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TV TECHNOLOGY

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NAB '94 Draws International Interest

by Arthur Cole

LAS VEGAS

In what many believe is indicative of a rebounding U.S. broadcast market, the National Association of Broadcasters had its most successful convention ever last month, topping even last year's banner event.

The convention drew a record 71,082 attendees, a 10 percent increase over last year. And reports from the floor were that equipment sales were up, a strong indication that the two-year slump that plagued the industry earlier this decade is now in retreat.

ON TOP OF THE HILL

Attendance from overseas skyrocketed this year as well, broadening the consensus that NAB is becoming more international in its scope. With 14,669 foreign visitors (up 27 percent from 1993) from 109 countries, international attendance made up 20 percent of the overall attendance total, an all-time high for the NAB.

On top of that, the NAB itself is awash in the glory of several victories in Washington, D.C., namely last year's cable regulation bill and several key successes this year in an attempt to allow broadcasters to utilize new HDTV spectrum for other uses, such as multiple channels of NTSC and new data services.

"... there is renewed optimism and excitement about our future," said Edward O. Fritts, president and CEO of the NAB. "It is now recognized that broadcasters' seamless system of universal coverage... is the most convenient on-ramp for tomorrow's future information highway."

One dark spot at the show, however, was newly-installed FCC Chairman Reed Hundt's last-minute decision to forego the convention to attend an international communications symposium in Argentina. Instead of delivering the opening keynote address as scheduled, Hundt addressed the Broadcast Engineering Luncheon via satellite, where he vowed to work to "preserve everywhere in our country strong, diverse, creative, free, over-the-air broadcast service.

EYE ON TODAY

"... only miles separate you and me," he said. "And over those miles I hope you sense the sincerity of my belief that broadcasting has not even begun to reach the limits of the contribution it can make... "

However, over-the-air issues were not the only focus of the show. A good deal of attention was paid to wires, particularly telephone wires. Despite the recently-collapsed merger negotiations between cable TV giant Tele-Communications Inc. and regional telephone company Bell Atlantic, a combination that many believe would have greatly accelerated the envisioned broadband media highway of the future, many broadcasters are beginning to wonder what, if any, role they would have in such a medium.

But according to Raymond Smith, chairman and CEO of Bell Atlantic, who replaced Hundt as keynote speaker, broadcast and telco interests can both profit.

"With all the proliferation of new channels in the last 10 years, yours is still the most watched form of television today..." he said. "I submit that telephone entry into the video business will improve the competitive position of the broadcast industry, not impair it."

While such future-oriented issues

(continued on page 22)

STYLE AND FLASH:
Crowds at NAB were again drawn to the latest in computer imaging, such as this scene created on Softimage's Creative Environment. Turn to page 21 for more coverage.

Winter Olympics Wrap-Up on Page 6

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NEWS WATCH

SATELLITES

ORBIT GEARS UP FOR LAUNCH

MILAN, ITALY

Orbit Communications Company was continuing its buying spree of video and audio equipment earlier this year in preparation for its planned launch of a multi-lingual satellite television service to Europe, Africa and the Middle East.

Orbit recently awarded a multi-million pound contract to Snell & Wilcox for a number of its Alchemist standards converters. It is expected that about half of Orbit's programming will have to be converted before transmission.

Orbit also recently purchased 124 stereo digital audio converters from Pro-Bel.

Orbit is planning to offer 25 digitally compressed channels of Arabic, French and English entertainment and news. The service is due to be launched by mid-summer.

DIGITAL VIDEO

MEXICAN GROUP LAUNCHES DIGITAL TV SERVICE

MEXICO CITY

PCTV (Productora y Comercializadora de Television), Mexico's largest cable TV programmer, has launched four channels of programming in digital.

The launch brings the number of digital channels in Mexico to 16, with as many as 24 channels planned to be in operation by the end of the year.

PCTV will use General Instrument's DigiCipher digital compression system to squeeze all four channels through a single transponder on either the Solidaridad or Morelos satellites.

PCTV currently provides programming to 190 cities throughout Mexico with an estimated coverage of about 800,000 homes.

NETWORKS

EUTELSAT ACCEPTS ESTONIA, LATVIA AND MOLDOVA

PARIS

Eutelsat's Assembly of Parties has unanimously approved applications for membership from Estonia, Latvia and Moldova.

The three additional nations expand Eutelsat's presence to 42 countries, including 16 that have joined in the past year.

Eutelsat provides trans-European networks for fixed and mobile television, radio and telephony using its two satellites, Eutelsat II and Eutelsat III.

The organization is currently examining membership applications from a number of additional countries in Europe.

SATELLITES

WORLD CUP SOCCER FEEDS SET

LOS ANGELES, CALIFORNIA

Italy's RAI network and ZDF of Germany have selected IDB Communications to provide transmission services for the 1994 World Cup Tournament to be held in the U.S. this year.

The 52 games in the tournament will take place June 17 to July 17 in nine U.S. cities. Broadcasts from all locations will be routed to an international broadcast center in Dallas, Texas, before distribution to broadcast rights holders.

IDB will provide a 24-hour-a-day, five-day-a-week service. It will obtain the Dallas feed at its Staten Island (New York) international teleport using local loop connections and a fiber optic network provided by the Vyvx National Video Network.

RAI will receive signals encrypted with a 525-line B-MAC encoder. Included in the transmission will be four diversely routed 7.5 kHz audio channels. ZDF will receive a standard 525 NTSC format. Both feeds will be uplinked to the Intelsat 601 AOR 332.5 satellite.

BUSINESS

ODETICS TARGETS ASIA-PACIFIC AREA

SINGAPORE

Automation manufacturer Odetics has moved some key personnel to its Singapore office in a move aimed at further penetrating the Pacific Rim market.

Odetics Asia Pacific will initially consist of Frank Borst, director of global business development and now managing director of the office, and Brian Lewis, division manager of Asian business development. Donald Greenspan, vice president and general manager of Odetics' information distribution division, will join the Asia Pacific office later this year.

"This region has an immediate need for television broadcast automation," Borst said. "Odetics does extremely well in emerging markets."

The office will be responsible for marketing Odetics' line of automated library systems, time-lapse video recorders, transmission equipment and timing and interface products.

RF TRANSMISSION

TV AZTECA PLANNING MAJOR UPGRADE

MEXICO CITY

Television Azteca S.A. de C.V. is set to undertake a major equipment upgrade aimed at its transmission, microwave, production and satellite capabilities.

The company recently awarded a US$30 million contract to Harris Corp. to provide equipment to its stations in 58 Mexican cities.

The project is expected to continue for two years, during which time Harris is expected to deliver more than 90 VHF and UHF transmitters, antennas and other RF products. Harris will also provide two mobile production units, two transportable Ku-band uplink systems, two portable microwave systems and three fixed microwave systems.

The equipment is expected to be delivered to Mexico City, Guadalajara, Guanajuato, Veracruz and Monterrey in time for use during the World Cup Soccer Championships beginning in June.

Originally a government-owned broadcast operation, TV Azteca is now a privately owned operation with 160 TV stations throughout Mexico.

PRODUCTION

AAVS BUILDING STUDIOS FOR VIETNAM TV

SAIGON, VIETNAM

French manufacturer AAVS has been selected to build two production studios for Ho-Chi-Minh-Ville Television in a deal valued at 10 million francs.

The studios will be outfitted with four cameras each, as well as a full complement of signal processing equipment, two post production cells and a switching center. Construction is expected to be completed within three months.

The agreement calls for AAVS to establish a joint-venture company with Vietnam's audio-visual import-export unit.

The Vietnam contract is the latest in a string of international arrangements for AAVS. The company recently completed a similar studio configuration for Canton Television in China and recently delivered a three-camera mobile news unit for Palestinian Television.

EXPOSITIONS

U.S.'S SHOWBIZ EXPO TO LAUNCH EUROPEAN SHOW

SANTA ANA, CALIFORNIA

Advanstar Expositions of the U.S. has announced it will bring its successful ShowBiz Expo exhibition to Europe.

The first show will take place September 24-26 at the M.O.C. Exhibition Centre in Munich, Germany.

According to the company's office in Chester, U.K., the event is expected to launch with about 100 exhibitors. The show will include live-action areas and hands-on demonstrations, as well as a conference and seminar program on such topics as European co-productions and film financing, selling and distribution.

"We predict that after 10 years in Los Angeles and three in New York, this event will also fast become the most important event on the calendar in Europe," said Liz Crawford, manager of the U.S. show.

The show is designed for manufacturers, rental companies, editing and general film and video companies.

BUSINESS

FIRM OBTAINS BBC SATELLITE CONTRACT

WASHINGTON, D.C.

Washington International Teleport (WIT) has been selected to provide uplinking facilities for the Washington Bureau of the BBC.

Under the contract, WIT will obtain news feeds from the PVS International Broadcast Center and transmit them via the Ku-band PanAmSat I to the BBC in London.

The agreement marks the continuation of an earlier alliance between WIT and the PVS center that allows the two groups to offer a collective production, program origination and transmission service.

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TV ASIA Eyes American Feed

by Frank Beacham

NEW YORK

Quickly seizing the opportunity to use direct broadcast satellite (DBS) technology to target niche audiences in North America, DirecTv — the new U.S. high power DBS startup — has announced a program distribution agreement with TV ASIA to beam Asian programming into the United States from the Indian subcontinent.

DirecTv, a unit of GM Hughes Electronics, is scheduled to begin the first high power commercial U.S. DBS service by mid-May.

Under the agreement with TV ASIA, DirecTv will distribute the programming on its second satellite, now scheduled to be launched in July on a General Dynamics Atlas rocket. The first satellite was successfully launched last December.

TV ASIA, which began service in April, 1993, marks the first significant attempt to use satellite technology to reach out to the nearly two million Indian, Pakistani, Bangladeshi, Sri Lankan, Guyanese and West Indies nationals residing in North America.

"DirecTv has the channel capacity and broad coverage needed to target highly specialized audiences," said Eddy Hartenstein, president of DirecTv. With the new DBS service, viewers across the United States will have access to up to 150 channels of programming through a small, user-installable 18-inch receiving dish and satellite receiver.

TV ASIA, which is currently offered on a limited basis through cable, C-band and MMS systems, offers movies, news, music and drama programs, as well as sports coverage of cricket, field hockey, soccer and squash from the Indian subcontinent. The cost of the service on DirecTv will be $5.95 per month. Programming will be offered weekdays from 6:00 a.m. until 6:00 p.m. (EST) and on weekends from 6:00 a.m. until 12 midnight.

TV ASIA is owned by parent Asian Broadcasting Network and is backed by an international consortium of investors. The service is also in operation in the United Kingdom.

The TV ASIA deal represents DirecTv's first foray into international niche programming, though more are expected. Initially, the DirecTv service will offer a broad array of monthly subscription and pay-per-view programming. To date, 40 popular cable networks and about 50 channels of Hollywood movies are signed to the network.

DirecTv, the most ambitious single network startup in history, is now in beta testing. The home receiving system, priced at US$699, is being manufactured by Thomson Consumer Electronics and will be sold under the RCA brand name at consumer electronics outlets throughout the U.S.

Thomson's Joseph Clayton, executive vice president of marketing and sales, said the manufacturing of the encoders for transmission remains the most difficult task ahead for the project.

"We do not have all the encoders built yet," he said. "But we have encoders up and running, and it is now a matter of stability and integration. Once it is built right, then it is easy to duplicate."

Hartenstein said DirecTv will soon begin final testing with its own employees to get the remaining kinks out of the system.

"We will not experiment with real customers," he said. "We are taking the system up and down as we make software changes. Different employees are scripted to do different things to exercise the features of the system." ■

Data Network Tests Still Video

by James Careless

OTTAWA, Canada

Scientists at the government's Communications Research Centre here are on the verge of transmitting digitized still video pictures over the Internet — the world's largest computer network, with 2 million users in 152 countries.

In doing so, however, they have had to confront the prime transmission limitations of current global networks: inadequate bandwidth for full-motion, real time video.

"You just do not have total television channels to distribute the video," said Dr. Andrew Patrick, CRC research scientist. "You either have to greatly compress the video or reduce the amount of video that you are sending."

COMPRESSION QUESTIONS

Because of the ongoing debate over compression standards, Dr. Patrick and his fellow scientists at CRC's New Broadcast Services Laboratory have decided to go with video signal reduction. In other words, they are fitting uncompressed signals within the Internet's limited bandwidth by reducing the number of frames sent from 30 per second to one frame every 5-10 seconds.

They are not sending random frames, but selectively choosing images to synchronize with and enhance the information contained in an audio track.

"When the speaker changes, when the scene changes, when something interesting is happening in the video, that is when we change the video still frame," Patrick said.

The result resembles a preproduced slide show, what Patrick jokingly described as "radio for the imaginally impaired."

The CRC scientists produce the program by feeding the output of an industrial S-VHS editing suite into a peripheral computer device that allows the operator to capture specific frames. These are then synchronized to the audio track and packaged as digitized data files, which can then be accessed by other computer users.

The key word in the process is 'can,' because as of presstime, CRC had yet to actually upload any 'video files' onto the Internet.

The reason for the delay is software, Patrick said.

"You need a program to synchronize the audio and the key frame video, so that the images change at the right time in the story," he said. "That requires a program to run on the viewer's computer that will do that synchronizing. We have that program running in the laboratory for one type of computer, but we do not have it generalized to enough different types and speeds of computers to offer it on the Internet."

However, Patrick expects this hurdle to be cleared in a few months, meaning that CRC's video files will become globally available sometime in mid-1994. CRC is already digitizing daily radio newscasts from the publicly-owned Canadian Broadcasting Corporation (CBC), which — being audio only — require no such synchronization. These are currently available via Internet, and are being accessed on a regular basis by users worldwide.

WHY BOTHER?

Of course, all of this work begs a simple question: why bother? Why should CRC spend so much time and effort developing what is essentially a primitive form of "slide TV" television, when going "low-tech" is the last thing broadcasters want to do?

The answer comes in two words: "electronic highway."

In essence, CRC has developed a functioning electronic highway television format; one that can be used today, rather than in some distant future. The system's "minimal bandwidth" design is precisely what makes it usable on current computer networks.

"What we are trying to do is demonstrate to television producers and broadcasters that they can start getting involved with 'broadcasting on the electronic highway' now," Patrick said. "We do not have to wait for higher speed networks, for decisions to be made on compression."

This is precisely why the CBC is involved with CRC's experiment, he added. By participating (namely by providing programming), "CBC is learning what the legal issues are concerning copyright, royalties for artists, (and) keeping track of the traffic logs that are normally used in broadcasting stations..."

It is for these reasons that Patrick has such high hopes for the system; a format which he hopes to see commercialized and offered to the global marketplace.

CRC will be performing similar experiments on Ottawa's OCRInet, a local fiber optic research and development network capable of carrying full motion video, provided nothing else is being sent down the line.

"This is the kind of thing that we may be able to develop a technology that can be commercialized, that can be transferred to a company and made into a commercial product," Patrick said. "Our immediate goal is to make it available and determine viewer reaction." ■

*James Careless is a frequent contributor to **TV Technology** and its sister publication **Radio World**.*

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West Africa Looks to Wireless Cable

by James K. Vines

GUEST COMMENTARY

Wireless cable — also known as Multichannel Multipoint Distribution Service (MMDS) — is one of the hottest topics among adventuresome West African entrepreneurs. This is because West African governments from Senegal to Nigeria are deregulating broadcasting and are selling private broadcast licenses.

For reasons that I can get into later, a large number of these ventures will be wireless cable. Most will simply take satellite programming off of the Intelsats, while some will invest whatever is necessary to get the European quasi-DBS satellites, including the Eutelsats and Astra 1A, 1B and 1C.

They will also play bootlegged second and third generation (or worse) VHS movies.

Revenues will come mostly from subscriptions, as the programming will be scrambled. It sounds like a nice little business, like pay telephones or vending machines.

But what would happen if wireless cable ventures were configured to stimulate the surrounding regional economy? Dr. Samuel O. Enyia, a native of Nigeria and director of broadcast program communications at Lewis University, and I call this the "infrastructural imperative."

REVENUE RETURN

The effect of a growing economy would be to bring greater revenues and profits back to the wireless cable venture. This requires a "wireless" business strategy that has regional economic stimulation as a key objective. The "wireless" entrepreneur must learn to think of his business on an industrial and infrastructural scale.

This means having a mix of free and pay TV. It means making TV — even pay TV — affordable to the average citizen. Done resourcefully, the wireless cable venture will function as two independent profit centers (free and pay TV). Other independent profit centers will naturally arise; for example, video production for both local programming and advertisements. These already exist in Nigeria, Ghana, Cameroon and elsewhere. A truly visionary wireless cable operation will stimulate these and other already-existing independent profit centers.

Within any regional economy from Conakry to Kano, there is hardly a business or industry, including education and agriculture, that would not benefit from the presence of a forward-looking wireless cable TV venture.

So by all indications, a mix of free and pay TV would have the potential to boost the surrounding regional economy.

The impact would be even more profound and would produce much more immediate results if wireless cable were to operate in the UHF spectrum instead of 2.5-2.7 GHz. UHF signals propagate over rather remarkable distances in the tropics, and this would allow the wireless venture to keep subscription rates low, since greater numbers of subscribers could be served. In addition, any UHF free channels that are provided would earn greater ad revenues.

The result is a more active regional economy. It is a simple matter of applying growth theory economics to Third World television.

Enter the governments. In one country, just five channels — all UHF — have been made available for TV. Of these, two are used by the government, which employs 5,000 people in fiendishly unproductive ways. That leaves just three channels, and no private entrepreneur will be able to obtain more than one of those.

What we find in many cases is a government in which there are two conflicting schools of economic thought. One says that government should create jobs and protect those already in existence; preserve stability and protect from pain.

The other says that government should leave job and wealth creation to the private sector. The ongoing change (restructuring) that goes on in a free market economy is seen as preferable to the catastrophic collapses that eventually hit command-and-control economies. Pain endured in small doses leads to greater efficiency and growth.

In many West African nations, both government and the private sector interests are split between these two schools of thought.

When planning to launch a wireless cable venture for maximum regional economic stimulation, overcoming all of these obstacles can be quite a task.

In some cases, it is still possible to get UHF spectrum to provide a free channel. This becomes the "barker" channel, which among other things can be used to advertise and show teasers of the pay programming. Cashflow projections done by Dr. Enyia and myself suggest that a free channel can generate surprising revenues. And we have done studies for several areas in Nigeria and elsewhere that show that free TV will also enhance the earnings of pay TV.

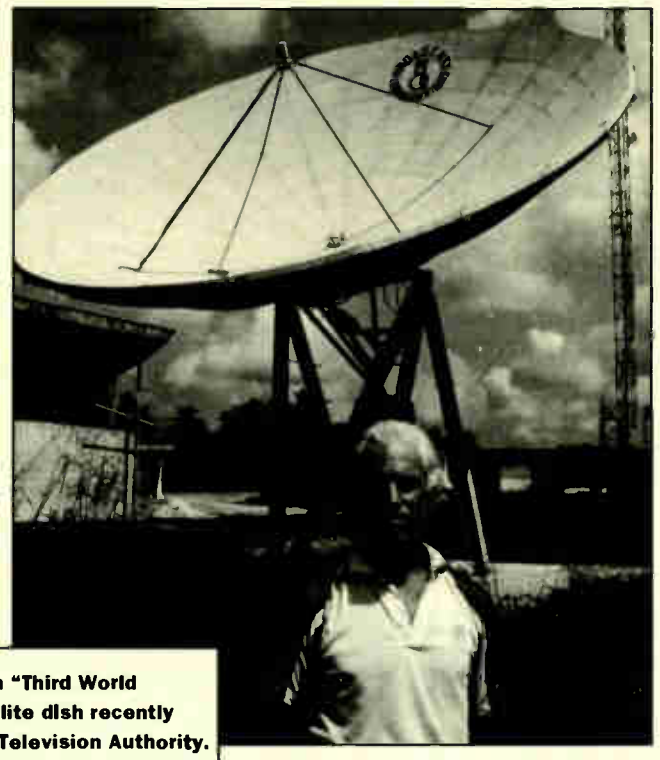
TRANSMISSION LIMITS

Sadly, when it comes to providing pay channels, the 2.5-2.7 GHz microwave range does not propagate much beyond line-of-sight, even in the tropics. UHF does. In fact, UHF can reliably provide reasonable reception over 150 km much of the time in the tropics.

UHF would also be more affordable to the average pay TV subscriber, since the specialized microwave Rx antenna and downconverter are not required. Close-in, a coathanger could make do.

So why all of the 2.5-2.7 GHz activity? It appears from the overseas calls we get that many Third World entrepreneurs (not just in West Africa) feel compelled to copy wireless cable as it is done in the U.S. Another reason is that Third World governments have been restrictive in granting UHF (let alone VHF) frequency assignments.

Fortunately, there is a way out of the woods (or jungle). Even at microwave frequencies, the pay TV programming can be carried well beyond the horizon. The key is a novel configuration of existing technologies known as OTH (over-the-horizon) microwave.



James Vines with a "Third World Manufacturable" satellite dish recently installed for the Nigerian Television Authority.

In essence, OTH can be considered "cellular" wireless cable. Because wireless cable uses broadband FM technology, more channels can be used in the block of frequencies usually devoted to cellular voice communications.

SINGLE SOURCE

In a simple OTH configuration, all channels originate from one point, just as in a normal wireless system. But instead of going directly to subscribers, programming is delivered via point-to-point microwave to cell site transmitters located throughout a desired coverage area. The cell transmitters then broadcast an omnidirectional pattern to area subscribers. The cell sites can be shaped according to ERP and antenna patterns to "shape" the area of coverage, and they can also overlap to provide blanket coverage of a large area.

More complex OTH configurations involve the use of bi-directional antennas, allowing the cells to act as repeater stations for other cells. This would enable programming to be originated from several central distribution facilities or from each cell site.

The cost of OTH configurations is low, and they are already being established in some areas.

With this configuration, it will be possible to stimulate profound regional economic and infrastructural growth. ■

James K. Vines holds U.S. and Canadian patents for satellite antenna design. With Dr. Enyia, Vines has been developing revenue prediction methodology for Third World wireless cable clients. Vines can be contacted at his company, Findex Worldwide, at P.O. Box 284, University Park, Ill., telephone: +1-708-534-0889;

SHOW LISTINGS

1-4 JUNE — BROADCAST ASIA 1994

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

22-24 JUNE — APRS '94

London. The 27th annual APRS convention at the Olympia 2 will focus on the broadening professional audio market. For information, contact Philip Vaughan, 2 Windsor Square, Silver St., Reading, U.K., RG1 2TH; telephone: +44-734-756-218; FAX: +44-734-756-216.

28-30 JUNE — SATCOM ASIA '94.

Hong Kong. The Institute for International Research presents the first Asia-Pacific forum to address the satellite communications industry. For information, contact IIR Ltd., 1804 Seaview Commercial Building, 21-24 Connaught Road West, Hong Kong; telephone: +852-549-5618; FAX: +852-547-3836.

5-8 JULY — FUTURE HORIZONS/SMPTE AUSTRALIA '94

Sydney, Australia. Television broadcasting, production and post production, as well as film and multimedia issues will be the focus. For information, contact organizers at telephone: +612-976-3245; +612-977-0336.

3-7 AUGUST — CES SOUTH AMERICA

São Paulo, Brazil. The Consumer Electronics Show opens in South America. For information, contact Cynthia Upson at: telephone: +1-202-457-8728, or write to her at 2001 Pennsylvania Ave., NW, Washington, D.C. 20006-1813, USA.

14-17 AUGUST — VIDEO EXPO-SET, BROADCAST SOUTH AMERICA '94

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NRK Pioneers Component Digital

Host Broadcaster Takes Digital Betacam to Some Pretty Extreme Conditions

by Carmel King

LILLEHAMMER, Norway

Olympic host NRK ORTO made broadcasting history at the XVII Winter Olympic Games as it successfully pioneered the large-scale use of new digital technology.

The Norwegian broadcaster, responsible for producing and directing more than 300 hours of live coverage that was transmitted worldwide to more than 2 billion people, relied heavily on Sony's new Digital Betacam format, and on serial digital routing.

"It worked like a dream," said NRK ORTO Managing Director Arild Hellgren.

"The real reason for going digital was to have a safer and simpler operation," and that is exactly what the host broadcaster got, said Hellgren. "That is perhaps one of the reasons why it was so calm in the (International Broadcast Center)."

THE DRIVE TO DIGITAL

Hellgren said he decided to go the digital route four years ago.

"NRK had gone into analog component, and I think we saw the benefit of doing component production, but being analog (required) too many cables," he said.

"Back then, we had the D-1 digital recorder, but it was too big, too expensive, too heavy to handle. So I started looking around and asking for a D-1 half-size, half-price," Hellgren said. "Suddenly, Panasonic, Sony, and Ampex came up with plans saying they could meet our time schedule for doing this. And we were allowed into the laboratories, and took part in the development."

