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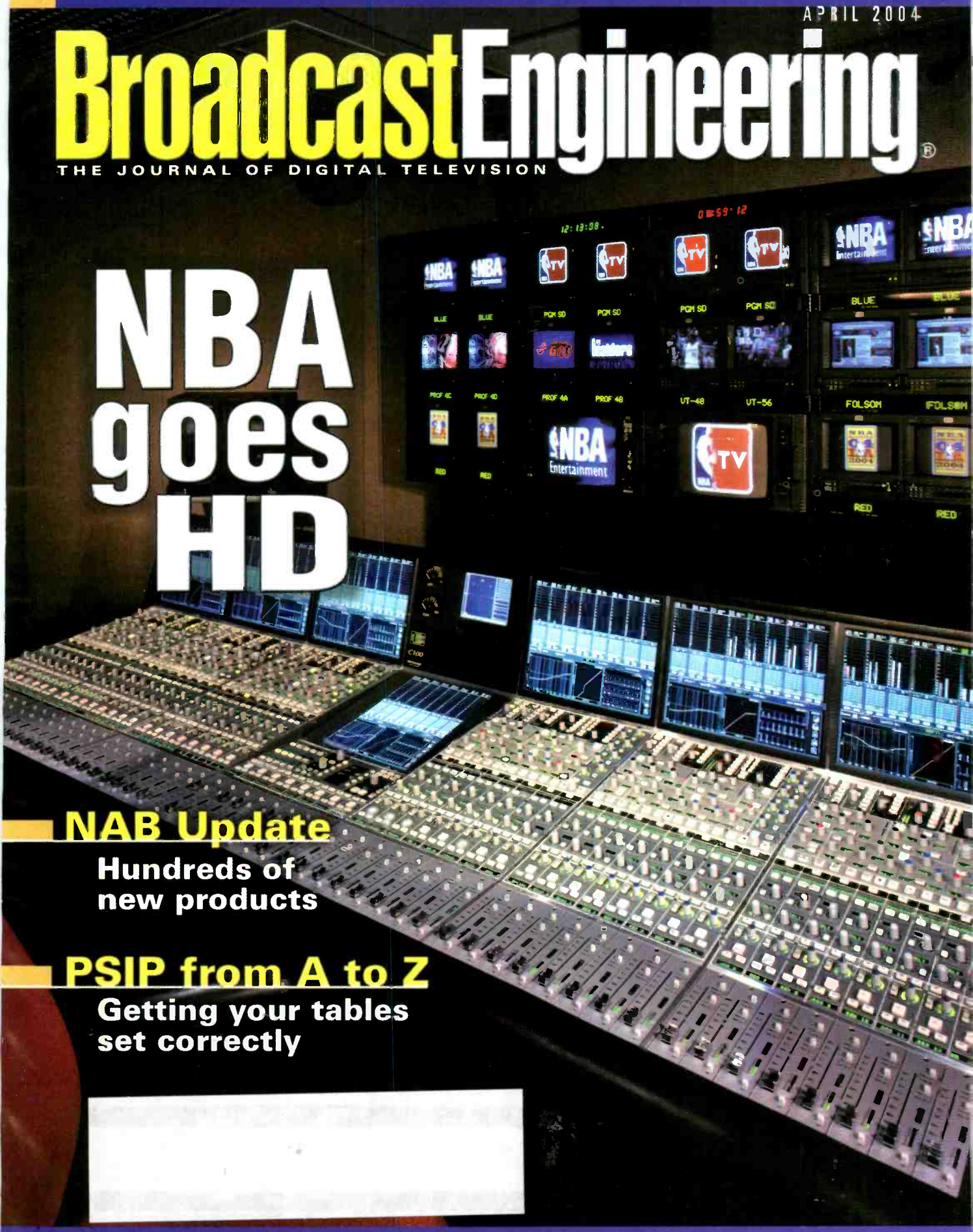
APRIL 2004

Broadcast Engineering®

THE JOURNAL OF DIGITAL TELEVISION



NBA goes HD

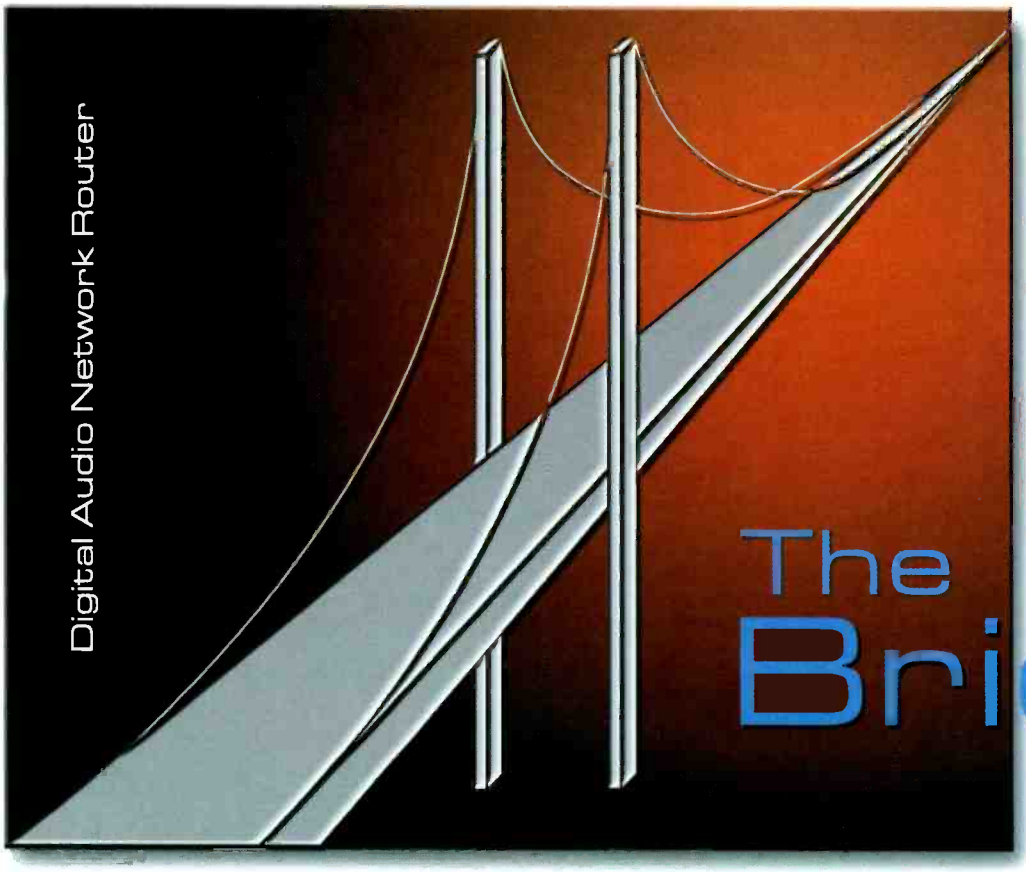
NAB Update

Hundreds of new products

PSIP from A to Z

Getting your tables set correctly

A PRIMEDIA PUBLICATION



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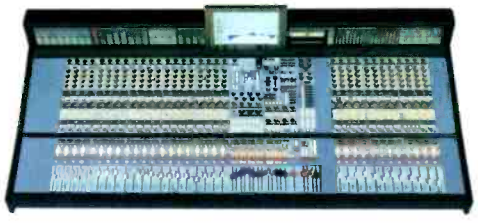

