

Tips for Lighting
a New Studio
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TV TECHNOLOGY™

International Edition

Indonesia '93 Exhibition Upstaged

by Mark Timpany

JAKARTA, Indonesia PT Pamerindo Buana Abadi, the organizers of the recent Electronic Media Indonesia '93 in Jakarta, seem to have been upstaged by their crosstown rivals. PT MultiMedia Promo announced plans for a five-day October broadcast-only exhibition in Jakarta at the Kemayoran Exhibition Center. The announcement was made less than two months before the opening of Electronic Media Indonesia '93. The effect of the late announcement was to draw many broadcast equipment manufacturers and suppliers away

from the February Electronic Media show.

The broadcast equipment displayed at Electronic Media Indonesia '93 was buried among telecommunications and computer gear displayed by participants in the two other shows running concurrently. Broadcasters who visited did not have a chance to do any comparison shopping or even see most varieties of broadcast equipment on display. Still, the few manufacturers represented put forth a worthy effort to show their support of the Indonesian broadcast market.

Satellites key in Indonesia

Varian had several traveling wave tube HPAs on display. Brian Knight, Varian's Asia-Pacific manager from its Singapore office, told *TV Technology* that about 90 percent of the Indonesian HPA market was using the Varian product.

Currently, service is provided through the Singapore office. Varian is in the process of setting up an inventory of spare parts through an office in Jakarta and will eventually make that office into its fifth Asian service center. Knight stressed that reliability and product support are primary considerations in selecting satellite uplink

equipment. Because of the unique geography of the Indonesian archipelago, satellite communications are a strategic national resource, both inside and out of the broadcast sector.

Technical support appreciated

PT LEN, a state-owned manufacturer of television and radio transmitters and satellite communications equipment, was also on hand. Most of its display was prepared for the telecommunications market, as was that of PT Elektrindo Nusantara, another private satellite systems supplier.

Mecomb Tehnik, representing Tektronix, geared its display to the broadcast market. It also presented a seminar on the first day of the show demonstrating the use of the VM700A in the broadcast studio environment. This sort of technical support is very well received in a country where the broadcast industry is still in the development stage.

Though Indonesian broadcast exhibitions have not yet reached the status of BroadcastAsia, and the IBC, Montreal Symposium and NAB remain the venues for the

(continued on page 6)

Looking into the Future of Compression

by Mario Orazio

You might not have noticed that pixels are prudes. Hey—I'm no sex goddess, myself. The last time I willingly showed off my own girlish figure was in nineteen ought—well, in those days, there was just one Germany, and there weren't any countries called Czechoslovakia, the U.S.S.R., or Yugoslavia (hmmm—methinks it's time to find new temporal benchmarks). But I'm willing to doff my habiliments when I have to—like for my annual bath or in the presence of a cute physician. Pixels don't get naked for anything.

I promise to get back to naked pixels, but actually, that's not what I wanted to rant about this month. Heck, to be imperfectly honest (who's perfect?), I don't really know what I want to rant about this month. Fact of the matter is: I'm frustrated (no off-color comments, please).

I mean—what's the single most important technology facing *everyone* in the video business today, and I do mean everyone—from a TV station accountant worrying about HDTV to a cable TV programmer trying to keep ahead of the direct broadcast satellite launches to a telco system designer planning subscriber loops to an editor lobbying a post facility to go component to a pimple-faced teen trying to do home computer graphics for MTV? It's Compression, with a capital C, and that rhymes with T, and that stands for Trouble.

The real thing

Forget Coke. Compression is It! What either will or won't keep Ampex in the video equipment business is Compression. What either will or won't allow telcos to deliver video to subscribers without replacing hundreds of millions of phone lines is Compression. What will or won't allow Hughes to compete directly with cable TV by raining dozens of channels from the skies is Compression, and what

(continued on page 11)

In This Month's Buyers Guide:

The speed of the BDL Autoscript system (shown lower left) plays an important part in ITN's London news operation. For more information on teleprompters and cameras, turn to this month's Buyers Guide on page 20.



photo by Richard Davies

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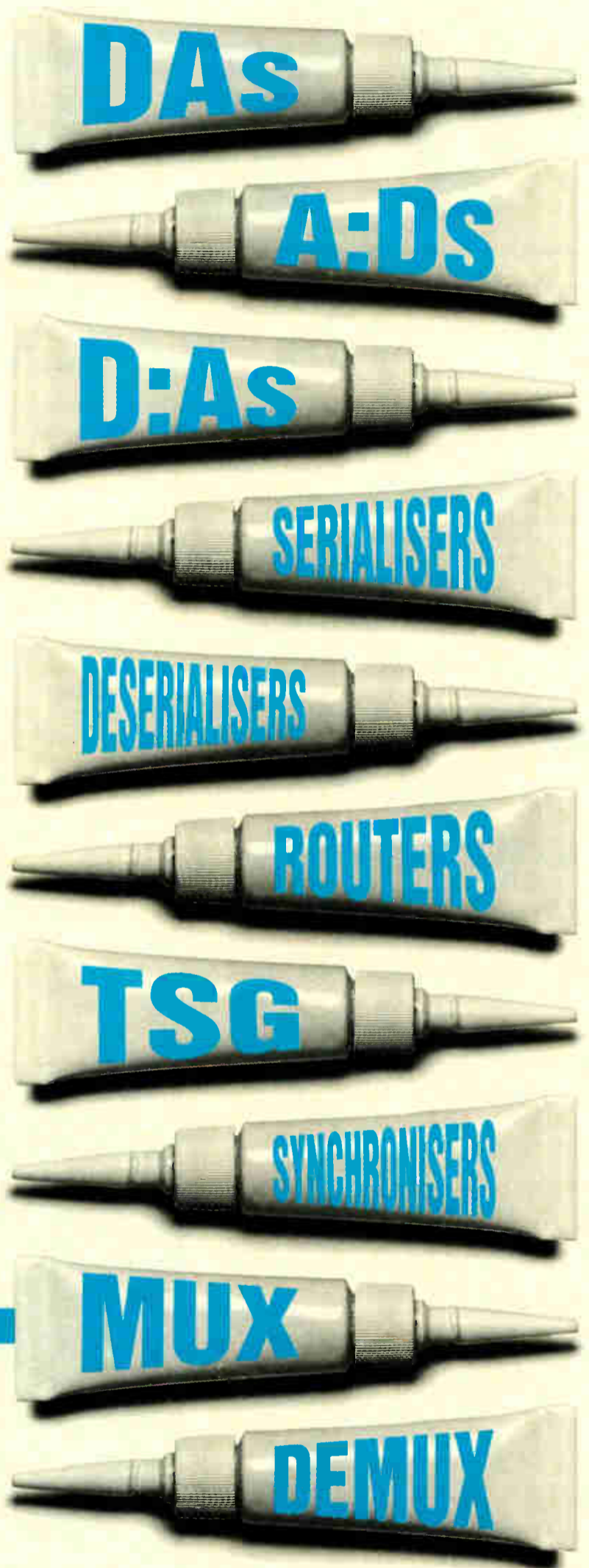
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CABLE

First U.K. Automated Cable Ad Insertion System Announced

BIRMINGHAM, U.K. The Birmingham Cable system will become the first fully automated ad insertion cable system in England, according to an announcement made by Channelmatic, Inc., which is providing the automation products.

The system will use Channelmatic and CCMS automation and software trafficking products. Installation and support will be contracted through Trilithic Ltd., a European distributor and representative for the two companies.

Trilithic principal Jonathan Rigby noted it was "an important event for all of our companies," and said, "It will provide the proven model for all cable systems within the U.K. and therefore provide a high quality of standardization throughout the industry."

DIGITAL HDTV

VADIS Consortium Includes Digital HD Among its Projects

HAMPSHIRE, U.K. Eureka 625, the collaborative European project on digital TV known by the acronym VADIS (Video-Audio Digital Interactive System), recently agreed to expand its goals to include digital HDTV. The audio-visual compression system under development within the project signals a step toward the introduction of digital HDTV in Europe.

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The VADIS project has developed picture compression techniques that reduce the data rate required for standard definition digital TV from 216 Mbit/s to about 4 to 8 Mbit/s. This compression, the group says, will enable digital audio-visual services to be carried by digital storage devices and telecommunications networks, as well as satellite, cable and terrestrial TV channels.

The project now is developing a multi-layer picture compression scheme that is matched to European requirements for a digital television offering both standard and HDTV resolution pictures.

The VADIS project consortium comprises 35 organizations from 14 European countries.

For more information, contact VADIS TCC Chairman Ken McCann of National Transcommunications at telephone +44-962-822372; FAX: +44-962-822409.

BUSINESS

New International Computer Video Company Formed

WESTWOOD, New Jersey A new company, Dubner International, has been formed by Harvey Dubner and his son, Robert. Harvey Dubner is the former founder of Dubner Computer Systems, which focused on graphics equipment, character

generators and animation devices.

The new company will focus on the multimedia/desktop video market, and its first product is Scene Stealer, a scene detector/video logging and cataloging product that consists of one PC/AT circuit board and software. The unit grabs black and white images from videotape and creates a video "table of contents" or storyboard by marking and recording, annotating and printing scene cut points. The stored images may then be reviewed at computer speed.

The Scene Stealer began shipping in February, and the company has other products currently in development. For further information about the new venture, contact Evelyn Bronson at +1-201-447-9365, or circle **Reader Service 48**.

Harris Allied and Wolf Coach Reach Business Agreement

FLORENCE, Kentucky Harris Allied Broadcast Division has teamed up with Wolf Coach to develop and market mobile video production, satellite and ENG systems.

Under the agreement, Wolf Coach will build "system ready" mobile units and deliver them to Harris, which will then supply audio, video and RF equipment. The units will then be marketed under the

Harris Allied name.

"This agreement will capitalize on exceptional strengths of two leaders in the mobile systems business," said J.C. Adrick, director and systems product line manager at Harris Allied.

The agreement also calls for the two companies to combine their current product lines and jointly develop new products.

NEW TV CENTER

New Commercial TV Channel to Go on Air in Bucharest

BUCHAREST, Romania Atlantic Television, a consortium of major European and North American companies, was recently awarded a license to operate the new commercial Channel Two service here.

The \$10.5 million contract to design and build the new TV center was won by Nexus International, which was responsible for providing NBC's International Broadcast Centre for the Barcelona Olympics.

Nexus will serve as project managers, directing the civil engineering, electrical plant and full television systems design and installation.

The center will include two production studios and full post production facilities (including ENG and VTR edit suites), an automatic transmission system, digital graphics and a news computer system.

SHOW LISTINGS

Upcoming conventions, meetings and exhibitions:

13-21 May 1993—SVIAZ '93

Moscow, Russia. The 6th biannual Communication, Data Transfer and Processing Equipment Show held in the EXPOCENTR in Moscow. For information on SVIAZ '93 contact Ms. Susanne Hess, Exposition Manager at TNT Productions Inc. P.O. Box 717, Callao, Virginia, 22435, USA; telephone: +1-804-529-5510; FAX: +1-804-529-5057.

10-15 June 1993—Montreux '93

Montreux, Switzerland. The 18th International Television Symposium and Technical Exhibition. For information contact: +41-21-963-3220; FAX: +41-21-963-8851.

1-5 October 1993—International Broadcast '93

Jakarta, Indonesia. A broadcast-only exhibition to be held in Jakarta at the Kemayoran Exhibition Center. Exhibition planner is PT MultiMedia Promo.

10-14 October 1993—VISION '93

Olympia, U.K. A new broadcast, film and video equipment show for the U.K., VISION '93 is the result of a collaboration between the IABM, the BKSTS, Single Market Events and Philbeach Events. For information contact Orlando Kimer: +44-71-830-8447/8.

18-20 October 1993—European Cable Communications '93

London, England. Following the success of the 1992 show, the Cable Television Association is expanding the size of the 1993 show. To be held at Olympia 2, London. For more information contact Sharon Chapman, Manager ECC '93, The Cable Television Association, 5th Floor Artillery House, Artillery Row, London, SW1P 1RT, England. Telephone: +44-71-222-2900; FAX: +44-71-799-1471.

25-28 October 1993—

Broadcasting, Cable & Satellite India '93

Pragati Maidan, New Dehli. India's 1st International Broadcasting, Cable & Satellite India '93 exhibition and conference. 150 exhibitors from India, Europe, the U.S., Asia and Australia are expected to exhibit. A three-day technical conference will focus on trends in broadcasting, hardware and software, emerging technologies and non-governmental broadcasting. For information contact Broadcast Engineering Society (India): Room No. 410, Research Dept., All India Radio and Doordarshan. J.P. Estate., 14-B, Ring Road, New Dehli-110002, or Exhibitions India: telephone +91-4622710; FAX +91-11-4633506.

16-18 November 1993—International Broadcast Equipment Exhibition '93 (InterBEE '93)

Chiba City, Chiba Prefecture, Japan. Japan's premiere technology and equipment exhibit, sponsored by the Electronic Industries Association of Japan (EIAJ). To be held at the Nippon Convention Center, Makuhari (Makuhari Messe) 2-1, Nakase, Mihama-ku, Chiba City, Chiba Prefecture, Japan. Admission free; visitors register at entrance. For information contact Sumi Kato, Manager, Japan Electronics Show Association, FAX: +81-3-3284-0165.

Early February 1994—

Broadcast Thailand Equipment Exhibition & Conference

Bangkok, Thailand. For more information contact Reed Tradex, 16th Floor, BB Building, Asoke Road, Bukhumvit, Bangkok, Thailand. Telephone: +66-2-260-7103-8; FAX: +66-2-260-7109.

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



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Satellite Compression Savings

by Bruce Randall

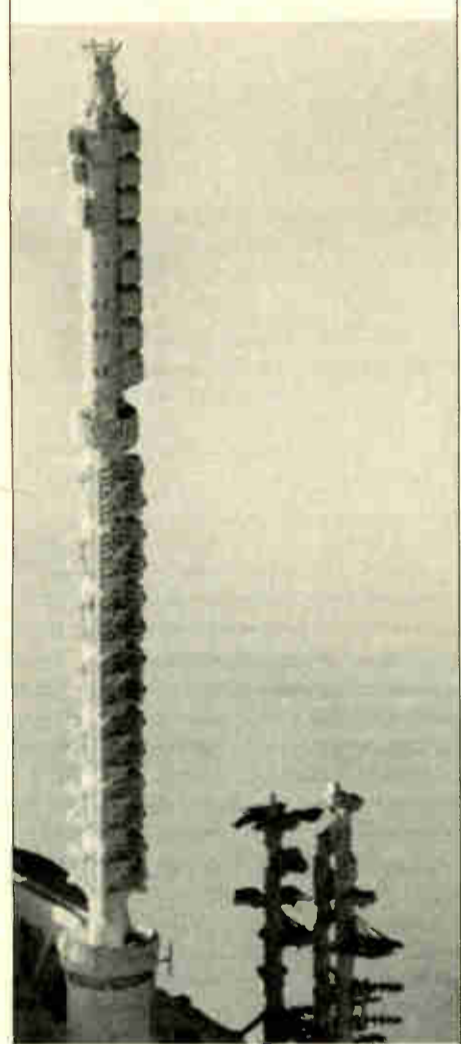
Part Two of a Two-Part Series

Last month, the benefits of "going digital" were explained along with the practical difficulties presented by high data rates. Video compression encoding using the MPEG algorithm was described, particularly the way in which the data rate is reduced by removal of temporal and spatial redundancy in the pictures.

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rates for transmission need not exceed about 12 Mbit/s, which includes overhead for two sound channels, error protection, etc. Efficient QPSK modulation is used, so for a bit rate of, for example, 8 Mbit/s, the occupied bandwidth would be about 6.75 MHz, and the bandwidth allocated to the channel would be about

**Potentially any
use of video may
have a use for video
compression.**

8 MHz. It is therefore possible to transmit eight such carriers in a 72 MHz transponder.

Given that the annual charge for a transponder may be as much as £3 million for a fully occupied 72 MHz transponder with 8 Mbit/s per channel, the cost per channel is reduced from £1.5 million (two FM carriers) to about £400,000. For applications where the picture quality requirements are less demanding, lower bit rates can be used, giving the possibility of further cost reductions.

With large numbers of carriers in one transponder, it is necessary to reduce the drive to the transponder to achieve the best trade-off between wanted signal power and intermodulation noise power. If all the digital channels can be multiplexed onto one carrier, the satellite back-off can be reduced, allowing smaller antennas to be used for the receive earth stations.

The disadvantage is that all the signals have to be delivered to the same uplink station, which can increase costs significantly for users distant from the uplink. The other side of the coin is that if separate carriers are used, because of the high back-off, only very modest power levels are required from the uplink.

Applications

The video compression market covers a broad spectrum of applications. Potentially any use of video may have a use for video compression. In general, video applications normally involve

SPECIAL REPORT

either the storage of video or the transmission of video. In these cases the benefits of video compression allow either greater storage capability or increased transmission capacity.

Video storage applications include multimedia computer systems, compact discs, video recorders and camcorders as well as professional television studio production and editing equipment.

Many different methods exist for the transmission of video material, including conventional terrestrial transmission, satellite delivery systems, broadband cable and telephony networks. In these cases, the high cost of distributing television services has prohibited the introduction of new services to the viewer.

Cable and satellite broadcasters are already looking at implementing services with 100 channels or more. These could be used to deliver "video on demand" services, which would allow, for exam-

ple, the same movie to be played at different start times on each channel. Thus whatever time a viewer wished to see a particular movie, he would only have to wait 10 or 15 minutes. Other applications include cable networks using increased channel capacity to implement interactive services. These services would allow different video sequences to be played according to viewer choice.

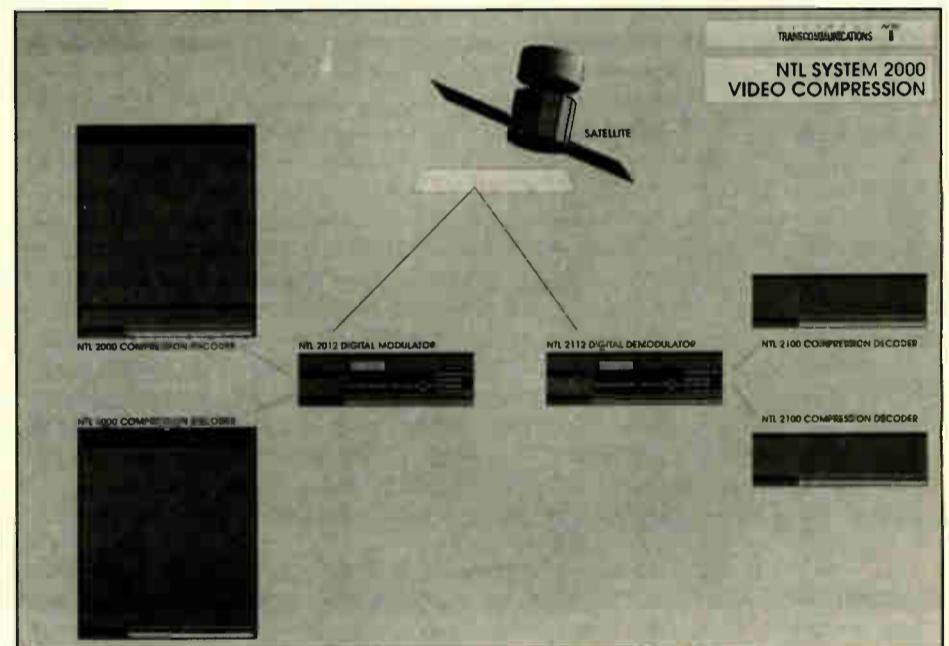
Video compression can also be applied to the distribution of television within a broadcaster's own network. Typically these applications involve the feeding of video material—normally news items—back to the studio for editing and transmission. Video compression, together with Frequency Division Multiple Access (FDMA), allow the broadcaster to share the transponder so that material from different locations can be simultaneously transmitted to the various studios.

cast quality transmission. The receiving end comprises a separate receiver/demodulator that interfaces to an MPEG video decoder unit and that can decode up to two video channels per receiver.

