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TV TECHNOLOGY™

International Edition

Español
Vea Las Páginas
8 y 22

Small Formats Get Professional Boost

by Chris Dickinson

LONDON The use of S-VHS and Hi8 recordings in documentaries is set to dramatically increase in the next few years due to the cost advantages these formats offer over normal professional videotape or 16mm film.

In London, delegates to a special British Academy of Film and Television Arts (BAFTA) seminar on shooting with these "small formats" were told of savings approaching a third of the total production budget.

Small revolution

The use of S-VHS and Hi8 is already well-advanced around the world for newsgathering. And with the likely introduction of digital versions within a few years, their use will become even more attractive.

Panasonic confirmed it has been demonstrating a digital version of VHS in Japan. Richard Scott, general manager of engineering at Panasonic Broadcast Europe, said the demos were of the technology, but that no product launch was imminent.

"There is no point denying that there have been various demonstrations in Japan of consumer-type digital formats using large amounts of compression," Scott said. "But how and when such a product is developed and launched is more commercially sensitive. I can only say there is no plan to launch a product yet."

Sony, the primary manufacturer of Hi8 equipment, has also admitted it has a digital 8mm format in development. But again, no product is to be launched in the near future.

At the IBC equipment show in 1992, Kiyoshi Yamakawa, senior managing director in charge of business and professional products at Sony Corporation, said the digital 8mm format is being designed with widescreen capability, but it is being held back until widescreen television takes off.

Sony and Panasonic officials also say the existing S-VHS and Hi8 formats are constantly being improved.

"S-VHS has seen significant improvements since it was launched in 1989," said Scott. "We are now four years in, and it has had two complete revisions of its product range. The video quality is significantly improved."

Sony pointed to the launch of a new recorder and edit controller for Hi8 at the Montreux ITS show in July as examples of its continuing support for the format.

(continued on page 6)

Scottish Television depends on the DAR Soundstation.
See this month's Buyers Guide on Audio Equipment, p.17.

When is Eight Bits Not Eight Bits?

by Mario Orazio

SOMEWHERE OUT THERE *You might not have noticed* that eight bits is not necessarily eight bits. I have, and I have also noticed some other subtle differences in digital video. I mean — just compare the D-1 and D-2 digital videotape formats (please forgive me for leaving D-3 out of this; its cassettes do not look like D-1's and D-2's, but, otherwise, just about anything I say about D-2 applies to D-3 as well).

Here is what everybody knows about them: As far as similarities, they are both digital (so they both offer superb multigeneration performance), they both use eight bits per sample, they both record four digital audio channels and they both use identical cassettes in three sizes filled with 3/4" tape. As far as differences, D-1 is component while D-2 is composite, D-1 costs more and is bigger than D-2 and D-2 gets nearly three times as much programming into the same size cassettes.

Some people also know such trivia as the fact that D-1 uses high coercivity oxide tape (like S-VHS tape) while D-2 uses metal tape, D-1 machines can handle 525/60 or 625/50 signals while D-2 machines must be purchased in NTSC or PAL versions and D-2 machines are plug-compatible with existing NTSC or PAL facilities while D-1 machines are compatible with 4:2:2/CCIR 601 facilities. I could also go into track configurations, coding schemes and the like, but you probably want to finish this magazine before the next issue arrives. Anyway, what is important is just price and performance.

Looking good

I have already told you D-2 is less expensive than D-1, and I do not think I will be revealing any state secrets if I tell you D-1 pictures look better (though D-2 pictures are certainly adequate — at least the match of the pictures from any 1" Type C VTR with an 8-bit TBC). The question is: Why do the D-1 pictures look better?

The simple answer is: Because D-1 is component and D-2 is composite. They both use eight bits, right? And the sampling rate of D-2 (14.3 MHz for NTSC, 17.7 MHz for PAL) is even higher than D-1's (13.5 MHz). So D-1 must look better because it has not had to scrunch luminance and two color difference signals into a single NTSC or PAL signal, thus picking up the cross-color (pinstripe suit moire patterns) and cross-luminance (crawling and/or hanging dots of color) that have always plagued composite signals.

Then Yves Faroudja and a bunch of other guys came along and said that if you use their advanced composite color encoders, you can eliminate cross-color and cross-luminance. And an advanced encoder costs a lot less than the difference between a D-1 and a D-2 VTR. And life, as we say in the States, is just a bowl of cherries. But the cherries have pits.

Legal U.S. NTSC cannot have more than 600 kHz of bandwidth in the Q color difference signal, no matter how it is encoded, nor more than 1.3 MHz in the I

(continued on page 12)

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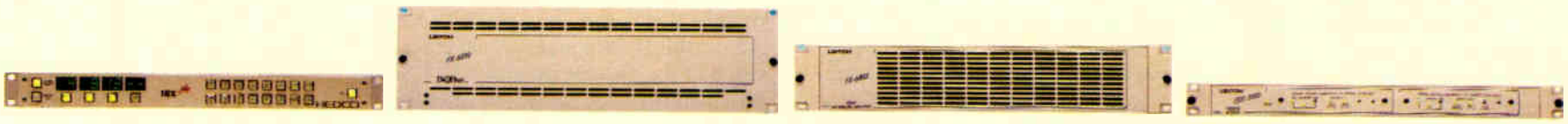

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DBS

STAR-TV Selects Digital Betacam

HONG KONG STAR-TV, the fast-growing five-channel international DBS service, has selected Sony's Digital Betacam for its operation.

The service recently purchased 18 DVW-A510 Digital Betacam players and six BFC-1 automated Flexicart program playback systems.

STAR-TV plans to start a subscription service of full digital transmission by the end of the year.

STAR-TV is the second DBS service to go with Digital Betacam. Earlier this year, Hughes Communications' DirecTv service, which is scheduled to launch next year covering the U.S., purchased more than 300 Digital Betacam VTRs.

In addition, Swedish national education broadcaster, Utbildningsradion (UR), has chosen Sony's Digital Betacam as its standard format, ordering a number of DVW-A500P Betacam SP VTRs.

The units will be installed in UR's two component digital edit suites, according to Håkän Oster, technical manager at the network. Once installed, the VTRs will work with UR's Sony DVS-8000C digital switcher, DME-5000 digital effects machine and two Sony Library Management Systems.

UR plans to utilize the Digital Betacam format for a number of production, post production and dubbing applications.

IN THIS ISSUE

News

Features

Equipment

Buyers Guide

COMPRESSION

Scientific-Atlanta Signs Satellite Deal with Orbit Communications

ATLANTA, Georgia Scientific-Atlanta (S-A) will provide a consumer digital video compression satellite network worth an estimated US$65 million to Orbit Communications Co. for a planned distribution service in the Middle East.

Under the agreement, S-A will deliver digital compression uplink gear, integrated receiver/decoders (IRDs) and headend equipment for the network.

The network will utilize MPEG-based PAL equipment, as well as S-A's encryption and conditional access system. S-A also will be responsible for installation, operation and maintenance of the system, including test and monitoring and coordination of backhaul feeds.

Programming will consist of news, sports and entertainment and will originate from three continents. Programs will be downlinked, processed and uplinked from a central location in Europe.

BUSINESS

Wavefront, TDI Ink Merger Agreement

ANAHEIM, California U.S.-based Wavefront Technologies Inc. and French-owned Thomson Digital Image (TDI) have agreed to merge the two companies into a global 2-D and 3-D computer graphics software company.

Under the terms of the merger, TDI will transfer all of its products, technology and shares to Wavefront. TDI's parent company, Thomson CSF, will become a Wavefront shareholder, although Thomson's percentage was not released. At presstime, the deal was pending U.S. and French approval, which was expected by October.

The merger is designed to extend the global reach of both companies' products. Wavefront has a strong presence in the U.S. with its COMPOSER and Visualizer Paint products, while TDI's 3Design and Blob Modeler have captured significant markets in Europe and Asia.

In addition, the merger will result in increased compatibility between product lines.

"TDI's powerful 3-D modeling and rendering technologies combined with our new animation software and 2-D post production products enable us to offer the industry's most advanced and comprehensive CGI product line," said Martin Plaehn, executive vice president of Wavefront.

Already, Wavefront's COMPOSER and Visualizer Paint packages have been optimized for TDI customers, and TDI's 3Design is expected to be available soon to Wavefront customers.

EXHIBITION

Trade Groups Plan Combined Exhibit

WASHINGTON, D.C. Four powerful U.S. trade organizations announced recently that their respective fall U.S. equipment exhibitions will be combined into a single event beginning in 1994.

In a joint announcement, the Radio-Television News Directors Association (RTNDA), the Society of Broadcast Engineers (SBE), the Society of Motion Picture and Television Engineers (SMPTE) and the National Association of Broadcasters (NAB) Radio Show said they will each conduct their own conferences around a single, large equipment exhibit.

The first joint show will take place 12-15 October 1994, at the Los Angeles Convention Center. The agreement, which will last eight years, calls for the NAB to manage the exhibition.

CORRECTION

In the October issue of **TV Technology**, p. 24, an incorrect telephone number was listed for Sefram Instruments and Systems with regard to a Marketplace item on the company's field strength meter. The correct telephone number is +33-1-69-41-31-32; FAX: +33-1-69-41-36-72. We regret the error.

SHOW LISTING

Upcoming conventions, meetings and exhibitions:

16-18 November 1993 —
International Broadcast Equipment Exhibition '93 (InterBEE '93)
Chiba City, Chiba Prefecture, Japan. Japan's premiere technology and equipment exhibit, sponsored by the Electronic Industries Association of Japan (EIAJ). To be held at the Nippon Convention Center, Makuhari (Makuhari Messe) 2-1, Nakase, Mihama-ku, Chiba City, Chiba Prefecture, Japan. Admission free; visitors register at entrance. For information contact Sumi Kato, Manager, Japan Electronics Show Association, FAX: +81-3-3284-0165.

29 November-1 December 1993 —
The Second Annual Asia-Pacific Cable & Satellite Television Summit
Kowloon Shangri-La Hotel, Hong Kong. A three-day event designed to bring attendees up to date with the policy, planning, regulatory, technological and programming developments in the industry. Organized by the I.I.R. Pan-Asian Telecommunications Information Task Force. The summit brings together a speaker panel of more than 40 leading authorities from around the world. For more details or a copy of the Summit Booklet, please call I.I.R.'s Australian customer service department at telephone +61-2-954-5844, FAX: +61-2-959-4684.

Early February 1994 —
Broadcast Thailand Equipment Exhibition and Conference
Bangkok, Thailand. For more information contact Reed Tradex, 16th Floor, BB Building, Asoke Road, Bukhumvit, Bangkok, Thailand. Telephone: +66-2-260-7103-8; FAX: +66-2-260-7109.

1-4 June 1994 — BroadcastAsia94
World Trade Center, Singapore. The Third Asia Pacific Sound, Film & Video Exhibition and Conference. For information contact Monika Daswani in Singapore at telephone +65-338-4747; FAX: +65-339-5651.

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

HD-DIVINE Gains New Strength

by Chris Dickinson

STOCKHOLM, Sweden When a group of Scandinavian telecom companies and manufacturers unveiled the outline of a new digital transmission system at the Amsterdam IBC show in 1992, the interest it aroused among delegates was only matched by the surprise they expressed at who had developed it. It was not thought Scandinavia had the know-how to develop such a system.

However, HD-DIVINE (Digital Video Narrowband Emission) immediately scotched that myth, and in the 18 months since its launch, it has developed new strengths.

Powerful backing

Perhaps the most significant move is the announcement that Finnish electronics manufacturer Nokia, one of the area's largest companies, has decided to back the system, giving the consortium some much-needed weight.

Nokia's involvement provides HD-DIVINE with a large receiver manufacturer that can incorporate the system's codecs into future TV sets and add the sort of muscle that should make broadcasters take the group seriously.

HD-DIVINE started life a few years ago when the European Commission was still pushing ahead with the now-doomed HD-MAC standard. SwedishTelecom, Telecom Denmark, Telecom Finland (Posti Ja Telelaitos), Swedish broadcaster SVT and Teracom Svensk Rundradio teamed up with Norwegian manufacturer Sintef Delab and Swedish compression specialist Digital Vision to develop HD-DIVINE.

Peter Weiss, managing director of Digital Vision, said the system was developed to show what could be done.

"HD-MAC was the official European means for HDTV introduction at the time, and digital systems were not at all considered," he said. "A number of people thought differently and decided to produce a system that proved it."

The first HD-DIVINE system shown in 1992 was aimed at 8 MHz HDTV terrestrial transmissions and included a motion-compensated hybrid DCT (discrete cosine transform) video codec, a 512 carrier OFDM (orthogonal frequency division multiplex) modem and four sound codecs compatible with the new digital audio broadcasting (DAB) standard.

Multiple channels

At the Montreux ITS exhibition this past June, HD-DIVINE — which was officially incorporated into a company, HD-DIVINE AB, two months before — announced a second, improved codec.

While HD-DIVINE is striving to become 100 percent MPEG II-compatible, the system is also developing in other ways.

The most important added feature was the ability to split the signal into either four parallel television channels, each with 4:2:2 video and stereo sound, or remain with one HDTV channel.

The net data rate for the video in the system is roughly 24 Mbps. With a sampling rate of 54 MHz for the luminance and 13.5 MHz for each of the chrominance components, the overall source data rate is around 650 Mbps. Thus the compression ratio is in the order of 30:1.

Another major advancement announced at Montreux was the ability to accommodate satellite and cable television distribution, rather than just terrestrial delivery.

Weiss said the move was vital to make HD-DIVINE more attractive to all users.

"The initial phase of the project was to show the technical feasibility of a fully digital delivery system for the most difficult case: terrestrial broadcasting," he says. "But the most recent phase is to adapt DIVINE to the MPEG II standard and optimize the system for terrestrial, satellite and cable TV applications."