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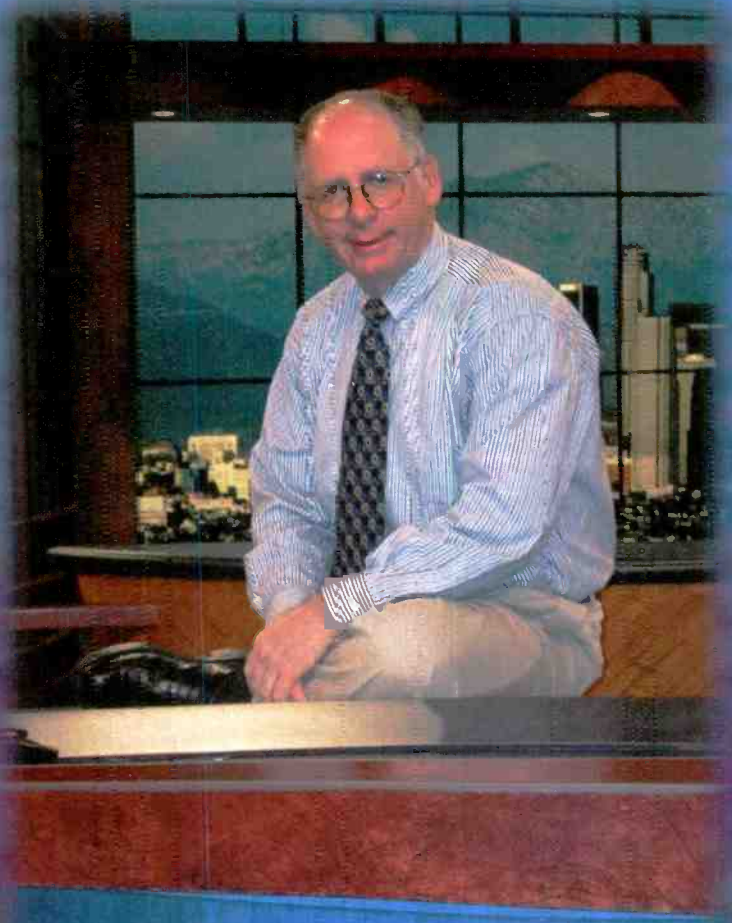

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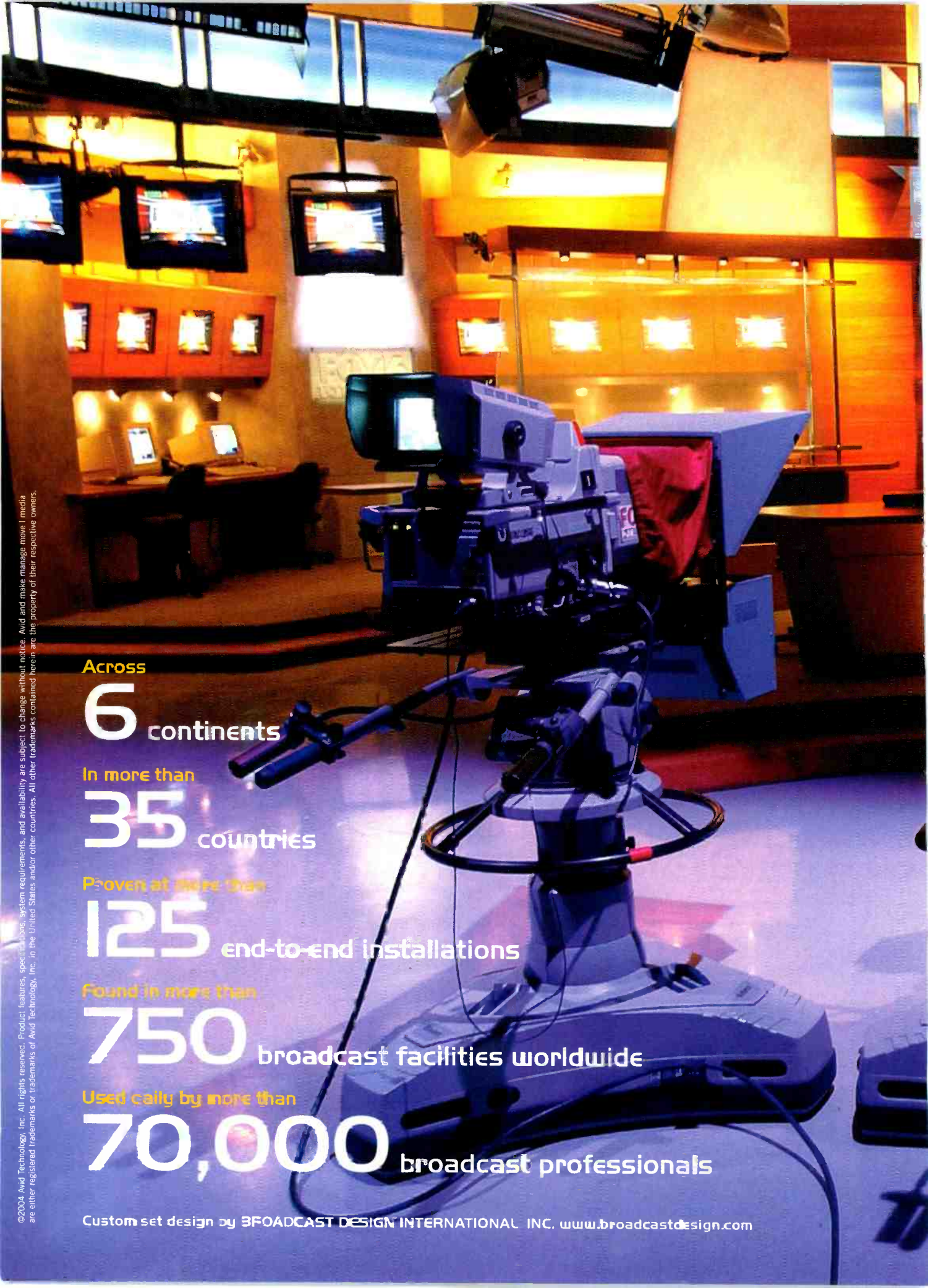

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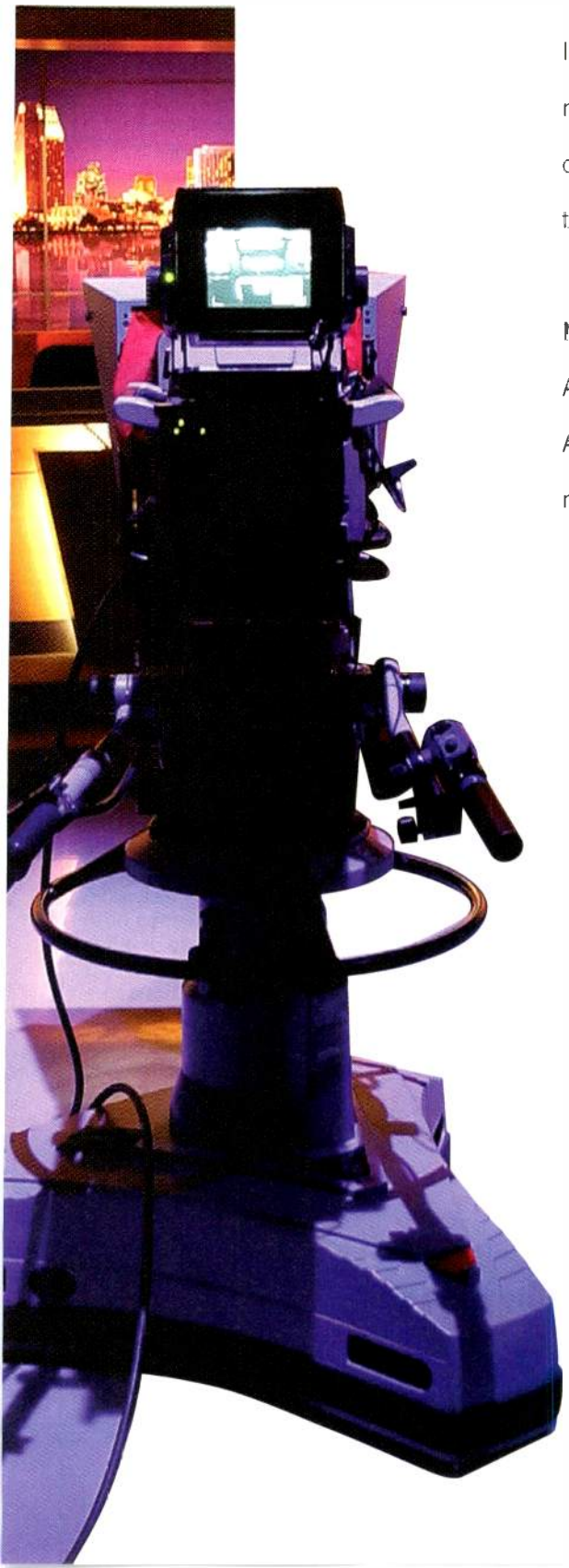
The numbers are in.