> **"The real reason for going digital was to have a safer and simpler operation,"**
>
> ***— Arild Hellgren***

Finally, NRK ORTO settled on Digital Betacam and ordered 200 units for use during the Games. It also made plans to wire the IBC facility for serial digital routing.

"Going digital, you can have both sound and digital video on one coax cable, which means when you have to plug in a signal, you only have to plug one cable. The whole distribution was much simpler. A lot of racks were saved in installation, a lot of audio cable not wired up," Hellgren explained.

"And of course, being an Olympics, there was a very high demand for quality and stability. With digital, there is nothing to measure, no gain to set, no signal-to-noise. So we saved a lot of time each day in measuring," he added.

While Hellgren said production quality was not as big a factor in choosing a digital format ("In the end, you are transmitting the signal; people won't notice the difference"), the benefits of digital production will pay off in the long run.

"With Digital Betacam, we will have pictures that can be upgraded to high definition sometime, with better quality than if you go to PAL. So I think in the future, we can show people even better pictures from Lillehammer," he said.

GREAT EXPECTATIONS

While there were a few, minor technical problems getting the digital units up and running, overall Hellgren said Digital Betacam "definitely" met his expectations.

"We had maybe a little more trouble powering the whole thing up, but we got the system to work during December and the first part of January," he said.

"Some things had to be cured, but we expected that, so we put in one-and-a-half months for testing." Hellgren said the host broadcaster "used that time to get rid of all the minor problems."

Sony's on-site Olympic support unit helped NRK in its efforts. "It was a big operation, and they did a fantastic job," Hellgren said. "Of course, there were some minor things I wish perhaps could have been better, but it was never the case where they had not done their job. Of course, sometimes we would have liked it to have been done the day before."

Hellgren said the Digital Betacam units, which were "very simple to operate," were well received by NRK ORTO's video tape operators and editors.

"...People are used to standard Betacam, (and) this is the same, except you have some new features. We had people in for training but it was rather easy to train them for this new machine," he said.

NRK purchased 111 Digital Betacam machines for its new facility. It planned to convert from analog to digital recording soon after the Olympics, according to Hellgren. The rest of the Digital Betacam machines were leased, he added. ■

ORTO Managing Director Arild Hellgren with a Sony Digital Betacam deck S/N001.

NHK Delivers Olympics in HD

LILLEHAMMER, Norway

If you are looking for the latest in television technology at any Olympic Games, you usually have to look no further than to the Japanese broadcaster NHK.

These Winter Games proved to be no exception. NHK was utilizing both the latest in digital recording and high definition television to produce its Olympic programming.

On the digital VTR front, the Japanese broadcaster employed 54 Sony Digital Betacam units in its facilities, according to Hideaki Momozawa, senior engineer in NHK's Field Operations Division.

"So far, everything has been good," he said.

RECORDED DIGITALLY

NHK was receiving the host feed from NRK ORTO in the digital format and recording it on Digital Betacam machines.

"Later on, when we edited, we could do so without degradation," said Momozawa. "We often had to do the work of editing many times. If we did it in the analog format, degradation of picture is inevitable.

To avoid that disadvantage, we used Digital Betacam and kept the picture in good quality."

Momozawa reported only "minor" problems with the new digital units.

"For example, some head functions were not good, and we had problems of non-recording, one or two of those," he said. "Apart from that, we did not find serious problems."

Before transmitting its all-digital signal back to Japan, NHK converted it from PAL to NTSC using three Vistek standards converters.

Although some motion problems existed with the conversion, overall Momozawa said NHK was "happy with the Vistek machines."

"At this stage, there is no perfect machine" for standards conversion, he added.

NTSC Olympic pictures were not the only ones available to the Japanese home audience. NHK also sent back 110 hours of high definition programming from the Games.

This volume was made possible by an HDTV program exchange between NHK and HD Thames, a London-based HDTV production house.

The exchange was unique in that NHK produced its high definition programming in the 1125-line format, while HD Thames used the European 1250-line standard. NHK used two standards converters made by NHK Technical Laboratory and OKI to convert the programming; HD Thames relied on Thomson units.

The program exchange "went well, as we expected," said Yukio Haba, senior engineer from NHK's Out-Side Broadcasting Division.

Part of NHK's objective at the Olympics was to demonstrate the progress of HDTV to other world broadcasters, a goal which NHK officials said it achieved.

"Almost every day, we had people from other broadcasting companies coming in and visiting us. They were very interested in the HDTV operation," said Haba.

Other visitors, according to Yosuke Sato, senior producer of NHK's HD Television Programs Division, included the president of the International Olympic Committee, the mayor of Atlanta (host of the 1996 Summer Games), the mayor of Salt Lake City (which is bidding for the 2002 Winter Games), and executives from Coca-Cola, Kodak and IBM.

"They were very impressed with the high quality of HDTV," Sato added.

FUELING HD IN JAPAN

The penetration of HDTV into Japanese homes is on the increase, according to Sato. Currently, nine hours of HDTV programming is broadcast each day in Japan, and there were plans to add another hour to that schedule in April, he said.

"We have now 20,000 households and 481 public viewing places. During the Winter Olympic Games, we estimate that 10 million people could see the (HDTV) picture," Sato said.

What has helped fuel this increase is a drop in the price of HDTV home receivers, he added.

"The cheapest viewing set sold by Sony now costs $6,000 U.S. dollars. The size is 28 inches," he said. "One year ago, the cheapest viewing set was $10,000 U.S. dollars."

During the Olympic Games, a controversy regarding the development of HDTV in Japan flared up when a senior Japanese telecommunications official discussed the possibility of abandoning the nation's current high definition television system in favor of a digitally-based system, such as the one recently adopted in the U.S.

The statement was retracted by the official the next day.

This controversy did not take away from NHK's Olympic HDTV demonstration, according to Haba.

"That was a misunderstanding," he said, of the official's comment. ■

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CBS Builds on Analog Experience

Lillehammer Center Used Systems Transplanted from Albertville

Eighteen-year CBS veteran Barry Zegel directed the U.S. network's operation for the XVII Winter Olympics. As the Games drew to a close, he talked to ***TV Technology*** *Associate Publisher Carmel King about the scope of the Olympic project, and what the experience was like for those involved. An excerpt from this interview is printed here.*

TV Technology: *Some cynics say that the Olympics are just another two-week remote. Do you agree?*
Zegel: No, it is not like doing a remote at all.

If you come in and are assigned to a venue, you bring in a mobile unit...it may have that kind of feeling. But actually building the entire Olympic system here, by the time we are done, this is about the third-largest facility CBS owns. And we built it in just a few months.

It is a 50,000-square-foot broadcast center. We have microwave systems on the towers, area IFB, VANDA systems throughout the entire Olympic region, mobile units, large edit compounds — I mean it is just as big as any major city operation you could run into... It is as encompassing a project as I can imagine. One of the largest broadcast efforts you could get involved with.

TV Technology: *What were your major operational considerations in approaching these Games?*
Zegel: Well, certainly, to build a streamlined, functional facility. Things worked pretty well in Albertville, but let's capitalize on what we learned, and also let's utilize the area and the terrain and some things that we can take advantage of.

TV Technology: *Did you have a bigger or smaller budget than Albertville?*
Zegel: We never talk numbers, but they certainly did not throw a lot more money at us.

TV Technology: *What was the philosophy behind going with an analog plant?*
Zegel: A number of things actually. Re-use of designs and facilities. A lot of the rack systems we used in Albertville were stored in France and brought here. After-use of equipment. CBS is still primarily D-2 and Beta SP.

Many times through the years broadcasters have used the Olympics as a time to bring out the new toys. But when you are sitting in the middle of the Arctic, I am not sure that is the time to push the envelope with new toys. So we had a good solid plant here, and I think we got great pictures. We had no compelling reason to make a big change.

TV Technology: *With the venues all in PAL, and the broadcast center NTSC, did you have any problems with standards conversion?*
Zegel: No, we did well this time. A lot of times you have to customize the set-ups for each sport. But the conversions I think have generally looked pretty good. It is not perfect yet, but it is where the technology is.

TV Technology: *What was the most challenging aspect of the operation for you?*
Zegel: I would not say there was one thing that was way beyond any other. It was keeping the whole (operation) in some kind of equilibrium. You sit day after day and say, "What did I forget?" You focus on every little group and make sure everybody is doing what has to be done. I think that — the sheer logistics of all of it — is the challenge.

TV Technology: *Did you learn anything here that will change the way you approach the 1998 Winter Games in Nagano?*
Zegel: Nagano will be totally different. (It) is spread out all over — it makes Albertville look compact. There are 13 venues, (and) very small roads. Mobile units like we know them in Europe just are not available in that area of the world, and the ones that are around I am sure will be gobbled up by the host broadcaster.

Barry Zegel

Also, we are live during prime time, with a 14-hour difference. It will not be as much of a post-production show as it will be live and live-to-tape.

Even if you wanted to do it exactly like we did here, you could not. You could not get the equipment in, you could not get the mobile units in, it is spread out all over the place. It is going to be quite a different challenge.

TV Technology: *Do you know how you are going to handle it yet?*
Zegel: Every venue is planned out to the camera. It may not resemble anything that we do, but the coordinating producer, director and I actually canvassed every location just to build up a budget, and took a guess at how we are going to do it.

TV Technology: *What about the broadcast facility there?*
Zegel: It will be quite a bit smaller than this. Again, it is not so post-production intensive. We may rely on New York more, with compression and some of the other things coming along. It makes sense to send a lot of stuff back to New York.

But it is four years away. We had to take our best guess today. We tried to think up new, creative ways to do great coverage and put our money where it really matters, and that is in covering the venues. That is where we always put our emphasis. If you are going to cut anything back, figure out a way to do post and the (broadcast center)-type operations for less. But do not lose your coverage out at the venues, because that is really what matters. ■

Graphics by Dynatech

LILLEHAMMER, Norway

Much of the look and feel of Olympics broadcasting is captured in the various graphic elements and logos used throughout the event.

For the 1994 Winter Games, many of the graphics created by NRK ORTO and fed to other broadcasters were designed on systems from the Dynatech Video Group.

Playing a large role were 22 Delta character generators from Quanta Corp. The systems were selected largely by virtue of their ability to handle timing information down to a tenth of a second.

For background graphics, as well as national flags, logos and symbols, NRK utilized a pair of DP/MAX workstations from ColorGraphics. Each unit was networked to a DP/Mosaic digital disk recorder and an Alpha 501 component digital production switcher from Alpha Image.

Graphics from the DP/MAX's were stored on removable hard disks, allowing them to be imported to the Delta's high-speed on-board RAM. Most banners, headings, textures and other static graphics were stored as completed images. For graphics that changed over time, the Delta's "Smart Planes" feature pre-defined such things as typefaces, positions, colors and sizes. This speeded up the delivery and display process.

The DP/MAX's were also used to create the symbols seen at each sporting event. The figures, based on ancient Viking drawings, were unlike typical sports graphics in that they did not have sharp edges or bright colors. Instead, they consisted of ragged edges and soft earth colors and natural textures. ■

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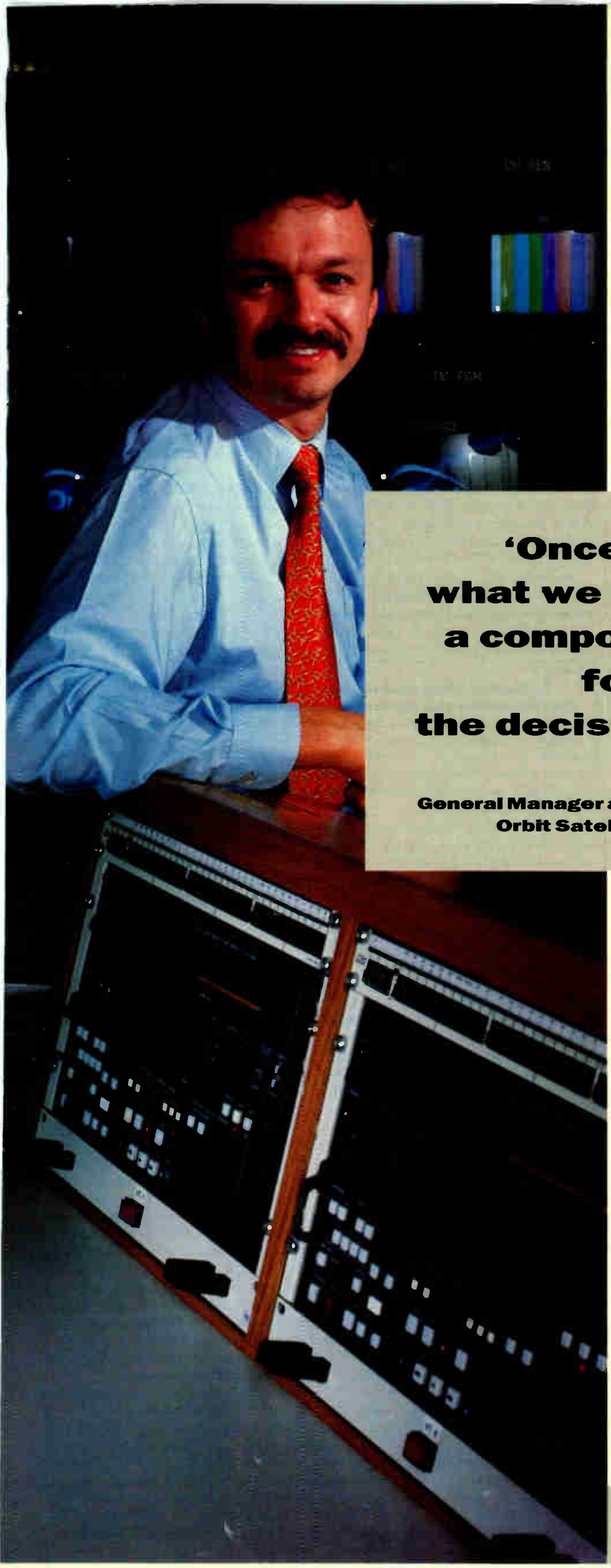

'Once we saw what we needed from a component digital format, the decision was easy.'

Philip R. Braden,
General Manager and Director of Operations,
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Questioning the 16:9 Switch

by Mario Orazio

SOMEWHERE OUT THERE *You might not have noticed* that camera manufacturers are giving us a choice this year. Near as I can figure, the choice seems to be between "Back to the Future," "Forward into the Past," "Days Of Future Passed," and "Wasn't the Future Wonderful?" If you gather from all of this that I am just a little bit angry about the trend in switchable 16:9/4:3 cameras, you are mighty far from wrong.

Usually, the publisher of this magazine lives in constant dread of my saying less than wonderful things about an advertiser. No worries this month, though. I will not say anything bad about a single camera manufacturer; I am furious at almost *all* of them. What we have here is another case of: "Excuse us, ma'am, while we demolish your house so we can build a new park so your neighborhood will be nicer."

A LOT TO LOVE

Please do not misunderstand me. I *like* widescreen pictures, and I am not alone. Some people that I respect quite a lot did some studies I am equally fond of and found that just about everybody and her sister likes widescreen pictures.

But so much for ideal-world preferences. Down here on *terra cognita*, the problem is how to get those nice wide pictures to my fellow man. We may like wider programming, but we own 4:3 TV sets. The research is not as great, and I am not as big a fan of its conductors, but there is a mess of circumstantial evidence that those same people who favor 16:9 are not entranced by the idea of black bars at the tops and bottoms of their 4:3 picture tubes.

We have had widescreen movies since before CinemaScope, but there is a difference between widescreen movies and widescreen TV. No matter where you go or what movie you see, somehow, magically, the picture perfectly fits the screen size and shape.

I do not mean to go around popping more balloons than I already have, but I must say that it is not a coincidence that you watch widescreen movies in widescreen theaters and not-so-widescreen movies in not-so-widescreen cinemas.

No, there is not a crew of carpenters and stagehands rebuilding the wall between movies; there are *curtains* that get drawn to match the shape of the projected image. So, what is the difference between widescreen movies and widescreen TV? Altogether, now: *TV does not have curtains.*

That means that TV must either live with just one aspect ratio, or something is not going to be wonderful. Personally, I would love to watch TV in just the 19:9 aspect ratio. On the other hand, I am not sure I am ready to give up that whole mess of programming that was shot in 4:3.

Table 1.
Comparison of the Good Old Days with the New Ten Foot Distance with 10mm Focal Length (2/3" Format)

	Good Old Days	New 16:9	New 4:3
Height	6.6	5.4	5.4
Width	8.8	9.6	7.2

I remember wandering through an NAB show a few years ago and laughing hysterically at somebody's TV set with rolling walls that automatically covered the outside sections of the 16:9 screen when 4:3 programming was on. Maybe I should not have laughed. The problem of showing 16:9 pictures on 4:3 sets and vice versa is going to be with us for a long time.

CUTTING EDGES

Maybe the best thing to do is just chop edges off pictures. I know this is not a great solution, but I cannot say that sliding walls, black bars or portable TVs with curtain rods are any better. We messed up black & white TV to add color; we can probably mess up 4:3 to go to 16:9.

Anyhow, the way I see it, the problem is in distribution — TV sets and channels. But that is not the way camera manufacturers see it, bless their ivory-towered little hearts. Just about anyone making a range of cameras has decided this year that *the* problem with 16:9 and 4:3 is in their products. It is not that their products are not already (cough) perfect. It is just that, while we figure out whether we should be broadcasting 4:3 or 16:9, we might need to buy new cameras anyway (like maybe some accountant does not want to pay for more 30mm Plumbicons). So, wouldn't it be just spectacular if we could buy cameras today, use them in 4:3, and then, when and if widescreen catches on, just flip a switch and be 16:9?

Yeah, right. Tell me another joke. There have been some wonderful advances in camera and lens technologies recently. Sensitivities have gotten so high that they are running out of f-numbers to describe them. More than one camera manufacturer are using "better than" language in its specs because the real figures are too ridiculous to believe.

Then there is resolution. With 600,000-pixel chips, some cameras for current broadcast standards are offering better horizontal resolution than HDTV cameras. And there are not many worries about cramped studios anymore. Small image formats with wide-angle lenses let you shoot just about anything anywhere.

Does this sound good to you? It sounds good to me. With the exception of computer graphics, no other area of TV technology has had as big and fast an impact on what we get to see as has camera technology. Anyone who says differently is looking for a fight (just let me know who wins).

So now the camera manufacturers are offering switchable 16:9/4:3 versions. I am not very whelmed. Remember the 600k pixel chips? Well, how about just 520k? That seems to be the pixel density of choice for the switchable chips.

WIDER PICTURES, MORE PIXELS

If you employed your slide rule before you read this sentence, maybe you came up with a resolution loss of a little over 13 percent. But I am afraid you would be wrong, whether you are interested in 16:9 pictures or 4:3.

Widescreen pictures are a third wider than normal. So, to match the resolution of a 600k pixel 4:3 chip, a 16:9 chip ought to have 800k pixels; with 520k, it has 65 percent as much resolution as you would like. That switchable camera, therefore, is going to be a dinosaur in the world of 16:9.

Okay, maybe you are willing to take a chance on a 16:9 dinosaur in the future for a 4:3 jaguar today. Well, swing that jaguar balloon over this way so I can get my pin ready. Here I go: *Pop!*

The way all the camera manufacturers have it, those 520k pixel chips are laid out in a 16:9 configuration, which means that when the switch is thrown into the 4:3 mode, you get to use only 75 percent of the chip. 520k x 75 percent = 390k. Lo and behold (I *still* do not know how to lo), 390k offers precisely the same fractional resolution of 600k chips for 4:3 as 520k does for 16:9 — 65 percent. So these new breakthrough cameras are offering less than two-thirds of the resolution of their slightly older, pre-breakthrough versions.

Still, maybe you are willing to accept lower resolution for the flexibility of being able to switch between 16:9 and 4:3. How do you feel about the reconstruction of your studios? You guessed it; I am talking about a return to the era before wide-angle lenses.

To make it possible to use these new switchable cameras with existing lenses, chip manufacturers are laying out the 16:9 image areas along the same diagonals as the 4:3 imagers had; if they did not, there would probably be some vignetting, to say the least. That is a diagonal of 11mm for a 2/3-inch camera (named for the diameter of the old camera tubes it once took).

In 4:3, that works out to 8.8mm x 6.6mm; in 16:9, it is 9.6mm x 5.4mm. BTS likes to use half-inch imagers (8mm diagonal) in its cameras, so the specific sizes I have just listed are different but the principles are identical, and BTS is talking about the same 520k pixels as everyone else.

Now, remember the basic lens angle formula? Object is to image as distance is to focal length:

$$\frac{O}{I} = \frac{D}{F}$$

Near as I can tell, the focal lengths have

(continued on next page)

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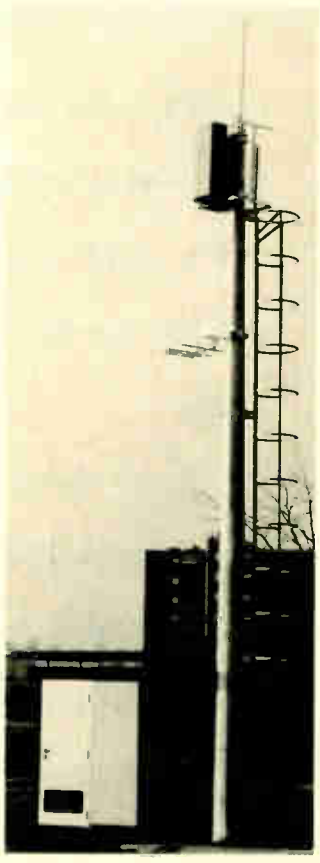

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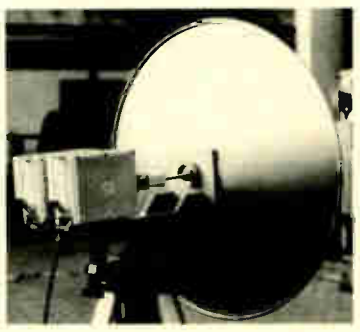

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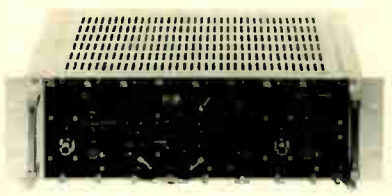

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Circle 51 On Reader Service Card

An Inside Look at Sony's UVW Beta

by Bill Kronemeyer

SPECIAL REPORT

Considering the low price of Sony's new UVW Betacam format (US$9,450 for the recorder), many people are wondering about its performance and features. Given that, I would like to present my observations and first-hand impressions of the UVW 1800 editing deck and the UVW 1600 source deck.

In evaluating any new VTR line, it is important to look at features, performance and cost of ownership (purchase price, maintenance projections, tape cost, etc.). What follows are some observations I have noted.

The UVW-1800 has no jog wheel and is intended to be used with a controller (unlike the PVW 2800 or JVC 822, which have built-in controllers). Even by itself, though, you can fast forward, rewind and do picture search. (To do picture search, depress the fast forward button for a few seconds). The 1800's maximum tape speed in shuttle is 5X with color (10X on the PVW) and 16X in black and white (24X on the PVW). With fast forward, tape speed is 35X. The 822 has a 36X color scan and 72X fast forward.

QUICK RESPONSE

The response of the buttons on the 1800 is very quick (going from stop to fast forward, for example). The picture does not do a good freeze frame when you hit stop (there is a noise bar), and there is no pause button on the UVW panel.

A separate black burst generator is recommended when editing, in order for the machines to sync up.

The 1800 has component, Y/C and composite inputs and outputs. It was a pleasant surprise to see that camera or tape signals connected through the Y/C inputs are so similar, performance-wise, to the component input. This is a significant discovery, because component switchers, special effects generators and DVEs can be quite expensive.

I alternately shot component and Y/C from a JVC KY-90 (US$29,000) camera and dubbed the signal in both component and Y/C over five generations. I did not notice that much difference.

Any adjustments to the TBC proc amp require an optional accessory (called the BVR-50, $935), unless you open the top and go to the TBC circuit board.

As with the PVW 2800, there are no FM audio tracks. There is Dolby C, but it cannot be switched off. There is no limiter for the audio tracks. I did some dubbing of CD material onto the linear tracks of the UVW-1800 and manually adjusted the volume controls. The sound quality playback was very good, as I expected. The relatively high tape speed, use of metal tape and Dolby C give it a moderately better sound than the Dolby B S-VHS linear tracks.

Because I own a compressor/limiter, I am not too concerned about this matter, but anyone who is used to a built-in limiter may want to purchase an outboard unit.

BUILT-IN TIMECODE

The UVW-1800 has time code capabilities built-in — longitudinal time code (however, unlike PVW, it does not have vertical interval time code), with a generator, reader and user bits. This should make it compatible with any PVW/BVW, BVU 3/4-inch, M-II,or JVC/Panasonic S-VHS VITC, although I cannot verify how it will work in your system.