Other modulation schemes, i.e. Time Division Multiple Access, are also possible as well as the inclusion of a conditional access system and an encoder/subscriber management system.

System 2000 offers broadcasters, cable and satellite operators substantial operational savings in the distribution of video, sound and data to transmitters or cable head ends. The high quality performance also makes the system suitable for the distribution of vision signals between studios. It can be used with normal telecommunications carriers such as 8.448 Mbit/s CCITT G703.

NTL has designed System 2000 to provide users with maximum flexibility. In satellite applications, users can configure the system for optimum trade-off between the number of channels, picture quality, transponder power and bandwidth. Currently interfaces are provided



Finally, the increased capacity resulting from video compression can be used not only to increase the number of services but also to accommodate services that would otherwise need greater bandwidth than is available, for example HDTV. In time, the technology will enable greater compression ratios to be achieved for the same quality, resulting in even more possibilities.

System 2000

NTL's video compression system, System 2000, comprises all the elements described under "System Architecture" in Part One of this series. The NTL MPEG video encoder is a discrete implementation of the MPEG-defined video compression standard. This means that it is possible to interface the encoder to other manufacturers' systems that use the same standard. The NTL encoder is the first to use the MPEG standard for broadcast quality and it has already been integrated into another manufacturer's video compression system.

The multiplexer comprises a packet-based approach, which allows a high degree of flexibility in configuring various services. The modulation system is currently an FDMA system, which allows two television channels to be uplinked to a transponder per single carrier. Two carriers can then be uplinked from different locations onto a transponder of 36 MHz bandwidth, giving a total of four channels.

The total bit rate for each video/audio channel is 8.4 Mbit/s, which yields broad-

cast quality transmission. The receiving end comprises a separate receiver/demodulator that interfaces to an MPEG video decoder unit and that can decode up to two video channels per receiver.

Video compression in the future

The future for video compression is likely to see many more applications as the cost of the technology reduces. With the growth of multimedia computer systems, video compression will allow more use of video within information technology as well as computer-based educational software and entertainment.

Within the television broadcast sphere, the multiplicity of channels will bring more and more services dedicated to meeting very specific viewer requirements in the areas of entertainment, education and home shopping as well as enhancing established television services. Not only is the future of television and video going to be digital, video compression is going to change the entire industry. The potential market for this new technology is enormous.

The author would like to acknowledge the invaluable assistance of his colleagues Ian Tapp, Wilf Harding, Ken McCann, Warren Hobson, Duncan Hopkins, Simon Bigg and Peter Barnett in the preparation of this article.

The opinions expressed above are the author's. Bruce Randall looks after corporate affairs for National Transcommunications in the U.K. He may be reached at telephone +44-962-822374; FAX: +44-962-822582.

Expand Field Production with Lasers

by Peter Gloeggler

The video industry's demand to provide ever more effective productions while maintaining control of costs is a challenge that requires continuous innovation and ready acceptance of new production tools as they become available.

One such tool, Sony's new Laser Beam Link system, employs recent advances in laser technology. Using the infrared spectrum for camera connectivity, Laser Beam Link provides electronic field production users with high quality, point-to-point, over-the-air video transmission, eliminating the limitations and expense of running cables to remote camera locations.

Better than microwave for short distance video transmission, which is limited in bandwidth and video quality, laser beam links can offer virtually unlimited audio and video bandwidth. Four or more full-bandwidth video channels can be readily multiplexed on the same laser beam and transmitted over a distance of more than a mile. Moreover, one-way or bi-directional communication is available with a simple reconfiguration of the units.

For instance, in one application of the laser link, three channels can be dedicated to transmit full bandwidth component video signals, while the fourth channel is configured to bring a composite video signal back to the camera operator.

High quality multichannel audio is

GUEST COMMENTARY

built-in CCD camera solve the operational problems found in earlier units. Aiming of the send and receive units proved particularly difficult in early laser links.

Very little power is required for laser beam signal transmission because the majority of the beam's energy is intercepted by the receive unit. However, the aim of the send unit has to be perfect or the link will fail.

Locking onto the beam

A built-in CCD camera is now provided in Sony's Laser Beam Link to capture the infrared laser beam invisible to the human eye. Coarse alignment of the send and receive units is now simple using the unit's built-in LCD display.

Once coarse alignment is achieved, an optical servo mechanism precisely locks the beam of the send and receive units. Normal expansion, caused by the heating from the sun, or small vibrations that caused the sending beam to miss the receiver in earlier units, are also totally eliminated by means of the optical servo mechanism. All of this advanced technology is packed into a very practical size, only slightly larger than a typical 12-inch computer monitor.

The Laser Beam Link provides a professional production quality video link for applications where it is impractical to string cable. Setup is almost instantaneous, and over-the-air, point-to-point transmission is now easy to achieve even

LETTERS TO THE EDITOR

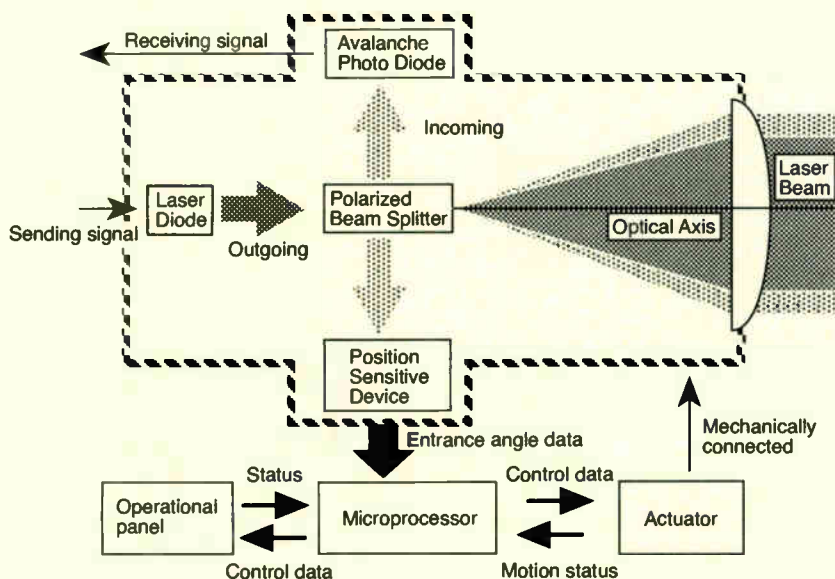
Questions, Comments?

Have something to say about TV Technology? Send your letters to: Readers Forum, TV Technology International, P.O. Box 1214, Falls Church, Virginia 22041 USA

for non-broadcasters. Currently the cost of the Laser Beam Link unit is approximately US\$20,000 per video channel. At this price, the Laser Beam Link can be expected to become a staple at rental facilities. Production users will discover a new degree of creative freedom in using special camera locations and angles that are impossible to achieve with earlier systems.

Peter Gloeggler is product manager, Camera Products Division, for the Sony Business & Professional Group in Park Ridge, New Jersey. He may be reached at +1-201-930-1000. For more information on the product, contact your Sony representative.

LBU-2000 Standalone Operation



Typical Laser Beam Link is illustrated with Sony LBU-2000 system

another requirement easy to achieve with these new Laser Beam Links. As many as eight channels of high quality audio are readily passed by these units to satisfy the most exacting audio requirements. Even more important to many non-broadcast users, the Laser Beam Link is easy to set up, easy to use and does not require a license to operate.

No interference

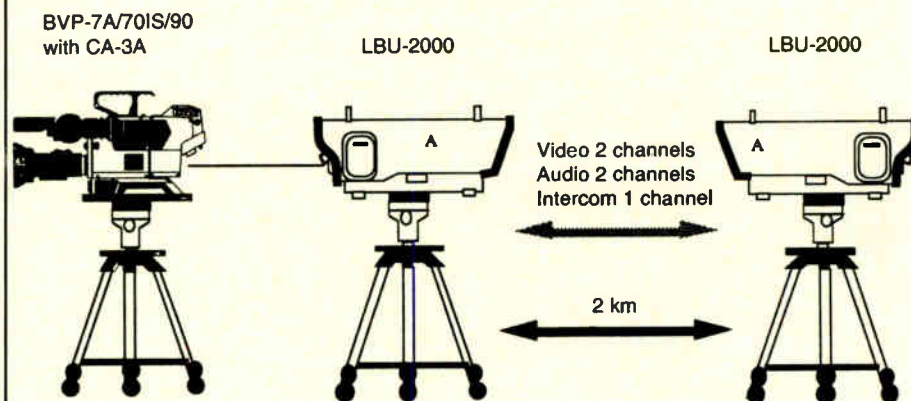
Broadcasters are equally likely to find the unique characteristics of the Laser Beam Link an effective complement to their existing microwave units. All information transmitted on a Laser Beam Link is line-of-sight and virtually impossible to intercept.

If four video channels are not enough, two laser beam units can be placed next to each other to double capacity, without fear or interference. Political conventions and other indoor applications appear to be a natural for these units.

For operation in the field, the low power consumption of the new laser beam units allows extended periods of battery operation. First reports indicate communication is maintained even in fog and rain, to further enhance the usefulness of these units. For operation in harsh surroundings, an environmental housing is available.

Delving into the inside of one of the more recent laser links available, we recognize significant improvements in capability and ease of use. A microprocessor-controlled optical servo system and

Sony LBU-2000 Laser Beam Link Optical Servo System



Sony LBU-2000 Laser Beam Link Optical Servo System

Bi-directional transmission via a laser beam requires the axis of the incoming and outgoing laser beams to be along the same line. The optical servo system of the Sony LBU-2000 is capable of maintaining precise lock of the two beams with vibration and natural phenomenon such as transmission through thermal layers of air with different indices of refraction.

Operation of the Optical Servo System

A polarized beam splitter is used to reflect a portion of the incoming laser beam onto a position-sensitive device. When the angle of incidence of the incoming beam differs from the axis of the transmitted beam, an error signal is generated by the position-sensitive device and applied to a microprocessor. The microprocessor then calculates a control signal that is applied to an actuator. The actuator in turn moves the whole optical block until the incident and transmitted beams again coincide.

TV TECHNOLOGY

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Professional DAT on Location

by Frank Beacham

Part Two of a Two-Part Series

In the drive to replace the venerable analog Nagra tape recorder as the standard for production sound in television and motion pictures, the tiny DAT cassette format is off to a strong start in its first year on location.

Fostex, a Japanese pioneer in time code DAT recorders, and Stellavox, a Swiss maker of precision analog recording equipment, have entered the market, producing professional DAT portables with different design philosophies.

The Fostex PD-2, with a street price of under US\$10,000, is a 10-pound portable crammed with controls and features requested by production mixers. The Stelladat, on the other hand, is a smaller, simpler design featuring a series of modular options. It is priced from US\$12,000 to US\$15,000.

Too much of a good thing?

Proponents of the DAT format for television and motion picture production recording contend the Nagra-D, the competing digital format from Kudelski of Switzerland (described in Part One of this series last month), is too expensive for the market, too heavy, too power hungry and full of unneeded features and capability for the application. And, they counter, the proprietary Nagra-D format is not a universally-accepted industry standard.

"The Nagra-D records to a format that is not supported by any other machine in existence," said Jeff Wexler, C.A.S., a Stelladat owner. RDATE, on the other hand, is universally accepted.

"The Nagra-D is a wonderful machine. It makes much better recordings than DAT," Wexler continued. "Whether we need something that good is still debatable."

No tape noise

Richard Lightstone, C.A.S., a Fostex PD-2 owner, said the 16-bit DAT format offers dramatic improvements in dynamic range and tape noise over traditional ana-

log tape recording. "Most conventional film sound has been recorded on mono Nagra tapes at 7-1/2 ips. Very few production mixers record at 15 ips," Lightstone said. "Now we've moved to the 16-bit digital domain where we have no tape noise at all to deal with."

Having used his Fostex to record location sound in hot, dusty Zimbabwe for the feature "Bopha," Lightstone said the headroom of DAT is more than adequate for the dialogue and effects work that dominates most motion picture location recording.

The headroom advantages of 24-bit



Fostex PD-2

anybody who's found true 16-bit to have any noise or dynamics problem."

Persistent terminology

Jerry Bruck, New York's Nagra-D representative, responds: "Bill Peugh is technically correct when he says there's no such thing as headroom on digital. Because when you've run out of room, you've run out of room; there's nothing left."

"Nonetheless, the term persists in digital," said Bruck. "Headroom refers to how many dB you are going to let there be above the signal level that you nominally want to put on tape. Most people want to leave at least 10 dB of headroom for the signal that comes along that they don't expect. All that happens in digital is that subtracts from the overall dynamic range of the recording."

Bruck said the Nagra-D allows the mixer to run the recorder at a considerably lower recording level than DAT without sacrificing dynamic range. "If you record to minus 10 on your DAT you could record to minus 25 on a Nagra-D and have just exactly the same signal in terms of resolution and dynamic range," Bruck said. "That's what is meant by headroom."

Expected problems

Production mixers with all three digital formats have experienced early software glitches and baffling minor problems in

the initial days of field recording. But such experiences were expected with new, highly complex technology. For that reason, most mixers are now running backup recorders on important productions.

Wexler, a digital veteran who has used DAT on seven feature films, said he was prepared for the initial glitches he had with his Stelladat. "It's been difficult but we've tried to weather the storm and stay in communication with the factory. Despite some mostly software-related problems, the machine has not failed and

is making wonderful recordings. I believe the Stelladat will end up being used by most people and am willing to suffer the growing pains."

Having used both the Fostex and Stelladat, Wexler, however, said neither manufacturer has been as responsive or supportive as he would like. "I feel that way because I'm out there in the field on the line with the machine. On the set everyone expects everything will work perfectly. If someone has to wait 10 seconds while I push some buttons it gets really intense. There is no tolerance at all if the equipment doesn't function perfectly."

One or the other

David Macmillan, an Academy Award-winning veteran of over 40 features, chose the Stelladat over the Fostex. "The Stelladat has a more sturdy, uncomplicated look than the Fostex...more of a straightforward, user friendly machine. You know the Stelladat is a professional machine. You look at the Fostex and still get the feeling it's a Japanese consumer product."

Richard Lightstone went the other way. "I loved the way the Stelladat looked," he said. It's Swiss-made and we're all aware of how good (Swiss-made) stuff is. I did extensive testing of the Stelladat and just wasn't satisfied. I begrudgingly tested the Fostex and it worked perfectly. Everything I wanted was there. It's a high tech plastic case but I found it to be more rugged than I believed it would be."

Wexler chose Stelladat. "The Fostex has an abundance of plastic and controls that just don't feel very solid. They feel as if they will break. The Fostex is a machine that's attempting to be all things to all

people. There are a million switches on the faceplate. The display is very busy."

John Pritchett, C.A.S., chose the Fostex. "I'm totally impressed with the machine. It is virtually flawless. Fostex has been totally behind us. Now, I think the machine is one percent away from being perfect."

Unanimous support for digital

The start-up hassles of the past year aside, the production mixers are unanimous in their belief that digital technology makes their production recordings sound better.

"Digital gives me so much latitude and dynamic range," said Kenn Fuller, C.A.S. "There is virtually no noise floor. The end product is better."

Adds Lightstone: "When you get very low dialogue you are not worried about it getting buried in tape noise. You don't have to ask that the actors speak up."

Billy Sarokin, a New York-based Stelladat owner, even hears a noticeable improvement in his sound at dailies.

"You have much more high end," said Sarokin. "A stereo Nagra starts rolling off the high end around 13 or 14k. The Stelladat is flat up to about 20k. There is no hiss. Basically there is no difference from what is going in and what is coming out."

"I think the basic thing is that while there are problems with digital, the overriding factor for me is that the sound is just so much better," Sarokin said. "And, hey, we are soundmen."

Indonesia '93 Exhibition Is Upstaged

(continued from page 1)

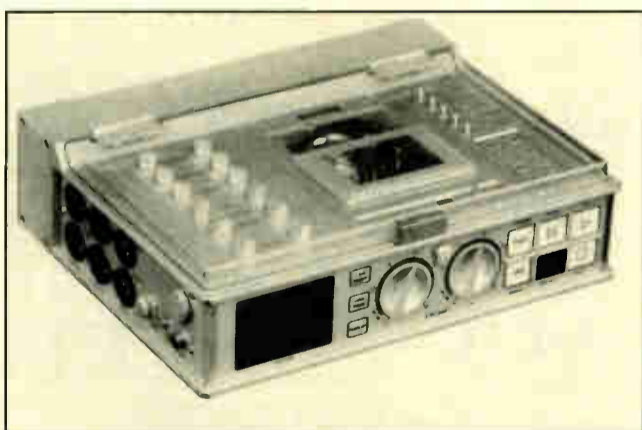
introduction of new products, the Indonesian marketplace is seeing some dramatic changes.

On the path to privatization

The week before Electronic Media Indonesia '93, Minister Harmoko of the Department of Information announced that four more private television licensees were to receive permits to make them national broadcasters. He named RCTI, SCTV, Cakrawala Andalas Televisi and Indosiar Visual Mandiri to join TPI and the state-operated TVRI. The year ahead should see a lot of broadcast construction activity as the new permit holders compete to be the first to place signals into key Indonesian markets.

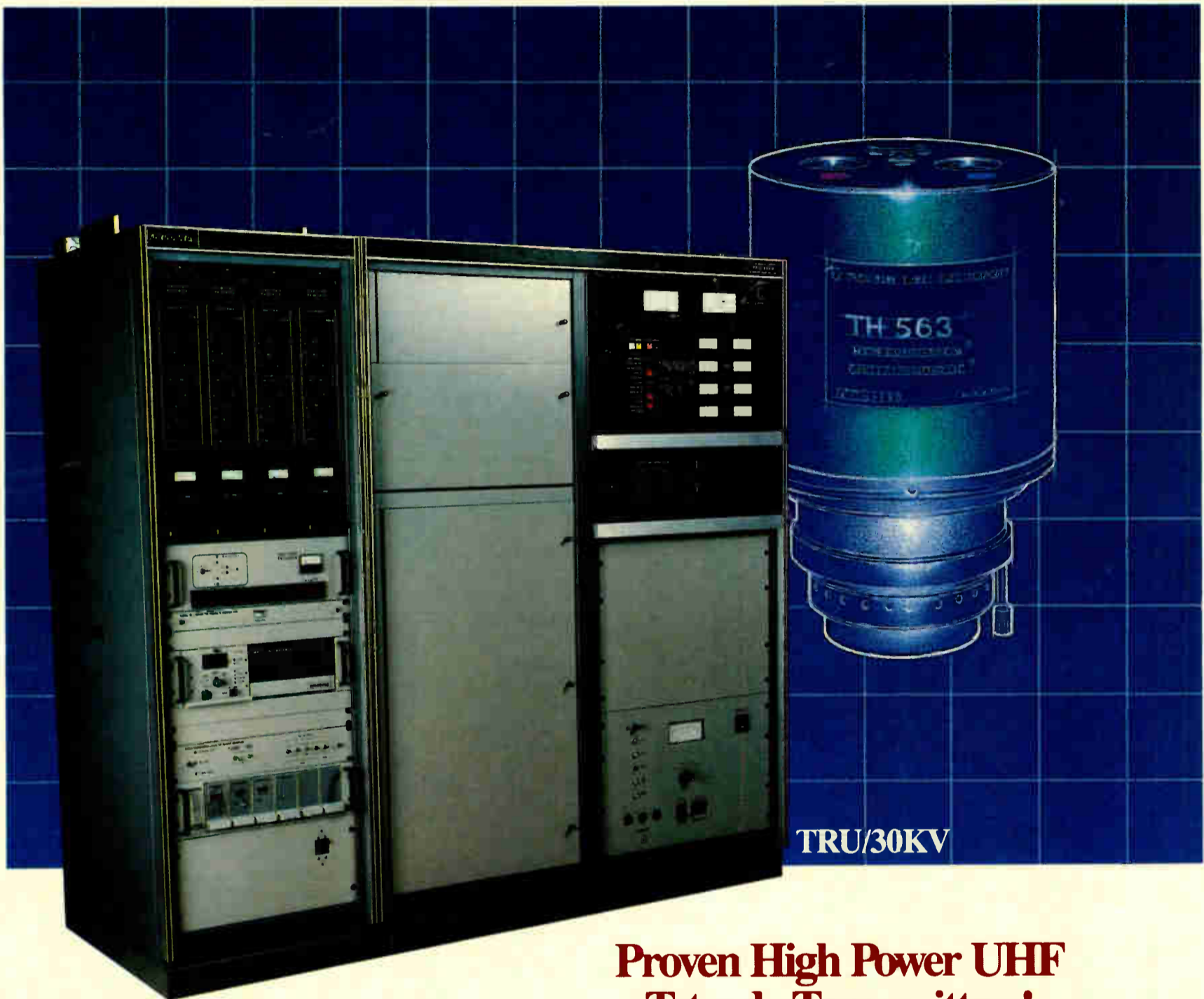
Not all the construction will be for transmission facilities. A few days after Harmoko's announcement, Alex Leo Zulkarnain, Director General for Radio, Television and Film, disclosed that legislation would be introduced that would allow the private broadcasters to produce their own news programming.