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ON THE COVER: Solid State Logic's C100 digital broadcast audio console is the centerpiece of NBAE's new networked audio suite. It handles both stereo and live 5.1 Dolby Digital AC-3 mix, from the same interface. Photo courtesy Dave King/ NBAE/Getty Images.

(continued on page 8)

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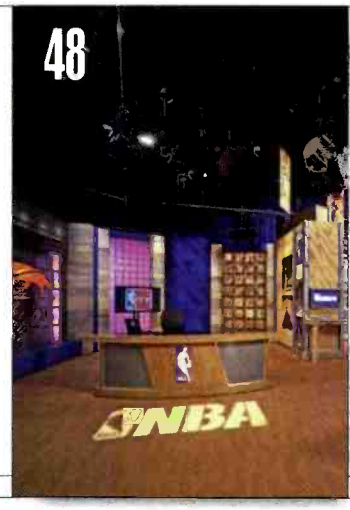

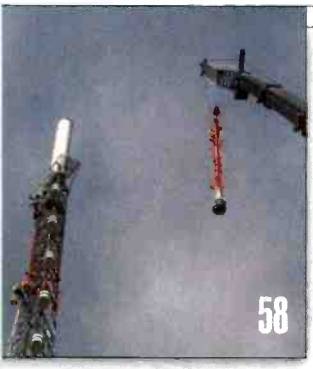

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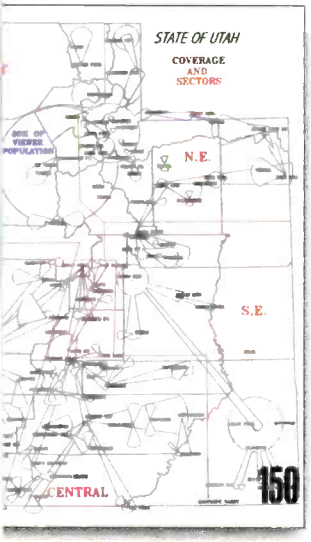

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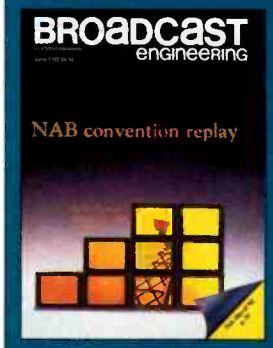
What's this Pick Hit?



In 1992, a handtool was selected as a Pick Hit. It has remained a common item in almost every video engineer's toolbox. What was it? Entries must provide the brand and tool name. Correct entries will be eligible for a drawing of *Broadcast Engineering* T-shirts. Enter by e-mail. Title your entry "Freezeframe-April" in the subject field and send it to: bdick@primediabusiness.com. Correct answers received by June 1, 2004, are eligible to win.

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Beware
the female binky

Today, it seems everyone (except me) has a cell phone. I was in the hardware store last night and noticed a father and his young daughter. As the child walked through the store, she was holding her personal cell phone in her left hand. After a while, she began trying to put the phone in her overall pockets. Despite the micro-sized phone, her pockets were too small.

After a few frustrating attempts, she said, "Daddy, my cell phone won't fit in my pocket." He replied, "Well, just carry it honey." Little did he know he was setting the stage for a lifetime of handicapped living for his little girl. She was becoming one of the millions of one-handed women.

Next time you're out, look around and observe what's most often in a woman's left hand. It's her cell phone. Women almost always carry their cell phones in their left hands. Today, the modern, small cell phone has become the adult female's version of a "binky." You know, like a child's pacifier. They just can't let go of the darn things.

You will see women in airports, overloaded with a purse, briefcase and luggage — carrying everything their right hand. Why? Because their left hand is carrying a cell phone. That cell phone may be plastered against their left ear because they are talking to someone, but it's always in their left hand.

Men, on the other hand, carry their cell phones on their belts. You don't see men running through airports with their briefcase, laptop and luggage all held in one hand so their other hand can embrace their cell phone. No. Men don't have this need to caress cell phones like women do.

Women, on the other hand, build an intimate relationship with their cell phone — never wanting to break that contact. It's almost as if the phone might run away if they ever let go of it.

After giving this matter some thought, I believe I've discovered the underlying reason for women's passionate love affair with their cell phones.

I think it's a plot. Women are really using their phones as an exercise device. They hold the cell phone to strengthen their left hand. And once their hands are stronger, they plan to take away guys' TV remotes. Then they will control the TV channels.

Oh no, perish the thought. Can you imagine watching as your TV surfs between "Trading Spaces," soap operas, Lifetime, Style and WE? That's too horrifying to even imagine. Men unite — before we lose control!

Meanwhile, "Barbara, hand me the remote, get me a beer and what channel is wrestling on?" BE

Brad Dick

editorial director

Send comments to: • editor@primediabusiness.com • www.broadcastengineering.com

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Piping plover

To the editor:

I am writing in defense of the piping plover, an innocent creature that you somehow parsed into the villain behind the massive power outage last year. Your thought process intrigues me.

It seems to me that it is man and his unquenchable and ever-growing demand for resources that led to our power problems. The "main man" being Dick Cheney, current vice president of the United States.

Do you remember Mr. Cheney's press conference when he said, "... conservation will play no role in the energy policy of this administration?" It is easy for one of this "feather" to blame an innocent and endangered bird for man's troubles and not the other way around. It's called denial. Denial is an amazing human attribute, especially if you want to keep that glass tower of yours at a comfortable 68 degrees instead of a "beastly" 75. It is EASY for one so SELFISH to put out of his mind that the piping plover is on the verge of extinction, and we all have had a part in it. Go ahead Mr. Dick and turn down the temperature another notch and pull the trigger on the plovers that inhabit the Missouri river sandbars ... the little crappers ... ha ha ha! Now that they're gone (according to you) our energy problems are all solved. Do you really believe this?

Do me a favor would you? When the power goes out again this summer because of our ancient and deregulated grid, or when the price of gas goes over $2.50 and we are hit with another "warmest year on record" report, please come up with another endangered species whose extinction will help solve our country's energy problems.

JACQUES MERSEREAU

Old news?

Did you know there was a company showing hydrogen fuel-cell camera batteries at NAB2001? Powertek won several industry awards for this product line, (which I thought was very slick). For some reason, I never saw them again and none of the conventional battery people I asked were aware of them. Yet they still exist and are apparently selling this product (*www.powertek-international.com*).