A look "under the hood" of the 1800 revealed nothing unusual in the construc-

(continued on page 12)

CONTINUED FROM PREVIOUS PAGE

Counting the Pixels In Switchable Cameras

not changed, and neither have the distances. The image sizes *have* changed, which means the object sizes will have to as well. To keep things simple, let me figure a shot 10 feet away with a 10mm focal length. Table 1 compares the good old days with today. Since the tens cancel out, the heights and widths listed are either image (in millimeters) or object (in feet) — take your pick.

The first thing to notice is that you can throw out whatever lens tables you used to own. The shot you used to get at 10mm is not the shot you are going to get anymore at 10mm, in either height or width.

If you shoot in the field, maybe you will be happy with those numbers. Whatever narrow, telephoto lens you now use is going to be 22 percent tighter. If you are shooting an object from 100 feet away, it will be like shooting with a current camera from 82 feet away.

This is about the only nice thing I can say about the switchable aspect ratio cameras. If you shoot in a studio, the nice wide shot you used to be able to get from a camera at the far wall now needs to be shot from 22 percent farther away.

ACCEPTANCE ANGLES

Yeah, I know: "Hey, Mario, why not just use a wider lens?" Please, go right ahead. Unless something new got introduced at NAB (publication lag times being what they are), the widest zoom lens you can get for a 2/3-inch video camera starts at 5.5mm. That has around a 77-degree horizontal acceptance angle for a 4:3 camera, unless someone's been diddling with the ROM in my calculator.

Stick that same 5.5mm lens on one of the new switchable cameras, and you will have something like a 66-degree acceptance angle in the 4:3 mode, the equivalent of a 6.7mm lens on a plain 4:3 camera. That is not great. Personally, I will take wide over tight any day, but what do I know?

That last question really hit me this month, even before I started asking myself questions like why I would want the weight and bulk of an optical system designed for an 11mm diagonal (8.8 x 6.6) if I was going to be shooting with just a 9mm diagonal (7.2 x 5.4). I mean, it is one thing for me to decide Sony (to pick a purely hypothetical example) is doing something stupid when they are the only one doing it; it is quite another when I find *everyone* is doing it: BTS, Hitachi, Panasonic, the aforementioned Sony — you name it.

I do not *think* I am losing my sanity (any more than usual). I think we ought to be producing the best 4:3 images possible (subject to the whims of the accountants, of course) until such time as we have to start shooting things in 16:9. Then, I figure we ought to turn out the best 16:9 pictures we can — who knows? — maybe even HDTV.

To me, it does not make sense to spend a lot of money to get mediocre 4:3 results now, followed by mediocre 16:9 results in the future. If asked to, I can provide mediocre results as good as the next masked engineer, but I will bet you that I can do it for less money. ■

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

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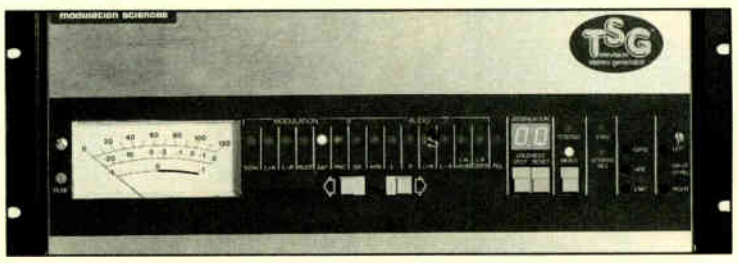

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CONTINUED FROM PAGE 11

UVW Beta: Low-Cost Appeal

tion of the chassis, circuit boards, etc., except that there is no cooling fan. A Sony representative said that "the fan is unnecessary because of the circuit design. It also reduces tape dropouts by minimizing air flow, which can stir up dust."

The 1800 has 85-watt power consumption and very quiet operation. It is relatively lightweight (42 lbs.) and compact. It is much smaller than the PVW 2800 and slightly smaller than the JVC 822. This means that, if necessary, one person could take it out into the field. (A PVW or M-II editor is better carried by two people.)

Although the 1800 was not designed for field usage, I was able to do direct component recordings from my JVC KY-25 (which has the component output adjusted for Beta SP) by means of a special cable. I was loaned a Sony CCZ-RGB-3 (US$330) cable that has a 26-pin connector on one end and four BNC connectors (Y, R-Y, B-Y and composite) on the other. Of course, you do not have trigger activation from your camera, but this is not necessary in a live switch or a taping of a continuous activity such as a business seminar.

The biggest problem might be the lack of a limiter, which could mean distortion on lively, dynamic sounds.

Like the PVW, the UVW unit records only metal tape, making it less attractive for high-volume tape users or people who are sensitive to tape stock costs. For its part, Sony has released the new UVWT tape line, which is priced about 15 percent less than the broadcast BCT. (Incidentally, I was told that the UVW tape is essentially the same as the SBT, which is being discontinued.)

Sony is further discounting the UVWT tapes until Oct. 1, 1994 by offering two free tapes with every 10 you buy. The UVW tape is a different yield (with possibly more dropouts) compared to BCT. Officially, PVW will play back oxide tapes, but UVW may not. There are two circuits in the BVW and PVW which allow for slightly better technical compatibility with an oxide tape (and the fact you can switch off the Dolby C, if necessary). And, according to what I have heard, it should play back with no problem.

In measuring (and viewing), I found that the color was excellent in the first five generations . . .

PERFORMANCE APPRAISAL

Here is a "performance appraisal" on the UVW-1600/1800. These tests were a combination of test signals and video footage of people, scenery and objects. All measurement figures were unweighted, and the 22 Series readings were done with the SA-T22 TBC and digital noise reducer set on "five" (out of 15).

The UVW literature states that the luminance signal-to-noise ratio is either 47 or 49 dB, depending on how it is measured, and the bandwidth is relatively flat (-4 dB) out to 4 MHz (about 320 lines).

In analyzing video formats, there is some controversy about the relationship between bandwidth, flatness of frequency response and the resolution chart ("wedge"), etc. According to Sony, both S-VHS and UVW will resolve over 400 lines on the resolution chart. The debate seems to be on the flatness of the curve and its relevance.

My test equipment only allowed me to measure out to 4.2 MHz. Two test diagrams (supplied by Sony) showed the UVW frequency response down 20 dB at 5.2 MHz (416 lines) and a competitor's S-VHS (not 22 Series) down -20 dB at 4.8 MHz (385 lines). The other graph supports a claim that the depth of modulation on the UVW is better than any color-under system.

My multiburst pattern testing showed a very linear response through fifth generation on 2 MHz (160 lines) and 3 MHz (240 lines). It was no worse than -1.75 dB. At 4.2 (which is about 335 lines), it was down 4.1 dB on first generation, down 8.5 on the second, 13.3, 17.6 and 22.1 for fifth generation.

I compared the 4.2 MHz reading on the 822 S-VHS and found that the third generation was comparable to a fourth-generation UVW. Since component formats are supposed to do much better in a multiburst test, this surprised me. When looking at actual video footage on the UVW, I noticed a little bit of enhancement (perhaps in the 2-3 MHz region) that caused some ringing, but this did not become an issue until about the fourth or fifth generation. No color-under deck is perfect in this regard either.

The color part of the UVW signal is excellent, and I have nothing to criticize — it is the strongest performance area of the format. Chroma AM and PM is rated at 47-52 dB, depending on how it is measured. This is only slightly lower than the BVW or PVW Series.

I tested red, green and blue fields and measured both chroma AM and PM using Y/C in and dubbing in the Y/C mode, and viewed "real world" footage. In measuring (and viewing), I found that the color was excellent in the first five generations, measuring between 52-56 dB in the first generation and falling to just above 46 dB for the fifth generation. (AM was similar to PM and all measurements in this article have been simplified for reading sake.)

GENERATIONS OF COLOR

Even at 10 generations the color did not smear, separate or bleed, although there was a loss of intensity and accuracy, along with other picture anomalies. The JVC 22 Series did well up to three or four generations, although it measured about 5-6 dB lower. Still it is the best I have ever seen for color under.

The video signal-to-noise (measured with a gray, white and black field) was about 47.5 dB in the first generation, and then 45.5 in the second, 44.5 in the third, 43.3 in the fourth, and 42.3 in fifth generation. This seems to be the UVW's weakest performance area and shows up as overall picture noise, limiting the "cleanliness" in comparison to one-inch, M-II or PVW/BVW. The JVC 822 measured about 1-2 dB better than the UVW in all five generations.

I was interested to see how the UVW compared to 22 Series S-VHS in an inter-format "shoot-out." I shot identical footage on the UVW 1800 and JVC 22 Series and then set out to cover all possible scenarios: S to S, S to Beta, Beta to S, Beta to Beta, and even S to Beta via the component output on the TBC. Everything was transferred to VHS.

This third-generation tape was played back in a $1,000 consumer deck (JVC HRS-6700) and viewed on a 20-inch JVC consumer monitor at a distance of about eight feet. There was — to my amazement — very little difference. Other people have looked at this tape, and there was no consistent preference. There are several reasons for this, but mainly, in my opinion, it is because VHS is the great equalizer.

I would describe the UVW Beta dropout rate as acceptable. Over my testing period, I had a chance to shuttle the tapes, do multiple edits at the same point and do multigeneration testing. The tapes are not as clean as other decks I have seen, including the 22 Series. Perhaps this is due to the UVW tape, tape handling or other factors too difficult to isolate.

After recording for several hours, I ejected the tape and found it warm to the touch. Sony suggests that this slight warming does not contribute to dropouts. My limited experience with the UVW would incline me to purchase the BCT tape if I were doing a short commercial or industrial (with a lot of edits), but to go with the UVW grade for a 60- or 90-minute edited business meeting or live event-type program.

MAINTENANCE COSTS

In most VTRs, the most common high-cost maintenance items are the heads (or head drum assembly). It seems like the digital formats are the most costly to maintain, the component analog somewhere in the middle, and "color under" the least expensive. I was able to put together these comparisons: the upper head drum assembly for the UVW 1800 is US$647, the PVW 2800 is US$1,120, and the JVC 822 is US$393. The cost of labor, additional adjustments or other parts that may be needed would be additional.

The UVW Series represents a breakthrough price and a welcome surprise in a component video format. I think it will be most attractive to industrial producers whose production requires more than four generations and who cannot budget for PVW or M-II. At four to five generations, I think you have to look beyond color under formats. However, you must be prepared to budget more for equipment, tape and maintenance costs.

If you are doing a three-to-four generation shoot and distributing on VHS, the 22 Series will still be a worthwhile investment.

UVW is not broadcast Beta or M-II, but it is a low-cost alternative for multi-generational users on a budget." ■

Bill Kronemyer is the head of WJ Kronemyer Assoc., a video production company in New Jersey. He is also a co-founder and current president of the North Jersey Videographers Association. Mr. Kronemyer can be reached c/o ***TV Technology*** *or by FAX at +1-201-445-2160.*

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Circle 76 On Reader Service Card

A Key to Shortwave Accuracy

by Doug Lung

RF TECHNOLOGY

Last month I told you how to build a simple standard frequency receiver and calibrator, but I did not have room to tell you how to use it.

Some purists might take exception to the claim I made last month that it is possible to use the receiver/calibrator to create a frequency standard accurate to 0.02 parts per million (PPM) using a few cheap parts. The conventional wisdom is that shortwave stations cannot be used to lock oscillators so closely because propagation delays cause significant variations in the phase of the received signal. Unless you live next door to a shortwave standard frequency station, the signal reaches your receiver after bouncing through the ionosphere — sometimes more than once.

The characteristics of the ionosphere change depending on solar conditions and time of day. That is obvious to anyone who listens to shortwave or even broadcast-band radio. Most commercial standards now use low-frequency-standard stations — like WWVB in Colorado or MSF in Rugby, Great Britain, both at 60 kHz — for a reference. These low frequencies are not affected by ionospheric fluctuations nearly as much as high frequencies.

COMPUTING POWER

How can I claim 0.02 PPM accuracy with a shortwave standard? Superior computing power. A phase-locked loop cannot differentiate between a phase shift caused by a shift in propagation delay and a phase shift caused by a shift in frequency. However, most humans, and certainly anyone reading this column, can easily see this happening on an oscilloscope and disregard it. I will tell you how to do it a bit later. First, here is how to set up the receiver/calibrator.

I found the sensitivity of the receiver/calibrator to be similar to that of a portable shortwave radio, perhaps a little better. If you have the room, a half-wave dipole cut for the frequency you are receiving, mounted outside, works well. At 10 MHz, each side of the dipole should be about 23 feet (or 7 meters) long. You might already have such an antenna if your station uses a time clock system based on WWV. "Direct conversion" receivers sometime suffer from direct detection of strong AM signals. If you use an outdoor antenna and are near an AM station, some additional filtering may be needed.

I found an amplified shortwave antenna that worked well. The whip antenna worked fine when propagation was good, even in south Florida. When the signal was weaker, a piece of wire plugged into the RCA jack on the unit helped, especially when I was able to get the wire outside.

With an antenna connected, adjust input tuning capacitor C1 for maximum sound. If you did not take the time to set the crystal oscillator with a frequency counter, you will probably hear the beat frequency between the oscillator and WWV or other standard frequency station. It is difficult to adjust the crystal frequency to a precise zero beat (a difference of zero with the standard frequency station) by listening to the audio.

Once the frequency difference gets below 50 Hz or so, it is difficult to hear. The best way I have found to set the frequency by ear is to set the crystal as close as possible when the station is sending an unmodulated carrier. Then wait until the station transmits an audio tone (WWV and WWVB send standard tones at various times throughout the hour).

I have found that by listening to the beat on the tone, I can set the frequency within 0.2 PPM — a frequency of 2 Hz, or two fluctuations a second with a 10 MHz station. Setting it much closer is difficult because the very low-frequency fluctuation from the beat is easily confused with signal fading due to propagation.

So what is the trick to improving the accuracy? An oscilloscope and an audio tone.

REMEMBER WHEN...?

If you are an old-timer or watch science fiction movies from the 1950s, you will recognize Lissajous figures. These are created when two harmonically related audio frequencies are connected to the X and Y (horizontal and vertical) inputs of an oscilloscope. Most two channel scopes have the ability to use one input as horizontal. The Tektronix 1480 and 1780 waveform monitors have a BNC connector on the back for this — it is the same one used for ICPM measurements.

Apply the same frequency to both inputs, adjust the amplitude, and you will see a circle. Double the vertical frequency and you will have a figure 8 on its side. Change one frequency so that it is not harmonically related and the pattern will move. Change the phase of two identical frequencies and the circle will rotate. Higher ratios trace complicated orbits on the scope screen. It is fun to play with.

What does this have to do with frequency measurement? Simple. By connecting the audio output of the standard frequency

(continued on next page)

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In Defense of the Thermionic Tube

by James Wood

SPECIAL REPORT

The history of the thermionic tube got off to a flying start in 1907 when Lee de Forest invented the Audion — later known as the triode — and then followed up a few years later with a vacuum tube for AT&T engineers.

In a few year hence, thermionic tubes will be 100 years old, but what a golden legacy those early pioneers left. Today, there are vacuum tubes for countless applications.

In the field of telecommunications and radio broadcasting alone, we have UHF power grid tetrodes, microwave tubes, traveling-wave tubes (TWTs) and tubes for radio broadcasting that can generate more than 1.5 MW of carrier power.

A world without tubes would be a world without radio and television; without space communications and satellite broadcasting; without the giant radars for defense. And medical science also would be much poorer.

TUBE VALUES

By comparison, solid state is an immature science. The most powerful transistor is still in the range of 150 W, a power level that thermionic tubes breached before 1920. Though solid state will continue to inherit more of the roles presently fulfilled by tubes, there are applications that only the tube can perform.

Solid state, over its nearly 40-year history, has come to dominate the domestic consumer electronics market. In doing so, it attained a high profile that tends to mask the professional electronics sector where tubes are vital.

Roles are being created to suit the limitations of solid state. Multiple paralleling of hundreds and even thousands of transistors to generate high power was promoted as a virtue, when the truth is of course, that it is a necessity.

Tube engineers quickly abandoned the technique of multiple paralleling back in the 1930s when higher power tubes became available for radio transmitters. So it is a certainty that if ever there is an all-solid state transistor developed in the future that can generate tens of kilowatts of RF power at UHF frequencies, the existing generation of solid state high power UHF transmitters with more than 1,000 transistors — in multiple combining arrangements in some designs — will become a thing of the past, just like the high-power 300-tube transmitter of the early 1920s.

Thermionic tubes in all their variants dominate the professional sector of elec-

A world without tubes would be a world without radio and television . . .

tronics in all branches of science: telecommunications, satellite, giant uplink earth stations, high-power TV transmitters, high-power radio broadcasting, fusion research and medical research.

Tube devices range in size from one-inch camera tubes to the giant megawatt-rated klystrons standing six meters or more. However, the high-power tubes found their first applications in radio broadcasting. These are the ancestors of modern tubes, like the TH-563 tetrode that is able to develop 40 kW of UHF power, and the TH-539 tetrode that can generate 1.5 MW of carrier power in long-wave service.

It is not only the veterans of the broadcast industry who have a deep affection for tubes. This same feeling is found in those who work in the tube manufacturing industry, whether in research, production or marketing. Proof of this is the extremely low staff turnover figure in all tube manufacturing companies.

MATURE TECHNOLOGY

Because of the long history, tubes are a highly developed product, and as is the case with any mature technology, technological improvements aimed at extending the boundaries of performance become increasingly more costly to bring about. It is only new and immature technologies where startling gains are brought about. This is why the tube manufacturing industry has to constantly increase the amounts expended in research and development.

One solution to the problem of sustaining massive treatment in research and development is by strategic alliances between competing companies. Such alliances enable companies to focus attention to long-term strategies by an exchange of technologies and sharing of ideas. With each company better able to concentrate on its respective core business, future generations of product will embody the best and the finest features of both companies providing better value to the customer. ■

James Wood is a consulting engineer and a writer in Berkshire, England. Contact him in the U.K. at telephone: +44-344-54938.

CONTINUED FROM PREVIOUS PAGE

Calibrating Frequency Using Computer Power

receiver to the vertical input of a scope and the horizontal input to a known audio frequency, we can watch the scope to see differences in frequency too small to detect with the ear.

The AC power line frequency is a handy reference in most places. If it is not stable in your area, use either a vertical sync output from a sync generator or an audio oscillator calibrated with a counter. It does not have to be highly accurate: at 100 Hz, a 0.1 Hz error is 0.1 percent, or 1,000 PPM — several orders of magnitude higher than the accuracy we are aiming for. Since we are comparing the audio beat note from sources at 10 million hertz, the error does not multiply — it adds. An error of 0.1 Hz at 10 MHz is equivalent to an error of 0.01 PPM, which is within our tolerance.

After zero beating the oscillator as close as possible to the 10 MHz standard frequency station, carefully increase the oscillator frequency until the audio beat note from the receiver matches that from your power line or reference oscillator. On the scope, you see a circle. Every now and then it will flip or collapse. That is due to the propagation delay changing the phase of the received signal. At this point, you should have the frequency within a few tenths PPM.

THE TRICK OF IT

So far, everything I have written is pretty standard practice for frequency checks 10 or 20 years ago. Here is the trick to set the oscillator even closer to the reference station. After setting the frequency as close as possible using the Lissajous figure, carefully move the audio reference frequency from the horizontal input to the sweep trigger input on the scope. If you are using the power line frequency for a reference, this may be as simple as selecting "line" as the trigger source.

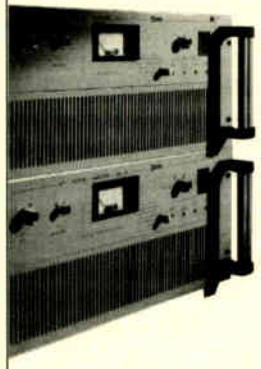
Adjust the horizontal time base to display three or four cycles of audio. Unless you had amazing luck with the Lissajous figure, the sine waves will be moving left or right (hopefully slowly). Carefully adjust the oscillator frequency until the waveform stops moving. You will notice that every now and then the cycles will change polarity or shape without moving. Your eye can filter out (average) the propagation errors from the standard frequency station. The oscillator in the receiver is now locked within 0.02 PPM of the standard frequency station.

However, there are a few things to remember. First, the frequency counter hooked to the oscillator on the receiver will no longer be reading 10000.0000 kHz. If you used a 60 Hz power line frequency as the reference and followed my advice to raise the frequency to get the audio beat, the counter should now read 10000.0600 kHz (10,000,000 Hz plus 60 Hz). Do not adjust the counter to read 10.0000000 MHz using this method.

As always, your comments are welcome. E-mail them to my CompuServe ID, 70255,460, or route them through the Internet to 70255.460@compuserve.com.

Mail is slower, but it will also work. Write to 2265 Westwood Blvd., Suite 553, Los Angeles, CA 90064. The FAX is faster (305-884-9661) and should work most of the time. I am busy during the day, but if you want to call, try my Miami office after 6:30 p.m. Eastern time at +1-305-884-9664. ■

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



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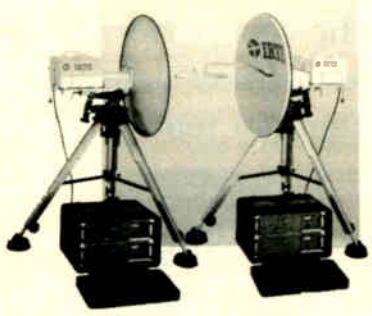

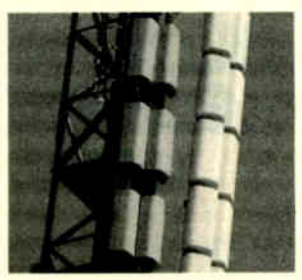

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Component Digital on the Mac

by Karl Paulsen

SPECIAL REPORT

In 1991, the artists and designers at Digital Post & Graphics (DPG) in Seattle, Washington, began to look for a faster, flexible and more versatile way to incorporate the full spectrum of graphic elements and typography into production design. Exploring the integration of Macintosh and PC platforms for design and full service component digital post production was the task set for the engineers at DPG.

Today, while still remaining completely component digital, DPG has successfully integrated the Apple Macintosh into a variety of uses and unique services for agencies and clients.

Quite recently, DPG has expanded those capabilities into the design of multimedia interactive products and services for CD-ROM title and interactive content developers: it also has bridged the gap between print pre-press and video production.

SETTING GOALS

DPG's first goal was to find supplemental ways to design graphic art for post production without tying up the Quantel Paintboxes or CGI workstations for inordinate lengths of time. Using familiar shrinkwrap desktop publishing products such as Illustrator, Freehand, and Photoshop, our artists now design typography and art on the Macintosh rather than recreating the same design work on the Paintbox.

The second goal was to create off-line graphics and effects on a Macintosh and use them as elements for animation and other art-based designs. Now the outside agency or independent producer can design the basic elements off-line and carry or modem the files to DPG for inclusion in the animation or video productions in process.

Today, it is more economical to bring those same graphics files over to the video world in digital form. Storyboards become usable elements in the actual production, and the process of printing out the Mac graphics and photographically capturing them using a camera stand is bypassed - and the results are much better. Slides and photographic art are now scanned to the Mac and brought across at the highest resolution possible.

Animation elements, frames and backgrounds created outside of DPG, are brought in on a Macintosh or PC and then composited into video streams (using the Harry or online) for the finished animation sequences.

From continued experimentation and actual use, we discovered that the filters and effects available in third-party products (i.e. Adobe Photoshop, Xaos Tools, etc.) were ideal for creating effects and looks that heretofore required 3-D computer graphics treatment or hours of experimental processing on the Harry.

The ability to bring full-bandwidth, component digital video frames across from tape, import them to the Macintosh, process the frames in a batch mode and then return them to Harry (all in D-1) has allowed greater creativity and productivity for DPG's designers. During production, complex light flares, swirls, image softening and the like can be accomplished in parallel on the Mac, allowing other compositing elements in Harry to move along faster and more cost effectively.

Two years ago, the integration of the Mac and component digital video was in its infancy. Using our Intelligent Resources Video Explorer card in one Mac station, capture and output capabilities are now far better than existing analog RGB grabbers or cameras. At that time, there was no real way to transfer huge numbers of images to or from D-1 to Mac without manually frame grabbing and filing each image individually.

Our CGI department was heavily entrenched in the Ethernet topology that represented the basic foundation for file manipulation and image processing.

The next step was to put the Macintosh computers onto the same network as all our Symbolics graphics systems, the Abekas A60 and Accom RTD disks, and the Abekas A72 character generator. Using a variety of Ethernet 10baseT, AUI/10base5 (thicknet), and even 10base2 wiring (depending upon where and what hosts we were connecting to), we established three independent network systems using Macs, PCs, and hubs as interfaces between topologies.

At the same time, DPG began to see real merits in doing more and more work at the Macintosh level. We had been satisfying client requests for computer-generated metamorphosis on our Symbolics 3-D systems, but the degree of complexity in creating models in 3-D space and essentially doing a 2-D morph on a 3-D object was expensive and time consuming - usually outside most clients' budgets.

