, that person cannot argue with equipment.

Now that I have a Hamlet Micro Scope, I do not go out in the field without it. And in the studio, I do not even need to go near a conventional scope anymore. The Hamlet units are fully operational test measurement devices, offering all the display modes, filter and phase information that conventional scopes offer, but at a fraction of the size and cost.

Most importantly, the Hamlet units

may be routed to large monitors, multiple monitors or monitors located in remote areas. To ensure signal accuracy, a waveform/vectorscope must be located near the source being measured, and with conventional scopes, the same holds true for the signal display. But not with the Hamlet units. The length of the cable does not distort the measurement accuracy.

One example of a convenient situation for routing the signal is when converting film to videotape. We run 16mm film to a one-inch recorder. Because we need to measure the film chain, we need scopes set up near it. However, our opera-



The Hamlet Micro Scope

ordering. External reference is standard on the standalone and board-level units and an inexpensive option on the portable Micro Scope. Also optional is an audio/stereo phase display so users can get an idea of sound level.

If you ask me, the Hamlet units (and units that operate similarly) are the wave of the future. I do not envision conventional scopes being around in the next five years. The Hamlet units are much easier to calibrate, more accurate, and 10 times easier to use. ■

*Editor's note: Ron Dillard is a field engineer for On-Video Productions, a video production facility with full mobile capabilities servicing the corporate, industrial, broadcast, and educational markets.*

*The opinions expressed above are the author's alone. For further information, contact Steve Nunney at Hamlet Video (telephone: +44-494-775-850; FAX: +44-494-791-283), or circle Reader Service 16.*

CONTINUED FROM

PAGE 29

## Wharf Cable Relies on The Magni WV-561

single failure of any of the more than 100 systems in our facility.

In the edit suites, we use a combination of YUV/composite and serial digital signals. In these instances, the Magni WV-561 is the ideal device permitting us to monitor both signal types simultaneously.

In master control, which acts as the hub for line feeds, we often encounter multiple formats from satellite and other sources. In these cases, the NTSC/PAL functionality of the systems provide an ideal and cost-effective manner for monitoring signals in different standards.

This functionality combined with the high reliability and excellent support has made it our monitor of choice. In the past, Magni has always been responsive to my requirements whether for support or new product applications. This is the type of relationship that ensures success. ■

*Editor's note: Before arriving at Wharf Cable, James Snelling held engineering titles at Hong Kong's Star TV and the Canadian Broadcast Corp. He also serves as a consultant to such organizations as MTV and World TV, and is a member of the SMPTE, SBE, IEEE and SIGGRAPH.*

*The opinions expressed above are the author's alone. For further information on the WV-561, contact Ed Kiyoi at Magni (telephone: +1-503-626-8400; FAX: +1-503-626-6225), or circle Reader Service 13.*

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USER REPORT

# Mersey Puts S&W to the Test

by **Graham Deaves**  
**Technical Director**  
**Mersey Television**

**LIVERPOOL, U.K.**

Mersey Television uses Snell & Wilcox's revolutionary new test pattern generator, the TPG20, as a permanent signal tester for Sony Digital Betacam machines.

The company, which is in its 11th year of making the popular television show "Brookside" for Channel 4, first used the TPG20 last summer to try to break the bit rate reduction of the Digital Betacam. It was part of the test we conducted on the

format before committing to it. We now have 10 Digital Betacam VTRs for mastering the show.

The TPG20 is the best test generator around. It is a very versatile device, providing access to all formats: PAL, NTSC, D-1, D-2, D-3, D-5, DCT and Digital Betacam.

When we tested the format, we tried to crack the bit rate reduction with a test made partly from the Snell & Wilcox test pattern genera-

tor, using the moving zone plate. But we failed. We went to about seven generations on the test pattern.

**The TPG20 is the best test generator around.**

Besides the moving zone plate test card, the TPG20 can create virtually any test pattern likely to be needed. Special patterns, including frame-grab-

bing images, can be added or downloaded at will, while more than 450 resident signals are already installed in the unit.

The secret to the TPG20's superior quality

is in its digital make-up. All patterns, whether composite or component, are generated digitally and, by generating the pictures directly rather than encoding them in the conventional way, the TPG20's specification exceeds the requirements of CCIR-601 for testing digital equipment.

Output from the system is in component and composite form for both digital and analog use. ■

*Editor's note: As technical director of Mersey Television, Graham Deaves is responsible for the facility's equipment and engineering systems.*

*The opinions expressed above are the author's alone. For further information on the TPG20, contact Snell & Wilcox (telephone: +44-81-332-6202; FAX: +44-81-948-5040), or circle Reader Service 63.*

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USER REPORT

# WFAA Chooses Audio Precision

by David Johnson  
Maintenance Engineer  
WFAA-TV

DALLAS, Texas

Recent audience measurements in our area placed WFAA-TV's newscast as a top-rated program. A first-class installation is just one of the tools used to get to the top, as we always seek the leading edge of technology in each purchase.

Updating our audio test equipment for both analog and digital segments required flexible hardware and software to handle current requirements, while not limiting our ability to maintain new products in the future.

The System One by Audio Precision of Beaverton, Oregon, is a natural choice. It is a PC-based system, which means any software changes or updates are easily installed. The hardware is modular, allowing users to pay only for specific applications, and storage of tests and parameters is virtually unlimited.

We purchased the SYS 322 dual domain, dual channel unit, which provides both analog and digital testing capabilities.

With the price of PCs coming down, we purchased a low profile 486/66 and the PCI card that plugs into the computer for interface with the System One unit. There are also several other ways to tie into the System One, such as Serial or GPIB.

MULTIPLE USES

The System One is used to test and maintain analog and digital VTRs, audio control rooms, the audio processing chain to the transmitter and even our SNG truck. We now have many VTRs with AES EBU audio, and I plan to use the System One to test the performance of the analog-to-digital and digital-to-analog converters. In the process, I am learning about the different sample and bit rates used in digital audio equipment. I installed the System One and computer on a roll-around cart, making it easy to work on location.

With two units, it is also possible to link via modem for remote testing. If your budget is limited like mine, consider a portable DAT player to record, then generate test signals at the remote location. I am also looking into having a CD recorded with test signals.

Because digital audio is new, it is also one of the least documented features with the System One. When testing AES EBU audio on a digital VTR, the digital audio is locked to the video, not to the System One. The System One has a sync input, but at present I still have not been able to lock the two together.

The VTR will still record the audio, but it will not show a lock with the test audio. As System One will not extract audio from the serial digital bit stream of a digital VTR, the company suggested a third-party manufacturer.

Audio Precision has been very helpful in answering any of our questions. A local factory representative came by to check my progress with the unit and to show me some short cuts for testing. Audio Precision also provided me with a handbook for audio testing, which is full of good tips.