Why am I bothering to write this? I guess it just ticks me off that another company is getting the press now when what they are doing is not really new!

ERIC WENOCUR

Editor's note: This reader response is to an article entitled "Fuel cell technology, the new power behind ENG at Sinclair Broadcast" in the News Technology Update newsletter.

HDTV toy store

To the editor:

I too was at the CES show and I have to agree with you that HD is finally being recognized as the killer app, at least by the CE manufacturing sector. But it is still a big struggle at the station end to convince owners and finance people that the future depends on investing in the technology to generate HD locally. Since the announcement of digital HDTV and the birth of multicast and datacast, I have wondered why broadcasters are interested in the concepts. While working at a number three-ranked commercial station in the late 1990s, I remember being part of a conversation about multicasting as an idea for what we should do with our digital spectrum. I quipped back, "Great! Now we can be number three through seven." The comment generated a few hard looks from my peers, but it also brought up the discussion that the future was not based on more channels of poor programming but focused on doing what we do better than our competitors. The other comment I heard at that meeting was that our local programming didn't really merit the expense of HD. At a number three-ranked station, you could make the argument that our programming didn't merit color or a square picture tube.

The future is not based on more channels of poor programming.

The other technology that I have heard discussed is datacasting. Most of the commercial broadcasters that I have spoken with about this are thinking that they would do an SD channel to meet the FCC requirements and then lease their remaining data capacity to others. I am perplexed at this concept, since being a data carrier doesn't seem to have particularly high profit potential unless you have huge quantities of capacity. And, for all of its spaciousness, the SMPTE 310M stream is not that large a pipe compared to SBC or Qwest.

I would encourage you to keep on touting HD as the killer app. I just hope a lot more broadcasters embrace the idea.

WILLIAM T. HAYES

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grass valley

BEYOND THE HEADLINES

A future so bright ...

BY CRAIG BIRKMAIER

How well do you know the viewers who watch your channels?

Channel, rather than station. Not all broadcasters work for a local station — you might work for a network, or a broadcast competitor — a channel that is not available to the antenna-impaired.

For local broadcasters, the channel number on each of the cable systems carrying their content is probably more important to their viewers than the one they were assigned by the FCC.

Chances are pretty good that you know a fair amount about your viewers — their age groups and gender, and approximately how many in each group watch the programs broadcast. You might even have some detailed demographic information about the homes in each of the neighborhoods you serve, but probably not how this correlates with ratings data.

But how much do you know about the family that lives at 2006 Main Street? The gender and age of each member of the family? Their annual income? Where they shop and what they buy? Most importantly, how much they watch your channel, and which shows they watch?

Believe it or not, broadcasters have plenty to be optimistic about!

Your digital competitors do, and they are getting ready to change the face of TV advertising ... one commercial at a time.

Going positive

Some might say that I have been "going negative" on broadcasters for years. I prefer to think of it as an effort to enable a brighter future for our industry. I recognize, however, that many broadcasters are uncomfortable with my vision.

Recently, someone pointed out that perhaps I should be more politically correct, and come down on both sides of an issue for a change.

Talk about a challenge!

But, believe it or not, broadcasters have plenty to be optimistic about!

The U.S. population has doubled during the time since TV broadcasting came into America's homes. And local broadcasters still play an important role in a growing $40 billion business.

They still enjoy some of the highest profit margins among U.S. businesses. And thanks to the democratization of the tools for content creation, the cost of creating content that may be of interest to today's fragmented audiences has plummeted.

The big media conglomerates are on the defensive, and the politicians are beginning to listen to the complaints from affiliates about the indecent way they are being treated by their networks.

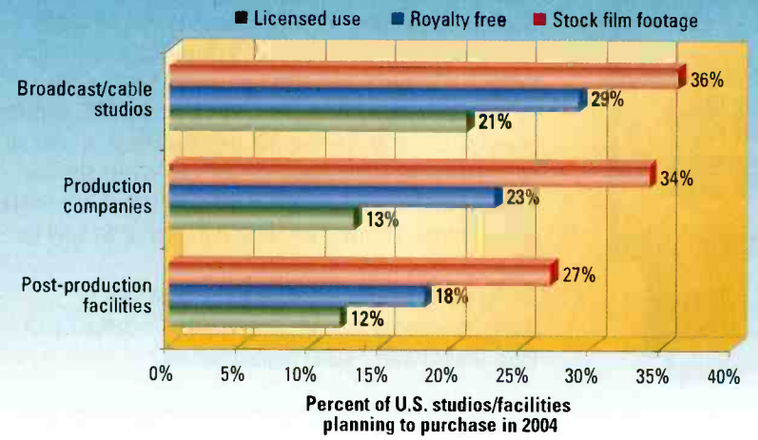
Speaking of politicians, broadcasters are trying to figure out how they can find space for a bumper crop of ads, as the politicians once again spend more money than in the previous election cycle. This time the haul for television and radio advertising is expected to be about $2 billion.

Things are looking even brighter for digital broadcasting. As reported here last month, U.S. Digital Television (USDTV) is launching an affordable multichannel alternative to cable and DBS. The service already has about 800 subscribers in Salt Lake City. For a $99 investment in an HD-capable set-top box, and a one-year $19.95/month commitment, viewers get all local DTV channels and 12 of the most popular cable channels. Service will begin soon

FRAME GRAB A look at the issues driving today's technology

Opting for stock

Stock footage can be a production tool



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The new DVM family of MPEG 2 instruments lets you know exactly what's going on, with powerful analysis capabilities. It gives you:

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The DVM 100/120 monitoring system

The single/dual-stream DVM 50

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in Albuquerque, NM, and Las Vegas, and may reach more than 20 markets within the next year.

Whether the service succeeds or not, it is working to enable many changes to the current broadcast model. It is creating important infrastructures that broadcasters will need to remain competitive in the emerging multichannel digital world. Broadcasters are going to learn a great deal about what will be needed to create a compelling and competitive multichannel service.

USDTV provides the subscriber with support and billing infrastructures that broadcasters lack. It is testing reception in the markets it is preparing to serve and pre-qualifying the neighborhoods where it should be easy to establish reliable service (see the link "USDTV Availability — Reception Maps," in the "Web Links" sidebar).

Similar to other multichannel services, USDTV subsidizes the cost of HD-capable receivers and installs the receiver(s)/antenna needed to receive DTV broadcasts.

In February 2004, the service provider announced a strategic partnership with Dotcast and Winegard to develop a compact indoor/outdoor antenna, which they expect will significantly improve digital and high-definition over-the-air reception. Based on Dotcast's low-noise amplifier system technology, the companies claim that the antenna will provide omnidirectional reception for markets with geographically separated transmitter sites, yet provide automated directional capability for difficult coverage areas. The new antenna will be manufactured by Winegard; it will be available to service subscribers as a compact, 22-inch tube that can be unobtrusively mounted on a TV set or placed along a windowsill, balcony railing or edge of a roof.

USDTV provides the integration necessary to transform stations that once were competing with each other into a service that competes with cable and DBS. It's converting anonymous viewers into subscribers.

Is video the next print?

Recently the On-Demand and AIIM Conferences and Exposition was held in New York, March 8-10 for members of the digital printing business. These folks have been on the endangered species list for almost 20 years. But this year's conference offered interesting new visions for the future of television advertising.