The work by the world's standards bodies to finalize a standard MPEG II this autumn is one of the most promising developments of the year, with just about all the satellite codec systems now using it.

The other major compression option is General Instruments' DigiCipher system, which is already available and also has been widely adopted.

Despite this, satellite operators such as Luxembourg-based SES, which runs the Astra system, believe MPEG II is the way forward and are fighting to have all manufacturers adopt it.

"We are interested in HD-DIVINE as we are interested in all digital systems," said Fritz Roller of SES's distribution development section. "Our main priority, though, is in MPEG II and getting a standard for digital compression. We're not so concerned with high definition at the moment."

While HD-DIVINE is striving to become 100 percent MPEG II-compatible, the system is also developing in other ways. The ability to split the signal to handle four normal channels has been achieved by coding the HDTV picture in a four-way split. The new picture codec operates as four parallel standard resolution codecs, with the HDTV screen divided into four vertical stripes, one for each codec.

Using a statistical multiplex, the output of the four codecs is combined into a single data stream. The interface of each of the codecs is CCIR 601, allowing the system to be reconfigured to distribute four standard definition programs instead.

Each of the four codecs utilizes DCT combined with adaptive quantization. Like the image data, the field of motion vectors is processed in a hybrid-DCT loop without motion compensation. This reduces the bit rate required for the motion vector field. Because the data reduction of 30:1 is so high, special adaptive spatial prefiltering is also used to reduce distortions in the picture.

The transmission system in HD-DIVINE is, like most of the European digital standards, Orthogonal Frequency Division Multiplex (OFDM). The OFDM modem, being made by Sintef Delab, uses a 16-QAM modulation technique in which each data symbol contains four bits of information.

The OFDM Way

HD-DIVINE argues that OFDM permits a "significant" reduction in transmitter power, which reduces operating and maintenance costs. And because taboo channels can be used due to the low interference properties of the system, the planning and introduction of HDTV transmissions in parallel with PAL transmissions can be greatly simplified.

Where HD-DIVINE takes itself from here depends on a number of factors, not the least of which is the degree of cooperation between itself and other research projects currently underway in Europe.

Weiss said that while there is dialogue between HD-DIVINE and other research projects in the European Commission's Digital Terrestrial Television Broadcast (dTTb) effort and elsewhere, there is still competition between them all.

"What might happen in the end might be a European Grand Alliance like the Americans, but the situation at the moment is certainly not that, so it is still a competitive situation," he said.

InterBEE to Showcase Latest in Technology

TOKYO, Japan Digital technology and equipment ranks high on the list of important topics to be discussed at this year's 29th International Broadcast Equipment Exhibition 1993 (InterBEE '93). The show is slated for 16-18 November at the Nippon Convention Center (Makuhari Messe) in Chiba Prefecture.

InterBEE '93, sponsored by the Electronic Industries Association of Japan, is supported by the National Association of Commercial Broadcasters in Japan and the Japan Broadcasting Corporation (NHK).

Latest technology

The exhibition showcases the latest broadcast products and technology, and provides overseas and domestic attendees the opportunity to discuss these developments with their colleagues.

Last year's event drew more than 26,000 attendees and 414 exhibitors from 40 countries.

Special events to be held during the show include an International Symposium and a seminar and panel discussion.

The theme for the symposium, scheduled for 16 November from 1-5 p.m. at the Conference Hall in the convention center, is "Sound Production for Visual Media and the Role of the Sound Designer." Presenters are Kim Aubry of American Zoetrope, Steve Haynes of Yorkshire Production Facilities Ltd., Akira Sato of NHK, Yasuo Tsuruhashi of Yomiuri Television, and Kazutaka Someya of Image Studio 109.

Panel discussions

The seminar and panel discussion, whose theme is "The Future of Visual Media and Digital Sound," will be held 18 November from 1-5 p.m. at the Conference Hall. Presenters include: Bill Mead from Dolby Laboratories, who will present a history of cinema sound and Dolby Stereo movies; a representative from Sony Corporation, who will discuss Sony Dynamic Digital Sound (SDDS); and Terry Beard, who will discuss Universal's DTS. A panel discussion will follow the presentations.

Also planned is a panel discussion with the National Association of Broadcasters in Japan on 17 November. Dr. John Abel, executive vice president of operations for NAB in the U.S., will participate in the event.

Current Confusion About ATV

by Laurence J. Thorpe

Recent writings and keynote speeches have introduced a new and disconcerting discussion into much that surrounds the topic of television. Nowhere is this more visible than within contemporary discourse on the future of television, or as we now describe it — Advanced Television.

Television is being dismembered into separate elements: digital television, analog television, high definition television, widescreen television, video, etc.

Let it be said that there is nothing alarming in dissecting a large topic into constituent elements, particularly when this facilitates technological examination, supports the development of standards, and allows a better description of specific applications.

However, the ominous tendency which has surfaced in recent years is to associate some of these elements of television with a particular position of advocacy — especially within the multi-faceted context of the techno-political debate which surrounds today's discussions on advanced television.

Unhelpful posturing and preaching (on all sides) has sparked strenuous but quite necessary efforts to redefine television: Analog television is now anathema to many; digital television has become the center of the universe to most; high definition television is a blind alley or "sidetrack" to some; and terms such as scalability, extensibility and interoperability have become mantras that envelop most current conjecture on the future of television.

Historical misperception

Overshadowing all, there has emerged a colossal misperception about what we historically have termed television and what now so many choose to re-brand as digital television. Academia especially, which might be expected to take the larger perspective, is, regretfully, producing a few vocal pontiffs who have totally lost sight of the fact that television is actually an all-embracing and extremely malleable system.

The danger posed by latching onto one singular attribute of television is the temptation to also weave a vision, founded on a questionable premise, that can easily escalate into a quite fallacious "global" scenario. The flaw in some contemporary writing is no better exemplified than in the statement contained in the July 1993 TV Technology Guest Commentary (with the alluring title "Global Harmony in Digital Television") that television is not about "delivering frames at a certain rate, resolution and aspect ratio," but rather that it is "all about radiating bits."

The opening pearl of wisdom in this article predictably contained the requisite stage-setting dismissal of analog television as the Japanese basis for a next generation television system — HDTV being merely "(scaled-up) TV as we knew it." Most likely, this is as the author knows it. Evidently, he never took the trouble to read the fine body of work published two decades ago describing one of television history's finest pieces of psychophysical and imaging research.

GUEST COMMENTARY

Journalistic titillation continued in the succeeding paragraphs, which described three distinct global scenarios: those that did the wrong thing for the right reason; those who fell by the wayside in doing the wrong thing for the wrong reason; and, of course, the inevitable party that did the right thing for the wrong reason.

Such a "prepping" smacks of a setup and invariably speaks of a greater wisdom to come. And, indeed, we soon learned of the author's discovery of an astounding celestial rarity — the stars of television R&D falling into a momentary, almost-perfect, order that presages a new age of global television. This wondrous cosmological order would surmount "reckless nationalistic" barriers, put aside "the faulty premise of resolution being the key issue in advanced television," dismiss "short-term business interests," and instead give us the new world order called digital television.

Television is predominantly about images and sound. It always was and always will be. It is not intrinsically about digital bits. Specifically, it is all about the transformation of the real world around us into two electronic embodiments — one representative of the capture of the "sights" and the other those of the "sounds."

True, computer-generated images extend our creative abilities in conjuring dazzling images not readily available in the world around us. Ultimately, though, all of these electronic representations are transformed back into an image replication accompanied by sound reproduction.

Television is thus all about analog image and sound capture and portrayal. Whether the intermediate electronic representation is in an analog form or digital is, in the larger context of television, somewhat irrelevant.

The holy grail of "digital television" speaks only to our contemporary method of dealing with the electronic "core" of the total television system. Digital bits expedite the passage of the electronic signal and its manipulation. Electronic imagery, with its multi-dimensional attributes, does not in any way "sidetrack" all that digital technology offers.

Imagery and sound

HDTV first and foremost speaks to the vitally important enhancement in imagery and sound within "Advanced Television." The former introduces dramatic enhancements to the psychophysical stimulation of the human viewer while the latter makes possible an incredible new raft of services and expediences that also will be made (optionally) available to consumers, business, industry, science, and medicine, etc.

HDTV is the very essence of where television imaging inevitably had to evolve. Digital techniques will greatly enhance the robustness of HDTV and it will certainly facilitate some extraordinary applications of this tremendously powerful imaging medius. HDTV is surely no sidetrack.

However, HDTV did lumber slowly and painfully from the R&D labs in the early '80s, hobbled by optical, imager, recording and display limitations. These first embodiments of working HDTV equipment for production and post production were largely analog. No apologies whatever are needed for this; it was the best and most appropriate technology at the time.

This analog implementation was quite sufficient to dramatically reveal the prowess and promise of the new medium. It was also enormously effective in spurring global experiments in HDTV program origination. Analog parameters constitute a core element of our HDTV production standard and happily coexist with the digital representation parameters. Both are indispensable.

Masters of the signal

With the confluence of stunning digital microcircuitry (LSI and VLSI), dazzling computing technologies, digital image processing, powerful digital compression algorithms (that can now be implemented cost effectively, in real time), an awesome array of digital engineering expertise and two decades of professional digital television experience (in broadcast studios and post production facilities) we stand poised today to enter an era in which we have finally become masters of the manipulation, distribution, switching and transmission of the electronic television signals (video and audio).

This mastery is opening up entirely new and revolutionary capabilities in harnessing television. These in turn speak to enhanced television services — quite separate from the enhanced television imagery earlier described.

Digital technology, within the television industry, is energetically embraced as fast as the technology itself evolves. But it is only a technology of implementation. The imaging characteristics, however, will always remain uniquely determined by fundamentals of human psychophysics and the all-important capabilities (and limitations) of analog transducers at the extremities of the system.

If we do not keep this distinct separation between television imaging and television digital implementation firmly in mind, it is easy to fall into the kind of philosophical trap so typified in July's Guest Commentary.

There are no conflicts here. There are no "sidetracks." If Advanced Television means enhanced services and enhanced images and sound, the astonishing new and diverse marketplace opportunities will soon be unleashed.

Big plans ahead

Already we are seeing gigantic plans unfolding worldwide. Alliances are being formed at an almost dizzying rate between major organizations encompassing huge program providers, cable and satellite operators, broadcasters, computer and telecommunication companies. No U.S. government, no G-7, no Eureka-95, no MITI entities whatsoever are involved (nor are they needed) in the large gyrations we have seen over the past 12 months. Normal vigorous marketplace dynamics are more than sufficient.

Multichannel digital video, video on demand (and near video on demand), interactive services, home shopping — the list goes on, all items promising incredible new television services. HDTV is a vital part of this mix, as are the traditional 525/625 television systems.

Digital television will also be the key that opens the door to the age of Electronic Cinema, providing flawless electronic distribution instead of damaged film prints, electronic encryption to eliminate piracy

(continued on page 7)

READERS FORUM

Have something to say about **TV Technology**? Send letters to Readers Forum, **TV Technology**, Box 1214, Falls Church, Virginia 22041 USA or MCI Mailbox #302-7776

Dear **TV Technology**:

I've heard a lot of people extolling the virtues of the Sony EVW-300P Hi8 one-piece camcorder, which is also being described as a "professional" piece and one which gives a "high quality image."

Just to have the facts clear, can you tell us the following?

1) Is material shot on this format acceptable to a) American networks, b) European networks, c) Asian networks, as being of broadcast quality (especially for documentary work)?

2) Would material shot on this and transferred and edited on Betacam qualify as being of broadcast quality by the above networks?

Ashok Mundkur
Insight Film Production
Bombay, India

TV Technology replies: Small formats such as Hi8 and S-VHS are seeing increased use by networks all over the world for newsgathering and even documentary work, as described in our front page story, "Small Formats Get Professional Boost." And with digital versions on the way, the trend likely will continue. Unfortunately, there is no clear-cut method of determining what constitutes "broadcast quality"; sometimes — especially with news footage — the answer hinges on content rather than quality.

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International Editor: Marlene Lane
TV Technology Editor: Richard Farrell
News Editor: Arthur Cole
Assistant Editor: Mary Ann Dorsie
Technical Consultant: Lyn Heiges
News Correspondents:
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Small Formats Gaining Ground

(continued from page 1)

At the BAFTA seminar, Bob Long, editor of BBC2's "Video Diaries" and "Video Nation" series, said using Hi8 equipment makes a big difference to the budgets of the shows, in which ordinary people are given cameras to make films of their lives.

"I calculated roughly it is two-thirds the cost per hour of program (using Hi8 instead of conventional tape or film)," he said. "The key difference is you save money on crew. There is also not a big production team."

More to choose from

For other documentaries, Long said much more material could be gathered by shooting on the formats, allowing the documentary maker to capture moments that would probably be missed otherwise. But he warned that the unobtrusive nature of Hi8 and S-VHS camcorders could be dangerous for interviewees.

Bob Long, editor of BBC2's "Video Diaries" and "Video Nation" series, said using Hi8 equipment makes a big difference to the budgets of the shows . . .

"If a camera crew goes into somebody's home and films them, generally speaking it is sort of fair in the sense that people know what is going on," Long said. "If you are wandering around with a little camera, people relax. Some of the miles of footage we have would incriminate people."

Long said one episode of "Video Diaries" was scrapped at the last moment after it became obvious that its subjects — a group of women who answer pornographic phone lines — were frightened of being identified, even though they had agreed to participate in the show.

"It ought to be considered that people drop their guard when you are using these sorts of cameras. And this is a warning: The rules that govern traditional documentary-making just are not good enough. The old "fly on the wall" has become a mosquito: It bites you," Long said.