DPG tried an inexpensive Mac-based morphing program that produced poor image quality and was difficult to use. Morphing a sequence of moving images into another sequence was not possible at all. Eventually, we entered into an arrangement to beta test ASDG's "Elastic Reality" for the Macintosh. This new application (which had already existed on the Amiga), in conjunction with the Mac and the Intelligent Resources Video Explorer card, resulted in better imaging that was easily integrated across platforms.

. . . the outside agency or independent producer can design the basic elements off-line and carry or modem the files to DPG . . .

FILE INTEGRATION

We provided feedback to ASDG that resulted in image improvements and a file integration and naming structure that would eventually allow us to integrate batch file transfers over various computer platforms other than just the Macintosh. Although other file and image utility programs exist, we stressed the importance of a file structure interface in their product from the onset rather than using an outside third-party application to do essentially the same thing.

Ultimately, DPG wanted to use its two Symbolics workstations for batch image processing and scaling, off-lining files onto Exabyte tapes, the A60 disks or RTD disks. Designing those interfaces became the job of DPG engineering staff, and now we are extending those concepts to the Silicon Graphics workstation as well.

Integration of desktop tools grew, expanding the various digital networks, both in-house and to remote locations via high-speed modem, offering some new and interesting concepts - a service that we later coined "Images By Wire."

Our concept has allowed out-of-market clients an approval process that is faster than overnight mail. In mid-1993, during several jobs, both in electronic pre-press and video graphics, we would send key frames via modem to our clients. They would open them on a Mac, make their comments or corrections, re-transmit them to us and then we would make those changes either in the Mac or the Paintbox as required.

UP-SAMPLING

We have also developed a method to "up-sample," enhance and retouch video source material for use in photographic reproductions and transparencies. Through our long association with Ivey-Seright International, a photographic and digital imaging laboratory, DPG has been able to successfully capture component digital video images and produce high-quality, photographically scanned transparencies for use in advertising, product packaging and other print-related products.

Using Photoshop and other desktop publishing software, our artists do page layout and actually place good quality digital video images into the same files, extending the use of video to another medium. DPG also uses these techniques for its in-house advertising and marketing.

File manipulation, palette rescaling, bit mapping and batch processing are everyday occurrences now. Carefully planning the client's project from the start lets us decide when to use dedicated hardware for speed and when to use open systems for flexibility.

The creation of line art and cel animation for integration in CD-ROM titles is now done on both the Harry and the Mac. Using some of Adobe's postscript products (Streamline and Dimension), 3-D appearances are added to clients' existing fonts and title graphics - further extending the original look to one of uniqueness and differentiability. Batch processing, using Equilibrium's "Debabelizer" software permits unattended file modification and processing for lengthy or complex animation and morph files.

With a couple of good strong years of experience in desktop multi-purposing video, we have found renewed uses for our "closed architecture" systems that have really created new and profitable services for the company.

For example, all of the graphic elements for Disney's "Bill Nye The Science Guy," a syndicated, upbeat weekly show about science that is post produced at DPG, incorporates many of the techniques, software and equipment described above. Graphic elements and animation are created almost exclusively on the Mac and composited in the Harry before the final show is assembled in the Abekas A84 digital online suite.

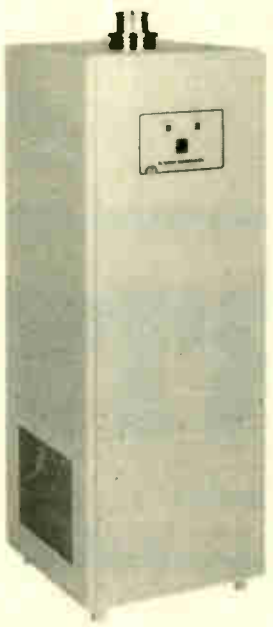
Without the Mac and its associated hardware, the graphic elements would be created entirely on dedicated hardware, adding extra days to a project.

But, most importantly, as we analyze the future of the video server, user interfaces for navigation graphics, compression and content development for interactive multimedia, DPG already has a good handle on the flexibility that the Mac and PC desktop offers.

Moreover, the flexibility we have realized preserves the video bandwidth without sacrificing quality through either compression or analog-to-digital conversion. ■

Karl Paulsen is vice president of engineering at Digital Post & Graphics and the Design Production Group in Seattle.

Question:
Ever wonder why transmitter manufacturers operate *Altronic* dummy loads at NAB and other trade shows?



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Circle 48 On Reader Service Card

Uplinking with GI's DigiCipher

by Phil Dubs

VIA SATELLITE

Over the last few years, the demand for satellite transponders, both domestic and international, has exceeded current capacity. Finding transponder space on an international satellite such as Intelsat 332, 307, or PAS 1 is practically impossible.

The situation has become such that many have looked to digital compression to increase channel capacity without increasing satellites.

For television entertainment programmers such as my network, GEMS, digital compression is an economical and technical alternative. The artifacts generated by digital video compression have been reduced to an imperceptible point. For all situations except sports, high-quality live feeds, and major broadcast networks, compression is the only the way to go.

Digital compression for satellite transmission comes in two flavors: MCPC and SCPC. MCPC stands for Multiple Channel Per Carrier; SCPC stands for Single Channel Per Carrier.

In the MCPC system, multiple channels are combined into one data stream and are then transmitted within one satellite transponder from one location.

DigiCipher 1, is General Instrument's current MCPC product. DigiCipher 1 is a fixed-rate system that provides up to 10 video channels and 20 audio channels that can be combined to fit into a half transponder of 36 MHz. In fact, the whole data stream will fit within a transmission width of 24.5 MHz.

The only disadvantage to the fixed-rate service is that no matter how many video channels you use, the transmitted bit rate remains at 39.02 Mbps with FEC (forward error correction).

THE SCPC APPROACH

SCPC, or single channel per carrier, provides for one channel of television information. Each carrier has a channel of video and at least two channels of audio. Since each carrier is self-contained, many carriers can populate a transponder given the space needed for each.

For instance, an SCPC system in London could occupy the first 6 MHz of a transponder transmitting a single data stream with video and audio. A second SCPC system in Zurich could occupy the second 6 MHz of the transponder and transmit its data stream independent of the system in London.

The downside to an SCPC system is that it requires an exciter/upconverter, HPA (high power amplifier) and appropriate antenna or combiner for each carrier. Operating two carrier/channels from one location would require two exciters, two HPAs, a combining system and an antenna.

In addition, every time a carrier is added to the transponder, individual carrier power is decreased. The total multiple carrier power cannot exceed the resources of the transponder. A reduction of some 3-4 dBW is typical for each carrier added.

INSTALLING THE SYSTEM

Installing a six-channel DigiCipher MCPC system requires more than a few rack units of space and a couple of cables. A six-channel non redundant system is built in two 77-inch racks. One rack contains the digital encoder for audio/video and the power supply for the encoder. The encoder has four individual chassis mounted in it. There is a video processor chassis for the I multiplex, and one for the Q multiplex. The ACDO (audio, control, data and output) chassis is the largest of the four. The fourth is the power supply.

The power supply has digital readouts on the front panel showing the megapower needed to keep all the ICs in the encoder satisfied. Typically we see 5 volts at 120 amps, when the system is working right. The 5 volt current is a good barometer of the health of the system. Drop all the video inputs and you can see a 10-15 amp drop in current.

Each processing chassis has numerous LEDs. For instance, the AVP (Analog Video Processor) has individual LEDs that indicate: Reset/Fault, Video Absent, and Sync Loss PLL lock loss.

The second rack contains one Faroudja analog-to-component decoder for each video channel, video/audio distribution amplifiers and a DEC VAX-4000 computer. The VAX-4000 is the heart of the MUS (Multi-Channel Uplink System). The MUS is responsible for controlling the CATV decoder authorizations and for defining the access rights for the television services transmitted by the encoder.

With a six-channel system, GI supplies eight DEC VT-420 terminals and two printers. Eight terminals take up a lot of space. The most important terminal is the monitor port, which displays the health. You need only one channel terminal to communicate with any of the individual channels. However, both printers were necessary as the system is configured; one printer for the monitor port, which will print out any time a fault is recorded, and one for the master console for key list and

(continued on page 20)

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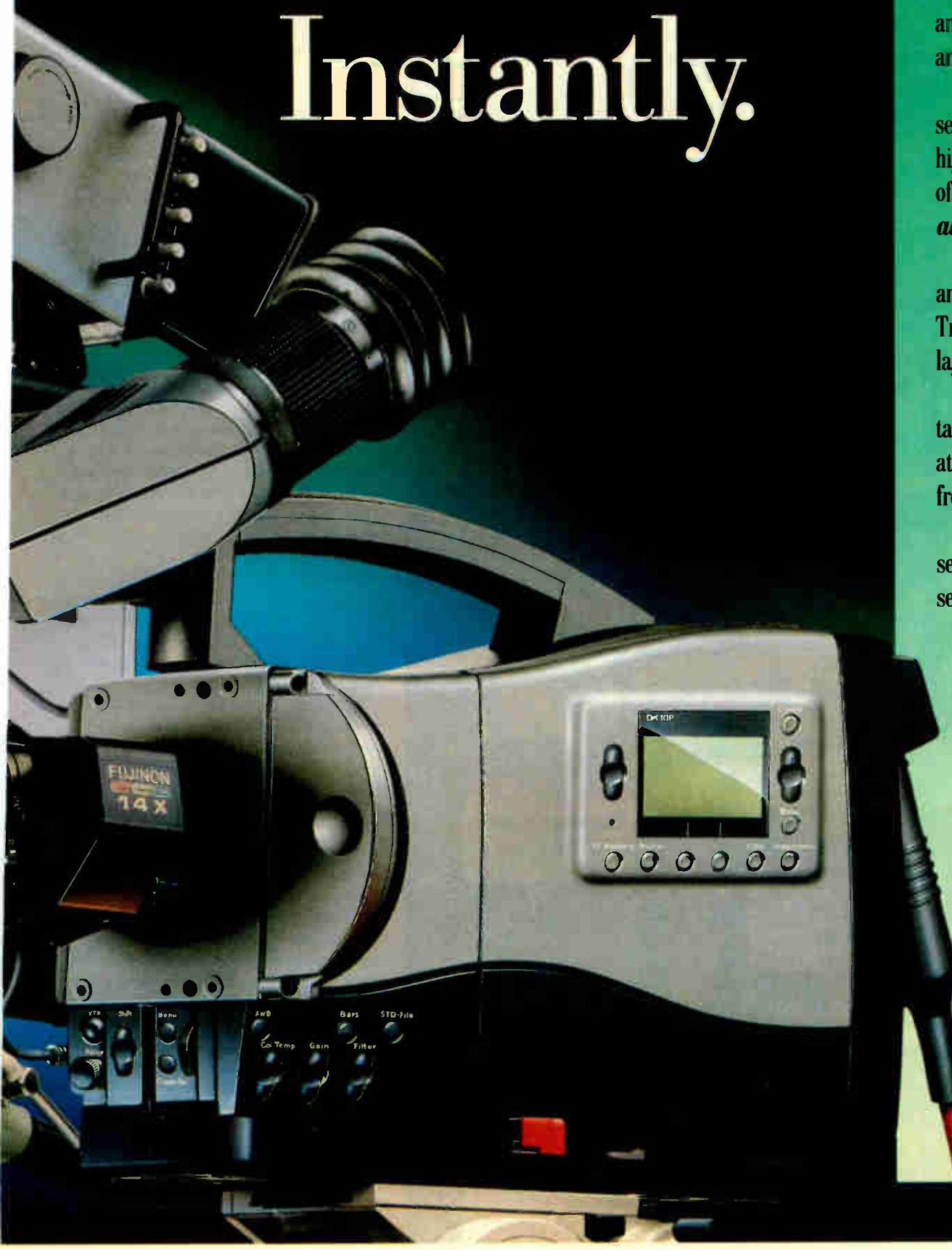

LDK 10 / LDK 10P

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

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

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

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

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

To discover more about how these exceptionally talented cameras put the power of DPM technology at your fingertips, you'd be well advised to study our free brochures.

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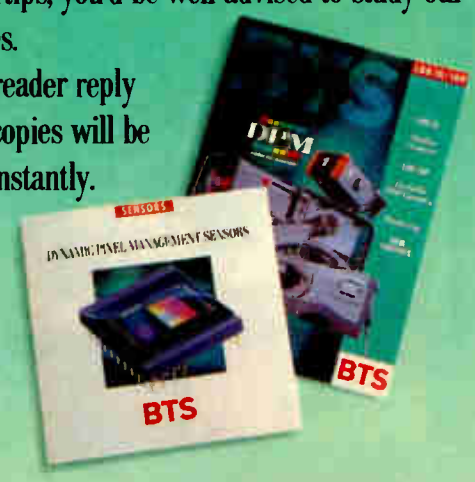

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Creative Television Technology from BTS

Circle 91 On Reader Service Card

CONTINUED FROM PAGE 17

Going on the Air with DigiCipher Compression

IRD authorization hard copies.

One terminal is dedicated to the encoder. The encoder monitor port provides for a window into the operation and health of the encoder.

Three basic operations, SET, SHOW and TEST provide for effective everyday operation. The SHOW-HEALTH screen is what we display when we are not using the other functions. HEALTH displays the "health" condition of each board of the encoder for each channel. A malfunctioning board will show up as a FAULT.

The second terminal provides for control of the MUS master console. All functions that are common to all channels are addressed through the master console. The following are the main functions:

- Overall Configuration
- Current state of each channel
- Management of the key lists for decoder authorization
- Event log generation (to the printer)
- System level configuration of the encoder

A major function of the master console provides for the assignment of resources of the system. Each channel can be assigned a bandwidth percentage of the total for each multiplex, I and Q. The I multiplex has I-0 through I-4 (5 channels). The Q multiplex has Q-0 through Q-4 (5 channels).

The third terminal is assigned to one of the 10 (in our case, 6) "Channel Consoles." GI normally considers that a terminal is assigned and connected for each channel for which the system is configured. In our case, that would have meant six channel terminals, and two other terminals for encoder port and master console. Since you can log in and out of any channel, we opted to put four terminals on the shelf — lots of backup.

One of the most important configurations the engineer must make pertains to the assignment of bandwidth to each encoded channel. Making this decision requires a little understanding of how TDM and video compression works.

Much has been written on the technical aspects, so I will not go into it too deeply. However, it is important to understand that to transmit digital video and audio in less space than it takes to transmit analog you have to throw something away. Two things are usually thrown away: picture resolution and information related to motion. Which one, and when, is what is contained in the well-guarded algorithms embedded deep inside the video encoder.

What we have to be concerned with is that when you reduce the bandwidth, you increase the picture artifacts — too many artifacts and the picture becomes distorted and unacceptable for transmission.

Since we have only 39 megabits per second (Mbps) or so into which we can squeeze all the video, audio, control, data and error correction, careful assignment of resources is needed. There are three levels of bandwidth assignment available through the software: fixed, statistical and limited statistical.

Fixed mode assigns a fixed portion of the bandwidth of the I or Q multiplex. If you have a fast-moving scene with lots of detail, something is going to be sacrificed. All assignments are made as a percentage of each multiplex channel, I or Q.

Statistical mode provides for the fact that not all the channels are going to have fast-moving and detailed scenes at the same time. Instead, the bandwidth values for each channel are constantly adjusted as scene information changes. This seems like a good alternative — let the system figure out what you need and assign as needed.

The limited statistical mode allows the system to figure out the needed bandwidth of each channel as program information changes, but then puts a minimum on any channel so resources are not pulled away below a certain amount.

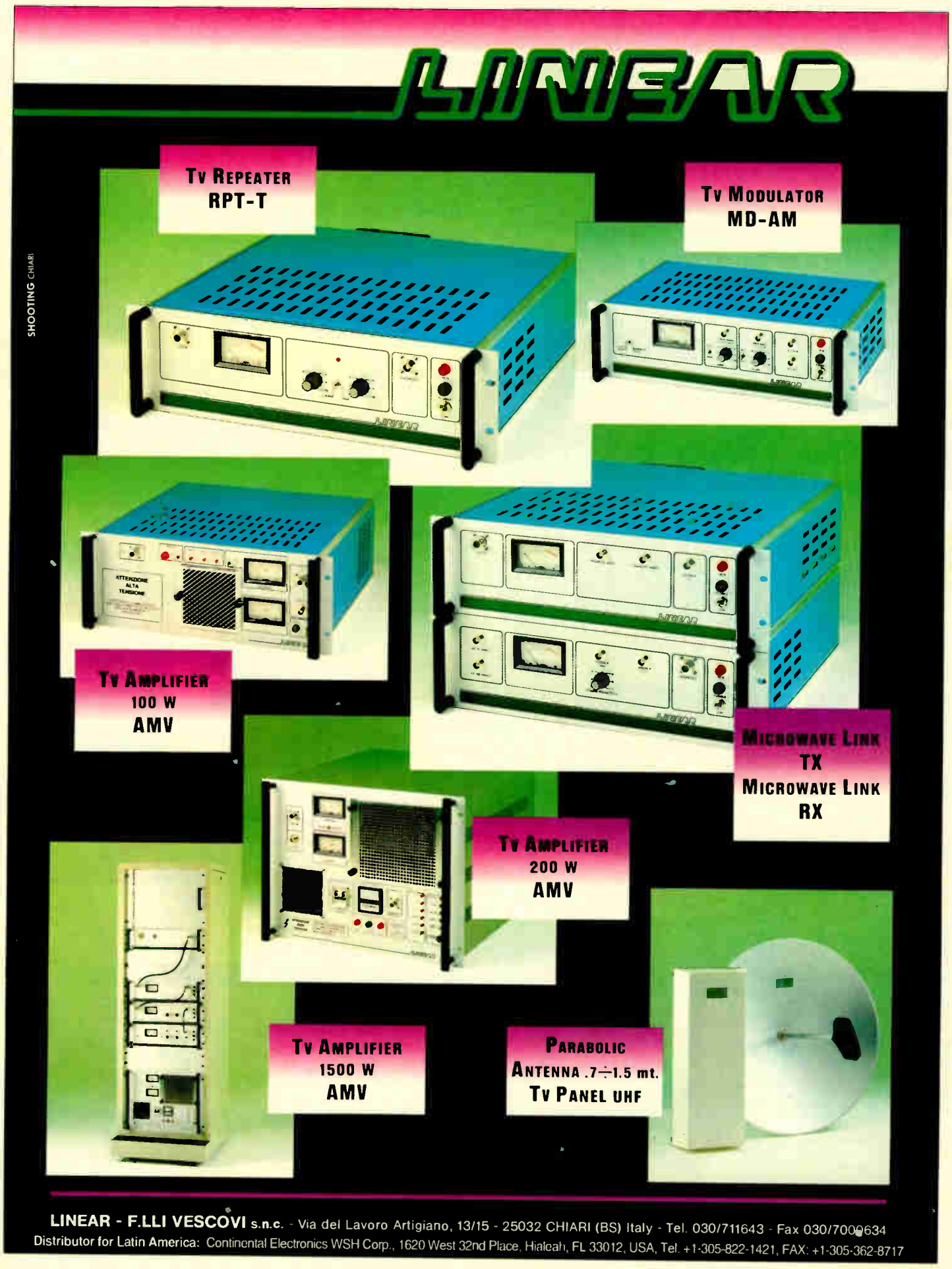
Being able to assign limited statistical to any one channel would be the best compromise, such as assigning it to a live video channel while the other channels originate from film sources, which do not need as much bandwidth.

As of today, as per the release of software in our encoder, limited statistical cannot be assigned specifically to one channel. You can, however, assign limited statistical to either the I or Q multiplex, allowing for some flexibility. Hopefully, future releases of software will provide for specific assignment of the limited statistical mode.

With hundreds of LEDs, megabytes of hard drives, huge amounts of RAM, hundreds of amps of power, the operation of the encoder is basically simple. Get your video and audio to the specified ports, connect the exciter and you have digitized video on your favorite transponder.

There are not a lot of adjustments. In fact, there are no user adjustments on the encoder itself. All adjustments and configuring is done through software via the terminals. And if your uplink is located some distance from your office, as mine is, kick your feet up, dial up the modem, and access just about everything from your desk. ■

Phil Dubs is director of operations and engineering for GEMS Television, a programming service of International Television Inc., of Miami, that provides two network feeds, serving 18 Latin American countries, as well as Mexico, the Caribbean, and the United States.



Circle 27 On Reader Service Card

1994 NAB Convention Equipment Report

LAS VEGAS MARCH 20-24

NAB: Few Surprises, Much to Ponder

by Chris Dickinson

LAS VEGAS

This year's National Association of Broadcasters' Convention yielded few truly dramatic surprises on the floor, although there were a number of significant technology developments.

One of the more vaunted new features this year was the arrival of the mainframe computer companies, such as IBM, Silicon Graphics, Hewlett Packard and Apple Computer. Although these companies all had elaborate stands, it was the small software developers, along with some bigger names, that offered some of the more innovative editing and graphics systems running on the standard platforms.

HD ANXIETY

High definition television, a year before licenses are to be issued in the U.S., proved to be a disappointment. Few companies were showing HDTV equipment, and no one at all seemed to be buying. The sessions highlighted why: The Grand Alliance HDTV standard is still being defined and broadcasters want to use new digital frequencies to offer multiple channels of data and NTSC television in addition to HD.

As for NTSC and PAL equipment, the predominant trends were toward serial digital signaling and support for the component digital formats. The large number of new products on the floor suggested that these standards will survive for a good while yet.

Despite the failure of the computer companies to make much of an impact this year, their products were featured on about half of the stands at the show, and they remain the biggest long-term threat to the conventional manufacturers.

Silicon Graphics (**Reader Service 13**), which holds a lead in the broadcast market, tried hardest to offset criticism that the computer companies are not prepared to develop products specifically for the professional TV market. It announced agreements with several manufacturers, in particular, Grass Valley (**Reader Service 61**), for the supply of video technology for incorporation in Silicon Graphics platforms.

Richard Snee, manager of digital media products at Silicon Graphics, said the alliance with Grass Valley would result in computers specially designed for the video industry.

"Grass Valley will be able to influence our future direction to produce better solutions in the video industry," Snee said.

In turn, Apple, IBM and Hewlett-Packard all displayed platforms with special video boards from third party suppliers.

But perhaps the biggest development of NAB was the sheer number of new non-linear editing systems, most claiming "on-line" quality, which in practice meant signal compression of between 10:1 and 20:1.

Among the big names to introduce non-linear systems were Sony, with Destiny; Panasonic, with Postbox; BTS, with Rio; and Grass Valley, with Sabre.

Sony said Destiny, shown running on a Silicon Graphics platform, used JPEG compression of ratios between 5:1 and 60:1. Panasonic said Postbox, which also uses JPEG, has three compression levels: 12:1, 16:1 and 32:1.

NON-LINEAR UPGRADES

BTS' Rio (**Reader Service 102**) was shown without its non-linear capability at NAB, but the necessary upgrade will be added by the autumn. Grass Valley's Sabre, running on a Silicon Graphics Indy platform, can be linear or non-linear. In linear mode, it is able to control up to 30 devices.

Editing Machine Corp. (EMC) (**Reader Service 18**), which was recently acquired by Dynatech (**Reader Service 2**), demonstrated the on-line non-linear PrimeTime, providing 60 fields per second with real-time fades, dissolves and effects.

Also on the floor was Matrox Studio (**Reader Service 35**), which has non-linear power thanks to SeaGate 2.1GB dedicated hard drives. The Matrox Personal Producer Xpress permits non-linear off-line at nine different resolutions, while the Personal Producer on-lines the production from linear sources.

Avid and Lightworks, early leaders in the non-linear world, both showed their latest products: Media Composer 1000 and 8000 from Avid (**Reader Service 130**); and Heavyworks from Lightworks (**Reader Service 5**). Quantel (**Reader Service 87**), which two years ago launched the Henry top-end, full bandwidth, non-linear editing system, unveiled Newsbox and Edit Box, both using its own Grid compression.

Grass Valley's Sabre editing system

Graphics systems were another product line very much in evidence at NAB. There were numerous low-cost systems designed for the Macintosh or PC, plus others aimed at the top-end graphics and animation markets.

Grass Valley launched its successor to the Kaleidoscope digital effects systems, Krystal. Grass Valley President and CEO Bob Wilson said Krystal takes effects to a new level.

"With the introduction of the Krystal 4300 digital video effects system, we have upped the standard another couple of notches: still higher image quality, a new lower price point and a revolutionary operator interface," he said.

Getris Images (**Reader Service 77**) launched Hurricane, a new multilayer, multi-DVE effects system. Antoine Patte, Getris' sales and marketing director, said Hurricane could handle up to 10 DVE layers, plus it incorporates 2-D and 3-D effects.

Xaos Tools (**Reader Service 113**), which makes the Pandemonium effects system, unveiled animation product Rapture, as well as text and filter packages for the Macintosh and an upgrade to Pandemonium, giving it more power.