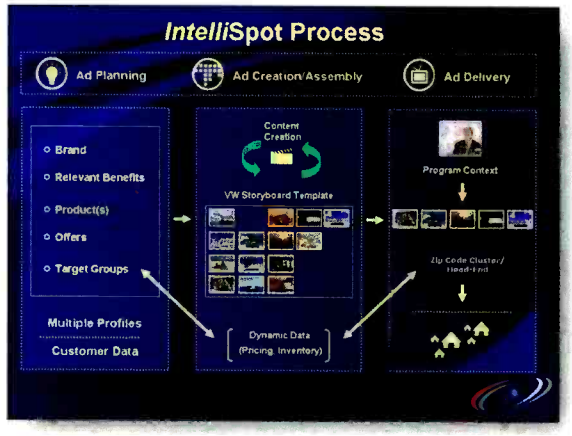


Figure 1. Visible World provides the software tools and physical infrastructure to develop multiple versions of ads that are created on the fly and delivered to targeted demographics.

On-Demand addresses the needs of companies that provide tools for on-demand printing — the subject of those TV advertisements talking about how anyone can be published today. The technology is now being used for massive localization and personalization of direct mail advertising: "Craig, you may already have won ..."

AIIM provides tools to many companies for document management and production within corporations, including on-demand printing of manuals and other product collateral. These tools are among those that were supposed to have resulted in a paperless world by now...

The amount of printed paper consumed in the United States actually declined for the first time last year. Traditional printing will never go away, but it is fair to say that this is no longer a growth market. Product packaging continues to be one of the biggest uses of printed paper. This article might reach readers as an HTML or PDF file, rather than the printed version. In a few years, the printed version may be delivered to a flexible display screen that readers can fold up and take with them. And the newspaper boy may be a local TV station.

The Digital Marketing Symposium was created to expose people in the on-demand print business to new opportunities to improve the way the world communicates with digital media. My panel sessions at the conference explored the changes that are taking place with TV advertising as the industry moves from viewers to subscribers, and the possibility that new forms of digital media — including DTV broadcasts — may soon begin to replace traditional printed media.

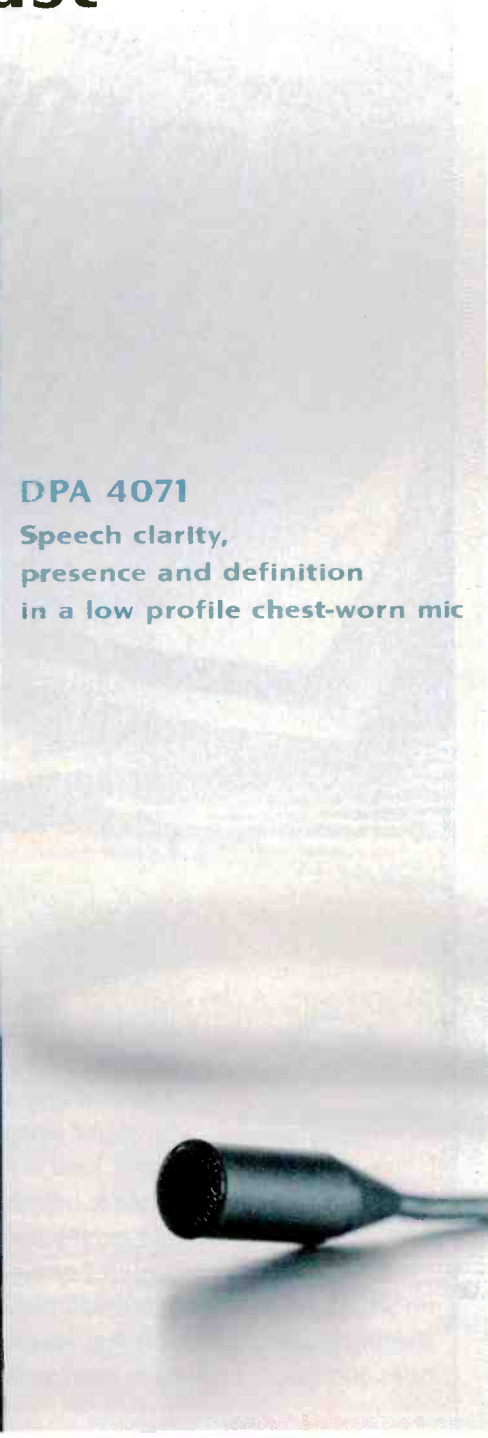
At the last minute, I added a presentation from Visible World that explored changes to TV advertising.

The presentation and demonstration about Visible World's IntelliSpot products opened many eyes in the audience. IntelliSpot offers a migration strategy from the old analog — every viewer sees the same ad — mind-set,

Web links

U.S. Digital Television
www.usdtv.com/
USDTV Availability - Reception Maps
www.usdtv.com/why_usdtv-reception_maps.php
www.show.digitalmarketing2004.com/dmsymposium/V40/index.cvn
Visible World
www.visibleworld.com/

The clear presence in broadcast



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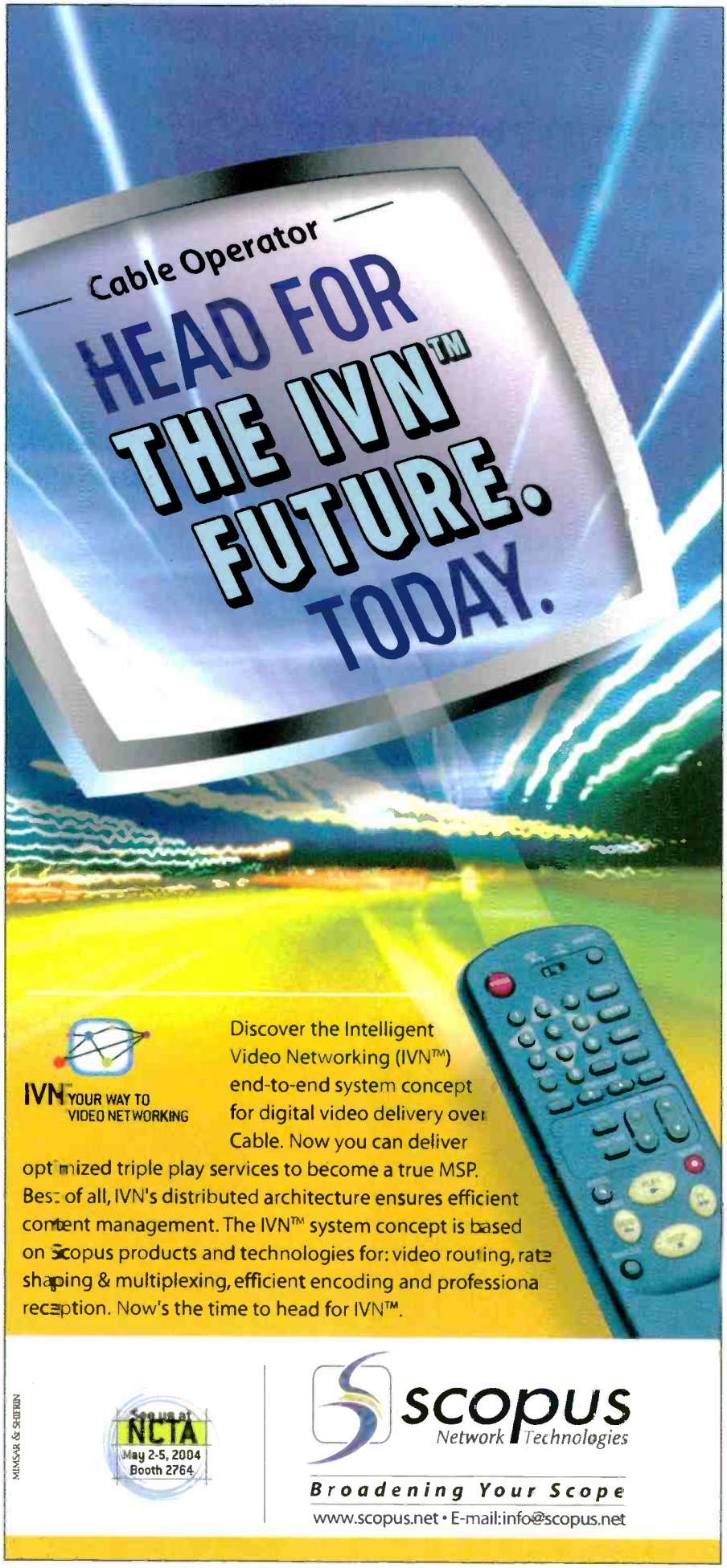

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I just stuck my neck out and discovered that things look a lot brighter than they have for years.