Flair for drama

Independent producer Colin Luke said Hi8 was ideal for certain situations, particularly scenes that are intrinsically dramatic and where the quality of the recording is of secondary importance.

"The proof of Hi8 is on transmission," Luke said. "Objectively, 35mm is infinitely better than 16mm. When I started out, documentaries were shot on 35mm, but cost made us shoot on 16mm. The public were happy with 16mm so it took.

"Likewise, the public watch blockbusters on VHS, so I think it is not so much the quality as the content that matters. Hi8 is 400 lines, two times better than VHS. There are a lot of creative advantages as well. One is intimacy."

But Paul Hamann, head of documentaries at the BBC, warned that commissioning editors would use any cost savings from using Hi8 to cut budgets rather than allow producers more time to make programs.

"Commissioning editors know about the cost and they are beginning to say you have to do it on Hi8," he said. "Increasingly, you can see the pressure is on."

He added that the lower quality of the formats compared to Betacam SP and M-II had a detrimental effect on programs.

"Craft standards have eroded because of tape," he said. "Hi8's wobbly, the sound is bad and the color is bad. The access it gives is good, but we should not forget that it is a tool and that is it."

Roger Graef, another independent producer who has used both S-VHS and Hi8 for making documentaries, said a further drawback to using the formats was that a potentially enormous amount of material is shot and thus has to be edited down.

"Because you generate a lot more material, your editing costs are more," Graef said.

Robin Angel, chairman of the program committee at BAFTA, said the lack of discipline on the director due to not having to worry about using up precious stock can also be detrimental to the final program.

"Content dictates the shape of the program," he said. "The director should impose his views on the program, and I would hate to see every documentary made in the 'undisciplined' style Hi8 induces."

NewTek Unveils "Screamer" Rendering Engine

ANAHEIM, California During the July SIGGRAPH '93 exhibition here, computer video giant NewTek announced the "Screamer" rendering engine, which brings supercomputer-level rendering power to 3-D animation, for under US$10,000.

Though it did not book exhibit space at this year's SIGGRAPH, and though it is not yet a product ready for shipping, NewTek threw an off-site party at nearby Buena Park's Movieland Wax Museum to announce the powerful new "Screamer" external 3-D animation rendering engine for the Video Toaster Workstation.

With NTSC video in and out, the Toaster Screamer system is reportedly able to achieve 600 MIPS (million instructions per second) performance, due to a design that uses four parallel MIPS R4400 RISC processors. The processors, running at 150 MHz clock speed, with both internal and external memory caches, drive the Toaster's built-in LightWave 3-D animation system, delivering twice the 3-D rendering power of a Cray I supercomputer.

While the announcement was not accompanied by a live demonstration of the engine, NewTek promised deliveries would be made in the fourth quarter of this year. The Screamer requires the Video Toaster Workstation, which can be purchased for under US$5,000.

If the product performs as billed, it should aid Toaster animators both financially and creatively. The dramatically increased rendering speed should allow greater work output as well as more freedom for artistic experimentation.

Abbate Announces Support for the AG-1970 VCR

Abbate Video announced at MACWORLD in Boston, Massachusetts recently that its VideoToolkit 2.0, a computer-based system for videotape cataloging, editing and QuickTime moviemaking, now supports Panasonic's AG-1970 S-VHS VCR. The AG-1970 is a replacement for the AG-1960 editing VCR. VideoToolkit directly controls two AG-1970s for logging, editing and QuickTime moviemaking without the need for sophisticated external controlling hardware.

The combination of a VideoToolkit and the AG-1970 is recommended for users needing industrial quality video, such as educators and corporate videomakers. VideoToolkit provides the user with direct plug-and-play control with the AG-1970.

Independent of special hardware, the VideoToolkit catalogs videotapes, creates an EDL, and automatically assembles QuickTime movies. QuickTime moviemaking from an EDL is done either live or, when the highest resolution is necessary, through a step-and-grab routine. With the latter, users can record up to 30 fps at full screen resolution. By embedding time code or counter numbers into the head of a QuickTime movie, VideoToolkit associates the movie with the original videotape.

For more information, circle **Reader Service 69.**

Current Confusion About Advanced TV

(continued from page 5)

and more flexible control over distribution strategies as fiber, cable and satellite HD transmission eventually come into being.

But HDTV imaging is what will preserve and indeed dramatically improve the quality of the imagery and sound experience in these future cinemas. Again, no conflict and certainly no "sidetracks."

With this larger perspective of television in mind, it is useful to revisit the global scenario so slickly described in July's Guest Commentary:

1. Japan: Hi-Vision is by no means obsolete. One might (from a U.S. perspective) question an analog DBS service at a time when digital ATV transmission has suddenly bounded onto center stage. But do not overlook the fact that Japan has mastered the larger task, which is still some years ahead for North America and Europe — Japan has an HDTV service already up and running. MUSE decoders embody highly sophisticated digital processing, and very complex second-generation LSI chips have reduced decoders to a single board. HiVision receiver costs have plummeted from US$40,000 to US$7,000 in a mere two years — and this with a total market penetration still measured in mere tens of thousands!

There is no short-circuiting such a marketplace crucible of learning. Lofty talk of digital leapfrogs are fine. But the day of reckoning comes when the dreams must be transformed to marketplace realities. The fact that Japan went "analog" Hi-Vision is incidental in the long term. The country has totally mastered HDTV picture origination, digital recording, digital post production and digital image manipulation, and it is now gaining enormous and crucial experience in providing an HDTV service to the home.

By the time other regions of the globe have reached the magic one percent market penetration with a real HDTV service, Japan will be well-poised to smoothly phase over to a new digital service.

2. Europe: Putting aside the highly questionable issue of government funding and management of advanced television, the larger issue within Europe is its spectacular success in mastering the core technologies of HDTV in a short five-year period. The fact that HD-MAC may be in rigor mortis is a small issue in the overall scheme of things. Europe had to go through its "analog" phase. After all, HDTV (that is, the total system from origination to home reception) did not allow any region of the world to start from scratch with a totally digital HDTV dream. Europe has an accumulated HDTV production experience that far overshadows the regrettably paltry activities (to date) in the U.S., in this respect. Europe also has vast experience in digital technology, which is now rapidly being mobilized. Recent setbacks notwithstanding, Europe has gained far more than it has lost.

Most important, Europe evidently has little confusion about television — it clearly understands all that constitutes television imaging, HDTV, EDTV and all that is digital television. Overall, Europe has not done too much wrong, given where it started from.

3. The United States: The U.S. did not "finally recognize" the shortcomings of the five (not four) proposed ATV transmission systems. A totally necessary private sector process uncovered all that was good in each system, and in addition clearly identified crucial areas requiring improvement. There were, again, no shortcuts to this learning curve. The U.S. competitive process proved that digital over-the-air transmission of HDTV will work. It also allowed multiple refinements to be forged in parallel — a crucial fact that will pay high dividends in the new Grand Alliance system. The dismissive description of this arduous process in July's commentary once again suggests a sad distance from reality.

One can only marvel at the shallowness of treatises that scornfully disregard the sound research of others, ignore the reality of global marketplace dynamics and misinterpret the multiple technological developments swirling about them. The continuing propensity to lecture and admonish the television industry on our blind and narrow ways while remaining blissfully oblivious to the significance of the ongoing and quite separate facets of television's inexorable advances is troubling.

Happily, many reputable international companies continue to invest enormous resources to grappling with the intractable realities of digital television, HDTV, future display technologies, MPEG chip designs and interoperable television-computer systems, etc.

We simultaneously work in the marketplace with the real entrepreneurs of multiple industries in harnessing all of the new tools to implement highly innovative new system solutions in business and industry, while also never losing sight of the myriad of new opportunities unfolding to entertain and service the world's customers.

We rely not at all on the stars — or "near-perfect order" — just terrific engineering, unrelenting commitment, vigilance to global marketplace realities and opportunities, and an unwavering comprehension of the larger topic of what we call television.

Did he really say G-7?

The author is vice president of Production Technology for Sony Advanced Systems.

CALCULE LOS LIMITES DE GANANCIA

por Larry Albert

¿Dado un número determinado de elementos de una antena transmisora. cúal es el límite de ganancia que se puede obtener?

Supongamos que la disposición de elementos es tal que las señales de cada elemento son recibidas en fase en la zona de recepción.

En los siguientes ejemplos se demuestran casos específicos que llevan a una solución general de la pregunta primaria.

Se usará unicamente una antena receptora en el sitio de pruebas, localizada en el campo lejano. Se usará la misma antena receptora para todas las pruebas. El sistema de la antena transmisora será lo único que cambie durante la serie de pruebas. En vista de los límites de presupuesto, tiempo y espacio, llevaré a cabo estas pruebas en mi laboratorio mental.

Calibración: Un elemento

Un elemento de la antena transmisora está montado. Se gira este elemento hasta obtener el máximo de señal en el sitio de pruebas. Se ajusta la potencia de entrada para que la señal desplazada al sitio de pruebas sea de un microvoltio (1 µV). Este nivel de potencia será el punto de 0 dB — el punto de referencia. No se cambiara este nivel para ninguna de las otras pruebas.

Prueba de dos elementos

Se divide la potencia de referencia igualmente entre los dos elementos. Cada elemento transmitirá una señal de 0.707 µV a la antena receptora en el sitio de pruebas (-3 dB). La suma de las dos señales es 1.414 µV, un incremento de 3 dB en relación al punto de referencia de un elemento.

Prueba de cuatro elementos

Se divide la potencia de referencia igualmente entre los cuatro elementos. Cada elemento transmitirá 0.5 µV (-6 dB). La suma de las cuatro señales es 2 µV, un incremento de 6 dB en relación al punto de referencia de un elemento.

Prueba de ocho elementos

Se divide la potencia de referencia igualmente entre los ocho elementos. Cada elemento transmitirá 0.3535 µV (-9 dB). La suma de las ocho señales es 2.828 µV, un incremento de 9 dB en relación al punto de referencia de un elemento.

Si se dobla el número de elementos pero se mantiene constante a la potencia de entrada, la señal recibida en el sitio de pruebas aumenta por 3 dB. El hecho de que cada duplicación de elementos resulta en un incremento de 3 dB me recuerda la fórmula conocida: $dB = 10 \log(P_2/P_1)$.

Por lo general, el límite de ganancia posible para una antena con el aumento de el número de elementos se puede calcular con la siguiente formula: límite de ganancia posible (dB) = 10 x log(numero de elementos).

Esta ganancia tiene como punto de referencia 0 dB para un solo elemento.

Hay que fijarse que no he incluído calculos para la perdida de señal debido al "splitter" de señales. Hay que recordar tambien que supuse que las señales llegaban al sitio de pruebas en fase. El limite de ganancia posible en actualidad será menor a lo que se puede calcular con esta formula.

Estos cálculos son hechos con sistemas de antena que tienen elementos idénticos. Estas fórmulas no se pueden usar para sistemas de antena que tienen elementos distintos.

Los sistemas que usan mallas reflectoras pueden cambiar los resultados de las calculaciones. Hay que recordar que estos elementos producen "espejismos" y hay que incluir estos elementos invisibles en las calculaciones.

Con este método se puede calcular la ganancia de referencia de un sólo elemento de un mismo tipo. Para comparar ésta a una antena dipolo, se necesita otro factor para hacer los cálculos. Hay que aumentar el valor de la ganancia de un elemento con punto de referencia a una antena dipolo. Este puede ser un valor negativo.

Limite de ganancia del sistema de irradiación (dB)
+ Ganancia sobre la antena dipolo (dB)
Límite maximo de ganancia total (dB)

Estas calculaciones brindan el límite máximo de ganancia que fuera posible. En actualidad, la ganancia será menor debido a los varios factores que discutí anteriormente.

En este metodo, la división de una potencia de transmisión calibrada entre elementos irradiantes multiples hace que cada elemento desplace un voltaje designado al sitio de pruebas. El "Teorema de Superposición" nos permite sumar los valores de las señales algebraicamente luego de suponer que las señales llegaron en fase. La condición de llegar en fase es problema del fabricante de la antena.

La solución es directa e intuitiva. No requiere una matemática complicada ni fórmulas de hondas. Solamente se requiere un poco de sentido común y ciertos conocimientos del tema.

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Selecting a Transmitter Site

RF TECHNOLOGY

by Doug Lung

Through my work at Telemundo, I sometimes get calls from people planning TV stations in South America. This month I thought I would cover some of the basics on TV transmitter system planning.

If you have been in the TV RF business awhile, you probably know most of what I am going to cover. If you see anything I have missed, or have additional ideas, I would like to include them in future columns. I also had a chance to do some more exhaustive testing on General Instruments Digicipher satellite video compression system. PanAmSat is using this system on some of its transponders, as is Multivision in Mexico.

The first step

When planning a new TV station, often the first thing that comes to mind is selecting a transmitter and ordering the antenna. This month I will look at what should be considered in selecting transmitter sites and transmitter power. A little bit of research can greatly increase the chances of the station being successful.

What sort of research? First, where are the other stations located? Second, where is the audience you want to cover? Third, what type of TV sets and antennas do they have? Finally, how much money can be spent on transmission equipment?

If the area you are going to be covering does not have any existing stations or if the existing ones do a poor job of reaching the population, skip this section. If possible, locate your station at the same location as the main station serving the community. People will have installed the antennas necessary to receive that station. In areas where the signal is weak, they will have invested in towers and antennas to pull in the signal, while where it is strong, they may use indoor antennas.

If your station is in any other location, you will face several problems. Antennas will not be aimed at your station, reducing the signal level. Worse, the areas where you are strong or weak will not match those of the existing stations. Your signal may be weak where people have only indoor antennas. There are some cases where it may be advisable to put the transmitter at a different location than the other stations.