BTS launched a new graphics effects system, Video Gallery, running on a Macintosh. The system is able to do 3-D animation, modeling, painting and image retouching, digital layering, character generation and rendering. The company also announced a tie-up with Chyron (**Reader Service 79**), by which it will offer Chyron's iNFiNiT! product family in its systems division.

SoftImage (**Reader Service 8**) released Version 2.65 of its Creative Environment and demonstrated how its Digital Studio integrates 3-D animation, parallel rendering, 2-D and 3-D paint, as well as sound editing

(continued on page 22)

Circle 74 On Reader Service Card

CONTINUED FROM PAGE 21

Product Introductions Abound at NAB

and non-linear, on-line editing.

Entering the graphics arena this year was standards converter and signal processing manufacturer Snell & Wilcox **(Reader Service 115)**. The company introduced Magus, a four-layer switcher and 3-D effects system that can perform two-channel effects on a single channel.

FORMAT WARS

Next to the non-linear editing and graphics systems, the most striking development at the show was the shove being given to Sony's Digital Betacam and Panasonic's D-5 digital component tape formats. Ampex, with DCT, also had a presence, but the company is in the process of reassessing its product lines in the broadcast arena and is concentrating DCT on post production only. (See related story, this issue.)

The JVC KY-27B

Sony announced that Canal+ in France and NOB in the Netherlands had both committed to Digital Betacam, while Panasonic announced that it would supply a total of 430 D-3 and D-5 VTRs to the Atlanta Committee for the Olympic Games, scheduled for 1996.

One area seeing a number of new developments was hard disk recorders. These devices that store video in the digital domain for random access retrieval are expected to have a broad impact on desktop video systems and main frame video servers.

Hewlett-Packard **(Reader Service 58)** had a new disk recorder for recording component digital video. The recorder, the HP 4:2:2, has been developed jointly with Sierra Design Labs **(Reader Service 90)**. It stores three, six or 12 minutes of uncompressed serial digital video.

Tektronix **(Reader Service 69)** also unveiled a new disk recorder, Profile, using JPEG compression for storing between 40 and 160 minutes of Betacam SP-quality video.

Abekas **(Reader Service 108)** introduced Hexus, a new 10-bit digital disk recorder aimed at multichannel and multi-user applications. The system has up to six record or playback channels available to four users at a time.

Dynatech's disk array system, Mosaic-360, offers six minutes of uncompressed CCIR-601 video in 8- or 10-bit formats.

New magneto optical (MO) disks were heralded by Sony and Panasonic, both saying they would launch new products this year. Panasonic said it had developed a new 12-inch MO; Sony said it was working on an eight-inch MO, using a new form of compression it had developed, called SPEG, a derivative of JPEG.

DISK CAMERA PLANS

Disk technology also invaded cameras as Avid and Ikegami **(Reader Service 72)** announced they were jointly developing a disk-based camcorder for newsgathering applications. (See related story, this issue)

Traditional camera technology also drew significant attention. Panasonic, which was the first to launch a Digital Signal Processing (DSP) camera four years ago, this year unveiled the WV-F565 10-bit CDD camera, featuring three half-inch 400,000-pixel FIT CCDs. Panasonic also launched the AQ-235W 10-bit studio camera and the WV-E550 three-CCD compact camera for teleconferencing applications.

Sony unveiled its first Digital Betacam camcorder, the DVW-700, featuring a removable, customized set-up card. The company also unveiled the BVW-D600 Betacam SP camcorder, incorporating DSP capabilities, and the UVW-100 camcorder, to go with its cut-down UVW Series Betacam SP range.

BTS launched a new range of widescreen CCD cameras, including the LDK-9W studio camera, the LDK-9PW portable, and the LDK-93W multirole portable. BTS also launched the LDK-10 studio camera and LDK-10P portable, featuring 4:3 and 16:9 switchability.

Hitachi **(Reader Service 26)** showed the new SK-2600, featuring 10-bit A/D conversion and 13-bit digital signal processing. The SK-2600 uses high resolution 900 TVL 600,000-pixel CCDs. Hitachi also showed the SK-2000W 4:3/16:9 switchable camera.

One area seeing a number of new developments was hard disk recorders. These ... are expected to have a broad impact on desktop video systems and main frame video servers.

Ikegami introduced the HK-366, using 450,000-pixel FIT CCDs providing 800 lines of resolution. Among its features is the ability to match subjects using a variable detail frequency control.

JVC **(Reader Service 31)** added color matrix circuity and a triax adapter to the KY-27 for studio and remote work. A new video gain system automatically increases gain as necessary. Also featured are an automatic color balance mode.

Toshiba **(Reader Service 127)** added the SC-521W and SC521HW extended definition cameras to its line. The cameras feature 16:9 aspect ratio CCDs yielding 850 lines of resolution. Toshiba expects to introduce a 4:3/16:9 switchable model next year.

Thomson **(Reader Service 133)** unveiled the 1657 camera, switchable between the 16:9 and 4:3 aspect ratios and between field and studio use.

Switcher manufacturers also showed a number of new products: Alpha Image's Elite **(Reader Service 105)**, an upgrade to the digital component Alpha 500 top-end switcher; Grass Valley's Model 1200 three key midrange digital component switcher; FOR-A's DVM-400 **(Reader Service 101)** compact digital component switcher with DSP; Vistek's D8801/4 **(Reader Service 64)**, 4:4:4:4 compact switcher; AVS' Integra **(Reader Service 66)** upgrade to its Integra switcher; Panasonic's AS-D740 production switcher; Sony's FXE-100 low-end digital component switcher; and Abekas' ASW8100, three-key digital component switcher.

PLAYING OUT

In playout systems, Quantel launched Clipbox for news and commercial playout. At between US$200,000 and US$2 million, Clipbox is not cheap, but it can handle six hours of full bandwidth video or up to 30 hours of compressed video. BTS showed a similar system in a back room at NAB, but the company refused to discuss it.

Dynatech, which owns the NewStar newsroom system company, also has a similar capability. And BASYS announced MAESTROworks, a suite of products based on video server technologies.

Other playout developments included an announcement by Odetics **(Reader Service 121)** that they would incorporate Tektronix hard disk recorders into their cart machines to perform spot playout functions. ■

CONTINUED FROM PAGE 1

1994 Sees Record Attendance

dominated the speeches and luncheons, on the show floor a number of present day dilemmas were being presented. As is usual at any NAB convention, the question of media formats was pre-eminent. However, in addition to the usual digital VTR format wars among the likes of Sony and Panasonic, a host of new disk-based products designed for post production and final distribution took a share of the spotlight.

Among these products were new editing systems touted as non-linear and on-line. These included Avid's Media Composer 8000 and 1000, ImMIX's VideoCube, the Primetime on-line editor from Editing Machines Corp. (now a member of the Dynatech Video Group), and Panasonic's PostBox.

On the distribution side, attendees had a chance to view the quality of disk-based on-air products such as Avid's AirPlay and D^2S^2's DigiStore system. Even Odetics, long known for its tape-based cart systems, displayed an add-on disk module for its dual-channel system.

The advent of disk technology has also caused a shakeout among some of the tape companies. Ampex has decided to sell off its tape division and concentrate on marketing its component digital tape to the post production industry. The reason, according to Ampex Chairman and CEO Ed Bramson, is that tape-based distribution is on the decline, a view not shared by Sony and Panasonic executives.

The 1994 show also heralded the first mention of a disk-based acquisition product, as Avid and Ikegami confirmed they are co-developing a disk-based camcorder.

On the HDTV front, much of the talk centered around regulatory issues, such as the flexible-use question. However, NAB 1994 was also the first chance for many broadcasters to gain first-hand knowledge of the Grand Alliance terrestrial broadcast system. Early in the show, Grand Alliance representatives addressed a packed meeting room to describe the various components of the system. And on the show floor, PESA-MCI showed a 1 kW transmitter that conforms to the 8-VSB transmission format selected by the group.

HD PRODUCTION

HDTV production also received a fair share of notice. Representatives from Matsushita Communications Industries touted a new digital production switcher, while Eastman Kodak highlighted a digital CCD telecine for HDTV.

Getting strong play from the NAB again this year was the movement toward all-digital facilities. The show presented two separate sessions on the topic — one on designing and building all-digital systems and another on testing digital bit streams — while highlights of recently constructed facilities, such as the DirecTv DBS center in Castle Rock, Colo., were peppered throughout the conference program.

And then there was multimedia. For the second year, the NAB and the Interactive Multimedia Association co-sponsored Multimedia World, an exhibition and conference highlighting the latest in computer video developments. This year's event again drew the likes of such heavy-hitters as Silicon Graphics, Apple, and IBM, and included an expanded conference program featuring in-depth profiles of some of the leading platforms available.

In general, the mood at NAB this year could be described as cautiously upbeat. With long-discussed technologies finally coming to fruition, plus the advancement of an entirely new media paradigm, there is still quite a bit of long-term anxiety in the broadcast market.

But, at least for the time being, the industry appears to be on the upswing. ■

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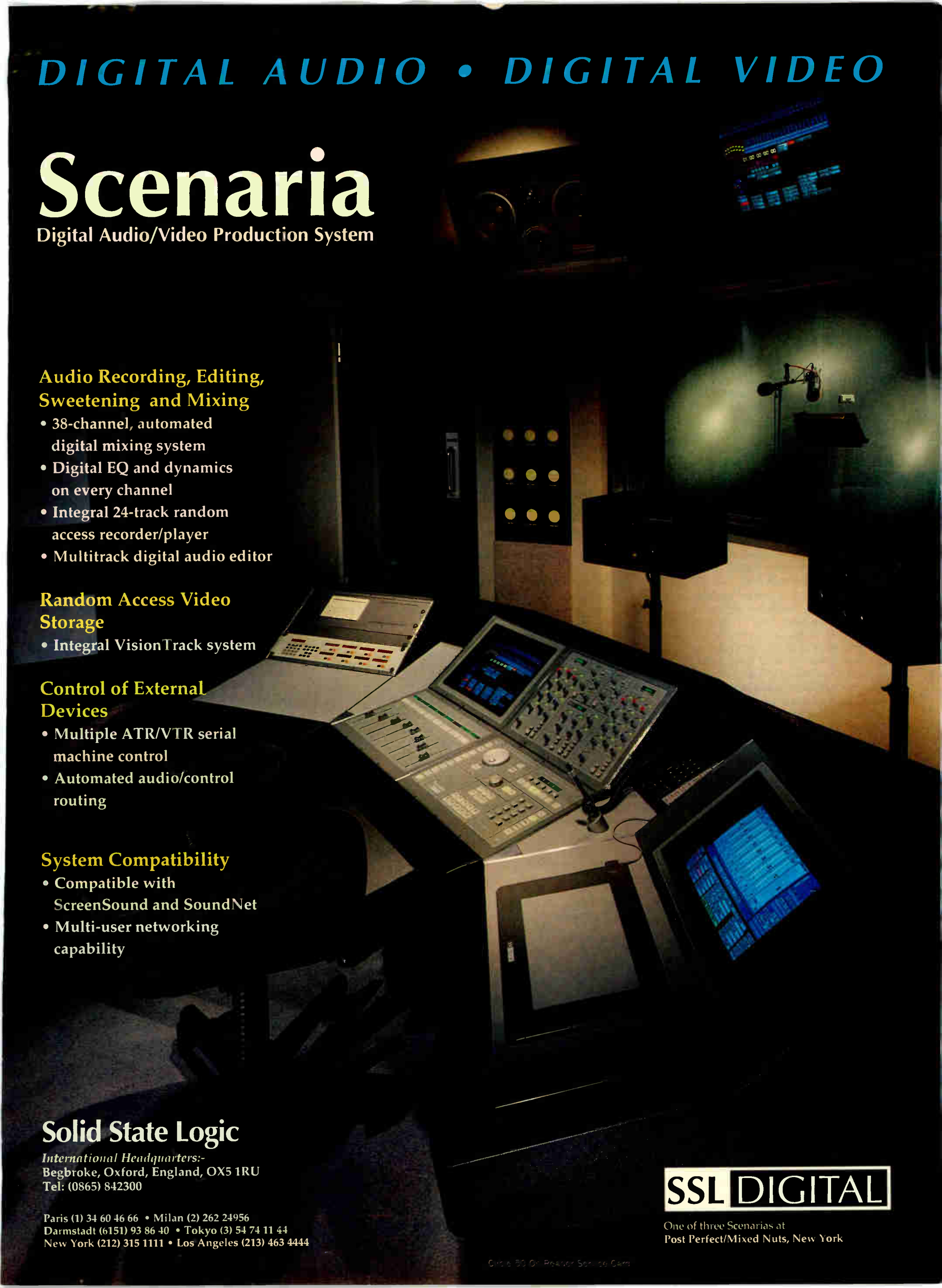

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NAB Highlights Multimedia

by Terence Dyke and Paul Smolen

LAS VEGAS

This was the second year the National Association of Broadcaster's convention included a pavilion dedicated to multimedia products. Quite a few changes can happen in a year, changes that bring progress, new players, a few casualties and alliances of every sort.

After bursting upon the scene with fanfare, multimedia seems to be in the process of establishing itself as an industry, changing from a novelty-charged, ill-defined idea into a working genre with viable products.

RGB CONNECTIONS

At the RGB booth **(Reader Service 39)**, the company showed its edit controller, Amilink, which is usually used in conjunction with the NewTek Video Toaster. RGB reps were also touting their exclusive deal with Centaur Development, manufacturers of Opalvision, a switcher and effects card that can be used instead of the Toaster.

At the high end of the RGB products exhibited, there was the Unisuite integrated desktop video production system for about US$20,000. It includes Amilink, Opalvision, two monitors, a TBC and an Amiga 4000 with a 350Mb drive.

A non-linear system is not yet available from the company, though it is positioning Unisuite as "non-linear ready" in its software and I/O design. According to one RGB spokesman, RGB is waiting for compression standards to settle down before introducing a non-linear system.

Matrox **(Reader Service 109)** finally showed its redesigned non-linear editor, the Series 2000. It appeared to have all the amenities, including real-time transition effects, and is expected to start shipping in May.

Last year, we saw a promising low-cost, non-linear editor called Hitchcock, part of the Video F/X line from Digital F/X. In January, Digital F/X sold the entire Video F/X product line to Aldus, the company best known for its desktop publishing product Pagemaker. Hitchcock now belongs to CoSA **(Reader Service 135)**, a division of Aldus and maker of After Effects, a post-production tool for special effects.

Hitchcock is a Macintosh-based software package designed to work with off-the-shelf JPEG cards like Radius or SuperMac. At $1,995, Hitchcock supplies the core of what looks like a cost-effective solution for disk-based editing, including batch digitization, A/B roll editing, and direct print-to-tape. However, there are some compromises. Transition effects, for example, are not done in real time, but rather have to be rendered. Hitchcock is expected to ship in April.

MID-RANGE SYSTEMS

A couple of interesting mid-range non-linear systems were on hand at the show: The Radio from Sundance **(Reader Service 95)**, a US$17,000 package that includes a 2.1GB drive; and the Amiga-based Digital BroadCaster from Digital Micronics that features full CCIR-601 resolution.

The Video Editor VE500 from Scala **(Reader Service 53)** is also Amiga-based, offering A/B roll editing, compatibility with a number of switchers and tape decks, and RS-422 machine control.

Also available is the PC-based AVer Video Producer from ADDA Technologies **(Reader Service 30)**, offering DVE, genlock, transitions, scalable video and more, all in a desktop production package that includes software, three circuit boards, and cables.

The Matrox Studio Series 2000 was one of the many new systems at the show.

Adobe **(Reader Service 6)** is well known for big programs like Premiere, its Quicktime editing package; but also on display at the Adobe booth were a number of special-purpose graphics tools like Dimensions, which helps transfer graphics objects back and forth between 3-D and 2-D programs. The big news from Adobe, though, is the recent announcement of its intended merger with Aldus.

Animation and effects products were abundant. ASDG **(Reader Service 20)** brings morphing to a high art with its Elastic Reality software.

Autodesk **(Reader Service 59)** debuted a major upgrade to its PC-based 3D Studio, which is a 3-D modeling and animation package; the company also announced a rendering module that runs on Silicon Graphics computers.

PowerAnimator from Alias **(Reader Service 129)** also runs on SGI equipment and was used to create scenes in major effects movies like *Jurassic Park*. A smaller-scale version called Animator runs on both PCs and Macs.

VISUAL SCIENCE

Another SGI-based system is VisLab from Engineering Animation Inc. **(Reader Service 4)**. Aimed at the scientific visualization market, this package allows high-speed rendering and 3-D animation of complex objects and scenes. Optional additional modules are also available: ParticleLab specializes in natural phenomena like smoke, rain, and fluids, while SyntheticActorLab offers a whole cast of poseable synthetic actors.

Caligari **(Reader Service 25)** announced that its Windows-based trueSpace 3-D modeling and animation software won the "Best Application Software" award at CeBIT in Hanover, Germany.

Crystal Graphics **(Reader Service 40)** showed its PC-based line of modeling and animation products ranging from Flying Fonts to TOPAS Professional 5.0. Crystal Graphics also has a version of TOPAS for the Macintosh.

Diaquest **(Reader Service 68)** introduced its Animaq/UX software-only animation controller for UNIX workstations, QuickPass/PC software for Diaquest DQ-422+ animation controllers, and the MacImage Node cross-platform networked video server for Mac and UNIX workstations.

Folsom Research **(Reader Service 84)** had on hand its CGC III video scan converter for converting any computer or workstation to standard video formats. It features autosync operation up to 100kHz, and outputs including RGB, Y/C, and composite video.

TrueVision **(Reader Service 10)** showed its TrueVista Pro digital frame buffer with Beta inputs and outputs, and its Targa 2000 full-motion, full-frame digital video engine with professional-quality stereo and integrated desktop display.

There are several trends that appear to be signs of an industry lurching toward maturity. One is that of established video companies no longer hanging back from this new area. Chyron **(Reader Service 41)** showed Cindy, a video board for Silicon Graphics equipment, while Dubner **(Reader Service 132)** showed its Windows version of Scene Stealer, which is an automatic scene detector and video logger.

The other trend has to do with partnerships and alliances, which were much in evidence. Apple has teamed up with Radius, Adobe, and others to produce the Apple Professional Video Production Solution, while a group of multimedia companies led by Avid **(Reader Service 12)** has successfully steered the Open Media Framework into being accepted as an interchange standard by the Interactive Multimedia Association.

A lot has happened in a year, and perhaps in one or two more, multimedia can leave the special pavilion and take its place in the main hall. ■

Terence Dyke and Paul Smolen are the principals of Media Methods, a communications design and production firm in Austin, Texas. They may be reached at +1-512-476-0422.

Avid and Ikegami Eye Disk-Based Camcorder

LAS VEGAS

Heralding what many hope to be the end of the lengthy process of digitizing tape to digital storage systems, Avid and Ikegami have announced they are jointly developing a digital disk-based camcorder for newsgathering applications.

The two companies said the camcorder, which will be launched in mid-1995, would combine an Ikegami HL-57 digital camera front-end with a dockable storage unit containing Avid-customized hard disk drive technology.

Curt Rawley, Avid president and CEO, said the camcorder would allow images captured in the field to be relayed straight onto an Avid system, or similar device, for editing.

"This is a major step forward for the industry," he said. "No longer will transferring from tape be necessary to utilize the power of hard disk-based editing systems. With this technology, the media captured in the field will plug directly into DNG (digital news gathering) edit stations."

Rawley added that Avid would buy 3.5-inch Winchester disk drives from third parties and incorporate Avid's own utilizing technology to make them work with the HL-57. He said the amount of compressed video each disk would hold would be between ten and 20 minutes.

Mitsuru Kumagai, senior executive director of Ikegami, said the camcorder represented a breakthrough for newsgathering.

"This alliance will allow us to offer breakthrough products to our users," he said. "Combining the strengths of the two companies in building these new cameras will change the very nature of field capture for news programs."

Other manufacturers said during NAB that they were also at various stages of development on disk cameras. BTS confirmed it had a front-end digital camera "ready to go," and had been in discussion with Avid about developing the hard disk drive. However, company officials said they still believe that disk technology needs another year of development before a product can be offered.

"We have the front end available now," said Greg Pine, BTS' marketing manager for camera products. "The problem is the recording media. Talking with news stations, they say anything we come up with has to compete in price with oxide Betacam SP tape, which for 20 minutes of video is something like $15. There are also issues of power consumption, compression levels and stability of the disk drive.

"We've had discussions with Avid and would be glad to see a disk camera come about. But we don't see it for maybe a year," he added.

Meanwhile, Panasonic said that although it also had a disk-based camera in development, it believed the same problems still had to be overcome and a product was unlikely before 1996.

Sony also said there were a number of serious problems to overcome before it would launch a system. (See related story, March 1994) ■

IBC and ITS Show Battles Continue

by Chris Dickinson

LAS VEGAS

The two main rival European equipment shows — the Amster-dam-based International Broad-casting Convention (IBC) and the Montreux-based International Television Symposium (ITS) — have stepped up their battle for the hearts and minds of the world broadcast community.

The two groups have been at odds since late last year when the IBC announced it would begin holding an annual convention starting in 1995. Traditionally, the two groups have held shows in alternating years, thus avoiding an over-saturation of broadcast shows in Europe.

Both IBC and ITS have been lobbing charges at each other since the beginning of the year. Each is claiming to have the support of a majority of exhibitors and attendees.

In the latest salvo. ITS has rejected suggestions that it favors large companies at the expense of medium and small manufacturers. And at a press conference at the National Association of Broadcasters exhibition here earlier this year, ITS announced that it is freezing stand prices for 1995 and is planning a number of improvements to facilities.

ITS director Michel Ferla said all manufacturers are treated the same. with no preference given to larger organizations.

"Large manufacturers spend more because they have bigger stands," he said, "but we have a similar pricing policy for large and small manufacturers. Half the space has been booked for 1995 from large and small exhibitors."

New facilities at ITS include a new show registering center and improved shuttle service to and from outlying hotels. And, in addition to the freezing of stand prices, Ferla said hotel prices will be frozen at 1993 levels.

Ferla added that ITS had petitioned Swiss customs to be more sympathetic to exhibitors travelling to the show after a number of complaints were received in 1992.

Meanwhile, IBC has dismissed the threat of a boycott from some well-known manufacturers. ITS recently released a letter of support from 13 companies. including BTS, General Instrument, NTL, Panasonic, PESA, Philips, Rank Cintel, Sony, Thomson and Quantel, saying they would not participate in IBC 1995. It has also received backing from 11 mainly American broadcasters, including ABC, CBS, Fox and NBC, plus the European Broadcasting Union.

John Wilson, chairman of the IBC management committee. claimed that manufacturers publicly supporting ITS in 1995 would probably revert to IBC in 1997. He also dismissed the other ITS announcements saying they did not overcome unhappiness among many manufacturers and visitors.

Wilson added that IBC this year had a new streamlined conference program, which he said would act as a counter to ITS' traditional strength in its Symposium papers.

IBC organizers said the decision to go annual was made after a large number of small and medium sized manufacturers said that ITS was too expensive and difficult to get to. IBC management added that the last IBC in 1992 was judged a success. ■

Thomson, Getris Plan New Stillstore Device

LAS VEGAS

Thomson Broadcast and Getris Images are teaming up to launch a new stillstore product, incorporating graphics capabilities, that will be aimed at station playout applications.

Details of the system are still under wraps, but Thomson said the two French companies would launch a product at the IBC show in The Netherlands in September.

"Getris is bringing its expertise in graphics systems and Thomson is providing its expertise in stillstore technology," said Arnaud de Panafieu. Thomson's executive vice president of operations.

He added the system would be jointly marketed by the two companies.