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For the past few years I've been keeping a low profile, watching and waiting for broadcasters to start thinking about the future. I just stuck my neck out and discovered that things look a lot brighter than they have for years. It's time for broadcasters to do the same. BE

Craig Birkmaier is a technology consultant at Pcube Labs, and hosts and moderates the Open DTV Forum.

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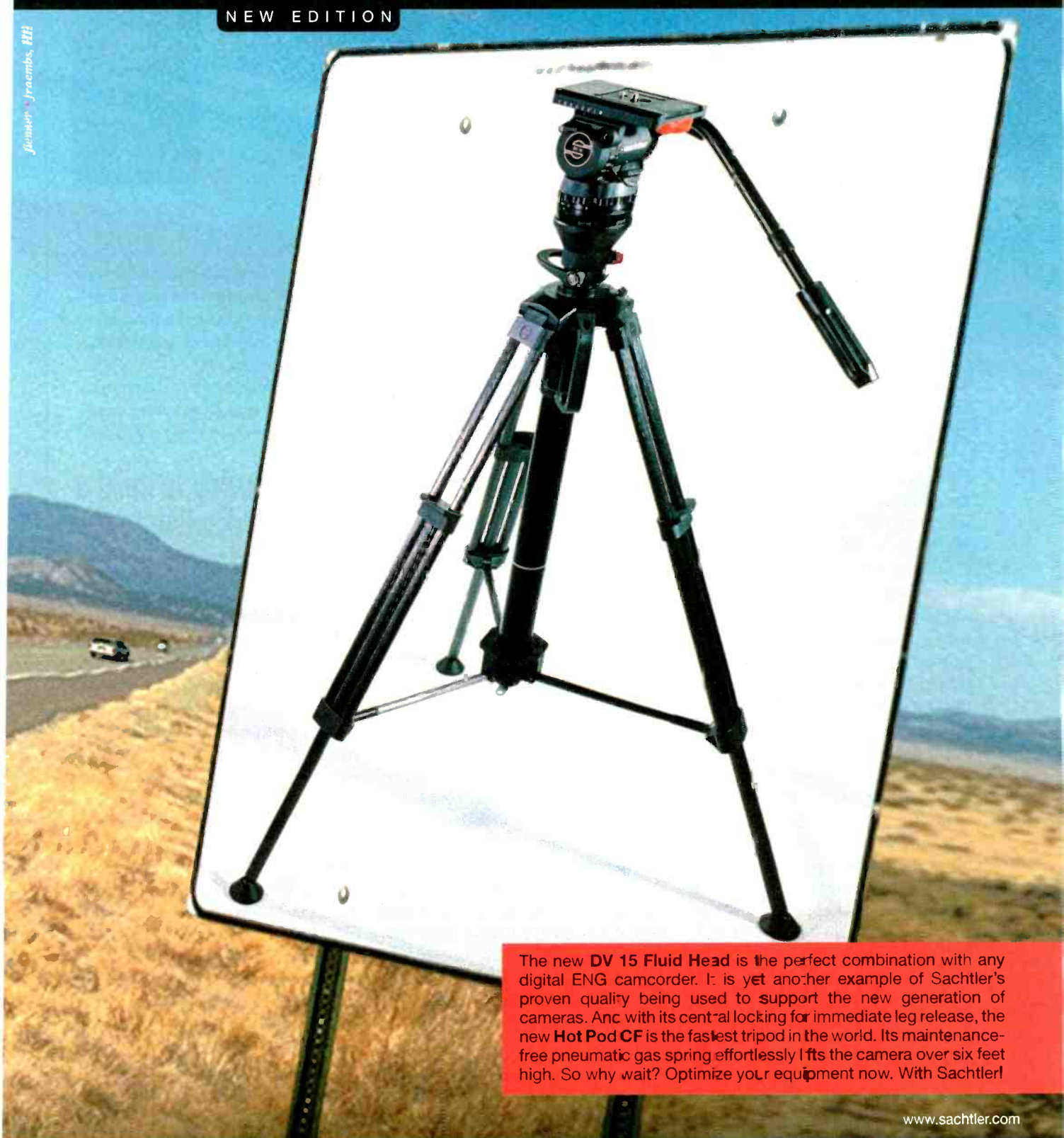

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BEYOND THE HEADLINES

New tower notification system in place

BY HARRY C. MARTIN

The FCC has adopted a tower construction notification system, which is intended to help guide broadcasters through the ofttimes difficult process of determining whether the site they have selected for a new tower is, in fact, taboo because of any number of historic, cultural or Indian tribal considerations.

The voluntary system is designed to facilitate review of proposed tower sites and to alert new tower proponents if their proposed construction might be affected by the site's proximity to site(s) of historic, cultural or Indian tribal religious significance. The new system is not intended to supplant the government-to-government consultation process with federally recognized tribes. The National Historic Preservation Act (NHPA) mandates that process. Nor does the new process alter the FCC's antenna structure registration process. Rather, the new process provides a tool to assist tower companies (and others, including broadcasters who find themselves involved in the tower construction process) in ensuring that their proposed construction complies with all applicable federal, state, local and tribal rules. The FCC reviews proposed tower construction under the NHPA.

Dateline

Television stations in Maryland, Virginia Washington, DC, and West Virginia must file their renewal applications with the FCC on June 1, 2004. Renewals must include an ownership report (Form 323 or 323-E), and an EEO program report (FCC Form 396).

Also on June 1, stations in North and South Carolina must begin their pre-filing renewal announcements.

The system allows anyone proposing to build a tower to submit an electronic notification to the commission about the proposed construction. The commission will then provide this information to the relevant entities on a weekly (by e-mail) or monthly (by postal mail) basis. Those entities may then submit responses back to the commission, and the commission will forward those responses back to the notifier. Information regarding any proposed tower construction site nationwide will be sent to every tribe unless a tribe asks the FCC to limit notifications to a specific geographic area. Each state historic preservation office will receive notifications relating to proposed tower construction at locations in their own state and any adjacent states.

The system allows anyone proposing to build a tower to submit an electronic notification to the commission about the proposed construction.

Despite the fact that the FCC is adding — rather than cutting — a middleman, the new system (in theory) should help abbreviate the often-lengthy historic preservation review process. The system streamlines the process, providing a kind of "one-stop shopping" for tower proponents: they provide the FCC with the notification, and the commission then handles the dissemination of that information to organizations that might be affected by the proposed construction. This replaces the alternative hit-and-miss system, in which would-be tower builders attempt to identify and contact all parties that might hold a vested interest in the historic, religious or cultural value of its proposed site. The FCC's new clearinghouse method should reduce the time committed to review, and broadcasters may therefore reduce the time, effort and money invested in a tower construction project.