Our unit was shipped with two VHS instructional tapes to quickly get us started. The software came with a multitude of tests already configured for typical applications, like two-or three-head tape machines, multitrack, DAT and many others.

Once the test is loaded, it is easy to go into

a panel and modify levels, filters or loads to match the Device Under Test (DUT). The test parameters and results may be stored together on hard disk, making it easy to later call up a test on a device and compare past and present performance.

TEST RESULTS

Once a test has been run, the data is saved and the test parameters can be changed and regraphed without having to rerun the test. Test results may also be overlaid with the previous test for comparison. The System One will output to any standard printer

device, including plotters. I am currently plotting HPGL format to disk and printing graphs on my laser printer using a plot.exe program supplied by Audio Precision.

FASTTEST and FASTTRIG are two other powerful tools of the System One. A multi-tone signal of less than one second in duration can derive audio test results when time is of the essence. In the FASTTRIG mode, the System One will continuously monitor program material, ignore voice and music, and recognize the multi-tone pulse.

From the multi-tone signal, we can extract frequency and phase response, distortion and

noise versus frequency, and channel separation (crosstalk) versus frequency. The tone can be generated in our SNG truck and played back on a portable DAT machine, then analyzed at the downlink site with the System One.

We may also try to insert the tone into our program material or between spots to perform quality control checks while on air. At present, we are not sure what effect the audio processing equipment will have on the multi-tone signal. ■

*Editor's note: David Johnson has been a maintenance engineer in the television industry for 17 years.*

*The opinions expressed above are the author's alone. For further information, contact Tom Mintner at Audio Precision (telephone: +1-503-627-0832; FAX: +1-503-641-8906), or circle Reader Service 43.*

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33 BUYERS GUIDE

U S E R R E P O R T

**Tek Gives Yorkshire TV an Edge**

by Francis Watson  
Systems Manager  
Yorkshire Tyne-Tees Television

**YORKSHIRE, U.K.**

Yorkshire Tyne-Tees Television was formed in 1992 when the two companies holding adjacent ITV (Independent Television, Channel 3) franchises in the north of England merged.

One of the strengths of the ITV network is its regional programming reinforced by local advertising. So when the company decided to consolidate its transmissions into

one center in Leeds, it was essential that the regional identity be maintained. For this, five separate transmitter feeds are required.

An early decision in the project was for D-3 as the preferred VTR format. While this resulted in undertaking the unusual step of designing a digital composite system, rather than the more familiar digital component, it also meant that all programs and commercials could be played out from a single, smaller area providing regional coverage for each of the five areas.

Within the transmission center design, Tektronix products were chosen for all

monitoring and test applications. This decision was made following many years of experience, satisfactory operation and reliability with Tektronix.

For basic system confidence monitoring, Tektronix' 1731D digital component waveform monitors are used, the output of the integral DAC being used to feed the adjacent 1731 SCH vector monitors. Control of SCH is extremely important in D-3 VTRs since sudden changes can cause recording problems. The range of monitoring facilities which this product combination offers allows simple monitoring as well as rapid

diagnosis of both digital format problems and SCH errors.

Remote sources and final outputs of the system are, of course, still analog PAL, for which Tektronix' 1781R PAL video measurement set fulfills its traditional role in the master control area for fast, accurate quality control. For secondary monitoring, made more com-

**Tektronix products were chosen for all monitoring and test applications.**

plex due to the multichannel requirements of regional playouts, Tektronix' 1751A PAL waveform/vector/SCH monitor was chosen. This decision was made not only for the unit's integral SCH capability, but because its eight signal input channels eliminated the need for an additional routing switcher.

In addition to the center's playout role, it is also used to record commercials, promotions and program feeds from outside sources. In order to ensure stable SCH on all sources, it was decided to reinsert syncs and burst on all incoming signals, and for this we use five Tektronix VS211A PAL synchronizers suitably configured for the job.

Since the VS211A's internal architecture is digital by design, a digital output is provided as standard, and it is this output which is fed to the routing switcher for onward use. The VS211A's eight-field, 10-bit design guarantees almost total transparency, enhanced still further in this configuration by only one stage of A-to-D conversion. Matching audio signals are routed via Tektronix 118AS audio synchronizers which, connected to the VS211As, automatically track the video synchronization delay and maintain lip-sync.

According to Francis Weston, engineering manager at Yorkshire Tyne-Tees, Tektronix products were chosen because: "We have used Tek television products for many years and they have always given long, reliable service. The operators like the fact that the user interface is very similar across the range of products, an important factor in live program situations. As reliability in a critical part of the program path was of vital importance, Tek's VS211A underwent stringent testing and was proven to provide reliable, transparent synchronization as well as solving some digital system issues at a reasonable price." ■

*Editor's note: Francis Watson has been with Yorkshire Tyne-Tees Television since it was founded.*

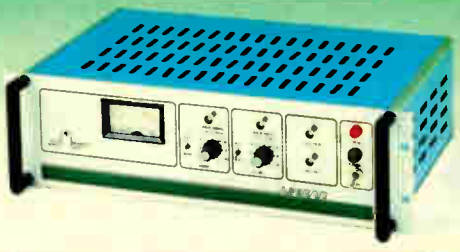
*The opinions expressed above are the author's alone. For further information, contact Tektronix at telephone: +1-503-627-1415; FAX: +1-503-627-5801, or circle Reader Service 52.*

**LINEAR**

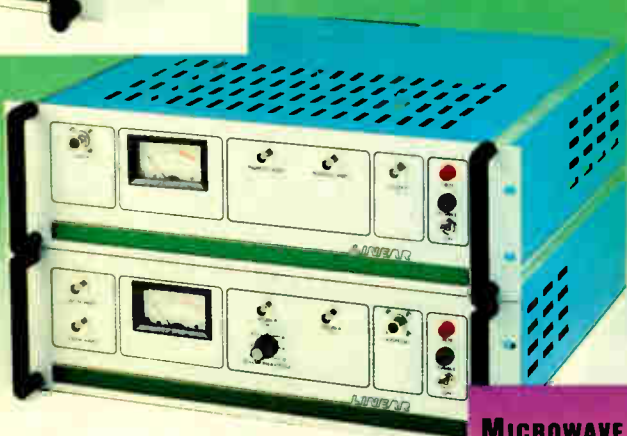
**TV REPEATER RPT-T**



**TV MODULATOR MD-AM**



**TV AMPLIFIER 100 W AMV**

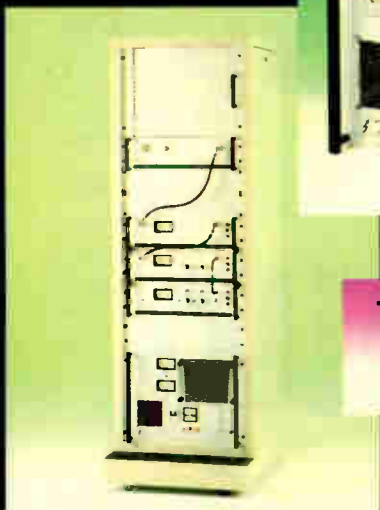


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Circle 81 On Reader Service Card

**BUYERS BRIEF**

The A2 audio measurement system from Neutrik features full dual-channel measurement capability and a multifunctional DSP generator.