At present, the state-operated TVRI is the source of all hard news broadcast on Indonesian television. Competition for advertising revenues among the new broadcasters may go hand in hand with competition for audience share with news broadcasts. 1993 promises to be a year of growth in the development of the Indonesian broadcast industry.



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Transmission, Compression and Tuning

A few days ago, the last Friday in February, I was on the phone talking to Gunter Auerbach from KUBD-TV when he mentioned a big explosion had occurred at the World Trade Center in New York City. Within minutes our news department told me our New York station was off the air, along with every other transmitter in the World Trade Center. Even though I was in Los Angeles, I got the distinct feeling they wanted me to do something to get it back on the air, fast!

I fought my first impulse, which was to call the chief engineer and ask what was happening. I have been in "off the air"

situations enough myself to know the last thing needed is management calling to ask "What's happening and when will we be back on the air?". After things calmed down, I found out smoke had reached the top of the building and all electrical power had been shut off, but there was no damage to the transmission

Many stations have backup transmitters . . . few have backup transmission sites . . .

facilities. Until late Friday, no one knew how long it would be before broadcast operations could resume at the World Trade Center.

Our contingency plan called for shipping backup antennas and a low power antenna to New York as soon as possible. Fortunately, I didn't have to dismantle one of our LPTV sites to obtain the transmitter. Both Acrodyne and Television Technology Corp. (TTC) had transmitters they could ship us within 48 hours. As it turned out, none was required; power was restored to the World Trade Center late Friday night.

Transmitter backup

This exercise got me thinking about backup capability if a site is lost. Many stations have backup transmitters. Some have backup antennas. Few have backup transmission sites. I'm considering putting together an "emergency restoration" package using a frequency agile transmitter operating at 1 kW. Higher power would be nice, but the size and weight of the power supply would make it difficult to ship via air. It will probably use a tube, since tubes offer high gain and are easily tuned over the band. Tube transmitters also tolerate wide temperature variations better than solid state designs. Most high power solid state LPTV designs I have seen are optimized for a particular frequency range.

We have to consider the antenna part of the package too. The antenna has to be able to work on all channels and be small enough to ship by air. I found that it was impossible to find any company that could ship a 21-foot Scala SL-8 antenna we had in California to New York City by air over the weekend.

Fortunately, I had some panel antennas available. Panel antennas are easier to ship and can be made wide band. Sira (sold by Micro Communications Inc. in the U.S.) and Kathrein offer wide bandwidth panel antennas. These look like the best compromise. The individual antennas are small and can be combined for different patterns as required. Kathrein's turnstile is even self-supporting. A small satellite dish and receiver would complete the package. Monitoring equipment would consist of a tunable TV set with video output, a waveform vectorscope and test generator with ID generator.

Video compression, again...

It seems like every day brings news of a new development in video compression. I have even seen articles talking about running movie quality video over conventional phone wires using compression.

One thing is clear, the use of video compression for satellite transmission is growing fast, even though a standard has yet to be decided on. The Telecommunications Inc. (TCI) order for a million cable decoders from General Instrument and AT&T seem to be heading toward a standard they call MPEG 2-EP. MPEG 2-EP does not use B frames and hence requires slightly less video RAM. B frames are used for bi-directional compression.

Other users are heading for an MPEG 2 standard that includes B frames. None of the existing systems fully comply with MPEG-2 standards. PanAmSat is looking to video compression to increase its channel capacity into South America. Industry rumors have PanAmSat choosing a different compression system every other month, or so it seems. By the time you read this, the final choice should be public. In Mexico, TeleRay is installing General Instrument's compression equipment at its uplink site for use with the MultiVision cable network.

It is likely the systems being installed

I used the Mini-Circuits ZFM-2H, however, other mixers should work as well.

Be sure to check the power handling capability of the mixer. The ZFM-2H can handle up to +14 dBm on the IF (video input in this application) and RF ports, and up to +17 dBm on the LO port. The LO port of the mixer is connected to an RF source centered on the frequency of interest. The video sweep from the sideband adapter mixes with the carrier frequency on the RF port to generate an RF signal swept around the carrier frequency.

Using the mixer

Here is a practical application for the circuit. If you are using any sort of tube type transmitter, you have had to sweep the tube cavities for flat video response. The most common way to do this is with a sideband adapter connected to the video input of the visual exciters. If the exciter permits the vestigial sideband (VSB) filter to be switched out, the transmitter response over a wide frequency range is easily measured.

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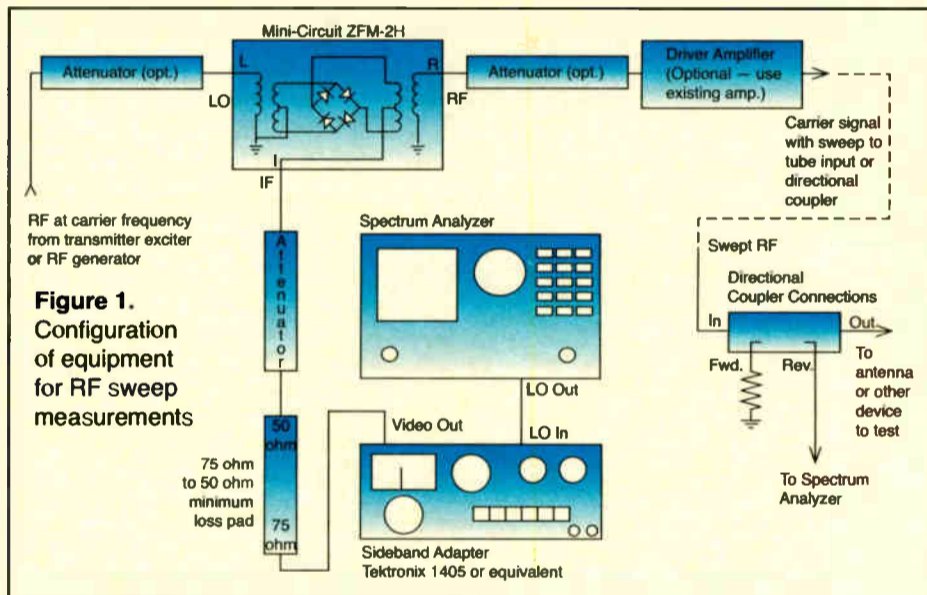


Figure 1.
Configuration of equipment for RF sweep measurements

today will be outdated with new compression technology by the end of 1993. At present, the cost of encoders is still very high. If the prices drop as expected, look for SNG operators to start using video compression to squeeze more signals on one transponder. If the cost of a video channel drops proportionally, SNG will become a viable option for TV stations wanting wide area news gathering capability without the capital investment in microwave relay sites.

Sideband adapter/sweep generator

Back to more practical matters: I was impressed with the method Acrodyne's Steve Blissett used to check the antenna system at our LPTV installation in Odessa, Texas. I have found most TV stations have a Tektronix 1405 sideband adapter and a spectrum analyzer. This combination does such a good job that few stations bother with sweep generators now.

The engineers at Acrodyne borrowed a technique originally used by Harris for doing a broad band sweep of RF systems, including tube cavities and antennas. It can also be used to check the response of the aural transmitter, something that is difficult to do without a sweep generator, markers and patience.

The setup is simple. Refer to Figure 1. The video output of the Tektronix 1405 sideband adapter is applied to the IF port on a doubly balanced mixer. For my setup

Problems develop when the VSB filter or other items such as linearity and group delay correctors in the exciter cannot be switched out.

The mixer comes in handy here. Remove the video from the exciter and switch off any sync adding circuits so that nothing more than a carrier comes off the exciter. This method will work with sync on, but the display is cleaner with it off. Some exciters kill the RF when video is removed, so it may be necessary to move a switch or jumper to get it back. Since the spectrum analyzer will be tuned to the output frequency of the transmitter, we need to grab the RF at visual carrier frequency. This will be after the upconverter.

Connect this to the LO input on the mixer. Most doubly balanced mixers cannot handle more than +13 dBm (about 20 milliwatts) and the common rating is only slightly more than one milliwatt, so either insert the mixer before the upconverter's output amplifier or use pads to reduce the drive to a safe level. Connect the input of the next stage to the RF port on the mixer. In other words, put the mixer in line with the RF going from the upconverter to the next stage.

The normal video out of a sideband adapter is about one volt. One volt into a 50 ohm load is 20 milliwatts of power, or +13 dBm. There are a couple steps you can take to protect the mixer. Turn off sync; it

should not be needed on a broad band sweep. Lower the APL below 50 IRE. Use a 75 ohm to 50 ohm minimum loss pad to match the video output of the spectrum analyzer to the somewhat reactive 50 ohm IF port on the mixer. A 6 dB pad will drop the maximum power down to +7 dBm. For best response, use a 3 dB or greater attenuator on the RF and LO ports as well. This will reduce the effect of mismatches. It will also reduce the power applied to the tube and cavity—which is advisable if you are tuning it for the first time.

When using the mixer, spectrum analyzer and sideband adapter tuning is the same as when using the visual exciter. The difference is that the output from the mixer will have a frequency response comparable to that of the sideband

over a 15 MHz or wider frequency range. Depending on the coupler, you might have to run the output of the mixer through one of the transmitter's wide band, low level driver amps to get a clean indication on the analyzer.

Several companies make wide band doubly balanced mixers. I used Mini-Circuits because you can order from them in small quantities and they take credit cards. The ZFM-2H comes standard with BNC connectors. Other connector options are available. Mini-Circuits main number is +1-718-934-4500. You can reach Mini-Circuits' distribution center in North America at +1-417-335-5935 or in Europe at +44-25-283-5094. In South America, contact HiTech in Brazil at +51-11-531-9355.

Mini-Circuits' Yokohama number in Japan is +81-4-5545-1673.

That's all the space for this month. Next month I'll give you details on an inexpensive isolation amplifier that can replace expensive chopper/transformer isolation boxes in transmitter remote controls. I'm still working on the 10 MHz frequency standard that can be calibrated directly to WWV (or other frequency standard stations outside the U.S.). My goal is to make the design easy to build, but sensitive enough to work with a piece of wire thrown outside the transmitter shack. If I succeed, look for the cheap, simple design next month.

I'll also pass along some information on what to expect from and how to participate in the Broadcast Professional's

Forum on CompuServe. Several manufacturers now have representatives there and engineers from around the world share ideas and information.

As always, I invite your comments. Suggestions for column topics are welcome, as are your tips and techniques for RF work with TV transmitters, satellites or microwaves. Don't worry about putting the tips into perfect prose. Hand draw the schematic, make a few notes and mail or fax them to me. The best way to reach me is through CompuServe, ID 70255,460. I can also be reached by telephone at +1-305-884-9664 or +1-818-502-5739. The second number has voice mail. Mail comments to me at 2265 Westwood Blvd., Suite 553, Los Angeles, CA 90064 USA.

RF TECHNOLOGY

by Doug Lung

adapter. This can be useful when trying to locate frequency response problems or off channel resonance.

Tuning the aural tube

The mixer will modulate any carrier frequency with the sweep signal. I find it most useful in tuning the aural tube. Stereo and multichannel audio systems demand a flat response around the aural carrier. There are several ways to test this response. One quick method is to overmodulate the FM carrier with a loud tone so that a lot of sidebands are generated outside the normal bandwidth. Do not try this on the air!

This method quickly shows if the response is sloped high or low, but it is not easy to use to see if the overall response is wide enough. Modulation Sciences includes a noise generator in its "SideKick" subcarrier and pro-channel generators that does a more elegant job of displaying response on a spectrum analyzer. These methods are fine for fine tuning a klystron or tetrode but do not have a wide enough sweep to see responses removed more than a couple hundred kilohertz from the carrier. They are useless for tuning a klystron, where the penultimate cavity needs to be tuned 6 MHz above the carrier.

The little doubly balanced mixer works well for these adjustments. A clean source of aural carrier is easy to obtain—just remove all the modulation from the aural exciter and use it on channel output. The hook-up is the same as for the visual exciter sweep discussed earlier.

You will find that it is difficult to see frequency response very close to the carrier using this technique. The sweep is generated at a TV line rate in the sideband adapter and does not really go all the way to zero. I suppose an audio sweep generator could be connected to the mixer for this close-in sweep, but I have not tried one.

Testing the antenna system

At the start of this discussion I mentioned Acrodyne used this mixer to test the antenna system. Apply the wide band sweep from the mixer to the antenna through a directional coupler (the one that is used on the transmitter for measuring reflected power may work or, for more accuracy, use a calibrated lab type directional coupler like those made by Narda).

Connect the reflected port on the coupler to the spectrum analyzer and view the return loss of the antenna system

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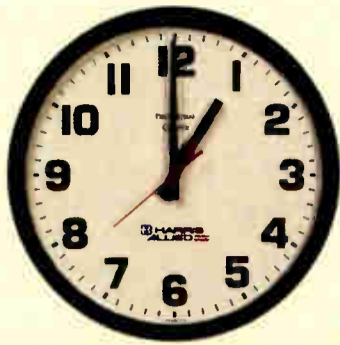
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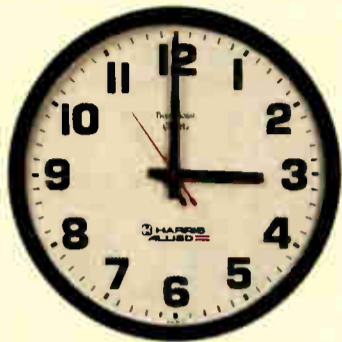
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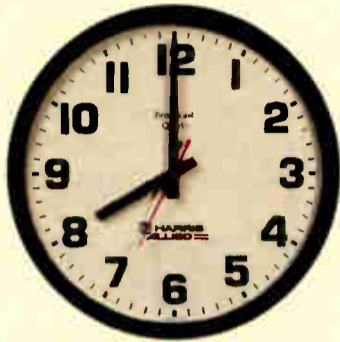
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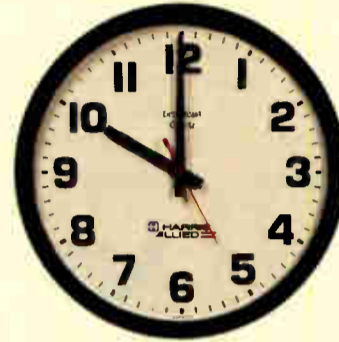
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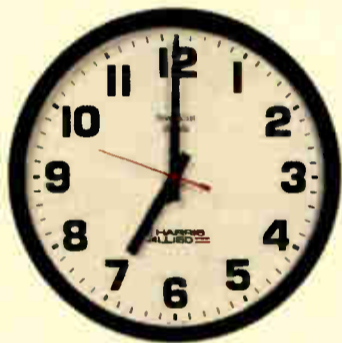
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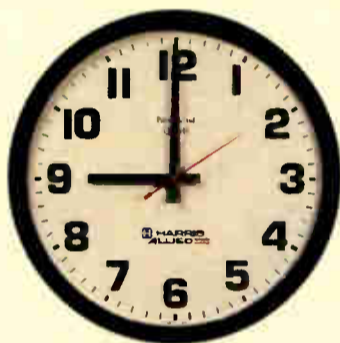
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Taking a Look at the Compressed Picture

(continued from page 1)

cable companies see allowing them to compete directly with video stores by offering movies-on-demand is Guess-what.

The instantaneity of trade press publishing not having reached its quantum efficiency, I gotta write this piece before the NAB show, but I don't think I need a souped-up crystal ball to say that the hottest products at Sony's booth will all be based on compression: Digital Betacam, the 4:2:2 front end for a D-2 machine, and the 4:2:2:4 front-end for a D-1. That's for one of NAB's oldest and largest exhibitors. Now I'll rub my orb for a look at one of NAB's first-time exhibitors, ImMIX. Their Video Cube "on-line" non-linear post production system would be impossible without compression.



by Mario Orazio

Masked Engineer

Have I made my point yet? No? Okay, fasten your seat belts; this next sentence will go fast. Compression is at the heart of all four U.S. HDTV digital plans and those in Europe and Japan (I'm afraid I can't speak for such other centers of HDTV research as Bhutan and San Marino), JPEG, fax, full-motion video CD-I, DS-3 video, MPEG, DVI, CCITT H.261 (or, if you prefer, px64), T-1 video, Microsoft multimedia (or anyone else's, whatever the heck *multimedia* means), any phone-line-based videoconferencing system, NVOD (near video-on-demand for you non-cable types), Apple's QuickTime, non-linear editing, Vyvx, CableLabs, all IBM film and video projects, DCT, the new PBS satellite plan, entropy-coding, "video dial tone" (telco entry into video-to-the-home), DBS, disk-based digital video origination, distance learning networks, and a whole mess of other stuff kicking around in the hollow space between my ears.

If I still haven't proved to you that compression is today's most important TV technology, might I suggest that you turn to some more fundamental literature? Perhaps *Dick and Jane at the Seashore*?

What is It?

Okay, here comes the part that's driving me nuts. Compression is It, but no one seems to know anything about compression.

Lookee: I don't need a crystal ball to make the following, guaranteed predictions: Your VTRs will break. Someday you will want to replace them.

There. I've let the cat out of the bag, again. So you looked around NAB and saw a bunch of new VTR formats, only one of which (D-5) ain't compressed. You think tape is old hat? You plan to make your quad machines last until you're happy with disk-based recording? Hey—I don't mind. Lemme see. Panasonic and Pioneer have some previously-introduced uncompressed systems, but if you didn't like those before,

I suspect you're waiting for something new, and I'll bet drachmas to donuts that new stuff will be compressed.

I write from personal experience here. Like I said, I'm frustrated. See, before I buy an uncompressed system, I like to give it a once over, just to see how it looks. I'll run the usual test signals to get objective results, and then I'll give the pictures a look-see, just to make sure I'm not missing something. When I plunk down someone else's hard-earned cash, I like to have some confidence that I won't get yelled at.

Handy advice

With compression, all bets are off. You might want to have the following sentence tattooed on your buying hand: *There is no test signal that can guarantee the picture quality of a digital video compression system.* Okay, maybe it's a little long to ink into the back of your hand,

but it wouldn't hurt to memorize it.