If you cannot afford enough transmitter power, a location closer to the audience may be better. If all the other stations are VHF and yours will be UHF, another location might be better. How do we determine that location? Research.

Find your audience

Locating the audience for your station is essential. I have seen many applications for TV stations in the United States that cover a huge area, but fail to provide a strong signal over any of the population centers in that area. These stations usually fail.

What is most important is to provide a strong signal over the population concentrations. There are two ways to do this. One is to locate the transmitter close to the population center. The second is to locate the transmitter on a high peak or tall tower and use sufficient transmitter power to put a strong signal over the city. I would recommend at least 10 mV/meter for UHF and half that for VHF. If a lot of people in the area are using indoor antennas or if you are forced to use a location away from the dominant station, I would increase that level by 10 to 20 dB.

Propagation programs are available to calculate signal strength. The ones I am most familiar with are based on the U.S. Federal Communication Commission's 50/50 curves in Part 73 of Broadcast Rules. The first rule of thumb for site selection is to try to be where the big guy (dominant station) is, or to be somewhere visible from the key population centers (tall building, tall tower or mountain top). Propagation at TV frequencies through buildings and over hills is unpredictable. Generally speaking, if your audience can see your tower, they will see your station if it has enough power to overcome the distance.

Knowing what sort of receiving equipment your viewers will be using will help determine how much transmitter power is required. A good outside antenna will have no problem picking up TV stations 100 km away if there are no obstructions between the transmitter and viewer.

But if the viewers have indoor antennas only or worse, no antenna, your station had best be within 30 km of the audience and be running near maximum power (30 kW or greater transmitter power on most channels). Urban areas are much more difficult to cover than rural areas. I have viewers over 30 km away in a rural area watching one of my UHF stations which has an ERP of slightly more than 1 kW. That transmitter is the only one in the area carrying Spanish language programming and the viewers are willing to install 10 meter towers, large antennas and preamplifiers to get a good picture.

Programming is important

Good programming can help overcome both low power and distance. I used to work at a station carrying Asian language programming. This programming was so important to its viewers they would call me before buying a new house to see if the signal was available there. While as engineers we like to have the best, most powerful stations, the money spent on programming is important, too.

This brings up my last point — money. If you have to cover a large area — several towns or cities — you have two choices. One approach is to use a mixture of high, medium and low power transmitters to serve the areas. This is what is done in England and much of Europe, but it is very expensive as there are a large number of sites to build and care for. A new 1,000 watt UHF transmitter site can cost US$100,000 or more, depending on needs for building, tower and antenna. A 5,000,000 watt UHF station will cost 10 times that or more. However, if more than ten 1,000 watt stations are required to get the same coverage the 5,000,000 watt station has, the cost of maintaining 10 sites makes the higher power site more attractive. In the Middle East and in the United States, most stations use high power and one transmitter. The population is spread across such a wide area that too many low power stations would be needed to duplicate the coverage.

If you were expecting me to tell you the best way to build your station, by now you should see that is not possible without knowing all the variables.

Try to model several options. Plot signal strength curves for each station, attempting to get 10 mV/m signals over urban areas and maintaining line of sight from the transmitter to rural areas. Add low power stations if necessary to boost the signal where terrain or buildings block the signal.

Engineers in the U.S. have access to computer programs that plot the number of people in each of a station's signal contours. If similar programs are not available for your area, make a list of each city in the 10 mV/m (for UHF) or 5 mV/m (for VHF) contour. Total up the population and compare the results for each of the transmitter power and site options you consider. This will help give solid, objective data for justifying the final design.

In future columns I will show more specific data on how to evaluate transmitter and antenna performance as well as point out some of the common mistakes in antenna and site selection.

Video compression revisited

I have received a lot of response via phone and CompuServe on my remarks on video compression in my last column. I mentioned the CableLab's tape as one of the best for checking compression quality. I do not have a source for the tape, and I am not sure if anyone is distributing it.

I did some compression tests at General Instruments (G.I.) in June using a tape our network (Telemundo) had produced as a sales promotion. It included snippets of much of our programming and had a number of segments I would expect to challenge a video compression system. One segment was a noisy, standards-converted soccer game with a lot of motion. Another included scenes with explosions from a movie promo. Music videos and news clips had lots of fast cuts, and there were high resolution shaded computer graphics with motion in front of them. Before anyone asks, I cannot make copies of this tape, as it contains copyrighted material.

At General Instruments I put the tape (D-2 format) through G.I.'s Digicipher compression equipment. We operated it in the four-channel mode, with a mixture of programming on the other channels. The noisy scenes in the original tape (the soccer game and some foreign news footage) made it through with no breakup or noticeable deterioration. No problems were noted on the other segments either.

Looping it through

To see how well the system would work in a situation where material might be compressed, decompressed, then sent through the cycle again, the video was looped back through the compression gear again for a second pass. Again, no noticeable problems. Finally, when G.I.'s engineer was viewing the two pass recording, we looped it back through the system a third time. I thought I saw a slight bit of deterioration, perhaps in shading and noise, but I was never able to pinpoint it. I wish I had one of the new Hewlett Packard compression analyzers!

What surprised me was that the noisy video segments did not fall apart under repeated compression/decompression cycles, nor was there any evidence of

(continued on page 16)

DVC Shows Great Promise for Cable Use

Part II of II

Editor's note: Last month, Walt Ciciora discussed the advantages and disadvantages of Digital Video Compression (DVC) and defined several DVC methods now being explored. This month, he examines what DVC can do — and when.

DVC is being used to put four channels in one transponder to improve the efficiency of use of the transponder. HBO is utilizing the General Instruments DigiCipher I system to deliver its multiplex service to cable headends. At the headend, the digital signals are converted to analog form for delivery down the cable system. In some cases the signal is scrambled before being put on the system.

Multiplexing is a marketing approach introduced by HBO to offer the same set of movies on three different channels arranged so that different genre appear on the channels. In that way subscribers are most likely to find something of interest nearly all of the time.

Generally, the multiplexed service is offered at no extra charge. Therefore, cost containment is important. The incremental costs for multiplexing are primarily the transponder costs. DVC saves most of that by using advanced hardware to better utilize the satellite.

Who is using it

There are a number of others promising to use DVC soon. TCI has announced that it will provide compressed signals via satellite to cable headends. At the headend, the signal will be remodulated onto carriers which are more appropriate for cable. The decompression will occur in the home. Addressing and servicing of the subscription will take place from a central site. Some have called this a "headend in the sky."

Time-Warner Cable is building an advanced system in Orlando, Florida. Extensive fiber links will connect servers and digital switches via Asynchronous Transfer Mode (ATM) signals to nodes in the neighborhood. The nodes will serve about 500 homes.

The servers will utilize terabytes of semiconductor memory to store movies. The silicon memory will be supplemented with high capacity hard drives. Subscribers will be able to order movies in true Video-On-Demand (VOD) format. All normal VCR features will be available. Other communications services will be provided as well. Accordingly, this is called the Full Service Network.

Others also have announced the use of DVC. Several telephone companies are promising video dial tone using Asymmetrical Digital Subscriber Loop (ADSL) technology.

There have been calls for standardization of DVC; In my opinion, it is much too early.

The nature of digital electronics is that the number of transistors available at a given price approximately doubles every 18 to 24 months. This has been going on for several decades.

If the experience of the last few decades extends one more decade, there will be about six-and-a-half doublings of transistors. Today's million transistors will become around a hundred million in a decade. Any more conservative estimate still promises five to 10 million transistors in five to six years. We can surely do better compressed digital NTSC with five to ten million transistors than we can do with just one million.

The DVC "standards" process by the international Motion Pictures Experts Group (MPEG), has already created one standard, MPEG I. Before it experienced significant implementation, an MPEG II standards-setting process was launched. It is likely that there will be an MPEG III, an MPEG IV, and so on. Who knows how far it will go? The rich availability of millions of transistors at very affordable prices will make this progress possible.

The four scenarios

It appears that there are four possible scenarios for the application of DVC to cable:

1) DVC for only Impulse Pay-Per-View (IPPV)
2) DVC for IPPV and Pays
3) DVC for IPPV, Pays and Tiers
4) DVC for everything

In the first scenario, DVC is only used for movies. This allows for the maximum compression for two reasons. First, movies have only 24 pictures per second. Second, movies can be compressed "off line" using human intervention to obtain optimum results. The movies can be provided in the Near Video-On-Demand (NVOD) format pioneered in the Time-Warner Queens New York Quantum system. In that application, advanced fiber techniques were used to provide 1 GHz bandwidths delivering 150 analog channels to subscribers' homes. Some 57 channels are allocated to IPPV.

The top five or so movies are staggerstarted every half hour, occupying four channels. The next most popular movies start every hour, occupying two channels each. The remainder just repeat on one channel. At any one time, 15 movies are available at differing repeat rates. If DVC were applied to Quantum, the top 75 channels would be compressed. If 10-to-1 compression were available, 750 simultaneous movies would be possible. That would create a very attractive movie service indeed, a Mega Quantum!

An important characteristic of this scenario is that decompressors are only provided in homes that generate new revenue. Thus, the cost of the relatively expensive new hardware can be covered in a reasonable period of time.

Because movies will be purchased, it is likely that only one decompressor is needed per home. Because of the high rate of repetition, there is no need for a separate decompressor for the VCR. Time shifting is unnecessary. The decompressor will be located in the principal viewing area, where the largest and newest TV is located. This scenario is the one most likely to pay for itself in a reasonable period of time.

Making Noise About Eight Bits

(continued from page 1)

signal, and some PAL Us and Vs are not much better. A CCIR 601 4:2:2 signal offers more than twice the I bandwidth in both color difference signals. True, you cannot legally broadcast that extra bandwidth, but it couldn't hurt to have it available for electronic matting.

Everything I have said up to now is about as new and thrilling as an old chair. But I caught your attention before with my peculiar statement about eight bits, so I might as well deliver on my promise right now.

Playing the numbers game

The little known difference between D-1 and D-2 is that, while they both record eight bits per sample, there is a huge difference between eight bits and eight bits. Yes, I know that eight bits allows two to the eighth power, or 256, different quantizing levels for the digital signal. That is mathematics. Now let me tell you about digital video.

by Mario Orazio

A D-1 signal has blanking at level 16 and peak white at level 235. That means it has 220 quantizing levels available for luminance — not 256, but close. It actually has even more levels for the color difference signals: 225. That makes D-1's eight bits about 7.78 for luminance and about 7.81 for color-difference — close enough to call eight bits, as far as I am concerned.

In NTSC D-2, blanking is at level 60 and peak white is at level 200. That's just 141 levels available for video, not counting NTSC's silly setup. Strangely enough, setup does not even fall on a single level; it is between level 70 and level 71. An NTSC D-2 signal with setup offers just 129 levels from black to white, a mere 7.01 bits, rather than the much touted eight. And if you were concerned about the color detail of D-2 not matching that of D-1 due to restricted bandwidth, try calculating the number of levels available for color in an encoded signal. Does the 8-bit D-2 machine start to look like something with only six bits? I would say you are being pretty generous. For some colors, I have to push my calculations to get a whopping five bits.

So, was everyone who bought a D-2 (or D-3) machine blind or crazy? Nah, but the folks plunking down their hard earned cash for D-1 machines were not crazy, either. What is amazing is that D-2 machines look as good as they do, and for that we can thank noise.

Noise is actually a necessity for good digital audio or video signals. As long as there is at least half of a least significant bit (LSB) worth of noise, digitized signals can be distortion-free.

To take this principle to an extreme, someone could actually build a one-bit digital VTR. If the signal fed into it is noisy enough, the picture played back will be about the same as what went in. If, on the other hand, the input signal is clean as a whistle, playback will be awful — like a badly clipped key signal.

That is where Quantel's Dynamic Rounding scheme comes in — it is designed to keep digital video signals properly noisy (neither too little nor too much). On the other hand, even with 8-bit (7-bit? 6-bit?) VTRs selling like hotcakes, some companies are saying eight bits of digital video are not enough. D-5 and Digital Betacam offer a so-called 10; some people are pushing for 12, or even more, to take care of the distortion introduced by digital processing (like a crossfade, which changes an 8-bit signal into a 16-bit one).

Sony likes to show off Digital Betacam's 10-bit quality by demonstrating the horizontal striations caused by just such a process. Digital Betacam's an interesting thought experiment. It uses "Coefficient Recording" (alias bit rate reduction) to go from a large number of bits to a number less than half that size.

Do the 10 bits become five? Does the 13.5 MHz sampling rate become 6.75 MHz? Nah. But my mother taught me you can't get something for nothing. For instance, Sony's own DVPC-4224 processor, which converts any old 7.8-bit 4:2:2 D-1 machine to a 10-bit 4:4:4:4 recorder will not work on Digital Betacam. Anyway, in the Digital Betacam demonstrations, the processing striations are apparent on the 8-bit side of the screen but not on the 10-bit.

A little bit more

Now, I like more bits as well as the next fellow (each extra bit allows you to improve the signal-to-noise ratio by 6 dB), but more bits does not solve the distortion problem (a double crossfade is 32 bits), and I think even the least expensive digital VTRs are pushing the limit of what the average TV station is willing to pay. So I applaud Quantel for making eight bits work. I also applaud the makers of the advanced NTSC and PAL encoders for getting rid of cross-color and cross-luminance. And — what the heck? — I applaud all the VTR manufacturers for all their latest efforts.

Maybe someday we will eliminate more differences between composite and component signals, like the color bandwidth I have mentioned here and the violation of the constant luminance principle, which I have not.

I have plenty of applause left in me.

Mario Orazio is the pseudonym of a well-known television engineer who wishes to remain anonymous. Send your questions or comments to him by writing to TV Technology. Or drop him a note via electronic mail in MCI Mail (accessible through Compuserve) at 581-6729@MCIMail.com.