Note that this new system is voluntary. You are not required to submit notification of a proposed tower if you don't want to. But whether or not you do provide a notification, you will in any event be required to comply with the NHPA, even if you are not aware of any sites near the proposed tower that might be of any historic, cultural or tribal religious significance. So while the new system is not a free pass around the statutory obligations relating to protection of certain culturally significant sites, it may help unsuspecting tower proponents avoid the unpleasant surprise of learning at the last minute that their construction cannot proceed as planned because of NHPA-related concerns.

If you wish to use the notification system, go to *www.wireless.fcc.gov/outreach/notification/index.html* and click on the "notify" button. You will then be prompted to provide an FCC registration number (FRN) and associated password, after which you will be required to provide information about yourself and your proposed construction. BE

Harry C. Martin is an attorney with Fletcher, Heald & Hildreth PLC, Arlington, VA.

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Revisiting Shannon

BY MICHAEL ROBIN

The year was 1948, 20 years after Harry Nyquist wrote his article "Certain Topics in Telegraph Transmission Theory," in which the Nyquist sampling principles were first presented. During this period (1928 to 1948) broadcast engineers built a countrywide network of analog audio AM transmitters, developed the concept of analog audio FM transmission and, in 1941, came out with the first high-definition television standard (NTSC 525/60).

By 1948, the FCC had finally (or so it seemed) frozen FM (88MHz to 108MHz) and TV (channels 2 to 13) channel allocations, allowing for an energetic and speedy development of FM and TV broadcasting. Bell Laboratories was preoccupied, as usual, with the efficient (bandwidth-saving) transmission of low-noise telephone conversations. All these analog systems suffered from the less than ideal performance of the transmission link between the signal source (microphone or TV camera) and reproducer (loudspeaker or CRT). Analog signal distribution link impairments were studied at long length and fall in three distinct categories:

- *Linear distortions* (frequency and group delay response)
- *Nonlinear distortions* (harmonic and intermodulation distortions)
- *Noise* (random and coherent)

In an analog world, all these unavoidable and cumulative impairments of the electrical signal (audio or video) shape have a direct effect on the quality (or lack thereof) of the reproduced sound and picture. In a digital world, the cumulative electrical signal impairments have no effect on the reproduced sound or picture up to a point (the cliff effect) when the system suddenly fails.

In a digital world, the electrical signal impairments have no effect on the reproduced sound or picture up to a point when the system suddenly fails.

It is at this moment in time, July 1948, that the *Bell System Technical Journal* published Claude Shannon's article "A Mathematical Theory of Communications." A conclusion of this article appeared in October 1948. This article created the concept of information theory, with its main application in communication engineering.

Shannon's communication system

A communication system consists of several parts:

- *An information source.* It produces a message to be communicated to the receiving terminal.
- *A transmitter.* It operates on the message in some way to produce a signal suitable for transmission over the channel.
- *The channel.* The medium used to transmit the signal from transmitter to receiver.
- *The receiver.* Performs the inverse operation of that done by the transmitter.
- *The destination.* The person or the equipment for whom the message is intended.

Figure 1 on page 26 shows the block diagram of a typical digital video communication system as found in contemporary digital video studios. The

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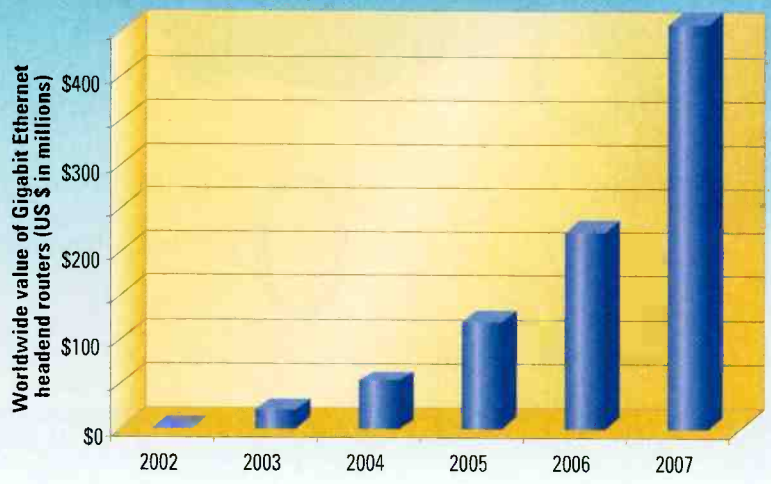

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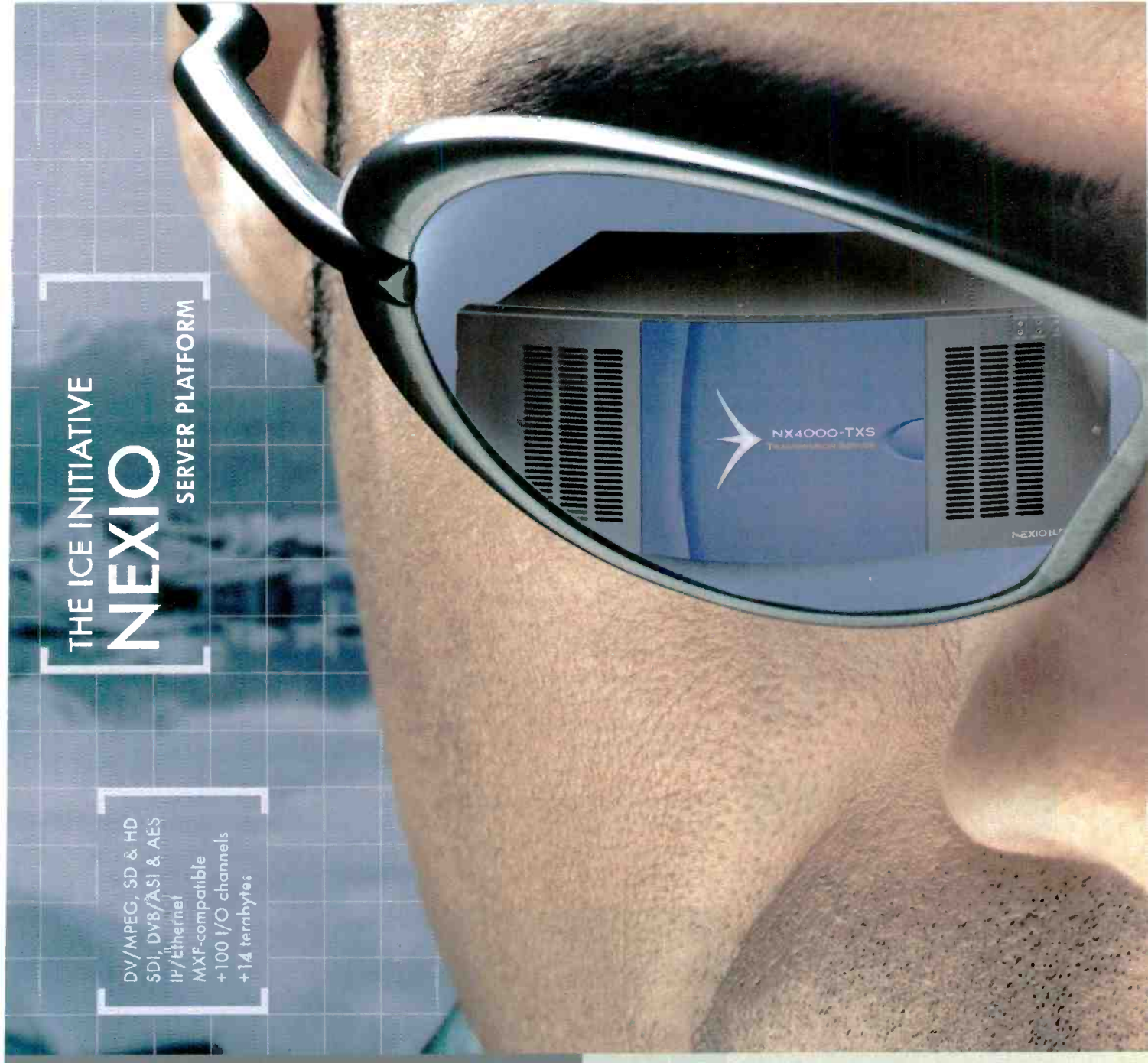