I don't care what you try—NTC, EIA, FCC, EBU, CCIR—there is no test signal yet invented that can objectively prove compression picture quality. Some folks have a hard time swallowing that, but it gets worse. There is no single pictorial sequence that will even *subjectively* prove compression quality. I've seen clips characterized as mean compression busters go right through some systems, when a few frames I thought were innocent enough make the same system have a fit. And vice versa, unfortunately.

Channel 4 in Britain needed to pick a new VTR format last year. They picked D-5 because they just weren't sure about DCT or Digital Betacam. Hey, I can accept that. But I can also see a day when there won't be an uncompressed choice (heck, if you want to do HDTV transmission to homes, that day is today).

About the only thing you can do to *guarantee* that a particular compression technique will work in your application is to watch every single sequence you will ever pass through the compressor and to perform every type of processing (including more compression) you will ever perform on those signals. Let me translate that into simpler words: There are no guarantees. That may be why Channel 4 went for D-5, but, as I said, uncompressed will not always be an option.

So, what I try to do instead is learn as much as I can about the compression systems in question. The fact that it does intraframe processing instead of interframe doesn't mean there won't be motion artifacts, but it lets me know what kind of stuff to look for. DPCM does different things than DCT. Different buffer sizes, motion estimation search ranges, and perceptual models mean different kinds of pictures will get through in different ways.

I once had a heck of a time selecting a compression system for a particular application. I got to sit down with the

system's designers, talk things over, toss out questions, and even look at some sequences *they* figured would mess things up (I was able to decide that some of those, like one with random noise keyed onto chroma and motion varying color ramps with a perspective character scroll, the whole thing dissolved onto more noise, were not likely to be a regular occurrence for my application).

Yeah, I was a little frustrated that I couldn't run some particular thing through the system and make a buy/no-buy decision, but I had a reasonable comfort factor after finding the compression artifacts and assessing their objectionability (remember, home viewers currently contend with cross-color, cross-luminance, line twitter, group delay, and a mess of other problems, and that's when their sets are properly adjusted). What's getting me *really* frustrated are some more recent conversations.

"No, I don't know all the details of our compression technique, but it has *no effect whatsoever on any picture.*" "I'd love to show you pictures that generate artifacts, but we've tried *every* type of picture, and *nothing* causes any problems." *QXJ!* I was going to write something like *hogwash*, but I didn't want to offend pigs or pig farmers. Consider *QXJ!* to be an angry expletive, and save this column for the next time you want to cheat at the game of *Scrabble*.

Here's a true statement you are welcome to fling back in the face of any salesperson who offers *perfect* compression: Random noise cannot be compressed. Period. So there's no compression system—built, designed, conceived, or even not-yet-dreamt of—that can *perfectly* compress random noise by any factor, not even NTSC's famous 1.001:1.

Lookee: I don't need a crystal ball to make the following, guaranteed (prediction): Your VTRs will break.

Of course, it probably doesn't matter whether or not random noise can be perfectly compressed. Imperfectly compressed random noise may look just as good as the original (maybe better), and how likely are you to transmit random noise and want it compressed?

I hope you're starting to get the idea. No compression system is perfect, but if you know how a particular system is imperfect you might just find you can live with it.

Oh, yeah. Naked pixels. I still say compression is *The* technology, but that doesn't mean I get frustrated only when dealing with compression. Perish the thought! Take this word that gets bandied about all the time in computers, video, and computer video: pixel.

It's simple enough, right?. Pixel is a contraction of the words *picture* and *element* (image scientists sometimes contract even farther and discuss *pels*).

On that and this, most people will agree: All else being equal, more pixels means more detail resolution. A picture with 400 x 400 pixels has twice the resolution in the horizontal and vertical directions as one with 200 x 200 pixels (honest—I wouldn't lie to you—well, not intentionally).

What doesn't work is when folks keep subdividing until, *reductio ad absurdum*,

they end up with a naked pixel that's one 400th as wide or as high as an array of 400 x 400 pixels. Like I said at the beginning of this harangue, there ain't no such thing as a naked pixel.

If you infer from my implication that pixels always wear clothes, you're sort of right (though you'd be a little righter if you inferred simply that single pixels always take up more room than they're supposed to).

One of my favorite quasi-pornographic pictures is one shot by HDTV engineer extraordinaire C.R. Caillouet. It's a single pixel, as naked as it gets, shot off a Trinitron screen, and it looks more like a post-Impressionist mural than anything you'd find in a computer video manual—a whole mess of colored lines, not an infinitesimal white dot or a perfectly-edged small white square.

I heard Charlie Poynton of Sun Microsystems showed the photo at a SMPTE tutorial he gave on pixels in February. I'm told he also showed how black pixels look different from white. Alas, I was committed at the time (no comments, please).

The SMPTE winter conference, which followed the tutorial, also had another lesson from Thor Olson of Management Graphics about what happens when you start packing pixels together. I don't think Charlie or Thor think they know all the answers yet, but they've at least been offering their above-average knowledge at SMPTE sessions. What I find frustrating is that no one's listening (well, almost no one—I hear attendance at the SMPTE winter conference was in the range of a couple hundred).

Anybody home?

Doesn't anyone out there want to understand TV technology any more? Are we going to buy compression systems and

naked pixels from sellers who want to keep us in the dark?

I just got my hands on a brochure for a product Grass Valley is introducing at NAB, the MCF (multi-channel fiber) system. Hey—12 videos through a fiber sounds interesting, right? So I turned to the specs.

Audio sampling rate: 48 kHz. Check. Video sampling rate: 31.054 MHz. Whuz-zuh? We're talking around eight-and-two-thirds fsc for NTSC, just over seven for PAL (seven would be 31.035). There ain't any relationship to CCIR-601 that I can detect, and my meager knowledge of telcos offers no help, either. I can't even think of a misprint that would make sense. And I am *not* making this up.

I ain't frustrated, yet. So far, I'm just intrigued. At NAB, I'm gonna ask questions and find out where 31.054 came from. If I hear, "Well, I'm not sure, but it's the *perfect* sampling rate for multichannel video through a fiber," then I'm gonna get frustrated. Or maybe something 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.

Tips for Lighting a New Studio

Selecting the lights for a new television studio requires that we know what the initial use of the studio will be. Using heat-load sketches and adding any new "show" information we have gathered, we draw a cleaner ground plan of every set to be used, even though we still have to guess at what some of them will look like.

After drawing the ground plans of the sets, sketch in the lighting instruments in a fairly lavish way. Remember to include lights for entranceways, scenes outside windows, chromakeys and a graphic camera setup.

The 2000 watt fresnels for main keys are easy. The 1000 watt fresnels for back lights and wall accents are where we may underestimate. If the cameras are new, we may choose to lamp the 2Ks with 1K lamps and the 1Ks with 500 watt lamps to retain the lens spread of the larger units. A 15 cm fresnel with a 1 kW lamp does not match the field coverage of a 25 cm fresnel with the same 1 kW lamp.

This first list of lights should include everything you can think of. It will be expensive, but you may have trouble finding the money to add later on. The bare essentials will be expensive already, so go for the extras. If you find a brand that is much cheaper than big-name manufacturers, be careful—the light may come out the front just like the big brands, but you will waste a lot of time making adjustments and repairs (that is, if you can get parts).

Inclusion ideas

Include accessories with every light: eight-leaf TV barndoors, color/diffusion frames and full- and half-screen sets. Plans for the studio have to include a storage area for extra lights and especially all the accessories. There should be space for flat storage of colors and diffusion with a cutting surface handy.

Include in your first list several gobo stands and arms as well as several sizes

of rolling floor stands. Be sure to check lighting manufacturers' catalogs for stands and grip equipment. Hasty setups for public service announcements and commercials with minimum camera movement can be much hastier when your lights are on floor stands. It is simple to move a floor light to exactly the

A dimmer-per-circuit setup eliminates the need for a bulky patch panel . . .

right position on camera rather than shift an overhead or compromise with an overhead that is almost right.

I will expect to hang approximately 90 percent of the lights on rods at a height lower than the catwalk or moving pipe or grid. Exceptions are cyc lights and steep scenic accents.

Attachment apparatus

The method of attaching the light to the rod is another option for speed. The rod may end in a stirrup to which the light may be attached with a pipe clamp. The rod may end in a spud to accept the hole in smaller lights, or a hole to accept the spud of larger lights.

With both of these, the light is only secure after the handle is locked tight and a pin inserted in the spud. If all of the lights are to be hung from the grid, this system is a little clumsy. If we expect sometimes to use lights on floor stands, the spud system offers the quickest conversion from grid to stands.

The spud system is most common to Mole-Richardson lights, which are basically manufactured for use in film studios in Hollywood, where the instruments are mounted vertically on stands,

trombones and on catwalks. Most manufacturers offer pipe clamps as standard.

The most important thing is to have every light hanging in the studio carry the same fitting so interchange is fast and efficient. I would recommend a separate group of lights on rolling stands that will never be used in the hanging position. These would include at least one 5 kW fresnel, four 2 kW fresnels, eight 1 kW fresnels, two 4 kW softlights and four 1 kW baby softlights.

For control, I want to have a dimmer for every circuit. This means that every outlet is connected to its own dimmer. Outlet 148 will respond to activation of dimmer 148. The dimming control console may have fewer control channels than there are dimmers.

There is no limit to the number of dimmers assigned to one channel. Twenty circuits (dimmers) of blue cyc light can be assigned to channel 1, 20 circuits of amber cyc lights can be assigned to channel 2, etc. For precise control, single lamps and back light can each run on their own channels.

The major cost of installing a "dimmer-per-circuit" system is the wiring and dimmers. The computer console that controls dimmer assignments with a simple keypad and assembles and memorizes cues is relatively inexpensive for the size and complexity necessary to handle most television shows. I would only expect to need perhaps 10 cues for an interview show with occasional musical performances. Even modest consoles can handle 100 cues.

Subtle cues

Remember that a lighting cue does not necessarily mean a change from day to night, although it could. Most cues involve subtle changes in only a few dimmers to alter the balance of a scene, such as when the weatherperson crosses from the chromakey area to the anchor

desk to stand chatting with the anchor people. The problem here is writing, not lighting.

A dimmer-per-circuit setup eliminates the need for a bulky patch panel and its attendant quirky maintenance problems. All patching of outlets (dimmers) is done electronically into the control channels. Most new systems offer an additional remote keypad on a long cable so lights can be patched and lighted from the floor without having to have a person sitting at the console during lighting.

In outfitting a studio, I can hope to acquire such a system as long as I can demonstrate savings in time, manpower and money. A remote location for the dimmers must be included in the plans. The dimmers may be 2.4 kW and 6 kW in size and come in racks of up to 96 dimmers each. A rack will occupy approximately two square meters of floor space and stand about 6 meters tall. Access to all sides for air flow and maintenance is essential.



by
Dave
Clark

FOCUS ON

LIGHTING

The dimmer room also must be air conditioned and clean. The reason for the remote dimmer room is that even the latest dimmer designs produce some RF hum, which can cause serious audio problems. The path of electrical lighting power in the studio must avoid running near the path of audio lines. This includes temporary lines on the floor for a specific show. We do not get much credit for a beautifully lighted singer if we cause distortion in the song.

Mind your A's and B's

In all of this planning, remember that the budget will have to be cut at least once before the studio is on line. Make an "A" list of everything and a "B" list of essentials. Keep the B list to yourself until you find you cannot afford everything on your "A" list. I would try to keep the grid system you like and the dimmer-per-circuit setup on the B list. These are elements that are more expensive to have to change later; it is less expensive to add missing lights.

You can include several 6 kW now-dim power sources to handle work lighting loads and to save some dimmers. The dimmer rack may have some empty spaces at the start, but they can be filled in later. If the grid is not right from the beginning, you will be in immediate trouble finding the perfect position for your fewer lights. But this will be our secret. Just do not get stuck with cheaper lights from some disco catalog rather than fewer good ones. You will hate yourself later.

David M. Clark is lighting director for Imero Fiorentino Associates in New York. He has won two Emmys and received numerous additional nominations for his work, and he is also a creative graphic artist, photographer and scenic designer.

Make Your Copy Camera Efficient

If your copy camera is being used in its macro setting, you cannot easily adjust image size with the zoom function. However, by spending \$US50 to \$US100 on a close-up lens you can regain control of the zoom feature and speed up your production.

Most cameras on a copystand require the macro setting on the lens in order to focus close enough on the image. When in macro, however, you are no longer able to zoom to adjust size. To change the image size, you must move the camera up or down and readjust the macro-focus setting.

If you need a particular size image in your production, you might have to make several attempts to get the size just right.

A simple and affordable solution exists: a close-up lens, which is readily available from a dealer who handles 35mm cameras and accessories.

The lenses of the set are numbered +1, +2 and +4. These numbers are in diopters. A lens of X diopters will focus at 1/X meter when mounted in front of a normal lens whose focus is set at infinity. The normal lens is the one you have on your copy camera now.

Use of these lenses will let you focus your copy camera without using macro. You can zoom instead of moving the camera to change size.

A lens set may be bought in two ways: thread in (millimeter size) or drop-in (series size). It is easiest to have the dealer order the size that threads into the front of your lens. These

lenses use the same threads at the front of your lens that the sun shade mounts into.

This size should be in your manual, or just take the lens to the camera shop for a fitting. There are two types of lenses: common (the type usually sold at camera stores; typically \$US50 to \$US100, depending on size and brand); and flat field-corrected (these will require special order and are more expensive).

If absolutely sharp focus at the edges is required, you will need the flat field-corrected lenses.

Here is how to set up a system: thread a +2 close-up lens into the standard lens (if you want to work at approximately 1/2 meter); set the standard lens at infinity; move the camera toward the copy board until it is in focus and then move it just a little closer; then focus normally. To

ensure accurate focus, the focus ring should not be at a limit.

Then place the artwork, and check the focus and zoom for the correct size. You can now get the required image size quickly.

You will recover your initial cost in just a few jobs because of increased productivity.

Two lenses can be mounted at the same time for even closer working distance. For more information on close-up lenses, consult a good photography book.

TECH TIP

by Larry Albert

Larry Albert is the TV engineer at Murray State University in Murray, Kentucky. Albert believes "cheap engineering" is an acceptable term and is a self-professed "cheapskate."

Understanding Your Camera's Controls

Those Who Are Not Familiar with A Camera's Internal Controls May Not Understand Its External Ones.

These days, news videographers need do little more than point and shoot in order to capture broadcast-quality images. Sophisticated automatic exposure systems and the rugged reliability of CCDs make it virtually unnecessary for anyone who shoulders a state-of-the-art portable camera to think about the technical side of videography, let alone remove the covers to perform maintenance in the field.

This is good news for videographers who, unencumbered by the need to perform simple maintenance chores such as setup and registration, and unhampered by the need to think about what is going on within the camera on their shoulder, are free to focus on the more creative aspects of photojournalism.

It is good news, too, for maintenance engineers who cringe at the thought of non-technical personnel removing the covers from their cameras. But while news photographers may be grateful to find their tiny green-handled screwdrivers have become the electronic equivalent of

VIDEOGRAPHY

by John Premack

the buggy whip, and maintenance techs no longer spend hours undoing the havoc wreaked in moments by well-intentioned "newsies," there is a negative side.

Understanding controls

Videographers who do not have to get intimate with a camera's internal controls may never fully understand the function of the controls on the outside of the case, either. In addition to the white balance button, most cameras have external controls for power, gain boost and filter selection.

Some cameras also have switches to allow selection of alternate white balance settings, color bars and DCC or video stretch circuits. This month, I will take a look at these camera controls, explore their functions and examine their usefulness.

Let us start with the power controls. The master power switch does exactly what you would expect. Turn it off and everything stops. Often located behind the videographer's ear on either the recorder control panel or the aft portion of cameras without attached recorders, this is one control that is not conveniently located for on-the-shoulder operation.

While this awkward location appears to be primarily a design convenience (adjacent to the rear-mounted battery and power connector), locating this switch away from the other camera controls does prevent the videographer from inadvertently shutting the camera down while fumbling for another function—not an uncommon occurrence when several tiny switches are crowded little more than a fingertip's width apart.

Next is the standby switch. Does anyone actually use it, or is it just something else to bemoan when you hit it by mistake? Switching a camera into standby

mode shuts down the recorder while leaving the camera fully powered. While this conserves some battery power by not idling the recorder's motor, the main advantage is that the recorder heads stop spinning, eliminating unnecessary wear to both the heads and the tape.

On some cameras, pressing the record button while in standby automatically powers up the recorder and begins the record process as soon as the heads are locked up, usually within two or three seconds.

Does anyone actually use (the standby switch) or is it just something else to bemoan when you hit it by mistake?

On other cameras, particularly older tube-equipped models, the switch must be flipped from standby to operate before a recording can be made. If the viewfinder stays dark after the master power switch is turned on, or the recorder doesn't roll the instant the record button is pressed, chances are the standby switch is in the wrong position.

Many non-CCD cameras have a second standby mode, sometimes called preheat, which cuts power to everything except the filaments in the pickup tubes and the viewfinder. The preheat mode allows the videographer who is waiting for a shot to conserve additional power by shutting everything off except the non-solid state components, which require time to warm up.

As a news videographer, I have little use for either standby mode. If I want to conserve power, I shut the camera off. If I'm waiting for something to happen and can't afford to miss the shot, then I can't gamble that I'll have a few extra seconds to wait for the recorder to run up to speed. The amount of power actually saved on standby with my CVR-300 Betacam doesn't justify being only half ready.

Gain gets a boost

Although the standby switch is of questionable utility to a news photographer, most of us couldn't live without the gain boost switch. Useful when shooting in low light, this feature increases the level of the video signal coming from the chips or tubes by switching in additional stages of amplification.

It is extremely helpful when a videographer cannot get enough lighting gear to raise the illumination level of a large area or for those times when using auxiliary light is either impossible or inappropriate.

Sometimes called the "dB switch," the three-position gain boost control usually offers a choice of 0-6-12 or 0-9-18 dB. Some CCD cameras allow the user to select the amount of gain each click of the switch produces. My Ampex CVR-300, factory set to deliver 0-9-18, can be easily reprogrammed to provide 12 and 24 dB, an option that is particularly useful on gritty night-streets spot news stories and investigative surveillance shots.

Because there is no advantage to dialing in more gain than is needed, it is important

to understand the relationship between dB values and the *f*/stops on a lens.

Pulling out the stops

Just as opening the diaphragm of a lens one full stop (i.e., *f*/4 to *f*/2.8) doubles the amount of light reaching the tubes or CCDs, switching in 6 dB of gain increases the video signal by a factor of 2. And if 6 dB is the equivalent of one *f*/stop, then 9 dB equals one and a half stops; 12 dB equals two *f*/stops, etc.

When selecting a gain setting, it is possible to use the *f*/stop calibrations on a lens in lieu of a waveform monitor to determine how much gain is required. To do this, first note the position of the iris ring at the rear of the lens with the gain boost switch set to 0. Unless the camera

already has enough light to "make level," the diaphragm will be wide open.

Set the iris control switch on the lens to automatic and keep an eye on the *f*/stop markings engraved on the iris ring. If switching in an additional 9 dB of gain (one and a half stops, remember) results in the iris closing more than one *f*/stop, it is a safe bet that you will have an acceptable picture without the additional gain.

If the iris just barely begins to stop down, the amplification increase is obviously required. If the diaphragm does not move at all, switch to the highest gain setting and see what happens.

Thomson Broadcast Implements New Company Structure

CERGY SAINT-CHRISTOPHE, France Thomson Broadcast has formed new company groups to emphasize product policy and development and enhance services. The changes were announced by CEO Francis Hericourt and General Manager Arnaud de Panafieu at the company's annual sales meeting in January.