The unit does not utilize multifunction keys, offering instead one function for each key. Output ports enable the A2 to be connected to a personal computer or a printer.

For further information, circle Reader Service 134.

34 BUYERS GUIDE

## USER REPORT

# Video Transfer Dubs Sound with Wohler

by Glenn Holton  
Chief Engineer  
Video Transfer Inc.

## BOSTON

Gone are the days when all televisions were equipped with one small speaker for sound, and picture quality was the only purchase consideration. Today's stereo television makes the audio program an equal, and for some an even more important, consideration than picture quality.

If you ask engineers or operators if they pay attention to audio quality when producing, editing or dubbing material, virtually all will answer "yes." A closer scrutiny of their monitoring equipment may shed a different light on the subject. We all like to think we do a great job in controlling the quality of our product, but everything from budget to space restrictions can affect our best intentions.

During the tape duplication process, many facilities pay too little attention to audio monitoring, supporting the theory that "it is just a dub." However, dubs are generally what is played back to air, whether it is a program, com-

mercial, public service announcement or promotional spot.

## LOGICAL STEP

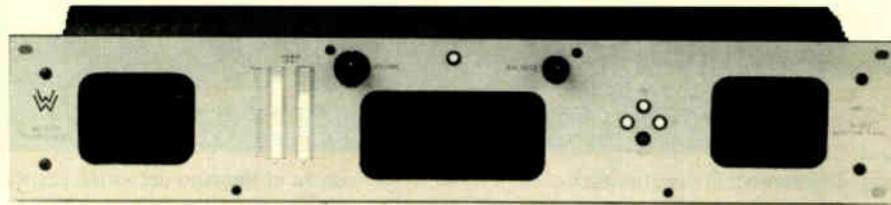
As engineers and operators set out to monitor their audio, the logical step would be to purchase one of the many power amplifiers with directional speakers. But what happens when you have space constrictions, a problem that we encountered from the beginning. We found our solution with the Wohler Technologies AMP-2 stereo audio monitor.

At Video Transfer, our full-service duplication facility employs several quality control racks, allowing engineers to monitor both video and audio throughout the duplication process. It is here that the majority of problems are detected and solved. We needed a monitor that was small and loud enough to fit into our existing system, while not interfering with surrounding equipment, including multiple video monitors.

The AMP-2 was a natural choice for our application. Its two-rack unit size was smaller than the space we allotted for audio monitoring. Our concerns about magnetic interference were put to rest, as Wohler has gone to great lengths to provide a monitor with powerful speakers, yet with an above average shielding system rated at 0.8 gauss or less. This extensive magnetic shielding

right speakers output the higher frequencies.

Another requirement for the monitor was high fidelity output. Wohler's AMP-2 delivers its signal with good frequency response between 60 Hz and 18 kHz with hum and noise in the area of -64 dB or below. This, coupled with its volume, allows us to listen to the particulars, while remaining on the production floor.



Wohler's AMP-2 audio monitor

allows placement of the AMP-2 immediately adjacent to most video monitors with no visual distortion or color impurities.

## HIGH OUTPUT

The unit uses three speakers to produce 20 watts per channel. The center speaker handles the low frequencies common to both channels, while the respective left and

At first glance, you cannot imagine that speakers placed so close together would provide enough separation. A test drive will quickly change your mind, especially when you realize that the more serious audio problems place the engineer in front of the unit. Wohler's monitor delivers adequate separation.

Aside from audio fidelity and power, the AMP-2's strongest feature is its audio phase monitoring and detection. The unit houses four LEDs, instantly showing users the presence of audio on either channel and whether it is in phase.

If the signal is out of phase, the bottom LED remains lit until corrected. For Video Transfer, this type of monitoring is crucial as we receive audio signals from various tape and fiber optic sources. The unit currently does not carry an audio alarm. This addition would be quite useful when constant

phase detection is needed.

Video Transfer purchased this monitor based solely on its high quality sound and phase monitoring. At that time, it was the only monitor incorporating phase detection within its console. After purchasing one, we became aware of some of the monitor's less emphasized characteristics.

These other features include a sensitive LED source level metering system that is divided into one and three dB increments, along with volume and balance adjustments. We especially appreciate the back panel input arrangement, allowing for either unbalanced RCA or balanced XLR type connectors.

Installation of the AMP-2 is extremely simple. Simply slide it in the rack, connect audio lines to the balanced XLR or unbalanced RCA phone inputs, and plug in the AC main power cord.

The AMP-2 provides innovative solutions to a variety of audio monitoring problems. It offers performance surpassing that of many popular monitor pairs, yet it does so without installation hassles, awkward placements or an added later look. The AMP-2 certainly provides "peace of mind" with its visual LED signal and phase display. ■

*Editor's note: Glenn Holton has been Chief Engineer at Video Transfer Inc., a full-service video and audio duplicator in Boston, for the past seven years.*

*The opinions expressed above are the author's alone. For further information, contact Will Wohler at Wohler Technologies (telephone: +1-415-589-5676; FAX: +1-415-589-1355), or circle Reader Service 7.*

## AAVS Keeps TDF's Bits in Line

by Denis Veyrier  
Maintenance Group Manager  
Télédiffusion de France

## PARIS

TDF (Télédiffusion de France) is responsible for maintaining the audio-visual installations of the French public television channel, France 2, which maintains an average market share of 24 percent.

The systems concerned are those for terrestrial (program 4/3) and satellite (program 16/9) continuity management. In addition, TDF runs and maintains a brand new digital switching center, which opened in September, 1993.

Since the design stage, TDF has integrated AAVS's S310 digital video analyzers in the switching center. These are present both in the operating console and in the monitoring bay. The final verification stage for signals emitted by the satellite continuity management system (transmitted by fiber optics to the D-2 Mac encoding station) is also equipped with an S310.

Finally, the maintenance workshop has an S310, which of course includes the options for digital test pattern generation and the maintenance module.

## MODULAR DESIGN

The main reason we have been able to use the S310 in so many different applications is because of the unit's exemplary modularity.