The second scenario clears out a few low penetration pay channels. For example, if a 33-channel cable system has three low penetration pays, they can be deleted. If 10-to-1 compression is possible, 30 new slots are created. Three are required for the pays which were deleted. This yields 27 new "synthetic" channels.

CABLE TECHNOLOGY

by Walt Ciciora

It does have some drawbacks. The pay subscribers must be given the relatively expensive decompression box. Some of them will not take any or much of the new IPPV services, generating little or no new income. The need for more than one decompressor in some homes will be felt. These subscribers may be accustomed to viewing pay programming in more than one room in the house. This is especially true if the pay services were originally trapped.

Subscribers who take more than one pay may also wish to tape from time to time. It is important to get all of the pay service providers to utilize the same DVC technology so that only one box is needed in the home. These pay providers will have to continue to deliver satellite signals in analog form for some time to come for the cable operators who have not yet adopted compression to the home.

In addition, pay services are not all movies. There are live sporting events and concerts which must be done in video. Furthermore, the live events will require live compression in "real time." The benefits of human intervention in the compression process are lost because there is no second chance. What goes through the compressor goes out over the satellite. This scenario is less likely to pay for itself quickly.

Take three

Scenario three adds tiered programming to the IPPV and pay services to clear out still more channels. This adds further complications. This is now likely to include subscribers who will not take the new revenue-producing IPPV service. There is very much greater likelihood of a need of multiple decompressors per home for additional outlets and VCRs. A major new headache arises. Many of these tier channels are advertiser-supported. Some of these are local ads. These ads must all be of the same technology as the programming so that the in-home box can decompress all of these signals. This is not what is being considered for ad compression now.

Still another problem is that American subscribers have become accustomed to holding the channel-up or channel-down button on their remote controls to scan through channels quickly to determine what to watch. This is commonly referred to as "channel surfing." Channel surfing is all but impossible with DVC. Because redundancy has been removed from the signal, it takes from one to 30 seconds to build up a picture, depending on the system.

Channel surfing is not important with IPPV, because a decision is made and the program is watched until it is over. It is not too important when there are just one or two pay services. However, when a tier of channels is compressed, channel surfing can become very important. This scenario is even less likely to pay for itself quickly than scenario two.

And finally . . .

The last scenario compresses everything. This approach requires a compressor for each and every TV and VCR in each and every subscriber's home. This is the most expensive approach and the one least likely to pay for itself in a reasonable period of time.

Any local origination programming also will have to be compressed. Some of it may have to be compressed in "real time." Channel surfing will be mandatory. Changing channels and waiting seconds for a picture will be a problem. Since a decompressor yields only one output program at a time, this approach has the consumer electronics friendliness of 100 percent scrambling. Depending on how the regulations eventually turn out, this option may even be precluded.

The creation of systems which use extensive DVC gives rise to a problem called "feeding the monster." Multiple hundred channel systems or systems with true VOD have a monstrous appetite for compressed programming.

Human touch

There is a school of thought that holds that the best results will be obtained if human intervention is allowed in the compression process. A movie would first be compressed by a best estimate of the compression parameters for each scene. Then, an experienced and talented operator would go back to the difficult scenes and adjust the parameters. (This becomes more important as lower data rates are used.)

This approach appears to preclude the use of stat mux because the central processor that controls the process for the 6 MHz slot will be dealing with pre-compressed material. There is an opinion that human intervention in the compression process may produce better results than stat mux. But that is just an opinion; there is no experience to back it up.

To implement human intervention, a compression suite must be designed and built and experience gained. A compression suite is a console with appropriate controls, time code equipment, monitors, tape machines, etc., to allow a skilled operator to efficiently and effectively compress the product. Such suites are available for film-to-

(continued on page 16)

Barry Flannaghan, designer of the one rack unit CVR45, compares it with the 120 rack unit ACE.

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Circle 93 On Reader Service Card

What DVC Can Do for Cable

(continued from page 13)

tape transfer. Similar setups will be required for compression.

It would be desirable to compress a movie once for many purposes. However, this is not likely to be the case, at least initially. Movies to be stored in servers which include semiconductor memory and large hard drives would best be compressed with a variable data rate. Frames that needed a lot of bits for compression would get them. Frames that did not need many would get fewer. That way excessive bits would not be needed in storage.

A need for data

Pre-recorded devices, on the other hand, seem to need a constant data rate. Rotational playback devices either have constant linear velocity or constant angular velocity. Using variable data rates would require a buffering memory along with some constraints on cumulative difference in rate.

It appears that most of the systems that have announced they will use G.I. DigiCipher I will migrate to DigiCipher II in the near future. Movies compressed for DigiCipher I will have to be recompressed if they are to be used with DigiCipher II. The same is likely to be true of DirecTv. And if neither DirecTv nor DigiCipher II end up being compatible with MPEG II, there may be a need for yet another compression of the same movie.

Unfortunately, in all the excitement about compression, inadequate attention has been paid to feeding the monster. No compression suites are designed or available. There are no practicing compression technicians. There is no inventory of movies being built up at present. Much must be done before the first monster is let out of the cage.

Digital Video Compression is upon us. There are many exciting new services that depend on it and a number of important challenges to the implementation. And it appears that there will be at least another decade of rapid development and change. Life will not soon be dull for the television technologist. That's the good news.

The bad news is that the technologist might as well forget about vacations and weekends. They will be consumed with the digital challenge.

Walt Ciciora is vice president of technology for Time-Warner Cable, based in Stamford, Connecticut. Prior, he was vice president of research and development at American Television and Communications. The above and previous articles were presented as a paper at the 1993 Montreux International Television Symposium.

Selecting a Site for Your Transmitter

(continued from page 11)

picture blocking or breakup. I did not have time to try the test with the slower six-channel data rate. The results might have been different.

As it was, the G.I. engineer worked through his lunch hour to do the tests I wanted. I have not had a chance to try the tape on an MPEG system. I was impressed with the improvements G.I. had made in its system (software) since my last visit. The slight amount of chroma bleeding I had noticed before was gone. I was also impressed with the job G.I. had done with actual program video.

MPEG-2 has a lot of support and a lot of companies working on it. Many are simply designing hardware around the C-Cube chip set. It will be interesting to see how long it takes MPEG-2 to reach the same level of maturity that Digicipher has. I expect it will happen, if only because of the engineering talent being focused on MPEG. The question is when.

I had some tips on satellite dish alignment, but I see I am out of space! Look for it next time. Meanwhile, I welcome your comments, ideas and tips. Send them to me via CompuServe at my PPN of 70255,460 or give me a call at +1-305-884-9664 or +1-818-502-5739. My FAX number is +1-305-884-9661 if you have a drawing, tip or product you think I might be interested in reporting on. I do have a regular job, so don't be disappointed if it takes me a couple days to get back to you. You can also write me at 2265 Westwood Blvd., Suite 553, Los Angeles, California 90064.

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

Opus Goes to Work at the Bridge

by Robbie Weston
Managing Director
Silk Sound/The Bridge

LONDON Back in 1971, when I was making radio spots, I used a mixture of NAB carts, 1/4-inch machines, a four-track and splicing tape. Most of the time, clients liked the speed and flexibility of this way of working, and everyone accepted that this was the way to do things.

By 1979, having worked for two radio stations and a major commercial studio, I summoned up the courage to re-mortgage my house, found two other investors who shared my ideas and set up Silk Sound in London's Soho area. For eight years, the state of the art was, you guessed it, NAB carts, 1/4-inch, lots of sticky tape and, by now, an eight-track.

Big change

This was fine for radio, but when video tape editing arose in the form of the then revolutionary one-inch format, everything had to change. At first, clients attempted to edit on video and add the sound in a film dubbing studio, learning the hard way that sprockets and video just don't go together.

So in 1983, we built a 24-track facility with synchronizers, a time code controlled desk and an amazing 32-channel GPI unit to control carts, tapes, CDs and effects; and that really was a nightmare.

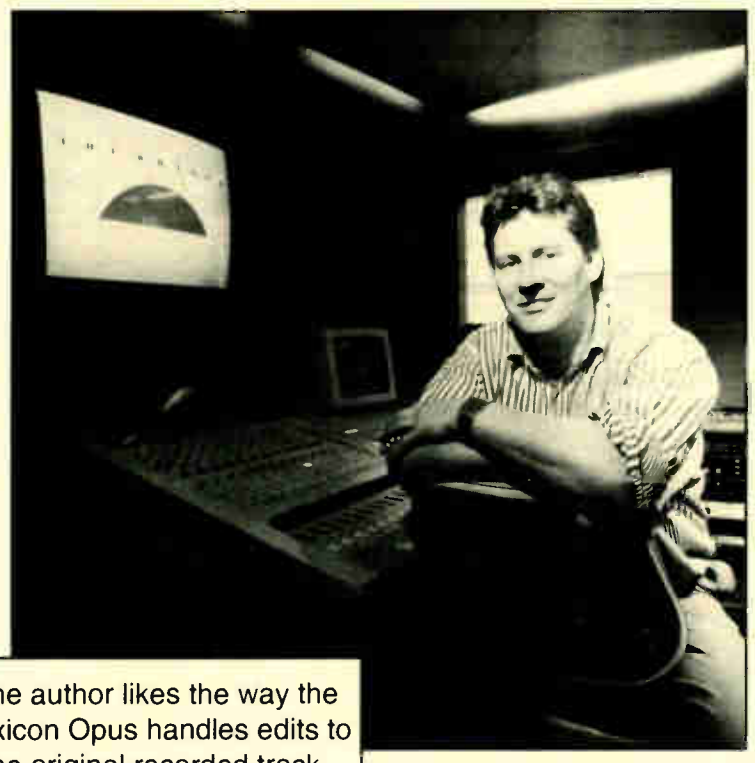
In 1987, we set up The Bridge as a separate facility with two SSL fully automated desks and the finest multitracks and synchronizers that money could buy.

But there was still something missing. We wanted to be able to move things around, edit, copy, go back to the way it was a couple of minutes ago, accommodate clients' changes of mind, save it all and then go back to it in a week's time and have it all reloaded the way it was.

In 1988, we met several members of Lexicon Inc. Huddled in a corner like some kind of espionage team, they showed us a number of blueprints of what they called a totally integrated hard disk-based audio workstation.

While we had seen hard disk recorders before, we did not really trust them. However, the Opus workstation that Lexicon was building was to be a mixer, recorder, editor and synchronizer, all fully automated and all in one box from one manufacturer.

Well, to cut a long story short, we visited eight U.S. cities in three days to see the Opus actually working. We were convinced. The purchase order was signed, a brand new room designed (in a bar, on a beer mat. Don't all great ideas start that way?), and the digital switch was thrown.



The author likes the way the Lexicon Opus handles edits to the original recorded track.

Crossing the bridge

Once we brought the Opus on line, there was no turning back. One Opus in 1988 became seven by 1990. This was due largely to the fact that given a choice between the Opus or an analog multitrack room, practically everyone would choose the Opus.

So what is so special about the Opus? To show you, I'll take you through a typical session at Silk Sound and The Bridge.

Studio One is working on some automotive ads for a big agency. The creative director hates the female voice, but wants to keep the male voice-over and the end line. So, we load in the previous session.

This is not the big deal some people would have you believe. We run an early shift to load up all the material we are going to need for the day ahead. Instead of coming in early to clean lots of tape heads and perform alignments on all the multitracks and cart machines, one of our junior engineers pops in the exabytes and restores everything we are likely to need. At the end of a day, the reverse process is used to back everything up.

Back in the session, the new female talent comes in to replace the selected lines. We run to forty takes, and, finally, a mixture of takes three, six, 17 and 39 are edited together.

Opus editing is extremely fast. Every take to picture was recorded on a separate track, which is easy with the machine's 99 virtual tracks.

The final edit is put together on one track, and no matter how many source clips were involved it can still be treated as one new piece of audio.

However, the new line is now too long to fit with the rest of the spot. To solve this problem, we use Opus' time compression, which allows unlimited previews to be heard with the rest of the tracks. Although the sound to be compressed could be made up of dozens of elements, the Opus will produce one freely editable time compressed result.

With all the elements in position, we start mixing. All the faders, mutes, pans and aux sends are automated and can be written in any combination, together or individually. After 40 passes, we end up with a favorite mix, which everyone approves.

So with the revised track, music, MVO, FVO and end line, all mixed and ready to go, we then work with the video editor, who has three new recuts of the video, all of which have to be presented to the client.

While normally this would require a major amount of work, with the Opus we simply make a copy of all the tracks involved and position them to picture one, then two, then three, all at different time code points.

Each one now needs some subtle changing. The long shot and the close-up have been reversed, but all we have to do is reverse the sound segments. Next, the voice over comes in a few frames later, but a simple correction is made and the problem is solved. Each of the three cuts now needs a few similar changes and then a mix.

Because the tracks were previously automated, the automation was copied for each of the new spots. So our mixing engineer makes a few tweaks to allow for the changes he has made, and the three new versions are finished.

A digital layback to D-2 completes the job.

Basic differences

While a number of other systems that could have handled this session in the same basic manner have since entered the market, the unique aspect of the Opus is the way it handles edits to the original recorded track.

Other systems record a clip or segment of sound and give it a number or name. These clips are then put into a list structure that instructs the system to play a segment, fade in from a certain point, etc. At the end of a job, whether it is a TV spot or a half hour TV special, you have a big list of commands. If you want to move things, you give them new numbers.

The Opus actually records any edits or crossfades as new segments. The lists it uses are completely invisible, giving the engineer the freedom to do edit upon edit upon edit, and then move, copy, time compress, varispeed or pitch shift the result—all without numbers, but all sample accurate.

The creative freedom and speed that this provides is immediately obvious to clients, engineers and, ultimately, your financial officer.