Three new groups were created: Cameras & HDTV, headed by Francis Delmas; Mixers & Studios (including switching products), headed by François Lainée; and Automation & Workstations/Processor-based Products (including compositing systems, still stores, master control rooms and standards converters), headed by Patrice Fournier.

Jean Pierre Lacotte heads the Systems Group, which includes systems engineering, design and installation, as well as customer support, after sales service and spares.

Manufacturing and joint development resources have been regrouped into the Industrial & Technical Group under Bernard Pierre Brunier. The Sales group, which is not affected by the changes, is now headed by Jean-Claude Rousseaux.

Of course, the gain boost switch should be considered a supplement and not a substitute for a lighting kit. Video recorded at a camera's highest level of gain boost is often noisy, with solid blacks replaced by fuzzy grays. Also, "making level" is not the same as making people look good. Pumping up the gain does nothing to erase those unsightly facial shadows thrown by overhead lights.

John Premack has been chief cameraman at Boston, Massachusetts's WCVB-TV for 14 years and has been covering stories on a daily basis for a quarter century. He can be reached by writing to TV Technology.

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Manipulating Light and Shadow

Controlling light is important for today's creative videographer. "Quality" of light is far more important than "quantity" of light. The ability to manipulate light and shadow is a skill every video imagemaker must learn.

The artistic application of light can transform a bland, flat two-dimensional television image into a compelling three-dimensional illusion. The modeling and shaping of an image with light is one area in the video production process where art overshadows science.

Proper equipment

Most video crews have some basic lighting hardware. Usually there is a kit with three or four lighting instruments, stands, barn doors and mounting accessories. Far fewer crews come equipped with an inexpensive kit of light control materials (usually rolls or sheets of deep-dyed polyester) that can literally save the day in many location lighting situations.

While the white balance adjustment on a video camera can quickly color correct an overall scene, light control materials allow selective filtration of light sources within the scene. By color matching these various sources, the camera sees all the light as one type and the result is even color balance throughout the scene.

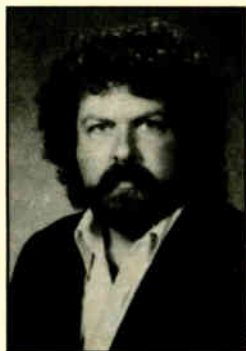
In addition to color correction, the videographer can achieve quick, easy shadow and intensity control with diffusion, neutral density and reflective materials. Effects filters can also be used to create the mood of a scene through color.

Let us take some common problems a videographer encounters on location. There is the one of shooting a tungsten-lit subject in the front of a bright picture window. Or shooting a speaker and slide presentation side-by-side in the same shot. Or shooting inside a large factory with a mixture of exotic light sources.

Other problems are photographing a dark-skinned person with bright clothing

against a light background, dealing with glare from shiny bald heads or placing an interesting design and/or color on a blank wall.

These are all problems that can be solved easily with light control materials. Rosco Laboratories, a manufacturer of light control products (its main competitor is Lee Filters), has been active in edu-



by
Frank
Beacham

VideoCraft

cating videographers about solving lighting problems through workshops, publications and a video, "Lighting in the Real World."

The video explores these and many other location lighting problems:

Problem? What problem?

Problem: Shooting a tungsten-lit subject in front of a bright window overlooking a city skyline. **Solution:** Cover the window with an optically clear window correction material. The material comes in large rolls and can be taped directly to the window glass or frame. In normal form, the material corrects 5,500 K daylight to 3,200 K. It is also available combined with neutral density filtration that can reduce the intensity of the light.

Problem: Covering a speaker at a podium and a slide projection screen side-by-side in the same shot. **Solution:** Use the ellipsoidal or "Leko" spotlight (a focus-

ing lens instrument with shutters). Two are needed—as key and fill—to illuminate the speaker.

These lights are set up to project a precise beam with a sharply defined edge onto the speaker with no spillage over to the slide screen. Place layers of N3 neutral density material over the lights until the illumination level of the slide screen and speaker are comparable. Then open the iris on the camera to compensate for the darkened scene.

To reduce the edge of the hard circle of light left on the background wall behind the speaker, add some Roscolux Hamburg Frost or similar material to the front of the Leko key light.

Factory light

Problem: Shooting an interior scene in a large factory with a mixture of daylight and bluish metal halide lighting (may also be sodium or mercury lamps). How do we determine the correct filtration to place on the video lights to match the ambient light in the factory? **Solution:** Set up the camera on a TV chip chart and white balance under the ambient metal halide lighting used to illuminate the factory work area.

Viewing the image on a waveform monitor, turn a video light onto the chart. (In this case we are using daylight temperature HMI lights.) Note the added chroma from the HMI light on the waveform monitor (the normally thin-lined stair steps get fatter with added chroma and thinner when chroma is removed). Experiment with different correction filters over the HMI until the added chroma disappears from the waveform monitor.

When color balance is reached, the stair step lines will be the same thickness

under either the ambient or video lighting.

Problem: Photographing a dark-skinned person with bright clothing against a light background. **Solution:** First, deal with the clothing. Use neutral density material across the bottom portion of lighting instruments to block the amount of light hitting the bright clothing. This should reduce the brightness of the clothing but not the skin of the subject.

Decrease the harshness of the key light on skin by adding diffusion material. To reduce light on the background, use a flag to block light from key and fill units. To bring out more of the skin tone of a dark-skinned person, place some Roscolux Light Amber or similar material over one light. (Note: Be sure to white balance the camera before putting the light amber material on the light. Otherwise, the effect will disappear.)

Problem: Eliminate the glare from a shiny bald head. **Solution:** One possibility is to switch from a single backlight to two backlights placed off at 30 degree angles behind the subject. Each light should have diffusion material in the gel frame or over the barn doors.

If this doesn't work completely, another possibility is to use a polarizing filter (if you can spare the light). A third possibility is to use makeup or Arrid Dry Powder Deodorant to dull the glare.

Painting the wall

Problem: An important interview subject must be taped in a hotel room or office with a plain, dull wall as a back-

The ability to manipulate light and shadow is a skill every video imagemaker must learn.

ground. **Solution:** Using color light control filters in front of your background lights, "paint" the wall with light. Times of day, mood and atmosphere can be established and a drab interview setting will come alive.

Rosco offers a "Creative Color Kit" that includes 10 color filters for this purpose. On top of the color, a pattern, shadow or design can be added. For instance, using a Leko with pattern and half blue filtration material, the Rosco video shows how to create the shadow of venetian blinds against a blank wall.

To balance and correct, control shadows and deal with the intensity of light on location, light control materials are an invaluable and inexpensive tool. A basic selection of color correction and diffusion materials should be in every videographer's survival kit.

The video, "Lighting in the Real World," is available in complete form from Rosco Laboratories in Port Chester, New York (+1-914-937-1300; FAX +1-914-937-5984) or Hollywood, California (+1-213-462-2233; FAX +1-213-462-3338). (Offices are also in Brazil, Canada, Madrid, London, Portugal and Australia). Three specialized segments of the program are also available. The company also offers several guides for using light control products.

Frank Beacham is a New York-based writer, director and producer. Contact him at 163 Amsterdam Ave., #361, New York, NY 10023.

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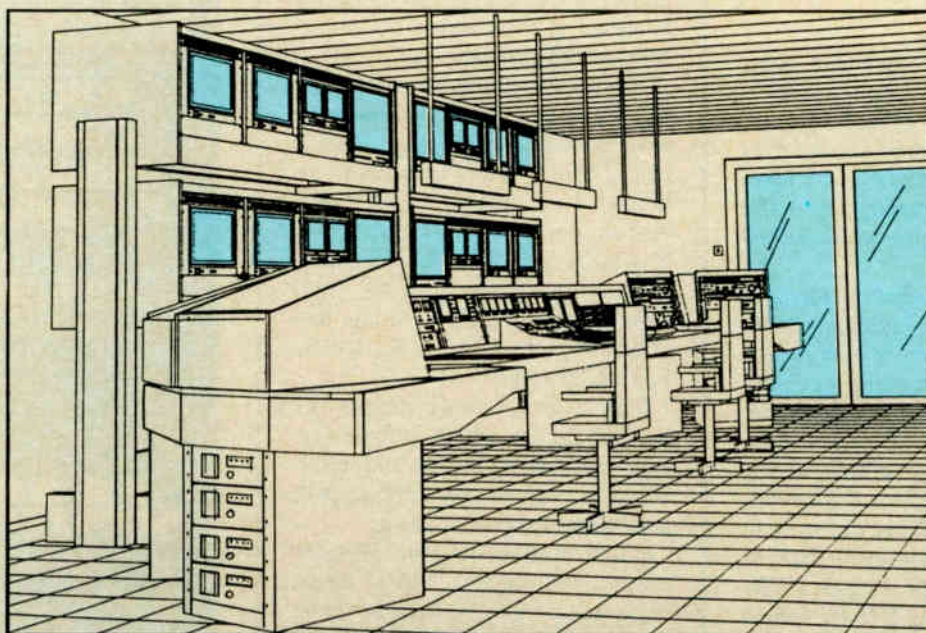
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How to Color Code Your Equipment

If you have ever wished for a fast, efficient, effective and, best of all, cheap method to color code connectors or terminals, listen to this. This method lets you apply any color of paint you choose, and you do not even have to clean a paint brush.

The supplies are found at your local truck dealer. The parts department knows it as "touch-up paint."

Touch-up paint is sold to repaint small nicks and scratches on vehicles. It comes in a small bottle with a brush built into the cap.

The brush need not be cleaned, as it is stored in the paint.

Because each color has its own brush and no cleaning is required, marking can be done quickly.

Getting paint colors for the standard resistor color code is not quite as easy as you might wish. When did you last see a factory original violet vehicle? Because auto colors tend to be muted and pastels, truck colors are a better choice. For example, orange is really orange. (Though violet is still not available.)

You can use this method to identify

cabling to equipment. It is suggested that you choose colors for "IN," "OUT," "RIGHT," "LEFT," and "MONO" and use that code throughout your system.

Use color bands on cables and dots at connectors. Multiple colors can easily be used as adjacent spots or stripes.

Marking the cabling this way makes it easier to reinstall the tape recorder you just fixed.

If you are currently using labels then you know their problems; "upside

down," "unreadable scribble," "rubbed off," and "it won't fit through the hole."

You know that the cable with "board out right" on one end is labeled "audio in right" on the other end, but matching up colors is easier and faster for you and your helpers.

A second place to find small bottles of paint is the hobby shop. The paint used for plastic models comes in small bottles. Though it doesn't have a built-in brush, you can use a wooden toothpick and paint dots with it.

If you haven't had your fill of tech tips, here's another:

Most stations have several small items that are subject to "disappearance." The consumer units are the ones that are most likely to "stray." These items include scanners, table radios, TV receivers and cassette tape recorders.

One way to reduce this problem is to make the unit unattractive to the thief. The uglier the better!

Units with plastic cases can easily be "branded" with a soldering iron. The easiest way is to put your call letter or other identification into the plastic surface. Brand each letter using the tip to make a group of dots—just like a dot matrix printer.

The defacing/identification works best if placed on highly visible surfaces. The purpose is to *deter* pilfering.

To further reduce temptation, items can be painted in an unattractive style. A paint scheme can make something so ugly that nobody will want to be seen with it.

And, oh, by the way, green stripes with pink polka dots are *really* ugly.

Both tech tips were supplied by Larry Albert, television engineer at Murray State University's MSU-TV in Kentucky. Albert believes cheap engineering is an acceptable term and is a self-professed "cheapskate." He can be reached at +1-502-762-4664.

TECH TIP

by Larry Albert

LINEAR

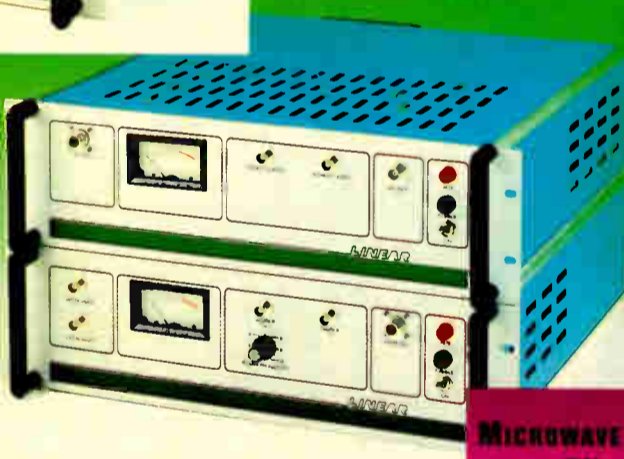
TV REPEATER
RPT-T



TV MODULATOR
MD-AM



TV AMPLIFIER
100 W
AMV

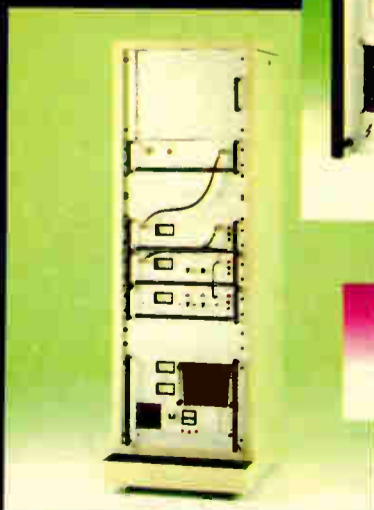


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TX
MICROWAVE LINK
RX

TV AMPLIFIER
200 W
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TV AMPLIFIER
1500 W
AMV



PARABOLIC
ANTENNA .7-1.5 mt.
TV PANEL UHF



LINEAR - F.LLI VESCOVI s.n.c. - Via del Lavoro Artigiano, 13/15 - 25032 CHIARI (BS) Italy - Tel. 030/711643 - Fax 030/7000634

BUYERS GUIDE calendar

june

Time Base Correctors &
Frame Synchronizers

•

july

Antennas & RF
Equipment

•

august

Editing Equipment

•

september
Signal Processing
Equipment

•

october

ENG/EPF Cameras,
Lighting & Support
Equipment

... highlighting the latest products available to professionals in the television industry.

Desktop video editor

Paltex International has introduced the EddiSX, a self-contained A/B-roll desktop editor that also features serial video switcher control.

Among the additional features included are: direct serial control of the NewTek Video Toaster and the Panasonic WJ-MX50, a 999-line EDL memory with EDL import and export, animation and auto-assembly modes, automatic match frame calculation, dual duration registers, and four GPI triggers.

Integral 40MB and 3.5-inch floppy disk drives are featured, and the unit has the ability to run Windows- and DOS-based software.

For further information, contact Paltex at +44-81-756-1993; FAX: +44-81-561-1122, or circle **Reader Service 49**.



Analyzer/receiver/monitor

Antenna Technology's Van-guarde Instruments' VI 2.0 is a precision, multifunction satellite spectrum analyzer, receiver and monitor. It serves as a full function spectrum analyzer from full frequency band of 900-2000 MHz down to a 10 MHz band. Also, it is a field strength meter simultaneously indicating program frequency, level, video image and sound.

It can serve as a receiver supplying the various audio and video signals through the three inch screen, and it has audio and video inputs.

For more information, contact Antenna Technology at +1-602-264-7275; FAX: +1-602-898-7667, or circle **Reader Service 7**.



Portable microwave link

Advanced Broadcasting Electronics' PM 2/P TV portable microwave link connects a TV camera by radio to a production center or mobile facility. It may also be used as a mobile link for outside broadcast purposes, or to provide a temporary feed to a transmitter.

The range of the PM 2/P depends on the type of antenna used, and can extend to several kilometers. The transmitter is synthesized and operates in the 2 GHz band.

For more information, contact ABE at +39-363-52550-51107; FAX: +39-363-50756, or circle **Reader Service 86**.

Digital video analyzer

Pro-Bel Ltd.'s new 6610 digital video analyzer applies the technique of signature analysis to measure the integrity of all parts of the digital video bitstream, providing a rapid and reliable means of identifying errors in any digital system.

The 6610 computes a unique Cyclic Redundancy Check value that can be compared with the value of the same signal after passing through an item of processing equipment or an entire system.

An optional generator provides a wide range of pre-programmed test signals and permits customer-specific patterns to be generated from an external PC.

For more information, contact Pro-Bel at +44-734-866123; FAX: +44-734-755787, or circle **Reader Service 108**.



Multi-effects device

Sony's DME-3000 serial digital multi-effects device supports the Digital Betacam format and performs frame-based processing. It offers features such as page turns, warps and explosions, and single color light sourcing. It also offers a key channel and the ability to combine two channels for intersecting effects.

The DME-3000 incorporates the Sony System G track ball and Z-Ring in its control panel for ease of operation.

For more information, contact your nearest Sony representative.

Arabic character generator

Aston Electronics' Arabic version of the Motif character generator features fully anti-aliased Arabic text, on-line resizing, full color graphics and DVE-type display effects.

Automatic form selection for Arabic text permits the correct display of the initial, median, final or standalone form of the character dependent on its context.

Motif immediately switches to right to left text entry as soon as an Arabic font is selected, so no special modes of operation need to be memorized.

Motif is switchable 525/625 and capable of accommodating 4:3 and 16:9 formats.

For more information, contact Aston Electronics at +44-252-836221; FAX: +44-252-837923, or circle **Reader Service 27**.

Routing switcher

Talia recently introduced a serial digital version of its E.O.S. routing switcher. The digital E.O.S. will be compatible with the latest 270 Mbit and 360 Mbit proposal for serial digital encoding, and will be able to carry digital audio either embedded in the serial bitstream or as separate channels suitable for breakaway, according to the company.

Digital E.O.S. pcb's may be fitted into existing rack frames and are designed to work alongside the standard E.O.S. video and audio matrix and output modules.

The standard Talia control panels may access the serial digital signals which in turn may be tied to up to seven other signal levels.

For more information, contact Talia at +61-3-558-9377; FAX: +61-3-558-9298, or circle **Reader Service 129**.



Transmitter

Harris TVT's Sceptre solid state UHF transmitters are available in 2 to 40 kW systems. They feature a single full band, 470-860 MHz amplifier module for vision and sound, circulator protection for all RF amplifiers, individual power supplies for each amplifier, and IRT, BTSC or NICAM multi-channel/stereo sound.

For more information, contact Harris TVT at +44-223-245115; FAX: +44-223-214632, or circle **Reader Service 57**.

Wireless products

Shure's EC Series wireless microphones are designed to meet a range of European technical regulations (TUV, DTI, BZT); the T Series wireless microphones, featuring three entry-level wireless systems based upon the company's T6 wireless receiver; the L5 wireless receiver, a portable wireless receiver designed for electronic newsgathering, field production and video applications; the WA404 antenna/power distribution system, an amplified wireless antenna splitter combined with DC power distribution; and the Beta 87 condenser microphone, newest in the company's line of Beta live performance mics.

For more information, contact Shure at +1-708-866-2200; FAX: +1-708-866-2279, or circle **Reader Service 33**.



Satellite newsgathering van

Advent Communications' LYNX2000-MA satellite newsgathering vehicle incorporates the company's 2m ultra lightweight, fully motorized antenna. It weighs a quarter of the weight of antennas of comparable diameter, according to the company.

For more information, contact Advent Communications at +44-494-774400; FAX: +44-494-791127, or circle **Reader Service 88**.

Upgrade for URSA

Rank Cintel has introduced 4 x 4, a 4:4:4 option for its URSA flying spot telecine. It is an extension of the digital channel. 4 x 4 means the entire channel is at a resolution of 4:4:4 or better.

The option is a field-installed replacement electronics assembly, available to all existing URSA's, as well as an option on new telecines.