At the switching center, the two S310s consist of the basic 4:2:2 module for monitoring digital images for dispatching between the different France 2 users, such as production houses, TV News, studios, etc. The units allow us to easily and immediately monitor the quality of the signal.

The S310 also provides surveillance of the 270 Mbps (megabits per second) signal and monitoring of numerous parameters, including peak-to-peak amplitude, average amplitude, clock jitter, low frequency voltage superimposed on data, activity of bits 0 to 9, 625 or 525 line standard, timing code errors (TRS byte), auxiliary data sequence and data preamble sequence. All these parameters are checked for their compliance with CCIR 601

and 656 recommendations.

On the maintenance side, the fully equipped S310 that we use is much appreciated for its great ease of use. There is no need to dive into the handbook at every turn. It allows us to bring under surveillance any defective components, such as analog-digital interfaces. Its swift notification of test results is a tremendous advantage.

The flexibility of the S310 under menu control allows us to assign alarm thresholds for serial or parallel signal levels. These thresholds are set on demand either in accord with values specified in the norms (normal mode) or to values specific to the installation.

We regret, however, that our units do not allow us to adjust alarm levels for 27 MHz and 270 Mbps clock jitter. Subsequent software releases have included adjustment of the 270 Mbps clock jitter alarm threshold.

## ERROR DETECTION

Use of the S310 extends equally to the detection of errors in timing and preamble code. It allows choice of display of any bit on the active line. To simulate faults, it is also possible to inject errors into the timing or preamble codes.

All these parameters are available for display on an oscilloscope for quantification. The BNC sockets on the front panel carry a signal which is the image of the value to be measured or detected (data sequence or error); also carried are mixed synchro, vertical and horizontal blankings and frame parity.

The S310 is more of a monitoring device than a measuring device. It is a truly universal monitor, suited to rapid monitoring when seconds are counting down just before the TV News program, for example.

It also permits not only the monitoring of the transmitted data, but the appreciation of the transmission medium as well. ■

*Editor's note: Denis Veyrier oversees engineering maintenance at TDF.*

*The opinions expressed above are the author's alone. For further information on the S310, contact Guillaume Duboc at AAVS (telephone: +33-1-4857-2164; FAX: +33-1-4857-3358), or circle Reader Service 42.*

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## I N F O R M E D E L O S U S U A R I O S

## EL VIDEO MASTER REALZA A NOTICIARIO

Por Richard Yeats

Productor Artístico de Operaciones  
de Primera  
Canal de Noticias NBC

Charlotte, Carolina del Norte

Durante los últimos años se ha hecho evidente a los servicios de noticias, que no se puede esperar hasta la hora acostumbrada del noticiero diario para que éstas sean difundidas. Los oyentes y televidentes esperan noticias durante las veinticuatro horas del día. Por esta razón, las redes de radio y televisión están tratando de satisfacer esta exigencia aumentando el número de servicios de noticias afiliados.

En los Estados Unidos, la NBC se ha enfrentado al desafío construyendo el Canal de Noticias NBC aquí en Charlotte. Esta instalación, cuyo costo ascendió a muchos millones de dólares, sirve de punto central para la recopilación y distribución de noticias nacionales e internacionales para las estaciones de la cadena NBC.

En esta instalación se produce, además, el programa de noticias "Nightside" y recientemente se inició la distribución, por cable, durante las veinticuatro horas del día de un programa de noticias en español, titulado Canal de Noticias.

## LA VANGUARDIA

El Canal de Noticias NBC, al igual que la competencia, depende enormemente de la

tecnología de último momento para recoger, procesar y transmitir el producto a tiempo. Utilizamos enlaces ascendentes y descendentes de satélite y el equipo de grabación y de procesamiento más moderno. En otras palabras: tecnología de punta. Nos preocupamos constantemente por encontrar una mejor manera de hacer lo que ya estamos haciendo para mantenernos

siempre a la vanguardia.

Con todos los conductos de alimentación que entran al Canal de Noticias NBC en todo momento, nos era imposible tener monitores para todos ellos. Necesitábamos una manera de lograr un mejor control de calidad en la entrada de material. Para lograr nuestro objetivo utilizamos el Video Master VM771 de FM Systems, en Santa Ana, California con éxito.

El VM771 es un procesador de video de banda base que estabiliza los niveles de video, elimina la interferencia de baja frecuencia y corrige automáticamente la desigualdad de luminancia a crominancia. La caja del VM771 no tiene controles o

perillas externos y esto la hace menos apta a desajustes causados manualmente. El estuche o caja utiliza poco espacio en el bastidor o gabinete y tiene las conexiones para energía y para video en la parte posterior. En el frente tiene un diodo emisor de luz verde que indica "VIDEO ON."

En la aplicación utilizada en el Canal de Noticias NBC, el Video Master está coloca-

del Canal de Noticias NBC. ■

*Nota del director: Richard Yeats ha trabajado en el Canal de Noticias durante tres años y con la NBC durante ocho. Antes de su traslado a Charlotte, Yeats trabajó en las oficinas de la NBC en Burbank.*

*Las opiniones expresadas en este artículo son las del autor. Para más información, comuníquese con Tom Corwin en FM Systems al teléfono: 714-979-3355, al FAX: 714-979-0913 o marque el No.33 del Reader Service.*

**El Video Master nos he proporcionado el medio para lograr mayor control de calidad para todo el material que recibimos . . .**

do en el trayecto del video entre la salida de encaminamiento y la entrada de la grabadora de cinta de video (VTR). Casi todos los conductos de alimentación para el Canal de Noticias pasan por la zona de ENTRADA y por el Video Master. El Video Master nos ha proporcionado el medio para lograr mayor control de calidad para todo el material que recibimos de numerosas fuentes alrededor del mundo.

## FUNCIONES

El VM771 puede hacer lo siguiente, de acuerdo con el manual para el usuario:

- Regula automáticamente la ganancia del nivel de sincronización a 40 unidades IRE (del Instituto de Ingenieros de Radio).
- Regula automáticamente la ganancia del nivel del blanco para que no exceda las 100 unidades IRE. El nivel del blanco no sufre recorte de picos y retiene una escala lineal.
- Regula el nivel de salida a 1 voltio de cresta a cresta (a 100 por ciento del nivel del blanco).
- Controla automáticamente la proporción de luminancia a crominancia, compensando la pérdida por inclinación o pendiente del cable u otra fuente de atenuación de la alta frecuencia.
- Con fijación de nivel en el umbral posterior, elimina todas las interferencias de baja frecuencia, tales como los enlaces de tierra de 60 ciclos, aun al eliminar la señal de video. Cancela la distorsión de baja frecuencia en la señal de video.

Antes de colocar el Video Master en nuestra instalación, se lo entregamos a nuestros ingenieros (junto con el manual para el usuario con las promesas que en él aparecen) y les pedimos que lo sometieran a pruebas.