USER REPORT

Editor's note: Robbie Weston founded Silk Sound in 1979 and established The Bridge in 1987. In 1989, The Bridge became the first Opus installation in Europe.

The opinions expressed above are the author's alone. For further information on the Opus, contact John Duran at Lexicon (Telephone: +1-617-736-0300; FAX: +1-617-891-0340), or circle **Reader Service 102.**

MARKETPLACE

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

Composition system

Pinnacle's Flash Grafix Composer is an on-line graphics composition system capable of still storage, paint, titling, 3-D modeling and animation.

The system includes FlashFile still storage technology with options such as dual channel and dual user operation, serial digital (SMPTE 259M) input/output, removable optical disk, a shot box for still recall and a file server for networking.

For further information, contact Andy Sheldon in the U.S. at +1-408-720-9669; FAX: +1-408-720-9674, or circle **Reader Service 7.**

Betacam SP videotape

3M's new BC-Metal Betacam SP videocassette tape formulation offers low head wear rate and comes with the company's Anti-Stat system of protection (to minimalize tape dropouts).

The product features an ultrafine metal-particle tape formulation comprised of a flexible cross-linked binder system for a high degree of integrity, according to the company. Four packaging options are available (album, hanger, snap cap and bulk).

For more information, contact Phil Hage in the U.S. at +1-612-733-7297, or circle **Reader Service 21.**

Cartoon animation software

Parallax Graphics Systems Ltd.'s Digital Ink and Paint System (DIPS) is a new cartoon coloring and compositing software that saves labor, according to the company.

It uses a new method for the vectorization of hand drawn images: After scanning in the original cartoon drawing, the system outlines each shape, saving the resulting form as a vector that can then be colored by selecting a hue and clicking on each shape that has that same color.

DIPS tracks the motion of the same area or character on subsequent frames and automatically colors them in according to the first color setup.

For more information, contact Lynwen Goldspink in the U.K. at +44-71-287-3626; FAX: +44-71-494-2822, or circle **Reader Service 83.**

TBC remote

ACTIV, from BVE, is a TBC remote that can control both audio and video levels. ACTIV can access any VTR or TBC from a network of mainframes; it interfaces to conventional analog and digital VTRs, plus Digital Betacam and D-5. It offers multiple presets to solve complex routing problems.

The ACTIV's high resolution output ensures absolute timing and level stability. ACTIV can interface to editors for storage and recall of correction data. It may also be used in unmanned automation systems.

For more information, contact Tom Evans in the U.K. at +44-81-563-0600; FAX: +44-81-563-7601, or circle **Reader Service 5.**

Multifunction keyer

Satellite & Television SA's MS-P 3400 ALPHA+ is a multi-format video interface in a one-rack-unit format. It is optimized for professional video users in PAL, Y/C, RGB and YUV standards.

The MS-P3400 is a broadcast keyer compatible with all Amiga computers operating in 625 lines video interlaced, and equipped with a 24- or 32-bit genlock board.

It is compatible with all 16 million color genlock graphic buffers working on the PC, Amiga and Macintosh.

For more information, contact the company in France at +33-31-67-12-62; FAX: +33-31-68-96-97, or circle **Reader Service 14.**

S-VHS recorder

Sanyo's GVR-S950 S-VHS recorder, coupled with the GVR-P02 control unit, is an animation, graphics and computer-based editing recorder. It boasts features such as a single-frame animation controller using an industry accepted interface protocol, a SMPTE time code generator and reader, and a single communications port for both RS-232 and RS-422.

Standard features include a built-in video and audio switcher, video playback processor, and front panel level and tape status monitoring.

For more information, contact Eric MacRae in the U.S. at +1-310-605-6527; FAX: +1-310-605-6529, or circle **Reader Service 92.**

Switcher interface

ESE's ES-195 is a Master Calendar and Grass Valley Group Master 21 Switcher Interface, suitable for newsrooms, teleconferencing centers and on-air studios. It can drive digital time and date displays as well as provide a GVG Master 21 with the same time and date information.

The ES-195 receives ESE time code from a master clock or time code translator and converts this data into two formats: one is ESE serial time code and the other is ASCII.

For more information, contact Brian Way in the U.S. at +1-310-322-2136; FAX: +1-310-322-8127, or circle **Reader Service 51.**

Editor

Avid Technology's Media Composer 400S is an entry-level non-linear, off-line editing system that consists of software and a board set to be configured with the user's Macintosh computer. The MC 400S has the core set of off-line editing features found on all Avid Media Composers, including Avid's maximum-storage image resolution (AVRI), two channels of audio input and output with four tracks for mixdown; four tracks of video; dissolves; and 30/25 fps playback with audio from optical and magnetic drives.

The system can be upgraded through optional hardware and software.

For more information, contact Christine Cataudella in the U.S. at +1-508-640-6789; FAX: +1-508-640-1366; or circle **Reader Service 68.**

Amplifiers

ATI's MX100 and XP100 Nanoamps are compact, rugged, low cost utility amplifiers for television and radio. The MX100 is a three-channel mic/line mixer, and the XP100 is a four-channel mic/line input expander. They feature low noise balanced inputs switchable for microphone or line levels, phantom power, independent headphone outputs, and a metered, high level, low distortion, protected 600 ohm output for balanced or unbalanced lines.

For more information, contact Sam Wenzel in the U.S. at +1-215-443-0330; FAX: +1-215-443-0394, or circle **Reader Service 114.**

Desktop system

Silicon Graphics' Indy is a desktop system that couples its own digital color video camera with a host of digital media capabilities.

The Indy is binary compatible with SGI's full line of workstations, servers and supercomputers, including the Onyx family. It features front-panel audio volume adjust buttons, a digital video port, composite and S-video inputs, an analog microphone, six-channel digital audio processing and Kodak Photo CD support.

For more information, contact Carl Furry in the U.S. at +1-415-390-3365; FAX: +1-415-965-2658, or circle **Reader Service 131.**

DAT recorder

JVC Professional Products recently introduced the XD-P1PRO, which it says is the world's smallest professional DAT recorder.

The XD-P1PRO weighs 21 ounces (with battery) and is only slightly larger than a DAT tape box. It may be used with either a snap-on A-to-D converter or the MU-Z1 digital output microphone module. It features JVC's servo-driven "Compressed M" loading mechanism, twin 18-bit 8x DAC, full ID editing capability, absolute time capability, mini jack interface, three-hour battery life and a separate AC power supply/charger. Basic controls are on the side of the recorder.

For more information, contact Dave Gifford in Japan at +1-81-33245-1614, or circle **Reader Service 115.**

Microphone

The Neumann TLM 170 R is a studio condenser microphone with five switchable directional characteristics: omni, wide cardioid, cardioid, hypercardioid and figure eight.

Features include low self-noise level with high output capability; a newly developed transformerless circuit; and true sound transduction free of coloration.

Output is balanced and transformer-less.

For more information, contact Wolfgang Fraissinet in Germany at +49-30-25993-110; FAX: +49-30-25993-108, or circle **Reader Service 85.**

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

John Wood Profits with Avid

by John Wood
Manager
John Wood Sound

MANCHESTER, U.K. John Wood Sound was the first facility to purchase Avid Technology's AudioVision digital non-linear audio editing and post production system in Europe.

The decision to invest in AudioVision resulted from our desire, and the desire of many of our clients, to change from linear-based audio equipment to digital technology.

We conducted an in-depth assessment of the various non-linear systems that are available. But after only the second week of evaluating AudioVision, we signed the purchase order.

News travels fast

Even before we had advertised our new system to our clients, the word had spread, and we secured 40 weeks of audio production work almost immediately.

We chose the Avid system for a number of reasons.

First, there is an increasing number of post production facilities in northern England, including Granada Television, BBC North, Yorkshire Television. Editz and Insync, that use Avid's Media Composer to edit pictures. The ability to take their files and load them directly into AudioVision is of great benefit.

USER REPORT

We also like Avid's commitment to future development plans, which promise a continuous stream of updates. This is particularly important with digital technology, which is continually evolving.

Another reason for choosing AudioVision was its two-screen approach. With one-screen systems, moving between the optical discs, directories and sequences is a very clumsy process. Avid AudioVision's two-screen design makes it very easy to organize and control work; pictures and audio in work reels are on one screen while the work in progress can be manipulated on the other. Moving between the two screens is done simply by dragging the mouse icon from one to the other, as if the system contained one large screen.

Up and running

We have now trained our two in-house sound editors, Simon Hall and Darren Cox, as well as a number of local, regular free-lancers, on the Avid system. At the moment, we are working on the sound tracks for two animated series — "Avenger Penguins" for Granada Television, which comprises 13 25-minute episodes, and 24 episodes of a new series called "Noddy" for the BBC.

We receive the pictures for these series on 35mm or 16mm film, which we digitize into AudioVision. Dialogue tracks are received on DAT. Within AudioVision, we compile a dialogue assembly, which is then transferred back to film so the dialogue can be bar-charted for the animator.

On completion of the animated pictures, they are digitized into AudioVision, where the sound effects are designed, selected and layed in sync. For the "Avenger" and "Noddy" programs, we produce between 38 and 42 audio tracks per episode, which we then download to Tascam Hi DATs for the mix session. This is mixed with the Beta master.

All the audio tracks, except for the dialogue and music, are created by us or taken from our extensive sound library. Within AudioVision, we have created a huge sound effects library that occupies a full hard disk. AudioVision's removable disk drives enable us to swap hard disks around so we can work on a number of different projects at once and move into the night shift with ease by avoiding unnecessary downloading and maximizing production time.

AudioVision gives us huge advantages over conventional equipment. We can jump between sequences and access audio and pictures immediately without having to jog backward or forward. This gives us a high degree of flexibility and makes the entire process of audio track-laying very fast.

Moving ahead

On film, the audio work would have taken about four weeks per episode to complete. With Avid AudioVision, it took just five days, resulting in staggering cost savings.

In addition, AudioVision's user interface is extremely easy to understand. This is a great advantage as it enables directors to be aware of what can actually be achieved.

With some equipment, the director does not really know what is going on technically and therefore cannot become fully involved in the audio work. With AudioVision, we can interact more closely with the director, which enables the whole process to move along more smoothly.

Editor's note: John Wood began working with audio in 1958 at De Lane Lea Studio in London. He built John Wood Studios in 1972.

The opinions expressed above are the author's alone. For further information on AudioVision, contact Ciara Collin at Avid (Telephone: +44-71-434-0122; FAX: +44-71-434-0560), or circle **Reader Service 30.**

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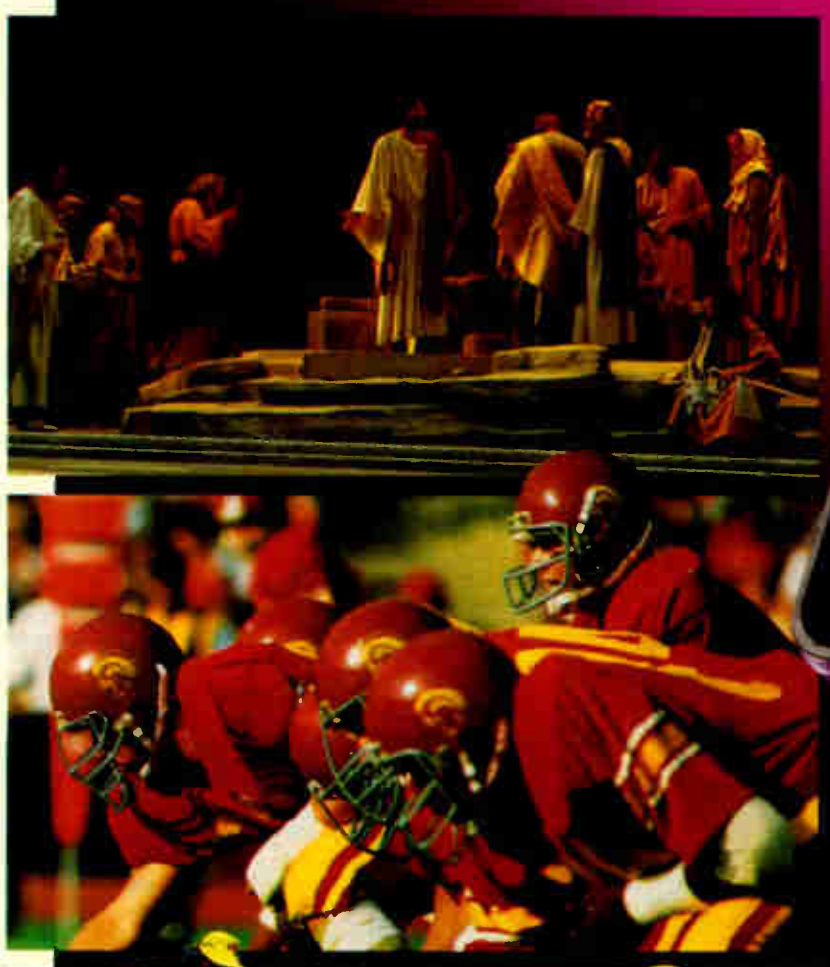

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SONY SINCRONIZA A SONO DOSMIL C.A.

Por Ricardo Landaeta Garmendia

CARACAS, Venezuela Tomar la decisión de cambiar el sistema de grabadoras fue una tarea difícil para nuestra empresa, Sono Dosmil C.A. Sono Dosmil es una empresa sin afiliación a ninguna compañía disquera o de televisión, y se especializa en hacer sonido para video. La inversión para hacer el cambio a un sistema nuevo sería alta, y había que escoger con cuidado.

Basados en nuestra experiencia y la de otros ingenieros, sabíamos que un ATR analógico es más lento de operar en "sweetening", además de que se deben sacrificar algunas pistas (tracks) para el código de sincronización. Descartamos la

INFORME DE LOS USUARIOS

idea de un ATR analógico y nos decidimos por la Sony DASH PCM-3324A.