It will provide very high resolution at the input of vector color controllers, such as the da Vinci Renaissance 8:8:8 or the Pandora Pogle DCP. It is also useful for facilities that choose to route or record 4:4:4 signals rather than 4:2:2, according to the company.

For more information, contact Rank Cintel at telephone and FAX: +44-435-867833, or circle **Reader Service 135**.



Línea de módulos

Leitch anuncia la creación de Mix Box, una línea de módulos alta calidad para transmisión en cuadros independientes. En la actualidad dicha línea ofrece una selección de diez de los populares amplificadores de Leitch y pronto incluirá una gama más amplia que incluirá diversos commutadores de direccionamiento y el popular PROM-Slide.

Las unidades Mix Box son completamente independientes y pueden operar solas o montadas en un cuadro con un total de tres módulos mediante la Bandeja de Montaje MMT-03.

Para más información, contactar Leitch: +1-416-445-9640; FAX: +1-416-445-0595, o marque el **No. 53 del Reader Service**.

MARKETPLACE

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

EL NUEVO TRABAJO DE EDICIÓN

Muchos editores se han visto intrigados por la promesa que presentan los sistemas de edición basados en las computadoras personales (CPs) para hacer el trabajo postproducción. Sin embargo, se sienten derrotados ante los problemas de interconexión (interfaz), ya que no son "magos de sistemas." Constantemente se hacen la siguiente pregunta: ¿Cómo puede formar el conjunto indicado, con base en una CP, si tengo un presupuesto limitado?

Este mes les presentaremos ideas y soluciones para este desafío, proporcionadas por los seis expertos que van a la vanguardia en el desarrollo de los sistemas de edición basados en las CPs.

Reglas fundamentales

Primeramente, he aquí ciertas definiciones. Bajo el título de sistemas de edición basados en CPs, conocidos generalmente como "editores de escritorio", nos referimos a productos vendidos como programas (software) y tarjetas controladoras designadas para ser usadas con las computadoras IBM, Macintosh o Amiga.

Además, en pos de congruencia, el sistema total que estamos creando debe ser apropiado para trabajo industrial, trabajo en línea (por ejemplo: un sistema que edita de dos fuentes, A y B, (A/B-roll) para efectos sencillos, con transportadores de cinta de bajo costo) y para trabajo de televisión fuera de línea (por ejemplo: un sistema que lleva a cabo ediciones exactas con referencia a al código de tiempo SEPTE y que produce discos EDL en la mayoría de los formatos MS-DOS de la industria).

Finalmente, no podemos dejar de mencionar que es imposible incluir todo el equipo apropiado; la combinación ideal varía de acuerdo con los gustos y las necesidades individuales. Por esta razón recalcaremos las diferencias y detalles particulares del equipo, siempre que sea posible.

La línea Ensemble

Primeramente prestemos atención a lo que nos dice Russ Srole, dueño de la empresa Editing Technologies Corp., que fabrica los editores de marca Ensemble.

"Considerando el costo," nos indica Srole, "recomiendo nuestro editor Ensemble Pro 3. Necesitará Ud. una IBM AT o una clona con un disco duro (disco fijo)."

En el campo de los transportadores de cinta, Srole recomienda el equipo U-matic SP de grado industrial de Sony, el modelo VO 9800 (reproducción) y el VO 9850 (grabación), el S-VHS de Panasonic (reproducción) y la 7750 VCR (grabación) o los modelos BRS-822 y BRS-622 de JVC.

"Todo este equipo requiere tarjetas de código de tiempo," ha indicado Srole. El S-VHS de Panasonic tiene TBCs incorporados pero los VCRs U-matic y el equipo de JVC necesitan estabilización externa del video.

Srole menciona cuatro empresas que fabrican TBCs en tarjetas para insertar o usar en una CP: Digital Processing Systems, I-DEN, Nova y Prime Image. Srole también está estudiando los dispositivos de ASC bajo el nombre Virtual Recorder, para trabajo fuera de línea.

"Nuestro sistema Ensemble incorpora interconexiones," ha agregado Srole "y varias compañías producen mezcladores de audio de precio razonable. Sin embargo, para una mezcla automatizada, Software Systems/Sierra Madre de Jack Calaway fabrica el controlador MIDI 422 que capta la información del conmutador de distribución de video y proporciona la capacidad de control para que el audio siga al video, a bajo costo. Si se combina este dispositivo con cajas MIDI, también de precio razonable, fabricadas por empresas tales como Niche y J.L. Cooper, se obtiene una mezcla de audio automatizada.

Srole concluye con los siguientes consejos: "Entre los conmutadores de distribución de video, El Pro 3 de Ensemble es compatible con todo equipo que use una interconexión RS-422 en serie, como lo son el Grupo Modelo 110 de Grass Valley, el PC-3 de Echolab, el DV7, el MX-50 de Panasonic y el Videotek Prodigy. Nuestro sistema tiene una base de datos para registro para trabajar en línea llamada SceneManager, que puede ser almacenado en disco. Además, ofrecemos un servicio privado de tablero para información (bulletin board) para computadora para la actualización de programas (software)."

Editing Technologies Corp. tiene más de 250 sistemas en este campo. Para más información, escriba a Editing Technologies, Corp., 11992 Challenger Court,



Por
Jay
Ankeney

ENFOCANDO EL MONTAJE

Moorpark, California, 93021, U.S.A., llame al teléfono +1-805-529-7074, al FAX +1-805-529-6744 o marque el No. 56 del Reader Service.

Múltiples interconexiones

Rush Besley, Presidente de la empresa Sundance Technology Group nos ha indicado que su participación en este mercado es el Sistema Sundance basado en la computadora Macintosh con un programa para la edición de video con "Q-Cut" y que utiliza dos fuentes (A/B-roll). Su precio es \$3.995 (dólares) y funciona con una computadora Mac Classic II.

"Nuestra MMI - Máquina de Múltiples Interconexiones - está incluida y proporciona control en serie RS-422 hasta para 15 fuentes y 8 IPGs. Para plataformas para la fuente puede Ud. escoger entre el equipo 622/822 S-VHS de JVC, los modelos 7750/7650 S-VHS de Panasonic o EVO 9850 Hi8 de Sony. Los formatos más pequeños gozarán de mayor confiabilidad una vez se perfeccione la fórmula para las cintas."

Ha agregado Beesley: "Para efectos visuales escogería la tarjeta Video Toas-

ter de NewTek en una computadora Amiga 2000 de Commodore, ya que también ofrece funciones para generar caracteres y para colorear. Con la versión 2.0 del Sistema Sundance, puede Ud. determinar la velocidad de transición por número de fotogramas directamente a la tarjeta Toaster, usando el teclado de la Mac."

"También recomendaría el conmutador de distribución de video MX-50 de WJ. Este modelo maneja la entrada compuesta NTSC y el componente Y-C con adaptadores o manipuladores de crominancia y luminancia y funciones para

Echolab."

"United Media también vende una tarjeta conmutadora OEM bajo el nombre PC-30. En vista de que Ud. también puede adquirir TBCs en tarjeta, esta combinación le brinda todo lo que pueda desear para mezclar y lograr estabilidad en el video. Además, si se usan unidades externas, estarán más accesibles para otros usos, de manera que todo depende de los usos que Ud. quiera darle al equipo. Finalmente, puede obtener un tablero en el VTR que se conecte a una tarjeta conmutadora en su CP," ha agregado Ricci.

La combinación ideal para un sistema de edición, varía de acuerdo con los gustos y las necesidades individuales.

que el audio siga al video. Incluye dos sincronizadores de fotogramas para entrada de material de la fuente y esta ventaja podría resultar en un ahorro si se escogen las plataformas JVC, ya que éstas no tienen incorporados TBCs."

Para terminar, ha indicado Beesley: "Por supuesto que el Video Toaster requerirá TBCs externos y un sincronizador."

La compañía Sundance Technology Group tiene más de 100 sistemas en este campo. Para más información escriba a la empresa al 6309 N. O'Connor Road, Suite 111, LB 128, Irving, Texas, 75039, U.S.A. o llame al teléfono +1-214-869-1002, o marque el No. 103 del Reader Service.

Otro punto de vista

Bob Ricci, Presidente de United Media, Inc., nos indica: "Acabamos de lanzar al mercado una nueva línea de editores basados en CPs para complementar nuestra serie UMI de computadoras editoras. Nuestro sistema menos caro que utiliza dos fuentes (A/B-roll) es el programa (software) para las CPs de la Serie 200 y la caja de interconexión, diseñada para plataformas IBM AT con disco duro."

¿Cuál sería el aparato magnetofónico escogido por Ricci? Los modelos anteriores de su máquina Hi8 no eran exactos, ha indicado Ricci, "pero la nueva EVO 9850 ha superado este problema. Hay, además algunas máquinas S-VHS con alineación o ajuste dinámico que permite efectos especiales."

"Pero el VTR escogido depende de la fórmula de cinta utilizada. Nuestros editores de la Serie PC EDIT pueden trabajar con cualquier aparato RS-422 controlado en serie y con un cambio sencillo de conexiones, el programa (software) reconoce la identidad de otra máquina y la controla correctamente," ha dicho Ricci.

¿Y qué hay de los TBCs? "Por supuesto que puede adquirir TBCs independientes, pero una opción sería obtener un TBC de dos canales, como el que fabrica Dynatech que tiene efectos especiales incorporados. Algunos de los TBCs de dos canales tienen efectos digitales. Otra opción es un conmutador instalado en la línea ómnibus de la CP. Un buen ejemplo es el modelo PC-3 de

La Serie PC EDIT de United Media es nueva pero la empresa tiene cientos de sistemas de computadoras dedicados a la edición.

Escriba a : United Media, 4771 E. Hunter, Anaheim, California, 92807, U.S.A., llame al teléfono +1-714-777-4510, al FAX +1-714-777-2434 o marque el No. 70 del Reader Service.

Gran flexibilidad

Frank Taylor, Gerente e la sección de productos para sistemas para editar de CV Technologies, una división de Comprehensive Video Supply Corp., nos indica que los programas (software) para editar de su compañía pueden funcionar de dos maneras. CV Technologies tiene el Edit Master (Versión 4.0) para los sistemas IBM AT y el Edit Master Mac (Versión 4.2) para las unidades Mac Plus que utilizan el sistema 6,05 o sistemas posteriores a éste.

Tanto la versión para IBM como para Macintosh requieren un programa (software) y una tarjeta controladora CVNET maestra. Se requieren, además, interconexiones para las máquinas. Un sistema que utiliza dos fuentes cuesta unos \$6.000 (dólares).

"Nuestros programas (software) Edit Master para editar son independientes de la plataforma," ha indicado Taylor. "Pero como mejoramos los programas para IBM y para Mac en años alternos, en estos momentos el Edit Master (Versión 4.0) para IBM tiene los cambios más recientes."

"Refiriéndonos a los transportadores de cinta y a los TBCs, recientemente probamos la máquina BAR-S822U S-VHS de JVC con un TBC incorporado y tarjetas de código de tiempo LTC/VUTC. Hay muchos nuevos tableros TBC que pueden ser controlados del exterior por medio de un acceso RS-232 o por una línea ómnibus."

"En Comprehensive Video haremos modificaciones a nuestro generador de caracteres PC-2 y vemos con gran interés la llegada de los tableros de audio basados en CPs. Con estos dos elementos casi todos los instrumentos para el trabajo de producción se encontrarán dentro de una CP."

"Además de combinar el equipo debidamente," aconseja Taylor, "lo editores deben estudiar la flexibilidad de dicho

equipo y las posibilidades que ofrece tanto en lo referente a tableros internos como a dispositivos externos tradicionales. Creemos que nuestro sistema para editar produce resultados muy allegados a los que se obtienen usando sistemas dedicados a edición por computadora y por los cuales era necesario pagar de \$40.000 a \$50.000 (dólares)."

Hay más de 1.000 sistemas Edit Master en uso y de ellos aproximadamente 100 funcionan con computadoras Macintosh.

Para más información escriba a Comprehensive Video Supply Corp., 148 Veterans Dr., Northvale, New Jersey, 07647, U.S.A. llame al teléfono +1-201-767-7990, al FAX +1-201-767-7377 o marque el No. 25 del Reader Service.

El Mago de Oz

En Videomedia, Inc., Bill Stickney, ingeniero jefe e inventor de la tecnología V-LAN, nos ha dicho: "Nuestro sistema, conocido como el OZ, es un editor basado en "Windows" que brinda video compuesto en un cuadro pequeño o ventana en el monitor de datos. En la NAB de 1992, en Las Vegas, usamos el tablero VGA de Truevision pero hay otros en el mercado que pueden usarse con éxito."

"Además de los programas (software) para una computadora IBM equivalente a la AT," ha explicado Stickney, "suministramos fundamentalmente un transmisor V-LAN y dos receptores en un tablero enchufable para control de corte solamente. Agregando otro receptor para que pueda funcionar con dos fuentes (A/B-roll), el costo total de las tres máquinas alcanza aproximadamente \$2.600 (dólares). El sistema Oz interconecta con todo el equipo de la línea V-LAN y por consiguiente podemos controlar hasta 31 dispositivos por cada acceso en serie de la computadora."

"La máquina reproductora más barata que hemos encontrado es el modelo S-VHS BAR-S605 de JVC. Su precio de \$2.000 (dólares) es una ganga y es ideal para nuestro sistema Oz, ya que puede funcionar con exactitud al buscar la vista o fotograma con una tarjeta enchufable V-LAN de \$500 (dólares). La unidad grabadora BAR-S811 de JVC, compatible con el equipo V-LAN, complementa idealmente un sistema de costo limitado. Recomendamos el conmutador KMD-600 de JVC porque es una caja con componentes seleccionables, conmutador combinado y efectos digitales con dos TBCs incorporados. Con esta unidad se evita la compra de TBCs para las máquina BAR-S605."

La máquina editora Oz es nueva. Escriba a Videomedia a: 211 Weddell Dr., Sunnyvale California, 94089, U.S.A. o llame al teléfono +1-408-7445-

1700 o marque el No. 65 del Reader Service.

Scott M. Sprunger, Gerente de la línea de productos AmiLink de la empresa RGB Computer & Video, nos ha indicado: "Nuestros programas (software) para A/B-roll se venden por \$5.300 (dólares) y utilizan la computadora Amiga de Commodore o una que sea compatible con IBM. Creemos que los editores preferirán la versión para la Amiga (AmiLink/VT), porque puede manejar el Video Toaster de NewTek desde la misma plataforma."

"Las máquinas reproductoras BR-S605 y 525 de JVC tienen

control interno V-LAN y son de precio razonable. Estamos estudiando las nuevas unidades Hi8 para ver si son verdaderamente exactas en relación a los fotogramas y creemos que las máquinas S-VHS 7650 y 7750 de Panasonic sean la mejor combinación de grabadoras y reproductoras, ya que tiene TBCs incorporados y tarjetas de código de tiempo opcionales que pueden ser enchufadas," ha agregado Sprunger.

"Si desea Ud. un TBC interno, las tarjetas DPS rinden buenos resultados. DPS también fabrica tarjetas para monitores de onda y vectorescopios (V-

Scope) para la Amiga o la IBM con despliegue de información en un monitor corriente de video."

"Ya que nos podemos comunicar con el Video Toaster y el conmutador de producción al mismo tiempo, ambos pueden trabajar simultáneamente. Con el editor para IBM, podemos comunicarnos directamente con la combinación Amiga/Toaster. Sin embargo, creemos que la integración completa del Video Toaster con nuestro programa (software) en la misma plataforma Amiga, ofrece flexibilidad excepcional con ahorro significativo de dinero."

Para más información escriba a RGB Computer & Video a: 4152 Blue Heron Blvd. West, Ste. 118, Riviera Beach, Florida, 33202, U.S.A., llame al teléfono +1-407-844-3348, al FAX +1-407-844-3699 o marque el No. 35 del Reader Service.

Agradecemos a todos los que han colaborado con información y tiempo. Esperamos que este vistazo a los editores basados en CPs les aliente a "echarse al agua."

Jay Ankeney es editor de video de la estación KTTV en Los Angeles, California.

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Studio Cameras & Teleprompters

JVC Plays Important Role for Police

by Nick Jardine
Director, Video Unit
Surrey Constabulary

SURREY, U.K. In a modern police force, video has played a crucial role for some time. Police officers use domestic camcorders as video notebooks, and squad cars on highways are fitted with small VHS cameras to catch speeding motorists.

The Video Unit of the Surrey Constabulary, manned exclusively by civilians, was created more than 15 years ago. It has since split its responsibilities between producing, training and briefing videos and augmenting the surveillance and other operations of our Technical Support Unit.

Most of the equipment we use for instructional and education work is high band SP. However, S-VHS does play a very important role, both in the studio and in the field.

For our operational work, we find S-VHS a lightweight, portable format with good light response. Over the past few years, we have used JVC's GY-X1 camcorder for operational needs and the multiformat KY-35 for studio and production work.

USER REPORT

However, we needed an S-VHS camera that could fulfill both studio and operational roles in a versatile manner, which is why we recently purchased the KY-27.

For studio use, we selected the KY-27 camera head with remote zoom and lens, a four-inch studio viewfinder and a CCU. This configuration perfectly matches to our KY-35 and provides us with a good working two-camera setup when needed.

Although we are currently recording on composite, we wanted to select a high quality camera that could be used with whatever format we might use in the future. The fact that the KY-27 can be configured to dock with S-VHS, Hi-8, Pro Betacam, M-II and Betacam VCRs was a crucial point for us.

Vital evidence

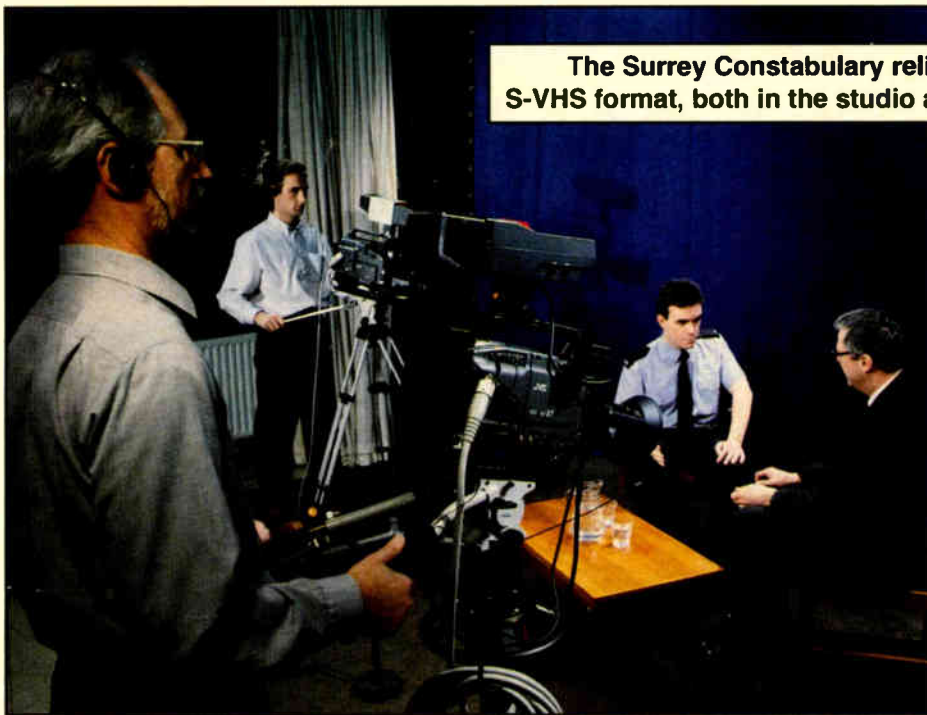
When recording crime scenes, particularly in homicide inquiries, our tapes act as memory aids for the investigating officers and are sometimes used in court as evidence. So the quality has to be acceptable.