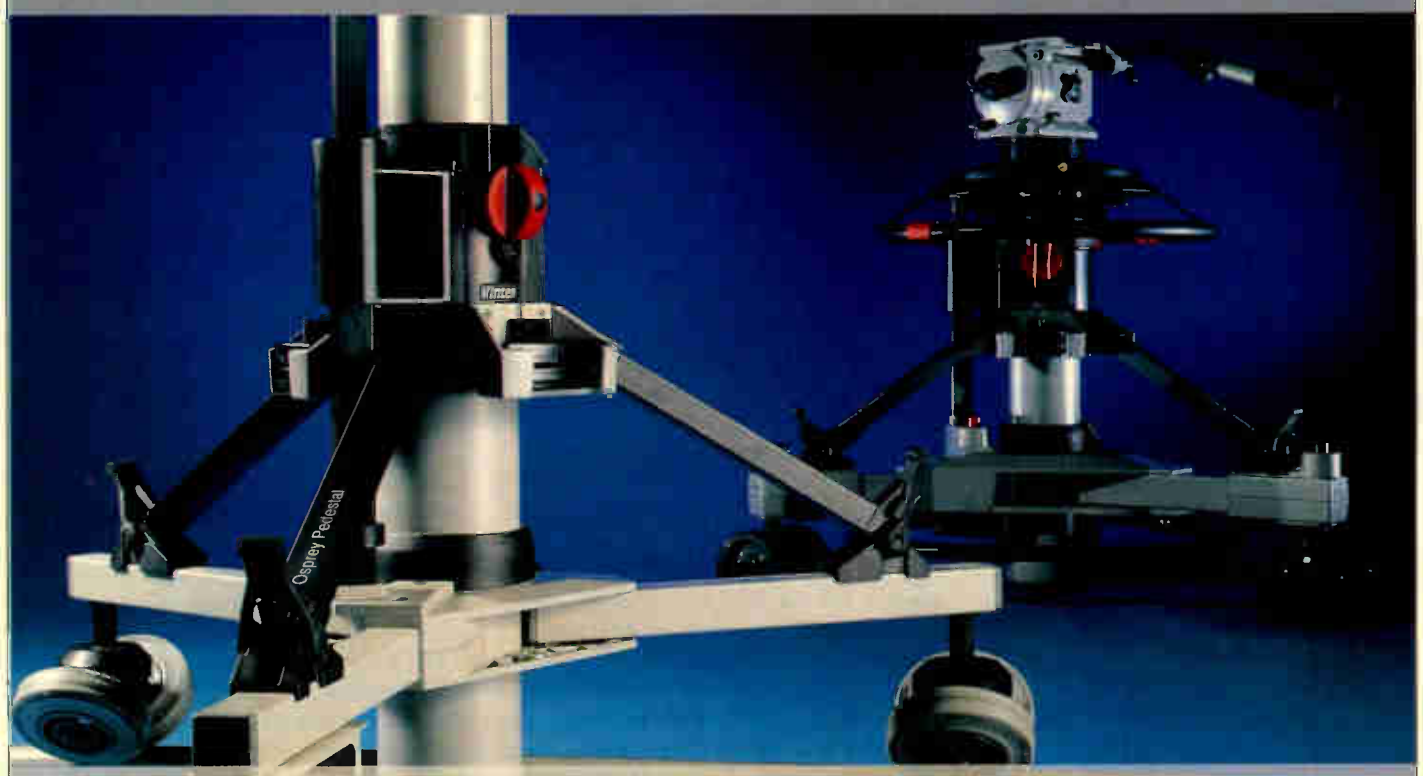
Thomson and Getris are currently working together to equip French broadcaster TF1's forthcoming news network, La Chane Info, which goes on air on 24 June.

Antoine Patte, Getris' sales and marketing director, said the new stillstore product could be incorporated into a larger automatic playout system for broadcasters.

"The key to the system is it has to be cheap," Patte said.

Quantel, meanwhile, has introduced a high-end news editing and playout system, Clipbox, working with up to eight editing workstations. ■

TRACK RECORD



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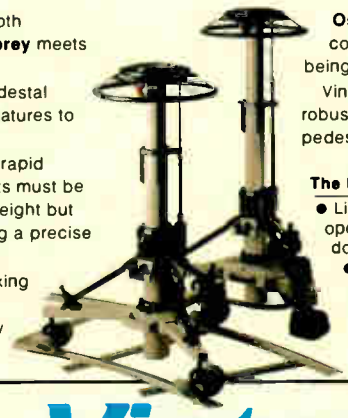

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USER REPORT

Shooting With BTS's LDK 910

Easier Set-Up, Savings on Tube Replacement Turn Out To Be Highly Beneficial for WCNY

by Hugh Cleland, C.E.
WCNY-TV

SYRACUSE, N.Y.

WCNY-TV, an affiliate of the U.S. Public Broadcasting Service (PBS) network, has been operating BTS LDK 910 CCD studio cameras for three years. They replaced Norelco PC 72 cameras, which had been in use for many years in both our studio and our remote truck.

In the summer of 1990, WCNY-TV looked at the various models of available CCD studio cameras. Demonstrations in our studio allowed for a side-by-side comparison with the PC 72 cameras.

At the same time, we had to wade through explanations of the new CCD imaging technology, such as IT, FIT, FT and sensor size and pixel count. For engineers familiar with Vidicons and Plumbicons, this is a new world requiring serious study.

In a community-supported public television station, the potential savings of US$15,000 or more per year for the replacement of camera tubes caused us to only consider CCD cameras. This was in spite of the fact that this new technology was up against the tried-and-proven tube cameras.

CHIP CHARTS

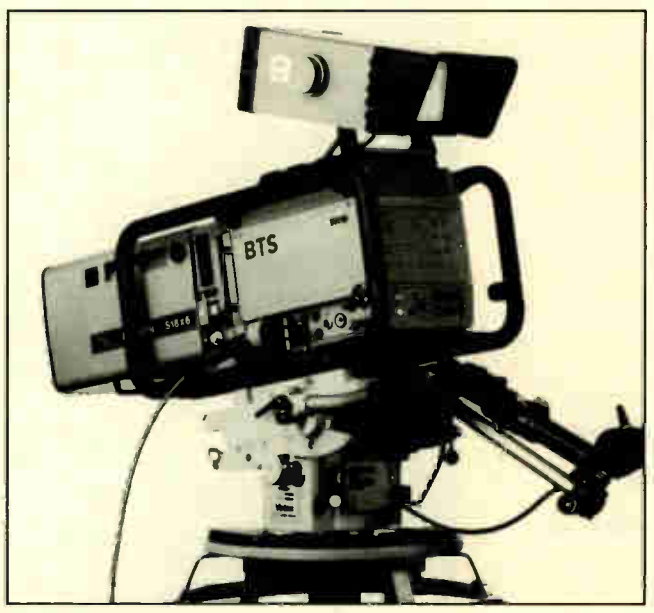
The BTS LDK 910 cameras set up very easily, as there is no need for registration, electrical focus or linearity adjustments. White balance can be achieved manually or by using the automatic features.

WCNY-TV has found that rather than using the chip chart on a daily basis, a simple white art board with a black felt patch fills in nicely, as the gamma circuits in this camera are very stable and only require periodic touch-ups using the chip chart.

Additional cost savings are possible because our master control engineer has been able to take over video control for almost all productions. Productions include a daily one hour call-in interview program, a weekly news discussion program, a weekly financial program, on-air membership drives, two TV auctions and various special programs. The new cameras are very stable and look the same hour after hour, day after day.

With the exception of some initial viewfinder problems, the cameras have been very reliable. It is reassuring to note that the cameras can be operated in a self-contained mode, such as without triax or the base station. This is because the camera head contains an additional encoder and can operate directly from 110 to 120 volts AC.

Speaking of triax, it may seem unnecessary in a setup in which the cameras are only 100 feet or so from the rack room where the base stations are located. But the triax makes it possible to quickly relocate the cameras from the studio to other locations in and outside the studio building.



The BTS LDK-910 shown on a Vinten head.

Gone, but not missed, are the days of TV81 cable and all its associated problems and expenses. While we have not used the LDK 910s on our remote truck, years of remotes with PE 350s, PC 72s, and LDK 25s indicate that 910s would be ready to go as soon as they are in place.

The colorimetry of the LDK 910 cameras closely matched that of the PC 72s, so there was no change with the on-air look of the studio. The change was also buffered by the fact that LDK 25B cameras from the remote truck were used in the studio for a short time in between the PC 72s and the LDK 910s.

Studio light levels of 80 to 100 foot candles and lens settings of *f*/2.0 and *f*/2.8 seem to work well for us. One production per week also involves intercutting with a Sony BVP-7 Betacam with good results.

ROUTINE OPERATION

Routine operation of the cameras is from the CCU panels in master control. Adjustments in the head or base station are rarely needed, but are best done by a senior maintenance engineer with the correct charts and test equipment.

A black-and-white picture monitor and a waveform monitor are provided in master control for each camera, as well as a switchable master color monitor and waveform monitor/vectorscope. The cameras are equipped with Fujinon 15-to-1 lenses.

The LDK 910 cameras allow WCNY-TV to produce competitive pictures as compared to the other local stations. These stations use a mix of tube and CCD studio cameras by various manufacturers, including one other local station using BTS CCD cameras (LDK 91s in a robotic setup).

All in all, the BTS 910 studio cameras have provided good service to the station, and, at least for us, represent a good compromise between cameras with too few features to meet our needs and cameras that are more complicated than needed for medium market station use. ■

Hugh J. Cleland has been at WCNY-TV since 1967. He received his bachelor's degree from Syracuse University in 1969, and has been chief engineer since 1978. He is a member of the SBE, SMPTE and AES.

The opinions expressed above are the author's alone. For further information, contact BTS at telephone: +49-6151-808-1; FAX: +49-6151-81420, or circle **Reader Service 63.**

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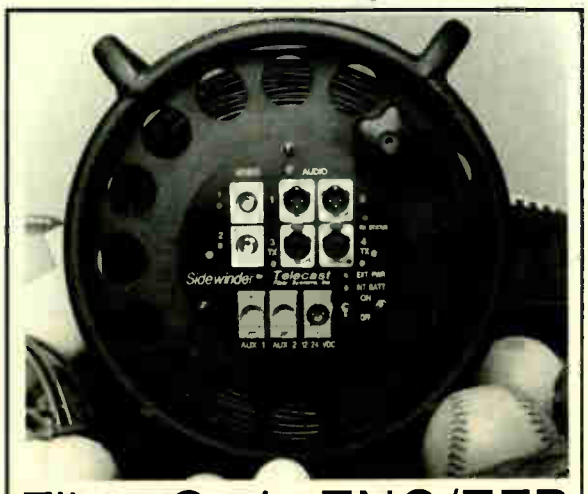

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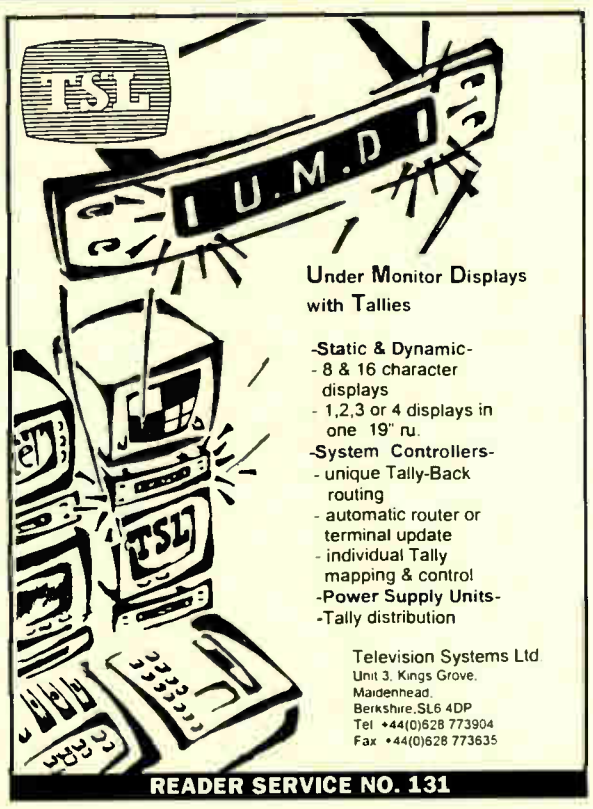

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Photron Ltd.'s Oscon Box video server can be interfaced with SGI family workstations to take full advantage of application software programs for digital image production on workstations.

The Oscon Box can be fitted with up to three input channels and two output channels.

It is a comprehensive digital image processing system, comprised of video encoders and decoders, two frame buffers, a three-bus video switcher with multilayer operation, a video mixer and a V-LAN tape/disk recorder controller.

For more information, contact the company in Japan at telephone +81-3-3486-3471; FAX: +81-3-3486-8760, or circle **Reader Service 11.**

COMPUTER GRAPHICS INTERFACE

The CGI-100 multi media computer graphics interface by Vortex Communications Ltd. provides a comprehensive link between video and computer graphics applications.

Composite or YC (S-VHS/Hi-8) video is decoded to RGB and syncs that are fed to the computer. The computer's RGB output and key signal are fed to the CGI to be recoded or keyed over video and coded into composite and YC.

The CGI-100 can be provided as a card alone or built into a Eurocard RGB input for keying.

For more information, contact Stephen Cole in the U.K. at telephone +44-81-579-2743; FAX: +44-81-840-0018, or circle **Reader Service 36.**

COLOR MONITOR

Vistek Electronics Ltd. has announced the launch of the GM7200 general purpose multistandard color monitor, available in 14- and 20-inch models.

The unit is outfitted with Y/C and dual composite inputs (PAL, NTSC, SECAM) as standard and can be provided with an optional dual digital input card (D-1 or D-2), allowing total format flexibility.

Other features of the GM7200 include a high-resolution CRT, stabilized EHT and automatic dark current stabilization. With the optional analyzer interface port, the GM7200 can be used with Vistek's GM7AH color analyzer.

For more details, contact Robbie Perry in the U.K. at telephone +44-628-531-221; FAX: +44-628-530-980, or circle **Reader Service 103.**

DIGITAL AUDIO EDITOR

The Penguin digital audio editor by Harmonia Mundi Acustica GmbH is based on a proprietary procedure named AutoCompile.

Unlike conventional hard disk editors or tape-based editing systems, the Penguin eliminates lengthy loading and backup procedures.

Primarily a compilation editor, the system uses the DAT or CDR recording medium as a source, as well as a mass storage device. The final master may be any standard format, including PCM processors, DAT, CDR or MOD recorders.

For more details, contact Ralph Kessler in Germany at telephone +49-761-49-1506; FAX: +49-761-49-1842, or circle **Reader Service 86.**

MICROWAVE LINKS

Teko Telecom provides a variety of equipment for mobile and stationary radio links that can also be used to carry out TV microwave links at 6/7/10/14/18 GHz for mobile, temporarily mobile or permanent stations.

The transmitting system is made up of video and audio modulating equipment for indoor installation and a transmitting unit for outdoor installation.

For more information, contact the company in Italy at telephone +39-51-625-6148, or circle **Reader Service 81.**

DIGITAL IMAGE STORAGE

The Viewstore by DVC Digitalvideo Computing is a multiformat RAM image sequence storage system that digitally stores and displays all TV formats, widescreen and standard.

The Viewstore can be expanded to 9 GBytes RAM, the equivalent of an HDTV image sequence of about 90 seconds.

Consisting of one to nine VME boards, depending on the configuration, the Viewstore can be directly inserted into VME workstations such as SGI or SUN. Adapters are available for desktop workstations.

For more information, contact Birgit Haberecker in Germany at telephone +49-8152-93010; FAX: +49-8152-3661, or circle **Reader Service 67.**

DIGITAL PRODUCTION SWITCHER

Panasonic's AS-D740 component digital production switcher features a mix/effects processor, a three-linear key processor, 16 standard serial inputs, 12 assignable external keys and a rack-mountable control panel.

Options for the AS-D740 include the AS-A741 dual analog input unit, the AS-A742 analog output unit, the AS-A743 dual frame memory unit for storage of still frame and key signal, and the AS-A744 dual chromakey unit.

For more details, contact the company in Japan at telephone +81-6-908-8173; FAX: +81-6-908-5969, or circle **Reader Service 134.**

ROUTING SWITCHERS

Hedco's 16X range of 1RU video and audio switchers are compact yet expandable and reconfigurable, allowing for future upgrades.

A range of over 25 control panels are available "off the shelf" to suit most applications, including single bus, multibus and full X-Y control.

Hedco switchers are currently in use at CBS News, Carlon TV, Visnews, Oasis Television and other facilities throughout the U.K.

For further information, contact Steve Hathaway in the U.K. at telephone +44-256-880088; FAX: +44-256-880428, or circle **Reader Service 110.**

SIGNAL GENERATORS

Universal Engineering, a division of VXL India Ltd., offers a range of signal generators.

Included are the Radart 2424 for 10-1040 MHz, the Radart 2424B for 10-600 MHz and the Radart 2426 for 10-1100 MHz.

Special features include a sweep facility, SINAD, phase and pulse modulation, reverse power protection, IEEE compatibility and DC operation.

For more information, contact the company in India at telephone +91-8-285-816; FAX: +91-11-462-0924, or circle **Reader Service 54.**

IF MODULATOR

Chunan Radio Factory's DZS IF modulator features low level modulation and good linearity.

The picture carrier of the DZS IF utilizes crystal oscillation, and the audio carrier uses a phase-locking circuit.

The complete self-testing functions of the modulator indicate any problems in the unit promptly and directly.

For more details, contact the company in China at telephone +86-5816-812552, or circle **Reader Service 44.**

CCD IMAGING CAMERA

Sanyo's Industrial Video Division has announced the release of the VDC2972 color camera that offers the advantages of both composite and separate luminance and chroma (S-video) outputs.

With more than 410,000 pixel elements, the camera produces a color resolution of more than 470 lines under lighting conditions as low as two lux.

The VDC2972 can be integrated into any system using a composite or black burst signal as a sync reference.

For further information, contact Wayne Kennedy in the U.S. at telephone +1-310-605-6527, or circle **Reader Service 78.**

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

USER REPORT

NOVOTNY-TV Excels with Ikegami 355

by Albert Nowotny
Owner
NOVOTNY-TV

OESTRICH-WINKEL, Germany

Founded in 1963, NOVOTNY-TV began as a specialized film production facility, concentrating mainly on industrial application films for mid-size enterprises.

In 1980, we became involved in video production and began what has turned out to be a long relationship with Ikegami. We chose the company's HL-79 series for our first installation of video cameras. At the time, this 2/3-inch tube camera offered sensational resolution, as well as color and contrast reproduction comparable to one-inch studio models.

We began with the HL-79A and later purchased three HL-79D cameras and another four HL-79E units in 1986. Although cameras proved to be extremely reliable, we decided several years ago that technology had advanced to the point it was time for us to upgrade.

In 1992, we invested in a new seven-camera OB van. Due to Ikegami's continuous product development, the new HK-355 presented itself as the camera generation following the HL-79 series. The 355 offered numerous advancements, including Skin, Soft and Dynamic DTL, a memory card system, a continuously variable shutter and the Super-V System. We purchased two HK-355 studio cameras plus four HK-355P systems.

NOVOTNY-TV currently employs six people full-time, but we also use any number of freelancers depending on our production volume. We have several well-known customers, such as the private German stations RTL, SAT 1 and the public ARD and ZDF networks. We produce not only game and talk shows inside the studio, but provide coverage of many sporting events throughout Europe using the OB van.

The Ikegami HK-355P studio camera systems have so far proven to be the ideal equipment for all our production needs. Because NOVOTNY-TV strives for the highest quality video, our OB van is equipped with the highest rated equipment. The picture quality, technical features and product stability of the Ikegami HK-355P meets all our requirements.

We also continue to be extremely impressed by Ikegami's effective service after the sale. ■

Editor's note: Albert Nowotny began his career as a film camera operator before becoming a freelance cameraman for ZDF. He founded his own company in 1963.

The opinions expressed above are the author's alone. For further information, contact the Ikegami in Europe at telephone: +49-2131-1230; FAX: +49-2131-102820, in Asia, telephone: +813-5700-1111; FAX: +813-5700-1137, or circle **Reader Service 106.**

BUYERS BRIEFS

Canon has introduced its newest lens, the J15aX8B, which features the company's IF PLUS technology.

The J15aX8B features a new generation of lens technology for the broadcast production generation. The lens utilizes the company's revolutionary Hi-UD Glass, and offers higher MTF and lower chromatic aberration.

The J15aX8B provides a focal range of 8-120mm, the shortest MOD in a standard ENG lens, and a wide angle of 8mm (57.6 degrees).

For more information, circle **Reader Service 17.**

Sachtler AG has available the Vario Ped 1-90 and 2-75 model pedestals designed for field production and studio work.

The units use a low pressure system, with a safety valve to prevent over filling. Standard features include lockable columns and "Quickfix" mounts for fast head changes. A friction damping feature prevents unwanted upward movement during quick tilts.

Also standard are crab and steer switching, individual wheel breaks and cable guards.

For further information, circle **Reader Service 22.**

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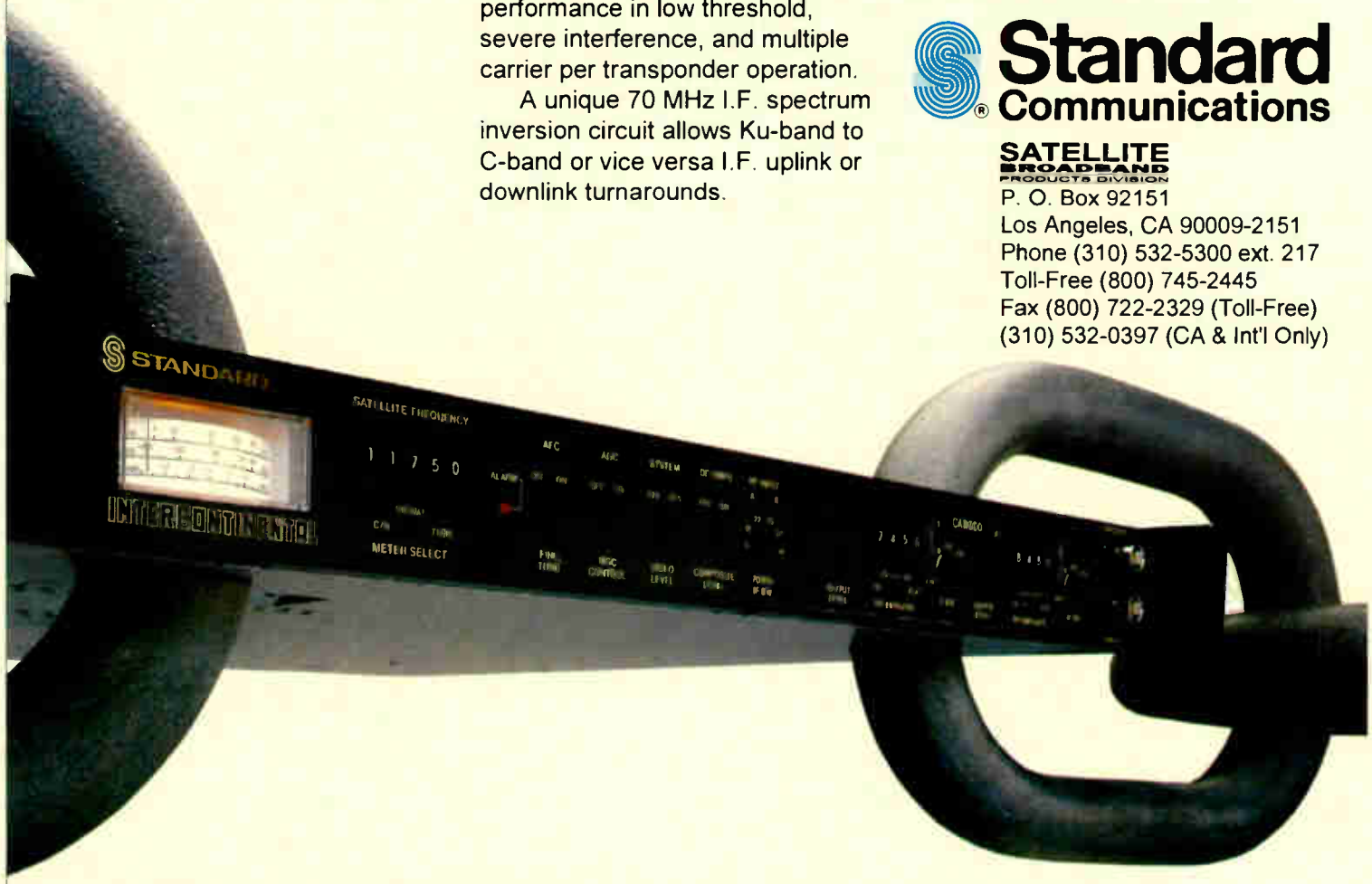

Circle 111 On Reader Service Card

USER REPORT

KNWS Prompts With QTV

by Alvin C. Saltzman
Chief Engineer
KNWS-TV

HOUSTON, Texas

Texas is home to KNWS-TV 51, our over-the-air all-news television station. Given the nature of the station's continuous presentation of international, national and local news, an unremittingly reliable yet flexible system for talent prompting is critical to the station's mission: keeping the greater Houston area's news junkies "in the know."

The design of the KNWS facilities called for the utilization of a state-of-the-art, computer-based newsroom as the engine to drive information through the editorial process, and ultimately to the talent for on-air presentation.

Selection of the Newsmaker system as the station's "backbone" required a prompting system which would easily interface within the Newsmaker's PC environment. QTV provided such a system.

STATION SETTING

The evaluation of various studio and field camera options provided another requirement for the station's prompting system. It was determined that a single camera head would be selected for all of the station's camera applications, with various supporting options added to configure the selected head for the studio or field use.

KNWS utilizes S-VHS as its tape format for field shooting, network recording, editing and play-to-air. The reliance on a single tape format provides great flexibility in the deployment of videotape hardware.

The same thinking went into the selection of a camera head for all applications. The intent here was to provide the station's engineers with a single head to deal with, resulting in less "spare parts" to inventory, a shorter learning curve for the maintenance engineers, and the ability to swap camera heads for the scheduled servicing if needed, without disrupting the ongoing studio and field operations.