Luego de completar las pruebas, los ingenieros nos indicaron que el aparato cumplía con lo prometido pero que sería conveniente que tuviera la capacidad de pasar video en caso de que fallara la energía a la unidad. Este es un pequeño detalle pero vale la pena mencionarlo.

Nos preocupa, además, que por ajustar la unidad el nivel de ganancia en relación con la sincronización, si la unidad recibe una señal con sincronización baja pero con niveles del blanco que excedan las 100 unidades IRE, los niveles del blanco excederán los niveles óptimos al regular la ganancia de la sincronización a las 40 unidades IRE. Un recortador de picos para el blanco convertiría a la unidad en el dispositivo perfecto para nuestra aplicación.

Pero, francamente, considerando su precio, esta unidad es excelente y ha recibido numerosos cumplidos de parte del personal

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The unit is selectable between 525 and 625 standards. Inputs and outputs can be 10-bit 4:2:2 serial or parallel component. Additional outputs include regenerated serial loop-through and component and composite analog.

For further information, circle Reader Service 71.

The PM 5695M TV monitoring demodulator from Philips TV Test Equipment is designed for transmitter monitoring and combines a traditional demodulator with the ability to analyze numerous transmission parameters, including RF level, vision/sound ratio, modulation degrees, sync amplitude and signal-to-noise ratio.

The 5695M operates in high RF fields, demodulating signals between 40 and 960 MHz with signal levels between 100 millivolts and 1 volt.

Two 50 ohm RF inputs and one IF input are available.

For further information, circle Reader Service 85.

Rohde & Schwarz has available the VNA video noise analyzer that measures noise voltage for NTSC, PAL, SECAM, as well as HDTV, computer video signals and medical video standards.

The VNA measures signals from 40 Hz to 30 MHz. A number of high pass and weighting filters are available for measuring noise level parameters.

Remote control is via IEC/IEEE or RS-232, and a parallel interface is available to connect the unit to a printer.

For further information, circle Reader Service 65.

# EQUIPMENT EXCHANGE

TV Technology's Equipment Exchange provides a FREE listing service for all broadcast and pro-video end users. Brokers, dealers, manufacturers and other organizations who are not legitimate end users can participate in the Equipment Exchange on a PAID basis. Call 1-703-998-7600 for details.

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JVC TK870U w/zoom lens, \$850. C Bell, 214-406-9292.

Panasonic CLE-300 3-chp camera w/case, batt, tripod plate & pwr sply, in great shape, \$4850. J Boyer, JEDA Prod, 1004 10th Ave, Lewiston ID 83501. 208-746-8335.

JVC G-71USJ color video camera w/10 pin connector for VCR, incl pwr sply, mint cond, still in box, incl service manual, \$300/BO; RCA CKC-021 color video camera w/color viewfinder, Saticon tube, F1.4, 8:1 zoom, 10-pin camera cable, pwr sply, mint cond, \$300. Robert, Scrapbook Video, 408-247-7459.

Sony M3 3-tube camera, 4 batt chgr, case, tripod plate, gd cond, \$1500. J Boyer, JEDA Prod, 1004 10th Ave, Lewiston ID 83501. 208-746-8335.

Ikegami HC200 3CCD video camera, \$2100. R MacDonald, Video Prod, 407-452-4326.

Sony DXC-M3A with Canon 15X, Sony VO 6800 video rcd. with Porta-Brace, & Peter Lisand Ultra II tripod, excl cond, \$2700 + shpg. Jeff, Gorham ME. 207-929-3413.

Sony DXC-M3A kit including camera head, battery adapter, hard carrying case, tripod adapter, camera cable, Canon 15X lens, viewfinder, original pdct brochure, operators & service manual, excellent condition, \$2200. F Soo, 313-228-1600.

JVC KY 17/BRS 4100 dockable S-VHS camcorder w/16:1 lens, AC adapt, batt, camera case, excl cond, \$4295. D Brennan, 205-823-0088.

Ikegami 730AP plumbicon w/Fujinon 12X1 lens, batt, AC pwr sply, carry case, excl cond, 14 hrs, \$5000/BO. 917-556-2782 (beeper).

Panasonic 460 w/hard case, like new, 5 hrs use, \$1650. C Whennmouth, 408-624-2985.

Sony BVP-30 3-tube plumbicon camera, head only, tubes in gd cond, BO. Jeff, Cinecan, Ontario CANADA. 705-525-1801.

Ikegami 730AP 9.5-143 lens, AC adaptor, w/Canon, case, Anton Bauer Life-saver chgr, manuals, gd cond, \$1000. T Sankar, 14 Justice Sundaram Rd, Nageswarapuram Mylapore Madras 600004 INDIA.

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JVC BY-110U excellent condition, low hours, used indoors only, with service manual, carrying case & 17' breakout cable, \$800/Best Offer; Bogen 3118 with mini fluid head, \$150. 716-832-5339.

Sony BVP-7A camera with BVV-5 deck, Canon J14ax8.5B internal focus broadcast lens, Sony BC-1WB batt charger, vlt, mint cond, \$39K. P Whitely, Best Video Prod, St Augustine FL. 904-824-3414.

Hitachi FPC-1 3-chip camera with S-VHS board, 15X1 Canon lens, new GM-8N viewfinder, tripod plate, microphone & shoe mount, new hard case, excellent condition with warranty, \$4800. L Batwin, Montage Video, 585 N Railroad Ave, SI NY 10304. 718-979-8431.

Sony BVW-507 package, Canon 15x9.5 lens, 400 hours, Frezzi Mini-Fill with adaptor, Anton Bauer Logic series Life-saver quad charger, (4) brick batteries, Porta-Brace, \$25K. Phil Smith Productions, Irving TX. 800-634-8917. 214-831-8811.

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JVC KA-20 camera adapt for KY-25/KY-17 camera head, \$475; JVC 12' 26-pin to 14-pin camera cable, never used, \$100. L Kattenbach, 201-224-6063.

Sony CMA-8 pwr sply, new, \$350; Gitzo 480 tripod, \$750. C Bell, 214-406-9292.

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**VTRs & SONY M7 CAMERAS**

RM-P2000 (2) camera cntrl units w/cables, brand new, never been used, \$3000. Jeff, Cinecan, Ontario CANADA. 705-525-1801.

### DIGITAL EFFECTS

#### Want to Sell

Vidcraft Detaller III video image enhancer, works gd, \$1200/BO; Shure FP51 4-chnl mixer/gate/compressor, like new, \$395/BO; Archer special effects switcher, gd cond, \$35/BO; Panasonic WJ-MX12 digital AV mixer, \$1100/BO. G Giarrusso, Moonlight Video Prods, 345 First St Ste Q, Encinitas CA 92024. 619-942-9687.