Por lo general, en Venezuela y otros países de America del Sur, los estudios de sweetening están equipados bien sea con una grabadora analógica o digital de ocho tracks, o con un sistema de grabación en disco duro. Queríamos tener una sala grande y cómoda de post-producción y sincronización de Audio/Video, donde no tuviéramos limitaciones en la capacidad de grabación del disco duro ni en la cantidad de tracks de nuestra grabadora digital. A la vez queríamos lograr una grabación digital con la versatilidad de un sistema de grabación en disco duro.

Finalmente conformamos el sistema alrededor de la Sony. Al comenzar a trabajar con el nuevo sistema nos hemos dado cuenta del éxito de la selección del equipo, ya que todos los problemas surgidos se han podido solucionar.

Por ejemplo, no todos los ATRs tienen entradas para recibír la conexión de un oscilador de video. Todo los equipos que seleccionamos pueden recibír el sincronizador de video y ajustarse a sus necesidades.

El primer problema práctico que tuvimos que resolver con el equipo ocurrio durante la realización de un comercial de General Electric para neveras. En este caso, el productor debía copiar exactamente lo que se hizo en el comercial original; la música estaba basada en una orquestación sinfónica la cual debía mantener un ritmo (beat) estable.

La DASH PCM-3324A es el corazon del sistema del estudio de sweetening Sono Dosmil.

Dicha música fue grabada en un estudio que no uso un sistema de sincronización. Cuando se iba a llevar a cabo la post-producción, todo comenzaba bien hasta un cierto punto donde se salía de sincronismo. Al llegar a este punto, el productor solicitó nuestros servicios. Al ver el comercial original no se notan los cambios de tiempo, pero la música si cambiaba, aunque suavemente.

La solución consistió en crear los cambios de tiempo en el secuenciador para la música pre-grabada. Una vez trasladada al Sony DASH obedecería a estos cambios. El locutor y los efectos grabados en cinta digital de audio (DAT) iban por otro lado sin alteración de tiempo. Al final, el sistema resultó un éxito.

Luego de esto, hemos realizado otros comerciales donde la sincronización ha debido ser muy precisa. Ejemplos de estos son los comerciales para el Banco de Venezuela, Lifesavers, American Express y otros.

Cabe destacar que el proyecto donde mejor se adaptó nuestro equipo a las necesidades de video fue en la grabación del disco "ADITUS en Vivo" del grupo ADITUS de Venezuela, realizado en el presente año.

La idea de esta grabación era crear la ambientación de un disco grabado en vivo, aunque realmente se trató de una mezcla de grabación en vivo y en estudio, sincronizada a la perfección con nuestros equipos.

Igualmente, cuando ADITUS realizo una gira, grabamos en diferentes DATS la senal de las voces del grupo y del público, el cual en ciertas ocasiones coreaba las canciones que se interpretaban. Sin embargo, la grabación se había realizado en Sono Dosmil antes de la gira.

Hubo momentos en que la sensación de estar en el teatro donde se realizaba la actuación era sensacional, y no habia forma de saber si la voz que se escuchaba era la del interprete o la del estudio.

Indudablemente todo el personal que intervino en la realización de este proyecto (German Landaeta, Boris Centeno, ADITUS) y nuestra grabadora Sony DASH PCM-3324A conformaron un gran sistema-equipo.

Ahora, con la práctica, sabemos que la selección de equipo fue la adecuada. Pienso que, suceda lo que suceda en la industria, con nuevas marcas o con nuevos sistemas de grabación, Sono Dosmil tiene equipo para rato.

Ricardo Landaeta Garmendia es compositor, arreglista, productor músical e ingeniero de sonido.

BUYERS BRIEFS

The D/ESAM digital audio mixer from **Graham-Patten Systems** offers audio mixing functions similar to those found on video editors.

The unit allows digital and analog audio and video tape machines to become fully integrated.

All level settings, channel and machine assignments, delays, EQ settings and crossfades can be stored and recalled as snapshots.

For further information, circle **Reader Service 122.**

Neotek's Esprit console provides eight auxiliary buses and a mix-minus from each input.

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For further information, circle **Reader Service 47.**

The FMR-200 true diversity VHF receiver from **Telex Communications Inc.** includes a High-Q front end for out-of-band signal rejection.

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For further information, circle **Reader Service 64.**

The Revox MR8 eight-channel mixer from **Studer Revox AG** is now available in a "Video Edit" version with VCA options on each channel and in the master stereo output.

The MR8 allows operators to mix balanced and unbalanced signals, and stereo balanced channels can be configured from the back of the unit.

The mixer can be bus-coupled to other MR8s when necessary.

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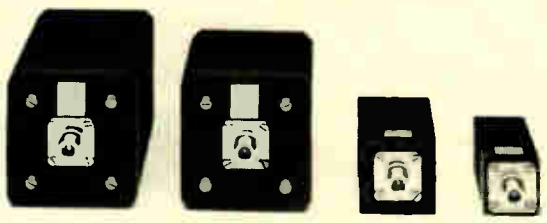

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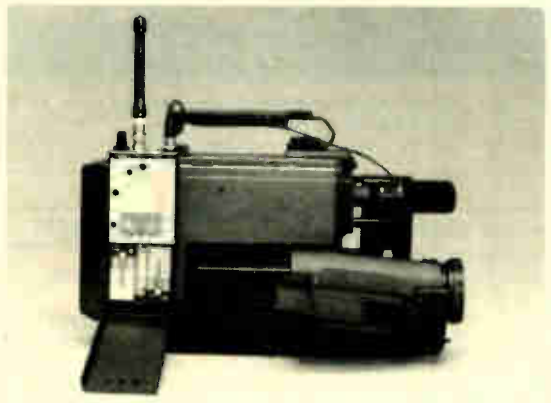

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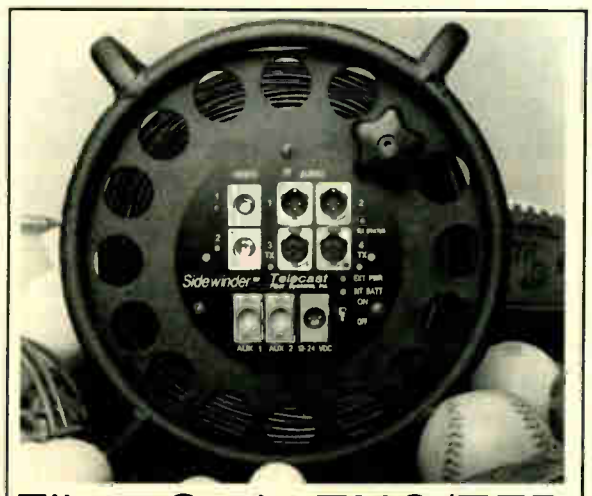

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JVC KY-310 ENG camera w/access, excel cond, $1500. F Spinetta, 415-321-6049.

Panasonic CLE 200 3-chip camera, w/case, batt, cable, tripod plate & pwr sply, excel cond, $3395. J Winslow, Creative Video, Box 7032, Endicott NY 13760. 607-754-1029.

Panasonic AG-460 2-chip S-VHS camcorder, 3 batts & all access, plus hard case, like new, excel cond, $1950. R Novick, Competitive Ents, POB 191032, San Diego CA 92159. 619-462-0064.

JVC BY-110 cameras (2) w/2 JVC VF400 studio viewfinders; RS110 JVC CCU (2), Sony BVU 200B (2) video cassette rcdrs, $3500/sep or pkg. P McGrady, WCAC-TV, Waltham MA 02154. 617-899-8834.

Panasonic WV-V3 (2) 3-tube cameras, carry cases, batts, $1000/BO; also have AG6400's port VCRs & edit equip. Visuals, 4541 Discovery Ln #6, W Palm Beach FL 33417. 407-686-3490.

Panasonic PVS-350 S-VHS camcorder w/digital efx, 2 batts, chrgr, hard case, excel cond, $675. G Collins, 714-723-4366.

NEC SP 3A 3-chip, gd pics, 16:1 Fuji Eagle lens, all manuals, case, adapts to MII, Beta, 8mm, gd cond, used by owner, $5000. H Ferguson, Pumpkin Creek Video, 520 Coffey, N Wilkesboro NC 28659. 919-667-7717.

Panasonic DM7010 MII camera/VCR dock pac system, (3) 2/3" CCD's, 750 lines, 62 db S/N, digital processing, new, full warranty, $12K. 800-233-2430.

Sony BVW-10, VO-5850 off-line Betacam to 3/4" editor w/RM-450 cntrlr & monitors, $10500/trade for BVP-7/7A. G Allen, Rainbow Prod, 4807 Pipestone, St Louis MO 63129. 314-894-5536.

Panasonic AG-460U S-VHS 2-CCD camcorder, battery, AC chrgr, hard case, filters, 10 hrs of operation, $2400; Panasonic WV-6000 12:1 zoom, genlock, hard case, 2 batt chrgr, manuals, mnt cond, lw hrs, $700. J Hines, 327 E Dakota, Pierre SD 57501. 605-224-7609.

ED Beta camera w/dockable rcdr w/16X1 Fujinon lens, $3000. Call Kelly, 318-234-1422.

Sony DXC-325/9000 w/16X Fuji lens, carry-on & hard case, $5500; 2X extender for 325, $500. J Karhik, JK Prod, 248 Village Green, Encinitas CA 92024. 619-436-2308.

Ikegami ITC 730A with Fujinon 12X 9F with 1X extender & macro, studio finder, AC power supply, 6' camera cable, mic holder, tripod plate, padded shipping case, $2500. Dick, RW Prod, 313-945-9292.

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Sony DXC-325 camera w/13X1 Fujinon 14-26 pin + 14 pin cables, $4250. 800-466-8287.

Panasonic 200CLE 3 2/3" chip camera, 12X Canon lens, tripod plate, batt chrgr/AC adaptor, batt, mic & hard case, $3600; Panasonic 7400 S-VHS port rcdr w/factory case & Portabrace field case, 4-chnl audio, insert audio dub, TC input, $1600, cable for camera/VCR connection, $100, all excel cond, one owner, lw hrs, $5000/all. Mountain Magic Video, 916-367-2841.

Canon RC 570 still vidoe camera, BO. 319-393-1993.

Ikegami 730A clean, lw hrs, AC adapt, pwr cord, carry case, raincoat, zoom lens, pixel 125 lines, $2400. Nimbus Prod, 301-507-3358.

JVC KY-210BUPL camera, new tubes, 16X1 Fuji lens, case, cord & plate, excel cond, $2500/BO. E Stevens, 81 Lancaster Ave, Malvern PA 19355. 215-889-9676.

Panasonic WV-D500 digital video camera, $850. Light Productions, 704-328-3391.

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Canon J14ax8.5 B4IRS internal focus bdct zoom lens w/macro focusing, 2X extender, rectangular lens hood & UV protective filter, new cond, $5000. B Suchy, Florida Films, POB 13712, Gainesville FL 32604. 904-377-3456.

Panasonic 15X lens for Panasonic industrial/consumer camera w/interchangeable lenses, trade for Hi-8 gear or? B Barrett, Barrett Prod, 350 Blue Heron Lane, Missoula, MT 59801. 406-542-2563 eves.

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Panasonic 1830 & 1960 future video cntrlr, BO. 319-393-1993.

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Panasonic AG-800 still video rcdr, BO. 319-393-1993.

Sony VO 6800, excel cond, $1000. F Spinetta, 415-321-6049.

Quanta Orion SE 30 Meg hard drive, 72 anti-aliased fonts, RGB component & composite output, 74/ns resolution, $6500/BO. B Bachynsky, Vision World, 612-623-9112.

Knox K40 character generator, user friendly, high res, self-contained 58-key-board unit, 64-pg memory, 6-fonts with dbl sze font capability, 32-color palette, roll, crawl, title, italics, flash, non-volatile memory, internal sync gen, $1500. Mobile-Video Prod, Bethesda MD. 301-656-2525.

JVC KMD 600U switcher, like new, $2950; Videotex TSM-61 vectorscope, $900. J Maida, 713-861-2115.

Laird legend CG, $2000; JVC 3/4" port rcdr, $700. Call Kelly, 318-234-1422.

Sony EVO 9800/VO 9850 Hi-8 3/4" SP edit system w/450 cntrlr & K-100 CG, $10500/assume lease. J Karhik, JK Prod, 248 Village Green, Encinitas CA 92024. 619-436-2308.

Sony BVE-800 A/B roll cntrlr w/3 RS-422 interfaces, $2200; JVC RM-G850U A or B cntrlr, $950; Cross Point Latch 6119 5-input SEG, $850; K&H video prod cart, 16" tires, $250; Electrodyne 8 chnl audio mixer, $100; Furman audio patch bay, $75; Horita WG-50 time code reader/window dubber, $200/all BOs considered. Paul, Videosyncracies, 802-865-2323.

JVC SAK-33 parallel interface card, links JVC BRS 822 or 622 S-VHS machines to Sony RM 450 edit cntrlr, $195. R Glusic, Wilderness Video, 24200 Alliene, Lomita CA 90717. 310-539-8573.

VCR/VTRS/RECORDING MEDIA

(Want to Sell)

Sony VO2610 top loading 3/4" rcdr w/RF adaptor, audio dub, programmed repeat program operation, gd cond, $350+shpg; Sony VO3800 port 3/4" rcdr w/Sony AC3000 AC/color adaptor, gd cond, $350+shpg. B Williams, On-Trax, 9340 Narnia Dr, Riverside CA 92503. 909-687-5506.

JVC CR-600U, like new, only 300 hrs, $1900. Light Productions, 704-328-3391.