Much of this work involves shooting in extremely low light, sometimes in very small spaces where the weight and portability of the equipment is a major factor. While we have always found S-VHS cameras with Optex wide angle adaptor lenses ideally suited to this kind of work, the KY-27 has proved useful in another way.

Using the new camera instantly cut down the number of people needed for a crime shoot. Normally we are asked to enter dimly lit houses or buildings where portable lights are essential. Using the KY-27's unique LOLUX facility, we found the definition in low light conditions absolutely outstanding, so the extra person normally needed to carry and position

lights became unnecessary.

The camera's main advantage is its ability to pan from bright light to low light with very little loss of contrast without



The Surrey Constabulary relies on the S-VHS format, both in the studio and in the field.

having to insert an ND filter, or readjust the white balance or iris setting.

Noise control

While we had grown accustomed to grainy images at low light, the KY-27's

pictures are pleasantly un-noisy. In fact, the only drawback is the lack of manual override when the LOLUX facility is switched on.

The other minor irritations are a lack of a time/date generator (absolutely essential when gathering evidence) and the fact that the camera head is different from our other cameras, even the JVC ones.

In the studio, the camera has performed

very well for small presentations and pack shots, and we have found that we are able to drop S-VHS sequences into our final high band SP productions with no noticeable loss of quality. In fact, in certain circumstances, I believe we can use the format for our own training productions.

Our two-machine edit suite, consisting of a BR-S611 and 811 with RM-G810 controller, has performed as expected and was a major factor in staying with the S-VHS format for our work.

Our purchase of the KY-27 means we can just about cover all of our recording needs. The operational work is well catered for by the GY-X1, while the KY-35 has proved itself for studio and production work.

And since the KY-27 is as much at home in the field as in the studio, we can really get our money's worth without compromising on quality, wherever it is needed.

Editor's note: Nick Jardine previously worked as a still photographer for the British Ministry of Defence and a freelance cameraman/producer before taking charge of the Surrey Constabulary Video Unit in 1989.

The opinions expressed above are the author's alone. For further information on the KY-27, contact your nearest JVC distributor or circle Reader Service 95.

Prompting Needs Met by Magic

by Steven Rosenbaum
President
Broadcast News Networks

NEW YORK I am a reporter by training, so when it became clear that we needed a Macintosh-based teleprompter I volunteered to do the research.

How hard could it be? After all, Mac users are a creative bunch, and I figured someone out there would have rigged one up.

Here is what I found. First and foremost, there are a lot of IBM and clone teleprompter programs out there. And hung off the back of newsroom computer systems are prompter packages. But a prompting package for the Apple was difficult to find.

A Mac family

It is important to remember that Macs have made their way into video production facilities across the U.S. They are used for character generation, paint systems, animation systems and tape logging.

Our Macintosh family includes numerous models, from a speedy Quadra 900 to run our Avid editing system to a slower Mac Classic for basic copy writing. In all, we have 14 Macs, including powerbooks, ci's, SE30s—a whole orchard of Apples.

So with writers, producers, editors and office staff all working on a Mac platform,

a Mac teleprompter was what we needed to bring our weekly newsmagazine show together in time for air.

After months of research, days of reading trade magazines and hours of phone calls, we found only one company that has successfully built and deployed a Mac prompter: Magic Teleprompting of San Francisco, California.

USER REPORT

While other systems offer output to a scroll box (a mini computer that takes in text and scrolls it out the back), we needed to be able to adjust the script, make on-set changes and keep our files in Mac format. It was essential that the final prompter script reflected the words on air for our historic records.

The straight story

The Magic Scroll prompter has an elegant and simple interface. Text is prepared in any word processor, then imported into the prompter. Once inside, it can be changed, adjusted and scrolled with no complex training or prompts. Everything is designed with a Mac style icon interface—not a ported IBM version—and operation is intuitive and straightforward.

The system is so easy to use that if a staff

member is not available, an intern can run the prompter with little training.

Installation of the prompter requires software, a video board and a software key. Magic supplies all of this. The output is NTSC, and can be put out in either white type or reverse type. (Editor's note: A PAL version is in the works, according to the company.)

The interface to control the scrolling speed is either a track ball or mouse, and the scrolling is smooth and easy on the eyes. Other features, such as Find/Replace and Bookmarks, allow changes and adjustments to be made as the session advances.

Magic Scroll will work with whatever fonts are installed on the Mac.

Magic Scroll is the kind of software that promises a lot and then delivers.

As facilities move toward Mac platforms, I predict you will see Magic Scroll on more and more studio floors. It certainly has been put through its paces here.

Editor's note: Steve Rosenbaum created Broadcast News Networks in 1983 and has won two Emmy awards.

The opinions expressed above are the author's alone. For further information on the Magic Scroll, contact Japji Khalsa at Magic Teleprompting (Telephone: +1-415-626-5283; FAX: +1-415-626-2762), or circle Reader Service 127.

SBC Network Relies on Hitachi

by Asaad Sameer Bagharib
Engineering Manager
Singapore Broadcasting Corp.

SINGAPORE Singapore Broadcasting Corp., the national broadcasting network in Singapore, operates three television stations and nine radio stations.

Our television stations provide a mix of SBC-produced programs and programs from around the world, serving an audience averaging 2 million viewers per day out of an overall population of 3.2 million.

Latest developments

Over the years, SBC has upgraded its facilities to keep pace with the latest developments in broadcasting technology. State-of-the-art facilities include robotic cameras, digital post production suites, D-3 VTRs, NICAM stereo with dual sound capabilities and a computerized digital commercial recording and playback system.

Among the more than 125 cameras in

... the Hitachi SK-F3 can hold its head up in the electronics department.

use at our facilities, about 20 percent are from Hitachi. These cameras are deployed in all areas of production, from the studios to OB vans and single-camera ENG operations.

We purchased our first Hitachi cameras in 1989 when we equipped our newly constructed 800-seat TV theater. We selected three Hitachi SK-971 Plumbicon tube studio cameras and an SK-97 portable camera.

We mounted the studio cameras on manual Vinten pedestals and fitted them with 40x9.5 and 18x8 Canon lenses with 2x extenders. The portable camera was fitted with a 15x9.5 Canon lens.

One of the main reasons we chose the SK-971 was the fact that it can be operated independently with full auto setup at the camera head, similar to what can be achieved at the master control panel (MCP). We also liked the MCP, which has a full range of function control switches nicely arranged in a layout that is easy to operate.

Up and running

The SK-971s were put to the test almost immediately, being assigned to a very popular nightly live Mandarin variety show. The show is still on the air today and the SK-971s have been faithful running mates from the start.

Even though the SK-971 is a tube camera, registration and color matching is not a problem, thanks to its auto correction circuits and operation mode memory store facilities. Another useful feature is its automatic Prism Temperature Compensation, which enables accurate

registration to be maintained even when there is a variation in prism temperature.

With the SK-97 portable camera, however, we ran into a power supply problem. The camera head began to demonstrate frequent losses of DC supply during operations. When we could not determine the cause of the problem, our local agent replaced it with the new model SK-F3 CCD camera.

In 1992, we decided to refurbish our TV Studio 5, a medium-sized studio used mainly for producing magazine-type current affairs shows and sports programs. By that time, the CCD chip market had matured and the third generation of CCD chip cameras was available.

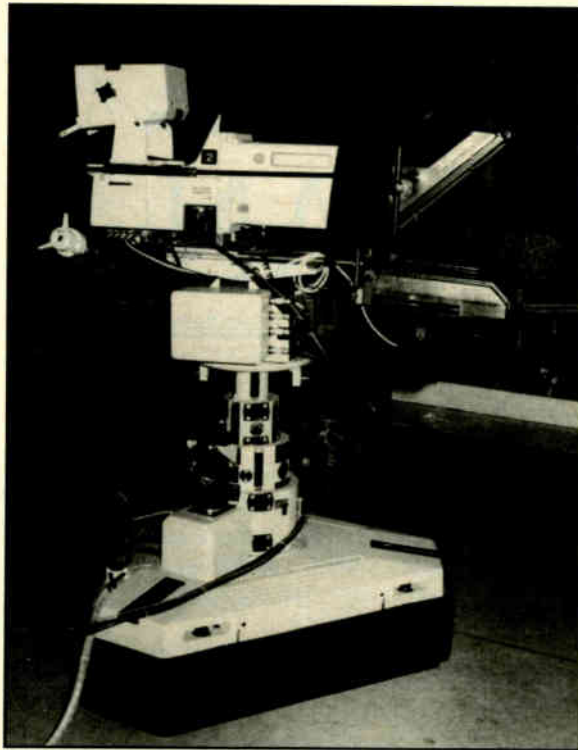
Of the three systems we considered purchasing, all were third-generation models employing FIT technology and capable of providing a horizontal resolution of 700 lines. In the end, however, we selected the Hitachi SK-F300 studio camera and the SK-F3 portable camera.

Vinten support

Our SK-F300s are slightly more than a year old now. Two of them are mounted

with a 14x8.5 Fujinon ENG lens with a 2x extender.

The cameras are operated at a working



Singapore Broadcasting Corp. upgraded its TV Studio 5 with Hitachi SK-F300s.

aperture of approximately $f/2.8$, which we vary only if the nature of the program requires us to do so. Effects and color correction filters come as standard accessories.

Although video compression is available, it is seldom used because of the controlled studio environment. The auto-iris feature is also hardly used. However, our camera operators find the scene files very handy because different shows are produced on different days and the memorized settings help speed up camera operations.

One minor problem we face, especially in the TV theater, is when a videowall is used on the set. The Hitachi cameras do

not have a shutter speed of 1/60 second, and because of the wall's NTSC format, we see flicker whenever the videowall display is captured.

Since the SK-F3 is used heavily on a tripod, it would be helpful for the baseplate to have a self-locking feature for speedy mounting and dismounting. This would especially help during the fast-paced variety show.

Viewfinder difficulties

Another area that can be improved on the SK-F3 is the mounting for the 1.5-inch viewfinder, which is not robust enough. Our cameraman routinely has to hold on to the viewfinder during hand-held operation. The viewfinder hood and magnifier attachment is also difficult to detach, requiring four screws to be removed.

These mechanical setbacks aside, the Hitachi SK-F3 can hold its head up in the electronics department. Features like the preset A and B memory, for storing operational parameters for auto white balance, are quite good and reliable.

Another positive aspect for us is the fact that Hitachi recently decided to open a representative office in Singapore, which includes a service center. While we service the cameras ourselves after the warranty period, the new service center cuts down on the number of spare parts we need to stock. And as the cameras get older, it is reassuring to know that the manufacturer's service engineer is only a phone call away.

Our experience with Hitachi cameras has been a pleasant one, and they have found a comfortable niche in two of our eight TV studios.

Asaad Sameer Bagharib has been with SBC for 12 years and is currently responsible for providing the technical manpower and facilities for all studio productions. He recently oversaw SBC's US\$2 million upgrade and refurbishment of Studio 5.

The opinions expressed above are the author's alone. For further information on Hitachi's line of studio cameras, contact your nearest Hitachi distributor, or circle Reader Service 45.

USER REPORT

on Vinten Fulmar pedestals, while the third is on a Vinten Microswift robotic pedestal. The SK-F3 is mounted on a Vinten Osprey pedestal and is also operated in hand-held mode.

All three studio-type cameras are fitted with 15x8 Fujinon lenses with 2x extenders, while the portable camera is fitted

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Rapid Advances Made in CCDs

by Fumihisa Nobui

TOKYO ENG/EFP cameras are becoming so sensitive and are delivering such high resolutions that they are increasingly coming out of the field and into the studio.

Throughout the world, from the smallest production facilities to the largest networks, these cameras are finding their way into the studio and are often used in conjunction with their larger, and more expensive, studio cousins.

Many of the advances in ENG/EFP technology were spurred by the introduction of the CCD, which has led to lighter weight, higher resolution and a list of other benefits.

Pick-up tubes in ENG/EFP cameras have been rapidly replaced by CCDs. This has improved anti-shock performance and has eliminated RGB alignment.

What's more, CCD resolution is now so high that it is pushing the limits of the

NTSC system. At present, three-CCD NTSC cameras are available in a wide range of pixel counts, from 380,000 all the way to 600,000.

On the high end, a number of 600,000-pixel cameras are available. They include the Hitachi SK-F380 and SK-F800 studio



cameras, the new Ikegami HK-377 studio/field and HK-377P portable cameras, and the Toshiba SC-521 studio and SC-831 portable cameras.

Sony, on the other hand, has elected to develop a pair of 520,000-pixel models, the BVP-375 studio/field camera and BVP-90 portable camera. The company says the lower pixel count is more compatible with digital formats.

Slightly lower on the resolution chart are several 450,000-pixel models: Hitachi's SK-F200S and SK-F350 units and Ikegami's HK-355 studio/field camera.

Toshiba, meanwhile, has available a 410,000-pixel model, the BCC-200 integrated camera.

Cameras with 400,000 pixels include the Ikegami HK-355P portable camera and the HL-57 digital hand-held camera, as well as Matsushita's AQ-225 and AQ-200 digital processing cameras.

NEC's new EP-3H camera has 380,000 pixels.

Naturally, cameras cannot be rated on the number of pixels alone. Depending on whether a camera is designed for professional or business use, different approaches are taken regarding the number of pixels.

While more pixels can mean higher resolution, it must be noted that sensitivity decreases as each pixel itself becomes smaller. Also, more pixels mean circuits of greater complexity.

Still, that does not stop manufacturers from pushing the limits.

For instance, Ikegami's two new 600,000-pixel models, the HK-377 and HK-377P, are designed with the next generation of HD formats in mind, and are expandable by broadening the wave-width and stretching the wave length, as well as by introducing D-1, D-2 and D-3 digital interfaces.

The HK-377P is equipped with the new Super V function, an improved version of the conventional Super V. The new Super V increases resolution by 20 percent but avoids the conventional Super V's sensitivity loss. Also, AHD (Auto Hue Detect) has been added to soften the glaring flesh-color common with high resolution.

Sony takes a different approach. It places greater importance on matching the sam-

pling frequency to counteract noise. This was the reason for adopting a 520,000 pixel system. Sony designers feel this is compatible with D-1 and D-2 recordings, as well as new higher definition systems such as EDTV-II.

Sony uses the unique FIT-type HyperHAD CCD to improve sensitivity and minimize smear generated with the conventional FIT. The FIT HyperHAD CCD has been in use since the 420,000 pixel camera.

Meanwhile, Matsushita (Panasonic) is promoting digital processing cameras. In addition to the AQ series, it introduced the WV-F500 for business use last October.

Ikegami also announced a digital camera, the HL-57, which uses 10-bit processing to counteract what the company calls "digital color." The HL-57 is equipped with a diagonal DTL to compensate for edges with slanting picture elements. It also has a digital encoder output for future expansion with digital VTR equipment.

BUYERS BRIEFS

Vinten Broadcast has released the MIC 100 joystick control panel for the company's Microswift robotic control system, which can be operated on a multidrop network with up to seven other panels.

The MIC 100 has two joysticks for height/drive and pan/tilt, a focus knob, camera selector, numeric keypad and an alphanumeric display.

For further information, circle Reader Service 44.

Tinsley Laboratories has available the Gyrozoom FP-1 image-stabilizing zoom lens. The Gyrozoom is a 60 to 300mm f/6 zoom lens that attaches to most broadcast cameras. No additional mounts or brackets are required.

Gyrozoom provides smooth, stable video from even bumpy platforms. It is ideal for long telephoto shots when getting close to the subject matter isn't possible.

For further information, circle Reader Service 39.

Station Opts for the Panasonic AQ-225

by Duncan Pearson
Chief Engineer
WPBA-TV

ATLANTA, Georgia WPBA-TV played a pioneering role last year when the station needed to replace its Marconi tube cameras, which had been in service since 1974.

As a public television station licensed by the Atlanta Board of Education, we were interested in getting ready for digital video technology and had received a government grant for new equipment. We then examined the AQ-225 digital signal processing studio/field camera from Panasonic Broadcast & Television Systems Company, observing the operations of the camera and evaluating its specs.

A closer look

The AQ-225 is a 2/3-inch, three-CCD camera with 750 lines of horizontal resolution at the output with 2,000 lux at f/8. Its digital signal processing delivers long-term stability, precision control and monitoring, and easy setup and camera matching.

WPBA-TV became the first U.S. purchaser of the AQ-225 when we bought three cameras last September for our live and recorded studio productions. The cameras have Angenieux 20x8.5mm lenses and are mounted on pedestals equipped with new Vinten Mark VII pan-and-tilt heads. They serve both of the station's studios.

The AQ-225s have performed virtually trouble-free, with no unexpected failures. They deliver superb pictures; even my peers have noticed the difference in our on-air look.

Our camera operators have found all the controls for the camera to be very comfortable and well-placed. The controls are engineered so anyone accustomed to any camera can walk in and use the AQ-225—even our most non-technical people picked up the camera's use very quickly.

They also like the camera's built-in script lamp and the fact that one cor-

ner of the viewfinder can mark an area for inserting a key. The camera memory is a particularly useful feature: pressing one button instantly recalls the settings for a particular show.

Continuous operation

We use the cameras for a 30-minute weekly live call-in series and for various informational and in-service teacher training programs.

Since public television in the U.S. is not ad supported, a big part of any public television station's production capability is devoted to fundraising. We recently finished 10 days of on-air fundraising, in which the cameras were operating 24 hours a day with no failures.

The AQ-225s were so stable that they required no additional setup between the time we left the studio at 11 p.m. and returned at 7 a.m. They just continued to operate.

USER REPORT

The station also produces commercials and training tapes for outside clients and hosts teleconferences for major corporations, which we uplink nationwide. We plan to use our AQ-225s in those applications as well.

While we have been pleased with the performance of the AQ-225s, we have also been pleased with Panasonic's attitude when the cameras have required servicing. We have never known any better or faster response from a manufacturer.

Editor's note: Duncan Pearson, a native of Atlanta, joined the production crew of WPBA-TV 26 years ago and became chief engineer in July 1991. He began his broadcasting career some 30 years ago at various commercial AM and FM radio outlets.

The opinions expressed above are the author's alone. For further information on the AQ-225, contact your nearest Panasonic representative, or circle Reader Service 32.

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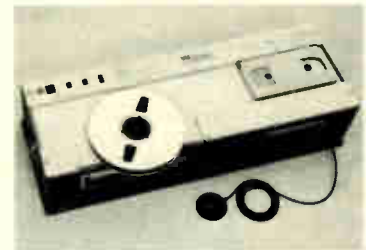
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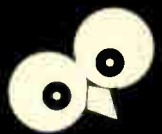
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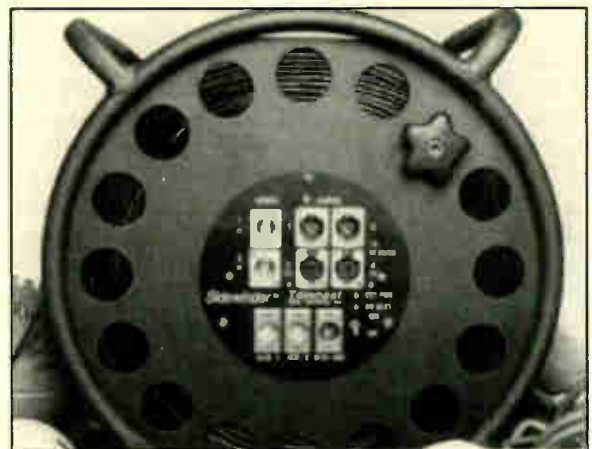
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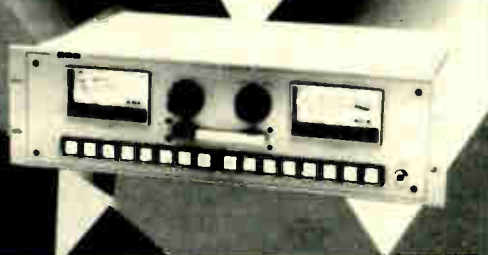
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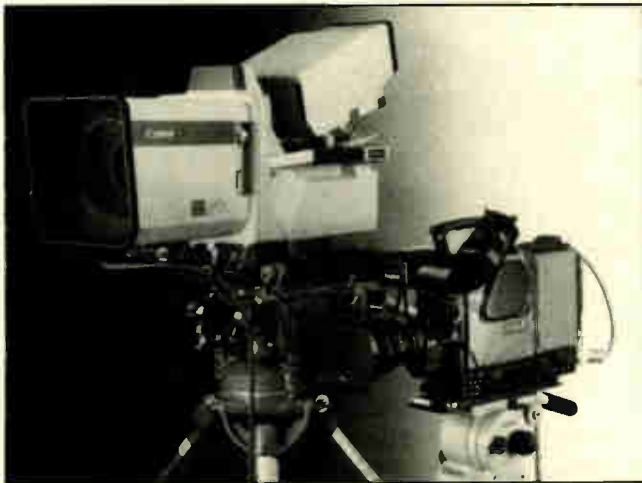
CARACAS, Venezuela Corporacion Radiofonica Venezolana C.A. (Coraven) is a Venezuelan broadcaster consisting of one TV network, six production studios for tele novelas (soap operas) and one theater-type studio for musical programming and various post production facilities.