### TEMMER VIDEO SPECIALS

MICROTIME ACT I, JAZZ ENSEMBLE, AMPEX ADO  
VIDEOTEK PRODIGY & GRASS VALLEY SWITCHERS  
USA TEL: 212-206-1475 FAX: 212-929-9082

Targa 32 videographics boards, (2) excl cond, \$800 or \$1500/both. Jeff, 310-276-0314.

### EDITING EQUIPMENT

#### Want to Sell

Videomedia Z6000-D computer editor, pwrful, user-friendly, software capable of A/B roll editing, split edits, sync rolls, animation & switcher control, incl event memory & printer output, operation manual, excl cond, \$1000. Peter, 603-434-8850.

**Complete turnkey A/B roll edit ayst,** Sony 3/4SP, BVU-900s, BVU-950, BVE-900, SEG 2550, CQG 500, TVM-620, Revox B-77, AT-850, mtd in 4-bay console & Winsted rack, 14 hrs, excl cond, complete w/audio & video patch bays, monitors & all connecting cables, will sell system w/o machines. Tele-Kinetics, POB 235, Zephyrhills FL 33539. 813-782-7037.

**EMC Nonlinear edit syst,** 486/ax, 4 M RAM, keyboard, mouse & shuttle, 80 M HD & 1.2G hd, 16 bit sound, \$10K or trade for Betacam port camcorder. Frank, 617-630-1109.

**Panasonic AU-A30 edit cntrtr,** \$250; JVC RMG850U edit cntrtr, \$1800. C Bell, 214-406-9292.

### MOVIE PRODUCTION EQUIPMENT

#### Want to Sell

**Steenbeck ST 921 w/interlock system,,** motor driven rewinder, extension boards, fold out magnifier, sound reader 16/35mm, like new, \$24000. N Ambatzis, Spectral, 9 Formionos Street, Athens GREECE 16121.

### PEDESTALS

#### Want to Sell

**TEMMER VIDEO SPECIALS**  
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SACHTLER & VINTEN & ITE TRIPODS  
USA TEL: 212-206-1475 FAX: 212-929-9082

### SIGNAL PROCESSING

#### Want to Sell

**For-A Y688 TBC w/Faroudja processing,** \$1500. D Andrews, Video Reflections, 6086 Fontaine Bleu Dr, SLC UT 84121. 801-272-3031.

**Merlin ME-808 standards converter,** \$10K. C Bell, 214-406-9292.

### SWITCHERS

#### Want to Sell

**MX-12 digital mixer,** mint cond, \$1250; Alta-Celeris YC converter for 3/4 to S-VHS, \$500. Carolina Video Prod, 803-881-4543.

**GVG 1600-4S auto cntrl syst, cntrl panel & parts,** incomplete for parts, cheap. Ross, 415-564-6802.

**Panasonic WJ-AVE5 digital A/V mixer,** \$825. 918-742-3382.

**JVC KM-1600 SEG 4 input full process Y/C switcher w/chroma key & soft edge wipes,** \$4000. Jeff, Cinecan, Sudbury, Ontario CANADA. 705-525-1801.

### TRANSMITTERS

#### Want to Sell

**TV Transmitters, new, solid state, VHF/UHF,** 100 Watt, \$6500; 250 Watt, \$8500; 500 Watt, \$12500; 1000 Watt, \$24950; 110/220 volts, stereo ready, FM/AM transmitters also. 305-757-9207.

### TV FILM EQUIPMENT

#### Want to Sell

**Fujix P701 video projector, \$650; Kodak Ektagraphic III slide projector, \$100; Houicishin 16mm telecine film projector, \$975. C Bell, 214-406-9292.**

**RTI TV-2000 16mm film edit syst,** inspects, evaluates, cleans & times film while you view or edit, view forward or backward at variable speeds, sound processor makes speech understandable even at double speed, high quality view screen, electronic timer display, digital defect detection system & more, \$5000/BO. Peter, 603-434-8850.

**Audio Technica 811 unidirectional mic,** new, \$100; Anton Bauer Lifesaver 8 hr chgr, \$250. Raider Prod, 215-889-9565.

**ELMO 16CL 16mm sound projector,** \$350. J Baltar, Maine Reel, 67 Green St, Augusta ME 04330. 207-623-1941.

**Moviscop viewer, straight-cut tape splicer,** pair of single-reel hand rewinders, 1 w/brake, misc edit supplies, everything excl cond, \$900/BO. Peter, 603-434-8850.

### USED EQUIPMENT

#### Want to Sell

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BROADCAST STORE

**BUY ■ CONSIGN ■ SELL & SERVICE DEPARTMENT**

Grass Valley 200-CV Graphic Factory

Ampex ADO-2000

Soundcraft 6000 Audio Mixer

**Priced To Sell!**

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**BCS/NY: 212-268-8800**  
**BCS/Europe: 081-810-9055**

**See Us At NAB**  
**Booth 1712**

### VIDEO PRODUCTION EQUIPMENT

#### Want to Sell

**Quanta 100 char gen,** \$300. R MacDonald, Video Prod, 407-452-4326.

**Panasonic WV-KB12A, \$50/BO. G Giarrusso, Moonlight Video Prod, 345 First St Ste Q, Encinitas CA 92024. 619-942-9687.**

**Sony BVH-2000 (2), 1 for \$14000 & 1 for \$18000. Dale, 800-428-7016 ext 251.**

**JVC CR6600 3/4" feeder/rcdr, vgc, 4sp remote, works w/editor, \$650/BO. R Jensen, Telectable Prod, 5812 21st St, Racine WI 53406. 414-632-3131.**

**Sony VO-8800 3/4" SP rcd. w/time code coard, Porta-Brace case, 14 hrs, excl cond, \$2000. M Daun, Hasidium Films, 1819 55 St, Brooklyn NY 11204. 718-232-7572.**

Circle (64) On Reader Service Card

**CCI 800-6 Y/C delay dist amp, 1 input, 3 output, front panel luminance, chroma & Y/C delay cntrls, new in box, \$450. Ron, Video Keepsakes, 85 Oliver Ave, Valley Stream NY 11580. 516-285-7146.**

**Panasonic 7400 S-VHS port VCR, 3 batts; Sony VO-8800 U-matic SP port rcd. w/Porta-Brace case, \$2000. R MacDonald, Video Prod, 407-452-4326.**

**Panasonic AGF700 TC gen/reader for 7750/7650 S-VHS deck, new, trade for TBC or? E Anderson, Electric Ink, 1617 E 4th St, Santa Ana CA 92708. 714-953-1589.**