Selection of the JVC KY-27 camera head as the station's only camera produced a new specification for the prompter system, the ability to work with what is essentially an ENG camera system.

The station's choice for studio prompting was the QTV QCP Mark II prompter system. The system operates on a 286 PC platform, which provides a clean NTSC output for routing throughout the station's control rooms and to the displays mounted on the studio cameras.

The QCP Mark II receives finished scripts created on the Newsmaker newsroom computers via a Novell local area network, with script playback controlled by the news reader.

In the studio, O'Connor wheeled tripods are used, with the QTV-provided mounting plates supporting both the QTV 15-inch ON CAM displays and the JVC KY-27 cameras equipped with Nikon lenses. This provides a well-balanced, easily-moved package of camera, prompter and tripod.

While the pure technical considerations were important, perhaps the most important criteria for the selection of the station's prompter system can be summed up in two words: user friendly.

SCRIPT PROMPTNESS

As an all-news station, KNWS relies on the QTV WCP Mark II to deliver each script on time, and with minimal fuss or operator intervention. The all news format requires a continuous flow of material, without "down time" for script downloads. The Mark II manipulates both inbound and outbound text effortlessly, without disruption in script flow.

The ultimate users of the prompter system are the on-air readers. With the all-news format, anchors may spend several hours each day on the air reading scripts from the prompter system.

Their comfort is critical to our smooth delivery of the news. Of course, high quality prompter displays are indispensable, and the 15-inch QTV displays provide sharp and clear images that are easy on the talent's eyesight.

Finally, we have eliminated the one major complaint from our staff: the lack of coordination between prompter operator and news reader.

Our QTV system is equipped with both hand and foot controls at the talent position, giving the talent full control of the script playback speed. This means they never worry about speeding up or slowing down to try to match the playback speed selected by an unseen operator.

By providing a high-quality, user-friendly prompter system and giving our air talent full control over the playback of their scripts, we have provided the best possible means of delivering the news to our growing audience using the QTV QCP Mark II. ■

Editor's note: Alvin Saltzman has been a broadcast engineer for 28 years. He has been technical director and engineering supervisor for network newscasts and chief engineer for television stations in New York and Houston.

The opinions expressed above are the author's alone. For further information, contact George Andros at QTV (Telephone: +1-212-460-9050; FAX: +1-212-529-9679), or circle **Reader Service 38.**

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30th Anniversary Inter BEE

30 BUYERS GUIDE

INFORME DE LOS USUARIOS

El Canal Once Crece Con Sony

por Oscar Baldenebro Salle
Jefe de Ingeniería
Canal Once

CUIDAD DE MÉXICO

Ha pasado mucho tiempo desde que el Canal Once hizo sus primeras transmisiones, el 2 de marzo de 1959, usando las cámaras PYE.

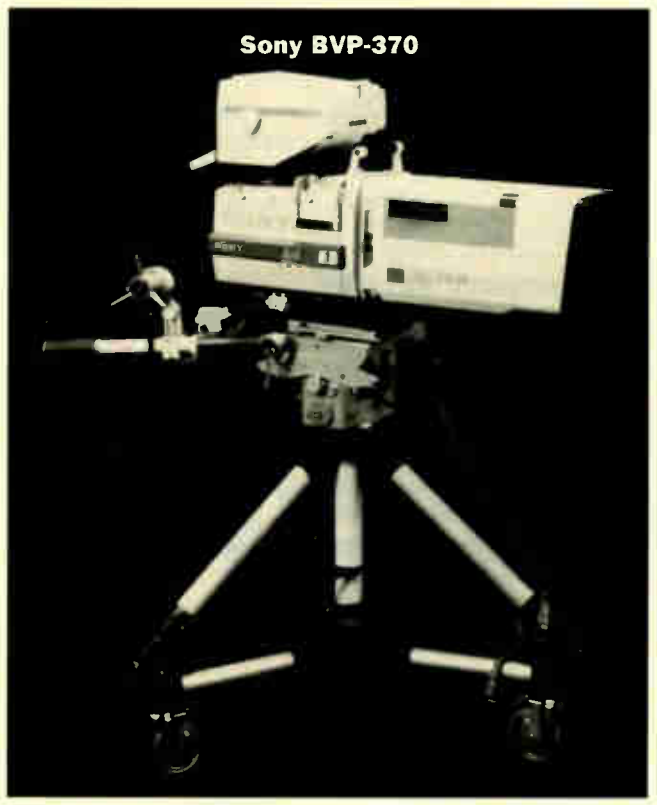
El canal nació como fuente de apoyo al Instituto Politécnico Nacional y sus primeras producciones fueron de corte educativo. La transmisión de clases de matemáticas no requerían de una gran producción, pero sí de los espacios adecuados para instalar los equipos de aquella época, que por lo general eran bastante grandes.

Con el transcurso del tiempo, las producciones se tornaron más sofisticadas, por lo que precisamos mejores cámaras y equipos.

En 1990, el Canal Once decidió cambiar las cámaras del Estudio Dos, sitio donde se realizan las principales producciones del Canal Once, incluyendo: programas musicales, concursos, teleteatros, etc. Esta decisión fue de gran importancia para el futuro de la institución.

La primera decisión a tomar fue seleccionar entre cámaras de tubos o cámaras de dispositivos de carga acoplada (sigla en inglés—CCD). Esta no fue difícil, ya desde 1987, el Canal Once había comprado cámaras de CCD y para entonces se contaba con experiencia sobre las ventajas de las mismas, ventajas que ya todos conocían y que deseaban seguir disfrutando en los nuevos equipos.

Las características sofisticadas ofrecidas por la cámara Sony BVP-370, su bajo precio y el tipo de producción del Canal Once fueron tres factores que considerados en conjunto inclinaron la decisión en favor de ésta.



En noviembre de 1990 se inició la operación de estas cámaras y a partir de entonces los tiempos perdidos por falla han sido mínimos.

Dentro de las producciones, el tiempo necesarios para acoplar el color de las tres cámaras se ha reducido considerablemente y esto ha sido un factor para mejorar las relaciones entre operadores técnicos y el personal de producción.

El acoplamiento del color se ha logrado con niveles de iluminación normales e igualmente en condiciones de baja iluminación como en el caso de algunos programas musicales.

En algunas ocasiones ha sido particularmente útil la función de detalle de cutis "skin detail" cuando, por diferentes motivos, no es posible maquillar a algún locutor. También las diferentes posiciones que ofrece el visor (viewfinder) son particularmente útiles en producciones de mucho dinamismo, como son los programas de concurso. Y el sistema de intercomunicador "intercom" nos ha proporcionado un servicio satisfactorio.

En general, el comportamiento de las cámaras ha sido satisfactorio, el apoyo de fábrica sobre capacitación en la operación y mantenimiento así como en la actualización de las mismas siempre ha sido oportuno. Como recomendación, sugerimos que se use este tipo de cámara ya que permite solucionar muchos problemas ahorrando tiempo que tiene que dedicarse a otro tipo de cámaras. ■

El Ingeniero Oscar Baldenebro Salle ocupa el cargo de Jefe de la División de Ingeniería del Canal Once, ubicado en la Ciudad de México. El Ingeniero Baldenebro ingresó al Canal Once en 1977. Baldenebro se graduó de la Escuela Superior de Ingeniería en Comunicaciones y Electrónica.

Para más información acerca de los equipos Sony, comuníquese con Julio García o Dan Murphy al teléfono +1-305-448-7450; o marque el **Reader Service 3**.

BUYERS BRIEFS

Century Precision Optics has introduced a universal Nikon-to-1/2-inch Bayonet Adapter that enables three-chip video camera users to take advantage of a diverse range of Nikon SLR lenses — from wide angle to telephoto.

The new Century adapter is optically compensated, ensuring that the original focal length of each lens remains unchanged.

The adapter is available for cameras with either a standard 1/2-inch bayonet mount or a Sony 1/2-inch mount. Both versions allow infinity focus.

For more information, circle **Reader Service 120.**

Teleprompter software creator **Magic Teleprompting Inc.** has released Magic Scroll International, a prompting program offering multiple languages, including Japanese, Chinese, Korean and other WorldScript languages.

The system operates on the Macintosh platform and offers a wide range of fonts, editing capabilities and scrolling speeds.

The system is available for desktop computers or portable systems for field prompting.

For further information, circle **Reader Service 83.**

The Mk7B Classic Cam head from **Vinten Broadcast** offers a number of improvements over the Mk7A head, including a 75 percent increase in pan and drag and increased mechanical stability for narrow shots.

The head has also been improved ergonomically, with control knobs for pan and tilt located on the same side. The unit also has a "park and quick cam change" feature, in which the cams can be raised off the rollers, allowing for longer roller lifespans and greater ease in transporting the head.

Weighing in at only 19 kilograms, the unit carries a payload of 114 kg.

For further information, circle **Reader Service 114.**

The new SK-2600 studio camera from **Hitachi** features 10-bit A/D conversion and 13-bit digital signal processing.

The SK-2600 uses high resolution 900 TVL 600,000-pixel CCDs, and all functions of signal processing are done using a single Hitachi-developed LSI chip.

Among the new additions to Hitachi's signal processing are flesh tone detail adjustments, adjustable detail center frequency and high chroma detail that increases apparent resolution of single colored objects by adding detail to them.

Hitachi also has available the SK-2000W, a 4:3/16:9 switchable camera using 520,000-pixel CCDs.

For further information, circle **Reader Service 71.**

The new C20S Dutch head from **Cartoni** accommodates cameras up to 61 lbs. and features an eight-step counterbalance and a patented fluid damping system for adjustable drag.

The head also offers a frictionless sliding base place and a European-style locking quick-release plate.

For larger cameras, Cartoni offers the C40S Dutch head.

For further information, circle **Reader Service 42.**

Circle 37 On Reader Service Card

USER REPORT

In the Studio With JVC's KY-27

by Dave Dunkin
Director of Media Services
University of Missouri-Columbia

COLUMBIA, Missouri

About one year ago, the University of Missouri-Columbia purchased five cameras to meet a remarkable list of requirements.

They had to be standalone models, source to almost any recorder and perform numerous odd production tasks. They also needed to be dockable for single and multiple camera EFP operations. And they needed the ability to synchronize easily to match in a multi-camera studio configuration, both at home and on location.

Our demanding set of requirements was placed alongside a very modest amount of funding. The result was an exhaustive evaluation process that led us to choose the KY-27 from JVC.

A UNIVERSITY SETTING

Television production in a university setting takes many forms. We do a lot of shooting that is later edited, but we are also doing more and more production for on-air broadcast.

The University of Missouri operates a 90-site satellite network, a fiber optic digital video network and ITFS facilities in metropolitan areas of the state. We have academic programs in broadcast journalism and communications radio and television.

To meet the programming demands of our organization, we are producing more and more multi-camera live studio programs. And the KY-27s are doing fine.

We purchased all our cameras with KA-27 camera adapters and Fujinon 16x9.5 lenses with 2X extenders. To work effectively in the studio and on location, we chose the RM-P300U remote operating unit and acquired about one kilometer of camera cables. We also have two dockable recorders.

Our engineering staff is very pleased with the electronics packaging of both the camera and the remote operating unit. The RM-P300 unit is designed to control the KY-35 and KY-90 cameras, and therefore has a full complement of manual adjustments and overrides for the automatic controls.

Operation of the ROU is enhanced by the use of multifunction controls coupled to an LCD display. Both the camera head and ROU are very stable and provide good, long-term luminance and chroma match at the SEG.

When using the cameras in the studio, they perform as one would expect, with nice quiet pictures, good color balance and good dynamic range. Pretty much a set-and-forget operation.

We have used the KY-27s in remote configurations during very harsh weather. These have been the times that try men's (and women's) souls — but the KY-27 has come through.

In addition, we have tested the KY-27 in studio configurations in some very unforgiving studios.

The camera powers up with good, clean video, stabilizes quickly and is easy to match to other cameras. The auto-iris with its multi zone weighing is a camera engineer's best friend in difficult lighting situations. The iris switches from auto to remote quickly and responds very well.

Low light operation is remarkable in a camera of this price range. Added gain of up to 9 dB is very acceptable, and 12 dB and 18 dB boosts are seldom needed, even in poorly illuminated venues. Flexible gain control gives our camera operators and the directors better control of depth of field.

Auto white and black balance function very well and very predictably. White paint on the ROU allows for excellent foreground match. Black paint is auto only on the version we have, but I understand that the "B" model will also have black paint, which would be helpful when gain is added.

The advanced memory system for white balance allows the operator to store multiple color balance settings. This is a soul saver when a camera balanced for HMI on the field swings around for the half-time interview in the press box, which is illuminated with 3,200 degree quartz.

SHARPER EDGE

Using the variable speed shutter allows for sharper edges on replay slow and still frames. But it is also great as a remote control ND filter when the need arises to shorten up depth of field or shoot some bright objects.

Along with the five Fujinon lenses, we had a pair of 30 to 1 Schneider lenses. A simple change of bayonet mount allowed us to mount the KY-27s to these long lenses with good results.

The bottom line on this hardware is that we feel we purchased five very flexible television cameras at an affordable price. Granted, they are a few steps away from the top of the line. The cables are multicore rather than triax; the studio viewfinder could have a larger image; and manual black balance would be nice. But they make good pictures and are dependable in a wide variety of studio situations. ■

Editor's note: Besides being director of media services, Dave Dunkin teaches coursework in broadcasting at the university. He is a member of ITVA and has held several elected positions in the organization. He has been working in television for more than 18 years.

The opinions expressed above are the author's alone. For further information, contact JVC in Europe at telephone: +44-81-902-8812; FAX: +44-81-900-0941; in Asia, telephone: +81-426-60-7560; FAX: +81-426-60-7569, or circle **Reader Service 7.**

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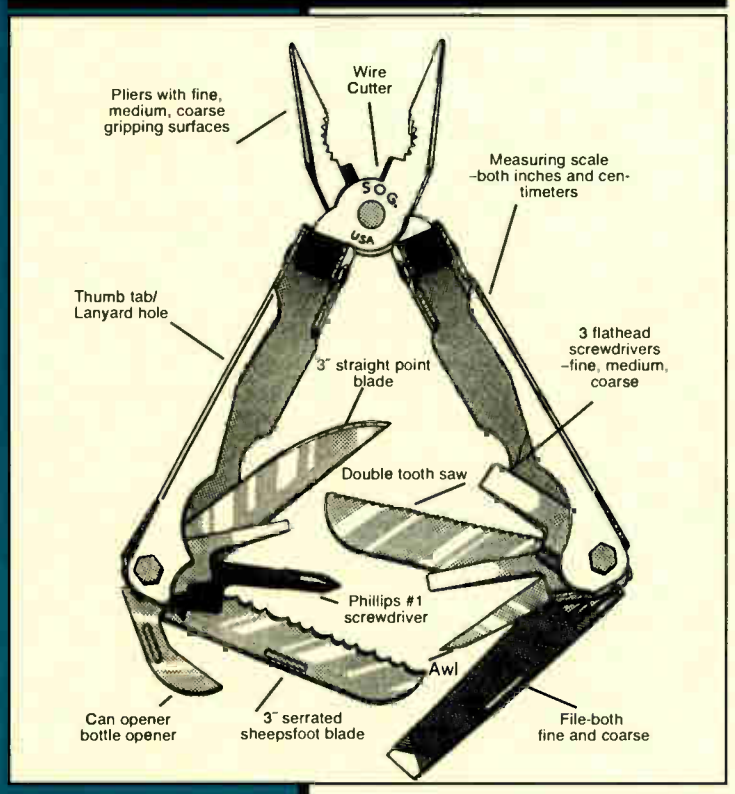

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☐ N. Government TV facility
☐ P. Educational TV facility
☐ Q. Recording studio
☐ K. Other (specify): _____

2 Job Function (check one)

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

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May 1994 Issue Use Until September 1994

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EQUIPMENT EXCHANGE

TV Technology's Equipment Exchange provides a FREE listing service for all broadcast and pro-video end users. Brokers, dealers, manufacturers and other organizations who are not legitimate end users can participate in the Equipment Exchange on a PAID basis.
Call 1-703-998-7600 for details.
Submit your free listings on your letterhead and state the make, model number, a brief description, sale price and complete contact information and mail it to:
TV Technology, PO Box 1214, Falls Church VA 22041

CAMERAS

Want to Sell

RCA TK-75 w/Plumbicon, Schneider 15:1, excl cond, lw hrs, $900. G Fox, 804-868-9351.

Sony CCD V5000 Hi8 in like new cond, access, chrgr, remote, recently checked by Sony, $2000. C Williams, CJW Prod, POB 1849, Orangeburg SC 29115. 803-531-1662.

Hitachi FP-C2 (2) 3-CCD cameras, Canon J15x9.5B4 2X lens, GM-7 viewfinders, CA-C2 camera adapter, Anton Bauer batt adapters, cable & hard case, $6000/ea. P Giglio, Artistic Video, 152 S State St, Dover DE 19901. 302-734-1114.

Sony BVU-150 3/4" SP U-Matic video field rcdr, excl cond, $2500/BO; Sony BKU-150 time code gen for BVU-150 field rcdr, $500; Porta-Brace for BVU-150, new, $160; looking for pkg deal. 201-429-1108.

JVC GYXZ w/Anton Bauer lights & batt, mag quad chrgr, 4 new P Pac 13, shot sun mic, all new, $8000/firm. J Barker, 305-472-2888.

Sony DXC-3000 w/Fujinon A12x10BRM 88 lens & CMA-8 pwr sply w/25' camera cable, vgc, $3575. Paul, 405-840-9699.

Sony DXC 3000 camera w/vf, no case, w/2-100' cam cables & VO 4800 3/4" deck, $2500. M Seeber, Seeber Prod, 122 S Wabasha Ste 460, St Paul MN 55107. 612-227-9520.

Panasonic WV3260 w/hard case, $400; Panasonic **WVD500 12X w/hard case, $400.** Videographics, 10 Wilsey Sq Ste 3, Ridgewood NJ 07450. 201-447-4243.

Sony DXC325 camera w/ PHX10X8BKRS 1:1.4/8-80mm lens, pwr sply, 6' Sony 3/4" deck cable, carry case, tripod plate, manuals, Bogen 3061 Fluid Head tripod, 6' aluminum stx, $3250. Darin, 208-888-7600.

Sony CCDVX3 3-chip camcorder, Sennheiser MKE-300 shotgun, Bogen 3021/3063 tripod, PortaBrace PC-2 bag, batts/chrgr, all like new, $3300/BO; Sony EVC100 Hi8 deck, $425; Samson MR1 wireless w/Sony ECM-44 lavalier, never used, $225. Doug, 401-295-7658.

Panasonic AG 460 2-CCD, like new, carrying case, batt chrg, AC adptr, $1600. A Zimbard, 914-723-6868.

Cool Lux L-20 battery pack, gd cond, $50/BO. G Giarrusso, Moonlight Video Prod, 345 First St Ste Q, Encinitas CA 92024. 619-942-9687.

Sony EDP-10 2-chip camera, AC pwr, 13:1 Fujinon lens, $1200; Ikegami HC200 3-chip CCD camera, PortaBrace case, tripod plate, uses NP-1 batts, $2950. Mike, 303-484-5535.

Canon L1 w/solidex VT88 HZ tripod & Arkon TC-600 turbo camchrger & extra Canon batt, Sony EV-S3000 Hi8 tape deck w/TBC, $2500/pkg; Canon L1 w/tripod, batt & chrgr, $1300. G Bell, Box 4261, Carmel CA 93921. 408-384-2901.

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Panasonic DM7010, WVF700 & AU410, dock pac system, only 10 hrs run time, $11000. 607-687-0545.

Sony DXC-537, PVV-1, CA-537, Canon J14 lens, PortaBrace SC-537 shoulder case, will sell all or part, lw hrs, excl cond, BO. Conder Media, 214-343-8460.

Panasonic AG-460 S-VHS, 2 CCD camcorder, batt, AC pwr sply/chrgr, hard case, excl cond, lw hrs, $1500. George, 707-586-0383.

Pansonic AG-450 S-VHS camcorder, can accept zoom cntrl & 2 speed zoom w/4 batts, $799.95; JVC KY-2000 3-tube bdct camera & Sony 4800 3/4" port pkg w/3 batts, $900; DPS Personal component adapter for Video Toaster adds Y/C, MII & Betacam to the Toaster, new, used 4 hrs, $400; Commodor 2 MB fast RAM brd for the A-2000, $100. H Sutherland, 407-567-0600.

Sony DXC 1821 color camera, no lens, cable, gd shape, $450. R Suraci, 67 Maple St, Newburgh NY 12550. 914-561-5866.

Sony BVP-30 camera, no lens, no cable, BO/trade. R Suraci, 67 Maple St, Newburgh NY 12550. 914-561-5866.

Sony VO-4800 gd cond, 2 batts & PortaBrace cover, $500. K Seay, 205-794-4101.

Fujinon A+ A15x8 beum-28, Sony mount, 1 month old, $6500; Canon J18x9 B4 BURB, rebuilt 2/94, $8500/BO. R Stookey Prod, Box 814, Mintum CO 81645. 303-827-5289.

Sony DXC-MZ camera head, UF, plate, case, 6' cable, $800/BO. J Baldwin, HTE, POB 398082, Miami Bch FL 33139. 305-856-1706.

Panasonic PK-957 VHS along w/port VCR & AC adapter, $185/both or BO. G Giarrusso, Moonlight Video Prod, 345 First St Ste Q, Encinitas CA 92024. 619-942-9687.

Panasonic WV-F250-BH 3-CCD camera w/12x1 Fujinon lens, mic, carrying case, excl cond, $5000/BO. T Jeans, Prism Video Services, 605-399-9391.

Hitachi SK-70 cameras (4), studio config'd, zoom/focus. CCU, DCU's w/triax cntrl, ENG finders, cases, manuals, completely tuned, $8000. G Larson, Advanced Media, HCR 31 Box 215, Sandy Valley NV 89019. 702-264-7065.

Hitachi Z-31P Plumbicon camera, component & composite brds w/both cables, case, pwr sply, manual, tripod plate w/Canon J15x9.5 KRS lens, excl cond, $2700; Sony BVP-30 w/1-A rcdr, case, manual, J13x9B4 IRSII lens, clean, light use, gd rcd heads, $3800. N Manning, 718-981-0120.

Sony BVP-30 Plumbicon w/CA-30 back, ext card, manuals, tripod plate, DC-310 & Anton Bauer adapters w/o lens, $2000. T Wagner, US Art, 22 Black Creek Ln, St Louis MO 63124. 314-567-6777.

Panasonic PK-957 VHS w/10 pin connector. G Giarrusso, Moonlight Video Prod, 345 First St Ste Q, Encinitas CA 92024. 619-942-9687.

Panasonic WV-250BH 3-CCD video camera docked to 7450 S-VHS rcdr, lw hrs, mint, $5500. Jake, Photographs Forever, 36 S Cloverfield Rd, Valley Stream NY 11581. 516-791-7405.

Sony BVP-3A w/lens/vf & Sony BVV-1 Betacam VCR & accs, camera & ver privately owned by prod shooter & prof maintained, $3800; JVC KY-1900 camera/lens/vf w/Panasonic 9400/JVC-4400 3/4" VCR & camera cable & AC pwr sply both in gd wrkg cond, $750/both; Sony CA-30 multicore Betacam BV-3/30/5/70 camera adaptor for CCU w/manual, $650. R Burks, 908-287-3626.

Sony BVP-30 3-tube Plumbicon camera, head only, tubes in gd cond, $2000/BO. Jeff, Cinecan, Ontario CANADA. 705-525-1801.

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Ikegami ITC-735, used, good condition, or new cameras, CCU units, spare parts. Brito Jose, Television Cape Vert, Cape Vert Island, West Africa. FAX 238-61-5831.

CAMERA ACCESSORIES

Want to Sell

Sony DXC3000 gd cond, incl tripod mtg plate & camera case, $2450. J Soyk, Soyk Adv, 525 Main, Lewiston ID 83501. 208-746-8134.

Sony NP-77HD batts (4) w/pwr meters, as new, $50/ea. 614-946-6611.

Sampson tripod w/Quickset fluid heads, $300. J Soyk, Soyk Adv, 525 Main, Lewiston ID 83501. 208-746-8134.

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Bilora medium duty tripod w/fluid head, just rebuilt & fully tested, $175; Schwem FP-1 Gyrozoom lens for Ikegami type lens mnt, system incl fitted case, LH-95/55 cable, Anton Bauer pwr adaptor & instruction/promotional tape, $6500; Sony BC-1000 6 place multi-sequence batt chrgr for BP-90 or equip, $175; Anton Bauer lifesaver 4 place quad chrgr, $350; (2) Cinema Products steadicam video SK w/standard accs, used for demo, $11500/ea; 2 triax cables, 100' & 50', $125/both; Anton Bauer UPL (2) pass thru pwr plates, used to feed pwr to light or access from an Anton Bauer batt, $75. R Burks, 908-287-3626.