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Our recent purchase of Ikegami's HK-343 and HL-43 cameras was a significant step toward upgrading our musical show production facility located in "La Campina Theatre" in Caracas. We also needed the cameras to meet the technical require-

ments of Buena Vista Productions, for whom we produce the Venezuelan version of the Disney Club Show.

Our camera system consists of three HK-343 studio cameras and two HL-43 portables, all of them in triax version with Canon lenses. These cameras are integrated with a



Ikegami's HK-343

GVG 200 switcher, a DPM-700 digital effects system, and a combination of one-inch Type C and digital composite VTRs.

In addition to having the best price/performance ratio available, the Ikegami cameras have a number of superior technical features.

For instance, the cameras provide an extremely high resolution due to the

SHBA (Super High Band Aperture) circuit. And their superior colorimetry enhances the look of our musical shows.

But when we require a different appearance, we can lower the sharpness of the

USER REPORT

image with the soft detail function without having to make any further adjustments.

Our camera operators like the PIP (Picture in Picture) function in the viewfinder, which they use to continuously monitor the on-air signal.

Due to the high sensitivity of the CCD sensors, we have been able to lower the amount of light in our sets and improve the contrast ratio of the image.

Another advantage is that the HK-343 and HL-43 share the same printed circuit boards for all functions and control systems, except for the triax adapters. This makes it easier for us to train our technicians in the maintenance of the equipment and lowers our requirement of stock parts for our spare.

So far, we have had only one problem with the cameras: one of the portable HL-43s arrived with problems in the optical block. However, the unit was exchanged by Ikegami in record time, and we were able to begin our studio operations on schedule. Both Ikegami and their dealer in Caracas have always provided us with very good service.

Viewers Notice New BTS Cameras

by **Eric Dausman**
Operations/Eng. Director, KGW-TV

PORTLAND, Oregon Three BTS LDK-910 CCD cameras were installed at KGW-TV more than a year ago, after the station earnestly began looking for new studio production cameras in September 1991.

We compared all the options from the major manufacturers and ultimately settled on BTS, a Philips and Bosch company, because of performance and price.

Easy and reliable

As with most television stations, news is a primary focus. We broadcast more than 23 hours of live local news each week. The cameras must be easy to set up and operate, and of course, they must be reliable.

As far as setup goes, the LDK-910 cameras couldn't be easier. The auto white and auto black balance features perform very well. I have watched experienced video operators spend considerable amounts of time balancing the cameras to beat the auto circuits.

In the end, the auto features do just as well.

USER REPORT

We also needed a system that had all the features of a high-end studio camera without paying for features we did not require. We looked at several "top of the line" cameras, but we did not require such things as the scene file features, because we were going to operate the cameras with the Vinten Microswift robotics system with CCU interface.

The Vinten CCU interface allows full control of up to eight camera adjustments. Camera parameters can be stored along with robotic parameters for full integration. With this amount of control from the robotics, we felt that the scene files would not be necessary. This has turned out to be a valid assumption.

The LDK-910 uses a resolution frame transfer CCD for a limiting resolution of 700 lines horizontal. It is very quiet, rated 62 dB for NTSC, and has the sensitivity expected of any high-end system.

Because the BTS frame transfer design requires a mechanical shutter in front of the beam splitter, we were concerned that such a device could fail, causing the camera to cease to function.

However, our concerns were eliminated when we were shown that camera can still operate even if the shutter is disconnected. There is some smearing that occurs on highlights, but it is hardly objectionable in an emergency. Additionally, BTS now warrants the shutter for 10 years.

Our LDK-910s have been very reliable. They worked right out of the box, and we had them on the air a week before the BTS factory personnel came in to check the operation and make final adjustments.

Since that time, we have had only one failure. The triax board in the CCU failed in one of the camera systems, but it did not keep us from using the camera. We used the encoded output available at the camera head to feed the output to the control room, and we had a replacement card from BTS the next day.

Discernible difference

Many times when new equipment is added, we wonder if people will actually notice. With the BTS camera, we wondered if our audience was sophisticated enough to appreciate the difference between our old RCA TK-47 cameras and any new high-end camera we purchased.

We had several comments, including one letter from a viewer who noticed one of our news readers looked much younger and better looking in general.

The inherent resolution and the out-of-band contouring in the LDK-910 design eliminates the harsh details in the faces and provides a very pleasing look. I am glad our viewers actually noticed the difference.

If you can live without some of the high-end production features, such as scene files, in your studio camera, then the BTS LDK-910 is an excellent choice.

There is no compromise in image quality between the top of the line LDK-9 and the LDK-910. The first year of operation of our LDK-910s has been very satisfactory.

Editor's note: Eric Dausman has worked for NBC network in New York in various capacities, including director of engineering for WNBC-TV and director of broadcast operations and core projects for the systems engineering group.

The opinions expressed above are the author's alone. For further information, contact your nearest BTS distributor, or circle Reader Service 124.

The HK-343 and the HL-43 have proven themselves worthy of our production facility requirements, budget constraints and performance expectations. We are very happy with our choice.

Editor's note: With a degree in electronics engineering from the Universidad Simon Bolivar and an MBA from the Universidad Catolica Andres Bello, Edgardo Mosca has worked at Coraven for the past eight years.

The opinions expressed above are the author's alone. For further information on the HK-343 or the HL-43, contact your nearest Ikegami distributor, or circle Reader Service 46.

BUYERS BRIEFS

The RP2 robotic pedestal from Radamec EPO is a free-roaming studio pedestal with infrared line scan camera navigation and collision avoidance capability.

Designed for portable cameras, the RP2 has a smaller footprint than earlier versions, enabling it to pass through most standard doorways. New software allows operators to control the unit via joystick without first having to steer the wheels in the correct position.

The unit also can be easily switched to manual control.

For further information, circle **Reader Service 51**.

Telemetrics has released three versions of a new robotic pedestal designed for special broadcast or industrial productions.

Models 51260 (multicore), 51261 (triax) and 51262 (RF-connected) consist of battery-powered pedestals connected to RS-232 control systems for camera movement, as well as pan, tilt, zoom and focus.

The units can be driven on hard or carpeted floors and even over cables or small objects.

For further information, circle **Reader Service 80**.

Century Precision Optics has introduced a new .8x wide angle converter for broadcast and industrial video zoom lenses. The new converter attaches to the front of a zoom lens and has the effect of shortening its focal length while maintaining full zoom capabilities.

The unit results in 20 percent increase in coverage when set to wide angle and a 20 decrease when shooting telephoto.

Listed at US\$1,295, the unit expands field-of-view and reduces minimum focus distance.

For further information, circle **Reader Service 100**.

Nikon Electronic Imaging's S19x8B TV-Nikkor lens for 2/3-inch ENG/EFP cameras has a wide angle 8mm, which enables shooting in tight situations.

The S19x8B, weighing just over 3.5 pounds, is a high-performance compact zoom supporting focal lengths of 8mm to 152mm angles. With the extender, it supports 16mm to 304mm.

The lens has a 19x zoom ratio, with a maximum aperture of f/1.7 covering focal lengths of 8mm to 117mm. The lens, which can also be used in the studio, is listed at US\$12,455.

For further information, circle **Reader Service 59**.

Sony BVP-375s Perform at Studio 7

by Ronald Paquette
President
Manhattan Center Studios

NEW YORK The music and video businesses are becoming inextricably tied, which is becoming especially evident in live concert production where the care placed in providing the finest digital sound is also taken in providing the best image capturing system.

I have witnessed this trend firsthand at Manhattan Center Studios, where my recent installation of three Sony BVP-375 cameras has created an ideal setup for live-event shooting. Manhattan Center's break into video is a logical extension of our digital sound recording capabilities, and our need to generate high quality video images along with state-of-the-art graphics is vital.

Manhattan Center Studios' Studio 7 is

used for videotaping live concert events that need to be multitracked to picture. It has a full production stage and multi-track studio to configure to the needs of any live event.

Sony setup

Shortly after our three Sony BVP-375 cameras arrived, Sony sent an entire crew of technicians over to match and set up the cameras.

I had already installed Sony's DVS-8000 switcher and DME-5000 digital multi-effects device, along with the BVE-9100 editor. It is a multiformat system comprised of one-inch Betacam and D-2 machines that integrate very well.

Our video control room, called Studio

USER REPORT

9, doubles as a live control room for Studio 7, and is connected via fiber optics to Waterfront Communications in Manhattan, where many other broadcasters are connected.

The BVP-375s allow us to do what could never be done before with live camera shoots.

The BVP-375s three HyperHAD "1000" FIT sensors provide excellent resolution, and the camera's Enhanced Vertical Definition System offers 450 lines of vertical resolution, producing a remarkable picture.

The camera is well-suited to live concert and theatrical applications, and even striking lighting contrasts, such as when a drummer or guitarist is hit with extremely bright overhead lights, never cause vertical smear.

More pixels

The most important improvement for a live producer who uses the BVP-375 is the performance of the Sony HyperHAD chip. In some cameras, the step design or pixel outline can be seen when doing a slow zoom.

But with at least 100,000 more pixels than other cameras, the BVP-375 has none of those problems. It's as smooth as the best of the old tube cameras.

The BVP-375 has triax configuration, 45x lenses, and takes no time to register.

For maximum flexibility at Studio 7, the BVP-375s match my BVW-400 cameras perfectly. And because of Studio 7's proximity to the Empire State Building, I have had to deal with the dreaded herringbone pattern from RF interference on my non-Sony cameras. The BVP-375 does not have that problem.

As acoustically-solid as Studio 7 is, the "look" of our room has to be to perfectly delivered. I am particularly glad that my switcher, editor, multi-effects generator and cameras all come from the same company.

When I first entered the production business, I had been working mainly with other manufacturers' chip cameras. For our studio applications, and for theatrical applications in general, I did not initially consider Sony. But after I saw the usefulness of Sony's ENG cameras, I was far more open to the consideration of the company's studio cameras.

Overall, in terms of performance, consultation and service, I have no regrets in choosing Sony.

Editor's note: Ronald Paquette has been with Manhattan Center Studios for three years, and has been president for one year. He has also worked with American Stream Music, and writes his own music and film strips.

The opinions expressed above are the author's alone. For further information, contact your nearest Sony Business and Professional Group representative.

BDL Keeps Pace with the News

by Tracey Hedges
Senior Prompt Operator
Independent Television News

LONDON, U.K. One of the most important things about the Broadcast Developments (BDL) Autoscript is its speed.

Especially in news studios, life is frantic. No matter how carefully scripts are prepared, there will inevitably be changes—that is the nature of the business.

Even when we are on the air, stories have to be edited, blocks of text moved or dropped, new stories added to the run order and old stories dropped to the bottom of the list—all at a moment's notice.

And although our newsroom computer is a very sophisticated system, the BDL Autoscript has two advantages.

First, it is a dedicated system and does not have different modes of operation. So no matter what I am doing at the time,

USER REPORT

every function is always available.

Secondly, again because it only has one mode of operation, all the keys keep the same function, so I do not have to stop and think; I know exactly what to do and how to do it.

Now that we have electronic newsrooms and sophisticated prompting systems, the

on-air talent seem to consider these systems to be totally infallible, and they place great reliance on us, the prompt operators.

And with the increased reliance has come a greater recognition for what we, and our Autoscripts, can do. For example, during an election news program, things are happening so fast that there simply is not time for complete stories to be prepared. On these occasions, we use the prompters as a sort of instant notice board to pass any available information directly to the presenter.

Even in regular news bulletins, more and more demands are being made of us. The news desks in all the ITN studios have a terminal to the main newsroom computer so that the news readers can change their own scripts. Even so, we still find that once we are on the air, many of them ask us to make changes directly onto the Autoscript. And—if they ask us very nicely—we can show them the changes as soon as they are made.

Moving up and down through the scripts is quick and easy and only requires one key to send a selected story to the on-camera prompter. We can also show them the script changes that have come down from the newsroom, or give them an instant preview of a later story.

With all this pressure to cope with



The BDL Autoscript system in ITN's newsroom

changes, one feature I use heavily is the Cloak function. This feature allows me to remove a block of text from the prompt output without actually deleting it from the script. Then, as so often happens, when someone decides to put that section back in, it can be done in only a few keystrokes.

We have five complete BDL Autoscript systems in the ITN studios, plus some additional location prompting equipment (also BDL's). Each system is a complete standalone prompter that can be used to create and edit stories, control run-orders and output scripts to the on-camera monitor or store them in memory or on disk.

With the introduction of the newsroom interface, the Autoscript can be coupled with the newsroom computer, as it is to the BASYS system at ITN. As far as the journalist in the newsroom is concerned, the act of passing a story to the Autoscript is as easy as sending it to a printer, but with the added advantage that once the program is finished, all the stories in their final form can be sent straight back to the newsroom system for archiving.

Editor's note: Before coming to ITN, Tracey Hedges was a senior prompt operator at the BBC.

The opinions expressed above are the author's alone. For further information on the Autoscript, contact Chris Lambert at BDL (Telephone: +44-71-538-1427; FAX: +44-71-515-9529), or circle Reader Service 29.

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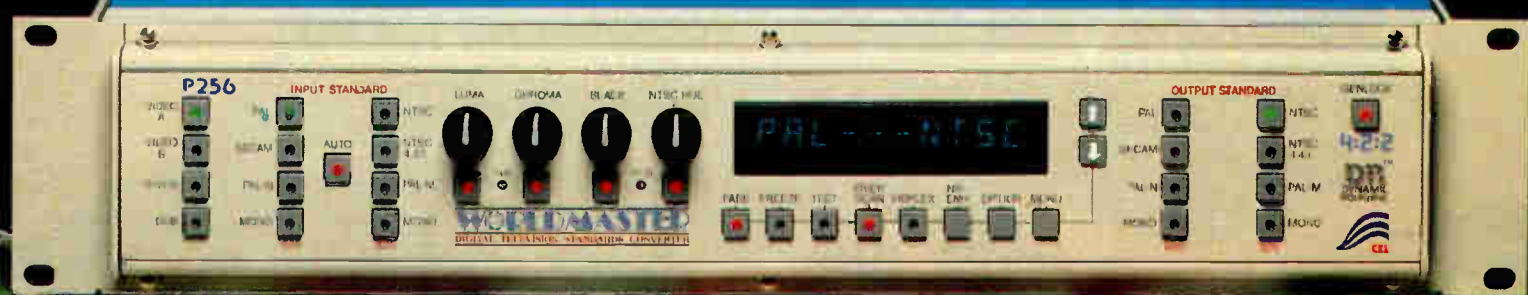
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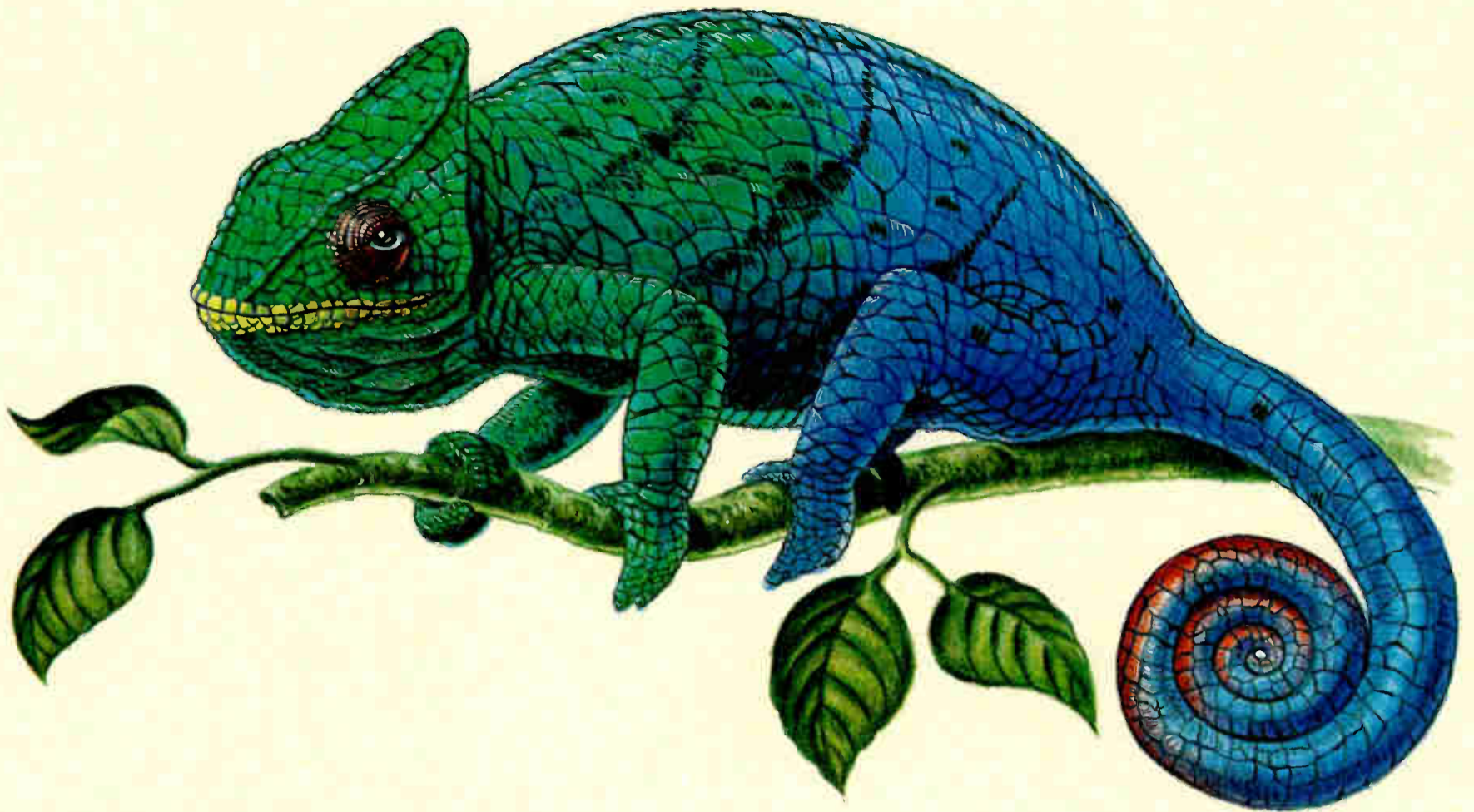
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