**TEMMER VIDEO SPECIALS**  
SONY BETACAM & 1" & 3/4" & 1/2" & S-VHS & NTSC & PAL  
SONY-PANASONIC-CONVERGENCE EDIT SYS  
USA TEL: 212-206-1475 FAX: 212-929-9082

**Panasonic 8500 (2) VHS w/A500 edit cntrtr, excl cond, \$2500. 917-556-2782 (beeper).**

**Panasonic AG 7500 S-VHS editing VCR, excl cond, \$2795. D Brennan, Brennan Custom Video, 205-623-0088.**



RF Transmission Systems

(304) 757-9623

FAX: (304) 757-9624

Transmitters - AM, FM, TV, Short Wave  
New - Used - Remanufactured - Rebuilt  
Antennas and Transmission Line  
Rebuilt Power Tubes

Circle (104) On Reader Service Card

**VCRs/VTRs/REC MEDIA...WTS**

Sony BVH-1000 1" w/Sony TBC, plays fine, audio record needs work, B.O. C Tobin, 3227 49th Ave SW, Seattle WA 98116. 206-932-7280.

JVC BR-S611U (2) S-VHS rcdrs w/SA-F911U serial interface unit & rack mount hardware, 500 hrs, \$2850/ea; JVC BR-S811U S-VHS edit rcdr w/SA-F911U serial interface unit & rack mount hardware, 700 hrs, \$3850; \$8995/takes all. Ron, Video Keepsakes, 516-285-7146.

Sony VO8800 3/4 SP w/time code, Porta-Brace, 450 hrs, great cond, \$2050. S Beck, Priority One Prod, 12771 Ridge Rd, Grass Valley CA 95945. 916-272-6789.

Panasonic 9240 port w/pwr sply, 150 hrs, will sell cheap. Tele-Kinetics, POB 235, Zephyrhills FL 33539. 813-782-7037.

JVC CR-4700U port 3/4" VCR, carrying handle, batt & operation manual, gd cond, \$500. Peter, 603-434-8850.

JVC BR-8600 U VHS editing rcdr, less than 450 original hours, B.O. Jeff, Ontario CANADA. 705-525-1801.

Sony VO-5600 3/4" VCRs, (5), excellent condition, \$1000/each. Bob, 212-940-5450.

Craig AC/DC video plyr, \$175; Panasonic AG-800 video floppy rcdr, \$450; Sony 8AFU 8mm camcorder, \$500; Sony CCD FX700E hi 8mm camcorder, \$1500. C Bell, 214-406-9292.

Research specialist seeking paid assignments. R Suraci, Fine Art Prod, 67 Maple St, Newburgh NY 12550. 914-561-5866.

Managing Producer/Director extensively exp in all phases of film/video prod, corp, govt, comm, salary open, able to relocate, ready for a creative challenge for a change. R Park, 10951 Laureate Dr #812, San Antonio TX 78249. 210-558-8066.

Consultation, startup and management of a corporate video/media department is my specialty. 15 years experience; broadcast & corporate. Nick, 011-966-1-230-2755, x216 (+8 hours EST).

**EMPLOYMENT**

**POSITIONS WANTED**

Temporary assignments wanted-Asia/Pacific area. Broadcast professional seeks position on installation/construction team, trade show, setup, etc. Larry Vogt, Box 86, TAIPEI TAIWAN. FAX TAIWAN, c/o HUANG 011-886-2-395-2503.

Advertise in **TV TECHNOLOGY INTERNATIONAL** For Details, Call **+1-703-998-7600** TODAY!

CONTINUED FROM PAGE 8

**1994 Show Highlights**

Array Windows router uses an MS Windows graphic user interface on a PC.

**TEST EQUIPMENT**

AAVS will showcase the S310 all-format digital video analyzer for testing composite or component signals.

JVC will introduce the TM-130SU monitor. Also on hand will be the TM-2084SU 20-inch and TM-2784SU 27-inch stereo monitor.

Leader will unveil its Model 5220 three-channel NTSC waveform monitor, the Model 5210 three-channel vectorscope, the Model 5222 eight-channel NTSC/PAL/SECAM waveform monitor and the 5212 three-channel NTSC/PAL vectorscope..

Also available will be the Model 5836A surround sound monitor featuring spatial display of four or five-channel signals.

Leitch's Digital Glue family will continue with the addition of the 6800/7000 series of test generators and D-2 monitoring distribution amps.

Philips TV Test Equipment will highlight the new PM 5639/82 and PM 5639/83 color alignment generators, as well as the PM 5696 monitoring receiver and the PT 5464 HD component/composite waveform monitor.

Sony will introduce its BZI-500/501 interactive status software for VTR maintenance, as well as a new line of its PVM color and black-and-white monitors. Also shown will be the BVM-8044Q monitor with serial digital interface.

Tektronix will show the new WFM601i serial component waveform monitor.

**TRANSMISSION**

Dielectric will show its new DigiTLine antenna line, designed for NTSC as well as digital HDTV.

Italy's DB Elettronica has the new KB 150

A/B class solid state amps. Also in the KB line is the 250, featuring 260-watt output, and the 500 with 500-watt output.

Harris Allied will showcase the new Ultravision 5 kW UHF transmitter, an all solid state unit compatible with all CCIR and color formats. Harris is also showing the Platinum Series HT EL2000HS VHF solid state 2000-watt transmitter

Other products from Harris include a new NTSC/HD panel antenna, a CP VHF panel antenna and LP Deltawing VHF and UHF panel antennas.

LDL Communications will highlight the new 30 kW IOT/Klystrode transmitter from Larcant-TTC.

Linear Vescovi will show new VHF solid state amps that now include 1 kW models with separate audio and video. Also on the floor will be UHF solid states amps up to 200W.

TEM will have new 100W UHF/VHF solid state amps featuring common amplification, broadband capability and 30dB gain.

Tennaplex will line up new HDTV-ready UHF panel antennas from 470-806 MHz.

In fiber optics, Telecast Fiber Systems will show its new Viper-X high capacity system, as well as new triax adapters and single-mode V/A trunks.

BAF will showcase its new SNV-F700-189 mid-sized SNG truck and the Crows Nest mast-mounted remote camera system.

Harris Allied will feature the S-21 satellite truck featuring an RSI antenna, four equipment racks and custom configurable design.

Nexus will also be on hand with new mobile OB units, as well as satellite and UHF network systems.

TEM will debut 8, 10, 12 and 14 GHz microwave links with 70 Hz mod/demod.

Ikegami will show the new PF-701S portable microwave link. ■



38 NEWS

**TV TECHNOLOGY**  
5827 Columbia Pike  
3rd Floor  
Falls Church, VA 22041

Call **Caroline Behan**, Classified Ad Manager, to reserve space in the next issue. Use your credit card to pay, we now accept VISA and MASTERCARD.