Panasonic 7400 S-VHS port deck chrgr & 3 batts, excel cond, $1800; JVC 6650 3/4" edit deck, excel cond, $1700; JVC 4900 3/4" port, 100 hrs, 3 batts, AC chrgr/pwr sply, $700; Sony BVH 1000 w/TBC, complete refurbish, excel cond, $7500. E Stevens, 81 Lancaster Ave, Malvern PA 19355. 215-889-9676.

Panasonic 460U Super-VHS camcorder, used twice, $1850. 203-243-9893.

JVC CP500O 3/4" player, 3 avail, gd cond, $100/ea; Panasonic NV-9100A 3/4" player, gd cond, $125. 216-929-3712.

JVC BR-S600U S-VHS prof VCR, $850. J Bodell, 54 E 2700 S, SLC UT 84115. 801-486-7090.

JVC BRS811U S-VHS editing deck, like new, less than 10 hrs on unit, $3888. 908-322-2002.

Sony BVU-150 like new, less than 100 hrs, flawless composite editing w/time-code capability, softcase, 14-pin cable, AC & rech DC supplies; Sony DXC-1800 camera, exc pix, 11-70mm F:1.4 TV zoom lens; VHF-FM wireless mic, 173.925 Mhz; 2 @ xmtrs; Audio Technica Lavalier mic; 3-antenna Diversity rcvr, AC & DC operation, will break-up or all for $2500. Genuine Effection, 401-232-3008.

Panasonic NV-9240 3/4" source feeder VCR, works w/NVA-500 & AG-750 edit cntrlrs, lw hrs, new belts, excel cond, $1295; Panasonic NV-8950 VHS True Slo-Mo machine, factory modified to accept advance sync for use w/TBC, new belts, excel cond, $1500. Water-Mark Video, Clearwater FL. 813-530-0354.

JVC CP474U VTR cable for 3/4" VTR 26P-14P; Sony VO8800 port SPU-matic rec/plyr VTR, BO. 702-259-6405.

Sony AV 3600 (4) helican scan 1/2" rcdrs, Sony AV 3650 helical scan 1/2" rcdr w/dual audio chnl, BO on all. J Lackness, 409-833-9421.

Panasonic AG6500 (2) port VCRs w/extra batts, $850/ea or BO; WV-V3 (2) cameras 3-tube, cases, batts, BO. Visuals, 4541 Discovery Ln #6, W Palm Beach FL 33417. 407-686-3490.

Panasonic AG7400 S-VHS port deck, HiFi sound w/case, excel cond, $1750. J Winslow, Creative Video, Box 7032, Endicott NY 13760. 607-754-1029.

Hitachi 200B 1" VTR new heads, digital servo syst pre-roll, edit, SMPTE time, C format and TBC, $6800; Sony VP-5000 3/4" player, search, reverse, forward, lw hrs, $650. Nimbus Prod, 301-507-3358.

Sony BVW-25 Betacam, $4900; Sony VO-4800 3/4" port w/BC-20 chrgr & (2) BP-60 batts, $1250; Panasonic AG-7400 port w/AG-B640 AC/chrgr & 8 batts, $2300. 800-466-8287.

Sony VO-8800 3/4" SP port rcdr/plyr w/time code, Kangaroo case, batts & chrgr, $2000; Sony MPX-290 editor cntrlble 8 input mixer, $2000; Panasonic MX-12 video effects switcher, $1400; Ampex Universal RS-422 job shuttle, slo-mo cntrlr, $800. Michael, 212-691-0375.

VO 5850, VO 5800, Convergence Super 90 w/edit cables, $3000. D Redman, 703-527-1200.

RCA TCR-100 (4) video cart machines, 2 wrkg, spare parts, video heads & APX 3000 carts, $2500/BO. J Richardson, 205-479-5555.

DAR Soundstation at Scottish Television

by Brian Paterson
Sound Post Production Supervisor
Scottish Television

GLASGOW, Scotland Scottish Television is the ITV (Independent Television) contractor serving central Scotland. The company's post production sound section was formed in 1989, and we have been using a Digital Audio Research (DAR) Soundstation in our audio post-production since January 1990.

Prior to this, the existing dubbing suites

USER REPORT

were operated as three dedicated autonomous units designed to undertake one-inch C-format video dubbing using two-inch 24-track, PSC (portable single camera) dubbing using one-inch eight-track and 16mm film dubbing.

Flexibility and throughput

The purpose of the new integrated unit was to increase the flexibility and throughput of the sound post operation while retaining the best of the existing working practices. It was felt that the biggest improvement to the operation could be achieved by replacing the aging 24-track operation with a hard disk-based system. In addition, installing a hard disk system in the 16mm film dubbing suite would allow video dubbing to be accommodated during down time.

After extensive investigations of the available hard disk market at the time, it was decided that the DAR Soundstation offered a number of advantages over other sound systems. The ability to replay 16 channels simultaneously meant that larger stereo productions could be undertaken entirely within the digital domain.

Also, the Soundstation's magneto optical disc (MOD) subsystem promised easy program reel back-up, directory augmentation and interchangeability of material. The "touch screen" method of input to the system seemed to be very fast and intuitive, and the system architecture allowed virtually all of the track-laying and editing operations to be done on one screen by a combination of dedicated touch locations and hard keys.

The system also appeared to be very "uncomputer-like," involving a minimum of number crunching through the use of the cursor control keys and dedicated functions, such as copy and slip. These aspects, along with the uncluttered three-window directory and highly visible "film bed-like" playback sequence, appealed particularly to our dubbing editors, who were more accustomed to traditional 16mm magnetic media.

Drawing a crowd

Shortly after we implemented the system, our "in house" production staff began to realize the advantages of working on Soundstation, and we began attracting a number of local independent producers and directors who were impressed not only with the sonic quality of the system but also with the speed of operation.

The company now owns three Soundstation Sigma systems, two of which are integrated into an Audio Kinetics E-S bus system in dubbing suites one and three, which share a central machine room and can undertake 16mm film or video work or a combination of both. The other Sigma system in suite two operates as a stand alone video post operation.

All three suites are equipped with Neve consoles using "Junior Flying Faders" and operate with Beta SP video machines. Suite three also doubles as a multitrack music production area.

We have just recently taken delivery of a DAR Sabre optical disc-based system, which will be used as an off-line track-laying system for major network drama productions. The first project to be undertaken on Sabre is a six part series for the ITV network filmed in Super-16 with dialog cut and track-layed on magnetic stock in the conventional manner.

A rough mix of the dialogue will be done on Beta SP, and the Sabre will be used to track-lay and edit up to eight tracks of music and effects to optical discs. The optical tracks will then be down-loaded to the Sigma in the film dubbing suite, and, at the final mix, the dubbing mixer will have the option of having all the dialogue, effects and music tracks available at the same time.

More tracks

The restriction of only eight available tracks on Sabre can be overcome by using a separate optical disc to hold tracks that have been spotted to picture and transferred back to a directory group.

We expect Sabre to significantly reduce the time devoted to track-laying film productions, and as our dubbing editors gain more experience on this technology, we hope to see a faster turn-around at the mixing stages. One further advantage of using Soundstation and Sabre in this way is that an optical disc library of music and effects appropriate to the series will be built up and held for future productions.

In the three years or so that we have been using Soundstation at Scottish, the system has become a fundamental part of our operation. We have been very happy with the standard of back-up and customer support offered by DAR and have found the modem support facility useful. The company is always very willing to talk to operators about ways the system could be improved, and DAR operates a good training scheme.

The reliability of the hardware is very good, and the continuing software development has helped increase the effectiveness of Soundstation in our operation.

Editor's note: Brian Paterson has worked at Scottish Television for 21 years and has been involved in audio post production for the last 17 years.

The opinions expressed above are the author's alone. For further information on the Soundstation, contact Jeff Bloom at Digital Audio Research (Telephone: +44-3727-42848; FAX: +44-3727-43532), or circle **Reader Service 59.**

Yorkshire TV Invests in AMS

by Steve Haynes
Director, Post Production Sound
Yorkshire Television

LEEDS, U.K. Yorkshire Television is one of the largest independent television companies in the United Kingdom. It is well-known for the high quality of its drama and documentary programs, all of which are produced and edited in stereo surround.

The Post Production Sound Department, of which I am in charge, consists of three dubbing theaters, each equipped with an AMS AudioFile PLUS hard disk digital audio and editing system and a Beta SP video machine. We also have two transfer suites equipped with virtually all formats of audio, as well as an effects library with 30,000 effects.

Sound investment

In 1991, Yorkshire Television decided to invest money in the Post Production Sound Department. After three years of campaigning for new equipment, I was finally getting a chance to refurbish the Film Dubbing Theater.

I felt strongly that the process of film dubbing that has developed over the years was worth preserving. In fact, I saw it as a good starting point on which to build. From possibly 30 or more individually laid tracks on separate mag, one ends up with eight or 10 premixes, which are combined to produce the final mix.

The only disadvantage of this system is that each piece of sound is locked into a premix. Making a change means a remix — resulting in a generation loop — and often an extra record punch-in.

Dolby SR helps considerably with the generation loop, but there is still a certain amount of loss. This is where the AudioFile PLUS is most helpful because any sounds that coincide can be separated by putting one of them into the AudioFile.

In 1990, I saw a demonstration of the AMS Logic 1 console, and I immediately saw it as the answer to my problems.

While this requires a lot of faders on the final mix, this is not much of a problem with automation.

For the mixing console, automated faders were an attractive option because I would no longer have to chase levels for record drop-ins. But when it came to equalization, I had a problem. Since dub mixing is as much about EQ as it is about levels, automated EQ is essential.

New perspective

After looking at the various mixers that were available, none seemed to offer what I wanted. I then thought that if the mixing desk is not the place to innovate, what about the tracks?

Sophisticated track laying was quick and easy, but EQ was still a problem. Film tracks would have to be transferred onto a hard disk.

In 1990, I saw a demonstration of the AMS Logic 1 console, and I immediately saw it as the answer to my problems.

I set about designing the ultimate dubbing suite within the boundaries of my finances. I wanted many faders within constant reach, so an AMS Logic 2 was the answer. This unit, coupled with a 16-track AudioFile PLUS with a Spectra color screen, became the heart of Dubbing Theater 1.

The advantages of using the Logic 2 are startling. Because it is digital, the sonic performance is superb. Also, the desk can be shaped into any format to suit the operator, and with digital EQ, the permutations are endless.

When set to a notch filter, I can even track an interfering tone of varying frequency by using the automation.

As far as beginning on a new console, it is quite easy to configure the Logic 2 to emulate an existing system. In this way, new operators can begin in familiar territory and gradually evolve to the new board.

Individual set-ups

Operators can have their own desk set-up. Within this, the mixer can have set-ups stored for later recall during specific applications, such as a recording session.

One of my intentions when I was designing Dubbing Theater 1 was to preroute it, so it would be ready for dubbing when we switched it on. Few, if any, patch cords are necessary to operate the room normally.

Each analog machine feeding into the mix has its own analog-to-digital converter, and each analog machine receiving sound has a digital-to-analog converter. With the AudioFile interfaced digitally, all switching in the room is done electronically.

The use of a mixing desk with total dynamic automation makes mixing much more of a pleasure. It simplifies the production of international programs and allows mixes to be honed to perfection.

It also radically changes the method of mixing. On a final mix, instead of littering the mix with drop-ins, I now make a virtual mix in the automation.

When I want to change anything, I just touch the relevant control and update the virtual mix. I then record a continuous layback of the complete mix. I no longer need to dissuade the director or producer at the final mix when he wants to change the effects balance.

By putting any contentious tracks into the AudioFile, I am now able to change or substitute tracks. And since the mixer is totally dynamically automated, any aspect of the balance may also be altered.

Automation memory

Even if I do have to alter a premix on film, I still have the data for that mix in the automation memory.

When it comes to audio post production, my philosophy is: Keep as many options open as possible until the final mix. It is

USER REPORT

impossible to tell how it will sound until everything is blended together.

Dubbing Theater 1 proves this by joining the old established film dubbing practices together with modern technology and inventing news ways of working.

In random access machines, such as the AudioFile, the use of magneto-optical disks ensures no time is wasted loading or unloading the hard disks.

The art of editing effects or music has been elevated to new heights by random access machines, such as AudioFile.

With an accuracy down to a sub-frame, and the capacity to stretch or compress the duration, it is the mixer's and producer's dream.

And with the totally dynamic automation on the Logic 2 console, post production sound mixing has come of age.

Editor's note: As head of post production sound, Steve Haynes mixes a large portion of the department's audio.

The opinions expressed above are the author's alone. For further information on the AudioFile Plus or the Logic 2, contact Joanne Darlington at AMS/Neve (Telephone: +44-282-457-011; FAX: +1-44-282-39-542), or circle **Reader Service 20.**

ADVERTISER INDEX

Page No.	Advertiser	Reader Service No.	Page No.	Advertiser	Reader Service No.
6	ATI	15	2	Leitch	42
23	ATI	95	13	Linear S.r.L.	44
23	Abbate Video Inc.	4	4	Merlin Engineering	37
10	Anton Bauer	58	22	Neutrik	118
11	Audio Precision	48	8	Panasonic	98
17	Avcom of Virginia	13	9	Rank Cintel	91
7	Avid Technology, Inc.	129	1	Snell & Wilcox	56
20,21	BTS	32	14,15	Snell & Wilcox	93
26	Broadcast Asia	–	16	Soundcraft Electronics Limited	27
25	Broadcast Store	66	23	Swintek	24
27	Comark	94	23	Telecast Fiber System	128
23	Dielectric Communications	36	23	Torpey Controls & Engineering	134
23	Digital Audio Research	107	24	Videomagnetics, Inc.	127
19	GEC-Marconi Communications	105			
28	Harris Allied	52			
3	IRTE	77			

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