Cool Lux L-20, gd cond, $50/BO. G Giarrusso, Moonlight Video Prod, 345 First St Ste Q, Encinitas CA 92024. 619-942-9687.

O'Connor 100 Fluid head in excl shape, strong springs w/beautiful wooden Mitchell standard legs, $975 + shpg. Joe, 617-566-1950.

Anton Bauer LPS-4 Snap-on pwr sply, like new, $80; Anton Bauer brick batty Logic series, Sony BP65 AN snap-on chrgr, excl cond, $70. N Manning, 718-981-0120.

Nikon TM-B2 lens converter, $800. Kokojan Video, 214-717-3828.

Bogen 3046 tripod legs w/3066 Cine/Video fluid head, excl cond, $390. G Odell, TFG, 83 Meadow St, Hartford Ct 06114. 203-296-2972.

Sony CMA7 w/rack mount, $75. K O'Malley, WTKR, 804-446-1328.

Century Precision Optics wide angle adapter sets (5), includes 75 or 80mm slip-on adapter, wide angle & super wide angle ens, pouch case, $400/ea.; Century Precision Optics wide angle sets (2), same as above but w/bent threads on the outer ring, $300/ea. J Davee, Cole Layer Trumble, 3199 Klepinger Rd, Dayton OH 45406. 513-278-3800.

JVC KA-20 camera adapter for KY-25/KY-17 camera head, $550; JVC 12' 26-pin to 14-pin camera cable, never used, $125. L Kaltenbach, 201-224-6063.

Canon J12x10 BKRSM clean. Yves, Ontario CANADA. 705-525-1801.

DIGITAL EFFECTS

Want to Sell

Sony DME 450 digital effects/switcher, no TBCs needed, 1 input effects, $2750. Mike, 303-484-5535.

NEC 100 DVE, $5000; ADO 100 w/3D & warps, $17.5K; Tru-Vision 32 bit paint & animation hardware/software, $8000. P Marth, Kirwin Comm, POB 3313, Park City UT 84060. 801-649-8226.

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Vidicraft Detailer III, video image enhancer, works great, $95/BO. G Giarrusso, Moonlight Video Prod, 345 First St Ste Q, Encinitas CA 92024. 619-942-9687.

Ampex ADO 1300 digitrail, digikey, gd cond, $15000. B Schwab, Audiocraft. 915 W 8th St, Cincinnati OH 45203. 513-241-4304.

Electrohome Jazz DVE ensemble, crop, rotate, flip, spin, tumble, croma key, GPI, 3 cards, page turn, BO over $8500. J Barker, 305-472-2888.
Quantel 5000SP works perfectly, $2500. G Fox, 804-868-9351.

NEC E-Flex DVE, $1250. M Seeber, Seeber Prod, 122 S Wabasha Ste 460, St Paul MN 55107. 612-227-9520.

Video F/X non linear edit suite, Macintosh based NTSC, $3000/BO. S David, Frontline Communications, Radmansgatan 3, 211 46 Malmo SWEDEN. 011-46-40-97757.

EDITING EQUIPMENT

Want to Sell

Sony BVU 950 3/4" SP edit rcdr, time code & TBC, $10750; BVU 900 sorce plyr w/time code & TBC, $6500; 250 hrs drum time per machine, $14500/pair; JVC 3/4" edit syst w/CR-8250U insert rec, CR-6650 U play/rec, (2) Sony CVM 1250 monitors, Convergence VE-93 cntrlr, $4500. Pro-Vision Studios, 1592 Union St #341, San Francisco CA 94123. 415-824-9343.

Sony VO 5800 clean, heads replaced onec, incl 12' edit cable for RM450 editor, manuals. Darwin, 208-888-7600.

Grass Valley editor w/K2 keyboard, w/VPe 131 6.0 software, $10.5K. P Marth, Kirwin Comm, POB 3313, Park City UT 84060. 801-649-8226.

Sony Betamax syst w/2 SLO 383 decks, RM 440 edit cntrlr & cntrl cables, $1500; 3/4" edit system w/Sony VO 5800, 5850, upgraded to read & record time code, Paltex ABR-1A AB edit cntrlr & Panasonic TR 930 monitor, $5500. T Menard, 203-426-8171 ext 441.

Panasonic AG 7750, new, $4000; Panasonic AG 7760, new, $3800; Panasonic AG 800, $3000. J Barker, 305-472-2888.

Sony RM 450 edit cntrlr, $1100; complete edit suite incl JVC 611 S-VHS feeder to Sony VO9850 3/4" SP editor, RM 450 cntrlr w/Sony DME 450 digital effects switcher, (2) 13" Videotech monitors, all cables, etc, $11450. Mike, 303-484-5535.

Convergence edit system w/TC, fade to black, cuts only, VE-93 edit cntrlr, Panasonic & Sony monitors, JVC 3/4" plyr & rcdr, Laird CG 7000 char gen, $3500. Gary Wachter Editorial, 212-399-7770.

Amilink CI A/B roll edit controller with VT control software, 3 Panasonic AG-1960 S-VHS edit decks, $2900. DHP, 910-841-5353.

United Media 450 editor, $2800. G Bell, Box 4261, Carmel CA 93921. 408-384-2901.

Paltex Abner II editor w/R-SIDD for (2) EVO9850's to BVU 850, A/B roll, $2500. J Smith, K35DG, 9500 Gilman Dr, LaJolla CA 92093. 619-534-4869.

Convergence ECS-204 edit cntrlr with 1 serial, 2 33-pin parallel & SWI-120 switcher interface, needs some work, great for spare parts, $1750; Microtime Digitrol 2 automatic programmer, $500; Faroudja/Fortel record EX NTSC signal processor, $300; Faroudja/Fortel color EX NTSC signal processor, $300; Sony VO-6800 VCR, $1000; JVC BR-S622U VCR (2), excellent condition, $3500; JVC E511 45-pin to 33-pin interface (3), $350/ea. D Lowe, KMVT Bdctg, Twin Falls ID 83301. 208-733-1100.

Sony 5850 (2), RM-440, Adda, AC20AS dual TBC, JVC KM2000 switcher, Quanta select 7 CG, $9000. Marv Dibben Productions, 913-492-2705.

Paltex editor Vanguard level 6.0, (5), 10 GPIs, 200 event memory, $2500. G Fox, 804-868-9351.

JVC VHS edit pkg w/RM-86U cntrlr, BR-8600U & BR-6400U, $4000. P Giglio, Artistic Video, 152 S State St, Dover DE 19901. 302-734-1114.

JVC BR-8600 U VHS edit recorder, less than 450 original hours, very clean, $1500/Best Offer; JVC CR-8250 U-Matic edit recorder, excellent condition, 400 hours, JVC_CR-5550 U-Matic edit player, clean 600 hours, JVC RM-86U edit controller 45-pin, will sell as package, $3000, other access available. Jeff, Cinecan, Ontario CANADA. 705-525-1801.

LIGHTING

Want to Sell

Lowel D'light kit with 3 hds, 4 doors ea, stands, case & numerous assorted spare lamps, $1100. R Burks, 908-287-3626.

MOVIE PRODUCTION EQUIPMENT

Want to Sell

Cine Special I 16mm camera, C mount w/2 200' magazines, $800. Kokojan Video, 214-717-3828.

Bower/Sonerex interlock 16mm projector, $1000; (2) 16mm Bolex cameras with 18x86mm zoom lenses, motors & time-lapse inter-volumeter & heated housings, $2000/ea; Frezzolini LW16mm camera with 12X 120mm ANG lens, side amp, 400' magazines, $1000. Terry, 208-888-7600.

Fluid tripod package with NCE/Hervic hydro-fluid jr. head with ball leveling, medium wooden legs with rubber sta-sets, baby wooden legs & cast metal hi-hat, tube case, very good condition, $1200. G Odell, TFG, 83 Meadow St, Hartford CT 06114. 203-296-2972.

Panasonic PTB1010UF 120" video projector, sealed new in box, full warranty, $4700. 607-687-0545.

Super 8 Projector sound, 5 blade shutter, only 2 hrs old, still in carton, $900. G Fox, 804-868-9351.

PEDESTALS

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Microtime 1600 TBC, $400. P Giglio, Artistic Video, 152 S State ST, Dover DE 19901. 302-734-1114.

Prime Image TBC/timer, $1500. J Barker, 305-472-2888.

For.A FA-300 full frame prof digital TBC, Y/C or composite, genlock, freeze frame, freeze field, BW, chroma level, video level, $1700. M Haughton, Lumina Prod, 650 Guemes Is Rd, Anacortes WA 98221. 206-293-4828.

Rane GE-27 (2) 27 band graphic equalizer, $299/ea; Tapco 2200 10 band stereo graphic equalizer, $199; Tapco C-201 10 band stereo equalizer, $225. 201-429-1108.

Hotronic AE-61 TBC, composite & SVHS in/out, $850. Mike, 303-484-5535.

ADC 24-input patch bay, $100; Videotek VSG200 sync generator, $500. P Marth, Kirwin Comm, POB 3313, Park City UT 84060. 801-649-8226.

For-A CCS-4300 (2) color correctors, remote box, 100' cable, $500/ea; For-A TBC FA-220, excel cond, $2000. J Davee, Cole Layer Trumble, 3199 Klepinger Rd, Dayton OH 45406. 513-278-3800.

Microtime 120D digital rack mnt or table-top frame synchronizer/TBC w/Sony slow motion dynamic trckg cable, extender board & service manual, $2475; CEL-P147 frame synch complete w/DVE functions such as push-ons, quad quarter frame compression, color gen, strobe & more, system has remote control panel for 2 source A/B switching, incl table top console, all control syst hook-up cables, instruction tape & manual, $2750. R Burks, 908-287-3626.

Hotronic AP-41 SF TBC, Y/C, $1100. N Madeo, 914-225-1625.

SWITCHERS

Want to Sell

Panasonic WJ-MX12 brand new in box, $1495. 614-946-6611.

Panasonic WJ5500A, $900. M Seeber, Seeber Productions, 122 S Wabasha Ste 460, St Paul MN 55107. 617-227-9520.

Sony SD-V1000 6x6 audio follow video switcher, 1 audio follow video FX send & return, one audio return per input w/rem, S video inputs, $200+shpg; Sony XV-C900 wiper/vader to black or color bkgrnd, color corrector, built in color bar gen, built in audio mixer/fader, S video inputs, $125+shpg. G Dunn, 510-516-0299.

ECHO-Lab SE/6 prod SEG, 3 mix effects, 5 keyers, mint, $8500/BO; ISI 902 prod SEG, 2 mix effects, like new, $1200/BO. K Campel, 203-322-3000.

Panasonic MX12 DVE mixer, perfect condition, one owner, studio use only, lw hrs w/original box & manual, $1275. B Kelley, Mountain Magic Video, POB 1113, Foresthill CA 95631. 916-367-2841.

Crosspoint Latch 6118 5 input switcher with gen-lock modification, $475; Panasonic WJ-4600 B 6 input production switcher/signal gen with service manual & X-10 board, $975. R Burks, 908-287-3626.

Sony SEG-1 B & W switcher, no manual, $25. T Wagner, US Art, 22 Black Creek Ln, St Louis MO 63124. 314-567-6777.

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

TAPES/CARTS/REELS

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RCA 7007/6166, RCA 5762, 4x500, nuevo, no reconstruido. 305-757-9207.

RCA partes de repuestos, nuevos, otros partes de repuestos de RCA en almacen para las lineas de "A" hasta "E". 305-757-9207.

TV FILM EQUIPMENT

Want to Sell

35mm upright Moviola editor, 1 pic, 2 sound, $1500; 16mm/35mm KEM Rapid-n 6-plate flatbed, $4000; editing rewind table with light-box, $195; Magnasync Moviola set of rewinds, $100; squawk box, $100; 16mm & 35mm tape straight cut splicing blocks, $150/ea; 16mm & 35mm 4-gang sync, $150/ea; 16mm Moviscop viewer, $150; Precision 16mm optical & magnetic sound reader, $100; Moviola 16mm/35mm synchronizer, $120. Gary Wachter Editorial, 212-399-7770.

Panasonic ET-100DS digital scan-line doubler, converts composite & S-Video signals into RGB, produces high quality flicker-free video, doubles the horizontal scanning frequency from 15.75 kHz to 31.5 kHz, use with Panasonic projection systems, mint condition, $1500/Best Offer, trade. 808-875-8871.

Light Level controller, automatic or manual, uses 8" density wheel, complete with stand, $250. G Fox, 804-868-9351.

Steenbeck ST 921 w/interlock system, motor driven rewinder-extension board, fold out magnifier, sound reader, 16/35mm, $24000. N Ambatzis, Spectral, 9 Formionos Str, Athens 16121, GREECE.

35mm film reels, old collectible ones, call/trade. R Suraci, 67 Maple St, Newburgh NY 12550. 914-561-5866.

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VIDEO PRODUCTION EQUIPMENT

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Panasonic OMDR TQ-2026F, gd cond, $1200; Panasonic OMDR TQ-2024F, gd cond, $500. J Davee, Cole Layer Trumble, 3199 Klepinger Rd, Dayton OH 45406. 513-278-3800.

MFJ 148B titler/CG w/2 font cartridges, $75. R Burks, 908-287-3626.

Chyron Dual chnl RGU-2 graphics & titling syst w/2 color encoders w/downstream keyers & font compose unit, $4500/BO; Intergroup 2031 matrix wipe gen, $875; Videomedia Magnum edit cntrlr for Sony rcdrs, $2200/BO. K Campel, 203-322-3000.

Sony BVE 800 edit cntrlr, A/B roll, timecode, serial ports w/3 cables, $2200; Alta Pyxis dual chnl TBC & switcher w/dig FX, wpies, push, dissolve, audio follow, poster, $2500. J Soyk, Soyk Adv, 525 Main, Lewiston ID 83501. 208-746-8134.

BK 2006 TBC remote for BVW, PVW, UVW decks, $400; 4K port softlight w/soft case, $1350; JVC TG-P47U port time code gen, $325; Convergence 200/202 A/B roll cntrlr/parts, $350. M Seeber, Seeber Prod, 122 S Wabasha Ste 460, St Paul MN 55107. 612-227-9520.

Sony 5850, $2750; Sony 5800, $2200, both lw time & recently serviced; Paltex Abner A/B edit cntrlr w/type 5 interface cables, $2200; Fortel Y688 TBC, $1500; Knox K-100 CG, $800; Sony RM440 edit cntrlr, $800; 3M SEG 672 6 input switcher, $400; Harris 516WB TBC, not working, $150; all of the above for $10K/BO, FOB Seattle. Rudy, 206-838-8338.

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Quanta QCG 500 bdct quality char gen, instant font sizing & multiple fonts, gd cond, $2895. D Brennan, Brennan Custom Video, 205-823-0088.

Sony BVU-800, 820 w/slo-mo time code edit syst w/CMX cntrlr, Microtime TBC-120D, GVG 100 switcher, Sharp 900D cameras w/CCU, Videotek 13" monitors, Quanta CG, racks, DAs, complete Tascam audio system, will sell all or pieces. Larry, IVA, 609-753-0142.

CBS 8010 image enhancer, comb filters, excellent condition, $475; character generator Amiga 1000 w/Shereff Systems software, 4 fonts, genlock, $500; Leitch proc VPA-331, never used, still in carton, $1200. G Fox, 804-868-9351.

VCR/VTRS/RECORDING MEDIA

Want to Sell

Sony VO-5800 (8) fair to gd cond, all work, most were rack mounted & have no side panels, $1000-$1200/ea. J Davee, Cole Layer Trumble, 3199 Klepinger Rd, Dayton OH 45406. 513-278-3800.

Sony BVW 40 with rack mount, $5250; BVU 870 with BVT 870 with BVT 810 TBC, $9500. M Seeber, Seeber Productions, 122 S Wabasha Ste 460, St Paul MN 55107. 612-227-9520.

Sony VO-6800 w/BC-1 W batt chrgr & 5 NT-1 batts, mint, $2250; Hitachi HR-100 1" port rcdr, vgc, w/AP-10 pwr sply & CP-11 color processor w/4 batts & chrgr, $4900. Paul, 405-840-9699.

JVC-BRS 605UB w/RS-232 board, $1800. N Madeo, 914-225-1625.

Knox Color Box, like new, $1200/trade. R Suraci, 67 Maple St, Newburgh NY 12550. 914-561-5866.

JVC BR-6400U source rcdrs (2), $1000/ea; JVC CR-4400 3/4" port VCR w/PortaBrace case, batt & AA-P44U AC sply/chrgr, $500; Panasonic NV-9400 3/4" port VCR w/PortaBrace case, batt & NV-B51 AC sply/chrgr, $500. P Giglio, Artistic Video, 152 S State St, Dover DE 19901. 302-734-1114.

Panasonic AG-6400 HiFi port VCR w/case, $500. Videographics, 10 Wilsey Sq Ste 3, Ridgewood NJ 07450. 201-447-4243.

JVC BR-S611U source deck, excl cond, lw hrs, $2250; JVC BR-S811U edit deck, excl cond, lw hrs, $2750; (2) JVC SA-F911U interface unit, excl cond, lw hrs, $500/ea; JVC SA-F411U TBC, componet, YC, composite, excl cond, lw hrs, $1500; will consider trading for Sony BVW-22 or Panasonic 1280s. T Clark, Clarks Video Group, 1206 N 8th St, Rogers AK 72756. 501-636-8599.

Sony BVU-110 3/4" port rcdr w/case & pwr sply, $400. K O'Malley, WTKR, 804-446-1328.

Sony VP-2011 3/4" plyr, $100. Gary Wachter Editorial, 212-399-7770.

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Sony BVW70 plyr/rcdr, BO; JVC 3/4" ply/rcd deck, $17.5K. P Marth, Kirwin Comm, POB 3313, Park City UT 84060. 801-649-8226.

Panasonic AG-7110 S-VHS VCR editing system feeder/plyr modified for audio in search speeds, $1600; Panasonic NV8020P HP-F B&W EIAJ, 1/2" open reel VTRs, $50/ea; Sony AV 3400 & AV-DV2400 1/2" EIAJ Porta pack VTR, real collectors item, $50/ea or $75/both; Sanyo GVR-S950 (6) S-VHS single frame rcdg VCRs w/time code gen, new used once, $2600/ea. R Burks, 908-287-3626.

Panasonic NV-9500 U-Matic edit deck w/edit cntrlr, 3/4" tapes, manuals, lw hrs, $500. J Foster, 337 El Cerrita Ave, Piedmont CA 94611. 510-653-5685.

Sony BVH 2500 new upper drum & DT brushes, factory aligned, $15000. B Schwab, Audiocraft, 915 W 8th St, Cincinnati OH 45203. 513-241-4304.

Panasonic NV-9600 3/4" editor VCR, $1000/BO; AG-6400 port VHS VCR w/stereo VU meters, $850; ICM image stabilizer, $300/BO; Panasonic AG-2400port VCR, $600; Sony VO-6800 3/4" port VCR, mint w/burgandy carrying case, $1200; Cross Point Latch 6119 switcher, $1000; Ikegami ITC 730A 3-tube camera, mint w/carrying case, hard shell & Porta-Brace w/3 Anton Bauer Pro 13 batts, bricks, $1200/BO. A Wander, 212-737-3058 or 201-385-0865.

Ampex VPR-2B only 1800 scanner hrs, AST, TBC, sync head, TC gen/reader, Dolby, $9K/ea. G Fox, 804-868-9351.

Sony VP 7000 (2) plyrs only, lw hrs, like new, $200/BO. Angelo, NJ, 908-289-4173.

Sony VO-8800 3/4" SP field deck w/TC, very lw hrs, serviced every use, Porta-Brace optional, $1975. Bud, BVP Prod, 5531 Phank Rd, Peoria IL 61604. 309-697-9669.

Sony VO-8800 port U-matic SP w/time code & PortaBrace, AC sply, mnl, orig box, exc cond, $2000. T Kremer, 5228 Carmen Blvd, Los Vegas NV 84108. 702-648-0526.

Ampex VPR 1-C 1" VTR, AST slo-mo, works fine, $2000; Eijen 1610 video disk recr, 300 frame still store, slo-mo, fast-mo, single frame animation, $2600. G Larson, Advanced Media, HCR 31, Box 215, Sandy Valley NV 89019. 702-264-7065.

Panasonic AG 7500 S-VHS edit VCR, excl cond, $2695. D Brennan, Brennan Custom Video, 205-823-0088.

Panasonic NV 9100A 3/4" video plyr, new hds, complete rebuild 11/93, $150 + shpg; Panasonic NV 9300 3/4" video rcdr/plyr w/built in tuner, complete rebuild w/new heads 11/93, $250+shpg. G Dunn, 510-516-0299.

Sony EVV-9000 Hi-8 dock rcdr, like new, $1600; Sony BVV-1A Betacam rcdr, like new, $2500/BO; Sony VP-5030, PAL, SECAM, & NTSC 3/4" videocassette plyr, $900/BO; Sony SL-HFR-70 Super Betamax, new, $210. K Campel, 203-322-3000.

NV-8420 port VHS rcdr, works great, $95. G Giarrusso, Moonlight Video Prod, 345 First St Ste Q, Encinitas CA 92024. 619-942-9687.

Sony BVU-110 3/4" port w/Kangaroo case, (4) BP-90 batts, pwr sply & time code card, gd cond, $800. N Manning, 718-981-0120.

Sony VO-6800 port 3/4" U-Matic rcdr, 400 hrs, exl cond, $1000; JVC-CR 4900U port 3/4" U-Matic rcdr, immaculate cond, hardly used, 100 hrs c/w new PortaBrace case & strap & AC adptr/ chrgr, $1000. Cinecan, Ontario CANADA. 705-525-1801.

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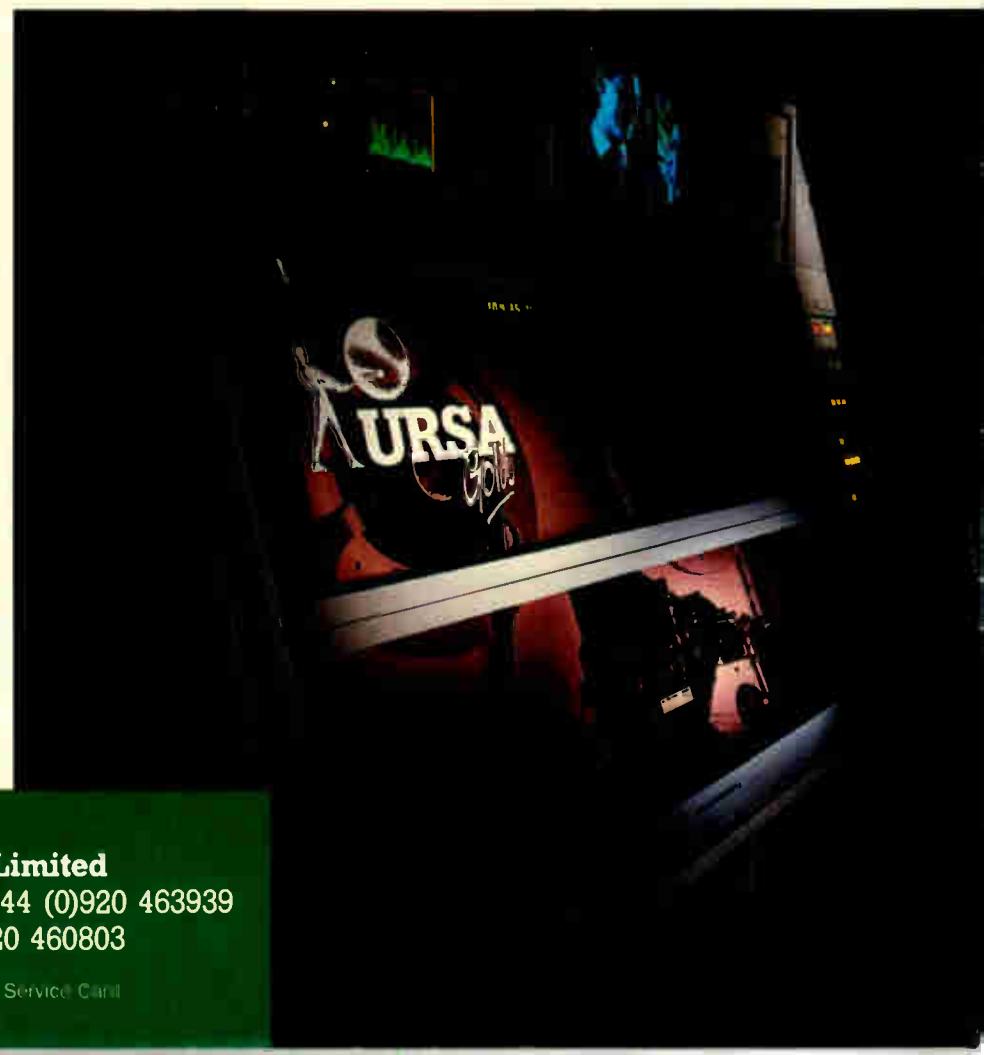

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