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Ad deadlines are the first Friday of each month for the following month's issue

**Select from these categories for best ad positioning:**

Help Wanted	Miscellaneous	Test Equip.
Positions Wanted	Monitors	Transmitters
Antennas & Towers & Cables	Movie Production Equip.	Tubes
Audio Production	Pedestals	TV Film Equip.
Cameras	Receivers & Transceivers	Video Production Equip.
Digital Effects	Remote & Microwave Equip.	Video Tape Recorders
Microphones	Switchers (Video)	

**Classified Advertising Rates Effective January 1, 1994**

	1x	3x	6x	12x
1-19 col inch (per inch)	\$80	77	74	68
Professional Card	95	90	86	84
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Blind Box Ad		\$10 additional		

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**ACTION-GRAM**

**Equipment Listings**

Please print and include all information:

Contact Name \_\_\_\_\_ I would like to receive or continue receiving TV Technology FREE each month.  Yes  No

Title \_\_\_\_\_ Signature \_\_\_\_\_ Date \_\_\_\_\_

Company/Station \_\_\_\_\_ Please Circle only one entry for each category:

Address \_\_\_\_\_

City \_\_\_\_\_ Postal Code \_\_\_\_\_

Country \_\_\_\_\_

Brokers, dealers, manufacturers and other organizations who are not legitimate end users can participate in the TVT Equipment Exchange on a paid basis. Listings are available on a \$1.75/word basis. Call 1-703-998-7600 for details and complete display rates.

**I. Type of Firm**

A. VHF-TV station	L. Corporate TV facility
B. UHF-TV station	M. Medical TV facility
D. Prod/post-prod studio	N. Government TV facility
E. CATV company	P. Educational TV facility
G. Network/group owner	Q. Recording studio
J. Broadcast consultant, mfg, dist, or dealer	K. Other (specify): _____

**II. Job Function**

A. Corporate mgt	D. Prod/oper mgt or staff
B. Engineering/tech mgt	E. News mgt or staff
C. Engineering/tech staff	G. Training
F. Other (specify): _____	

WTS:  Category: \_\_\_\_\_  
Make: \_\_\_\_\_ Model: \_\_\_\_\_  
Brief Description: \_\_\_\_\_  
Price: \_\_\_\_\_

**TV Technology Equipment Exchange**  
PO Box 1214, Falls Church, VA USA 22041  
Phone: +1-703-998-7600 FAX: +1-703-998-2966

**ADVERTISERS INDEX**

*While every care is taken to ensure that these listings are accurate and complete, TV Technology does not accept responsibility for omissions or errors.*

PAGE	ADVERTISER	READER SERVICE	PAGE	ADVERTISER	READER SERVICE
8	AAVS	35	34	Linear	81
18	ABE Elettronica	46	31	Magni	114
27	ATI	121	14	Modulation Sciences	41
36	Audio Precision	30	10	Orban/AKG/dbx	20
24-25	BTS	62	21	*Panasonic	99
22	Cartoni	58	20-21	Panasonic	27
6	Comex	5	19	Sachtler	119
16	CTE	131	4	Sintel Systems Int.	56
32	DB Elettronica	89	1	Snell & Wilcox	102
37	dbk Inc.	104	17	Standard Communications	24
29	ELCA	68	13	Swintek	128
15	EMCEE	69	26	Teko Telecom SRL	100
13	ESE	116	13	Telecast	82
13	Gamer Industries	77	13	Television Systems Ltd.	45
40	Harris Allied	86	30	Tennaplex	21
37	Horita	64	13	Tentel	101
6	IRTE	75	9	Thomcast	92
12	Jampro	125	23	Toshiba	38
2	JVC	28	37	Videomagnetics	97
39	Larcant/TTC	44	33	Vistek	19
7	Leitch	96	35	Wohler Technologies	127

\*This ad appears only in the Latin America Edition

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<b>U.S. West Coast:</b> Jack Ducart 916-988-8558 FAX: 916-988-4052	<b>Europe:</b> Dario Calabrese 39-2-7530274 FAX: 39-2-7532697	<b>Japan:</b> Eiji Yoshikawa 81-3-3327-2688 FAX: 81-3-3327-3010
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# Here's To A Great Broadcast Future!



Now that TTC is part of LARCAN we've got a lot to celebrate, because we've combined the resources of two great transmitter companies. LARCAN is today's market leader with the popular M Series solid state VHF transmitters and our new cutting-edge solid state UHF line. LARCAN-TTC excels with the ultra-efficient, high power UHF HDR Series IOT transmitters and our complete low power UHF/VHF lines. On the radio side, we already have more solid state FM transmitters in the field than all other domestic companies. And LARCAN-TTC is definitely HDTV-ready—*right now*. The engineering resources and corporate strength of LARCAN-TTC will insure you a great broadcasting future. Visit us at NAB '94, booths 15758 and 15708 to see products worth celebrating.

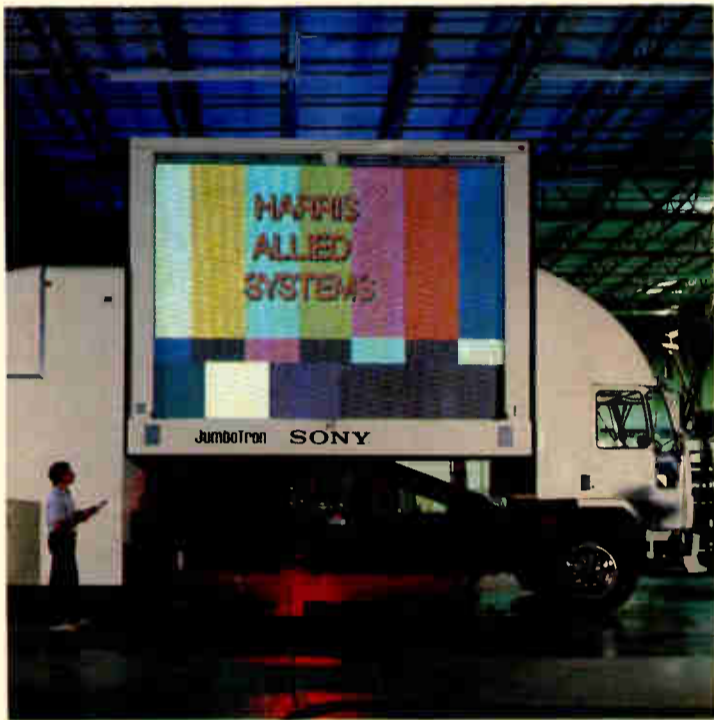
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FAX: 217-224-2764

### **Video and Audio Systems:**

Telephone: 606-282-4800

FAX: 606-283-2818