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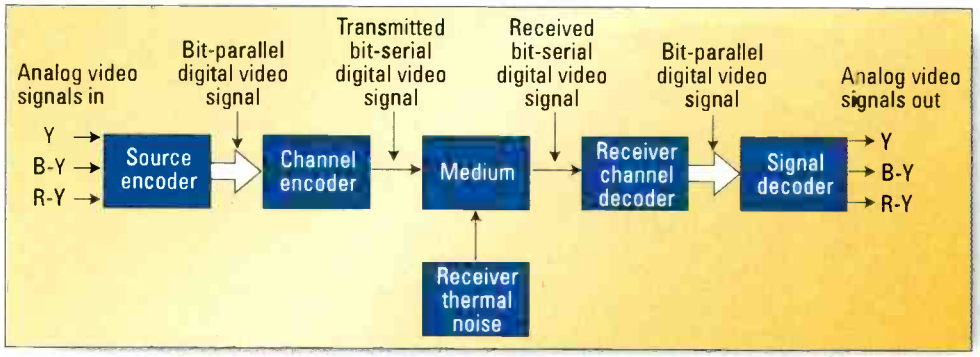

Figure 1. A typical digital video communication system

source encoder is the conventional set of three (Y, B-Y, R-Y) A/D converters followed by a time division data multiplexer. The output of the multiplexer is a sequence of C_B, Y, C_R parallel

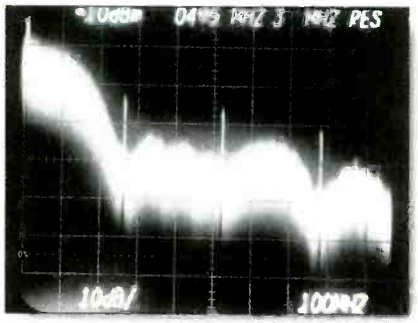

Figure 2. Spectrum of 270Mb/s 4:2:2 component digital bit-serial signal

10-bit words. The channel encoder transforms the bit-parallel digital signal into a bit-serial digital signal suitable for transmission via the chosen medium (coaxial cable). The signal is corrupted by thermal noise, which in a studio environment is contributed by the receiver input stage. The receiver channel decoder deserializes the received bit-serial signal and recovers the bit-parallel digital video signal. Poor signal-to-thermal-noise ratio at the receiver input may affect the capability of reconstructing the original signal, resulting in bits in error or missing altogether. The output of the receiver channel decoder is the original sequence of C_B, Y, C_R. The signal decoder is the conventional demultiplexer, followed by a set of three (Y, B-Y, R-Y) D/A converters recovering the original analog component video signals.

The bit-serial data rate is given by:

Bit-serial rate (Mb/s) = parallel word rate (Mwords/s) x number of bits per word

The SDTV 4:2:2 bit-serial rate is equal to:

Bit-serial rate = 27 Mwords/s x 10 bits/word = 270Mb/s

The normalized HDTV bit-serial rate based on 60 fields/s is equal to:

Bit-serial rate = 148.5 Mwords/s x 10 bits/word = 1.485Gb/s

The 59.94 fields/s data rate is equal to 1.485Gb/s/1.001.

Shannon's communication channel capacity

According to Shannon, a noisy communication channel has a specific

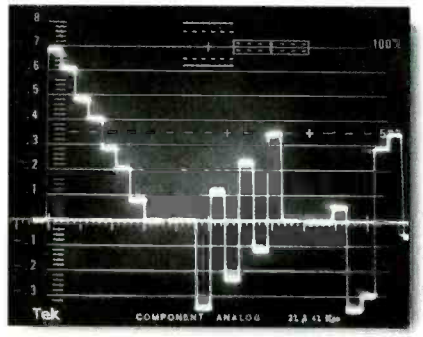

Figure 3. Sequential display of Y, P_B, P_R 100 percent color bars signals

capacity measured in bits per second. The channel capacity is given by the formula:

$$C(b/s) = B \log_2 [1+(S/N)]$$

Where:
B = the channel bandwidth (Hz)
S = the received signal power (W)
N = the accompanying noise power (W)

Shannon's theorem states that it is theoretically possible to transmit information with a low probability of error through a channel having a specific capacity, provided that the transmission rate is lower than the channel capacity. Shannon does not specify the means of obtaining an error-free transmission over a specific transmission channel but simply states that there are means of achieving it.

Each method results in a specific channel coding. The channel coding describes the manner in which the 1s and the 0s of the datastream are represented on the transmission path. There are many channel coding standards, and they all aim at optimizing some aspect of the bit-serial digital signal, such as the spectrum distribution, the DC content and the clock recovery method. The SDTV and HDTV bit-serial channel coding uses the Non Return to Zero Invert (NRZI) scrambled method. The result is an increase in the number of 0 to 1 transitions and the randomization of their occurrence to aid in the recovery of the clock in the receiver. A detailed description of this method is beyond the scope of this article.

Practical applications in a studio environment

Figure 2 shows the spectrum of the 4:2:2 SDTV NRZI scrambled bit-serial digital signals with markers

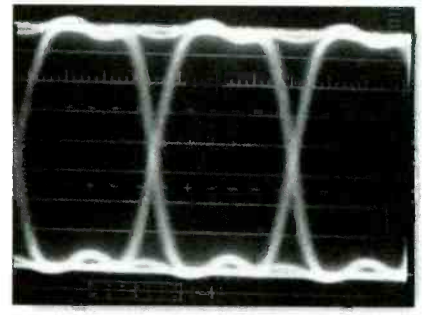

Figure 4. Eye diagram of the SDI signal at the output of the channel encoder

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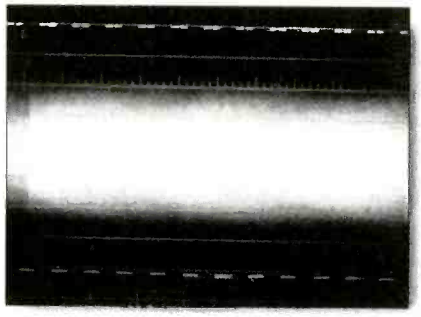

Figure 5. SDI signal after passing through a 200-meter coaxial cable

at 270MHz, 540MHz and 810MHz. The bulk of the energy is below 135MHz. The spectrum is typical of a suppressed-carrier pulse amplitude modulation (PAM) with nulls at the sampling frequency and its multiples. The distribution of this type of signal requires wide bandwidths on the order of half the clock frequency, in this case 135MHz. This requirement can be easily accommodated in a studio environment given adequate hardware technology. Figure 3 on page 26 shows the sequential display of the Y, P_b, P_r signals for a 100 percent color bars signal, the "message." Figure 4 on page 26 shows the eye diagram of the SDI signal at the output of the channel encoder. Figure 5 shows the same signal at the output of a 200-meter coaxial cable. Note that the signal is buried in noise. Figure 6 shows the signal of Figure 5 passed through an equalizing network with a peak at 135MHz. Note that the 0s and the 1s are clearly identifiable, and the decoded signal would look like Figure 3.

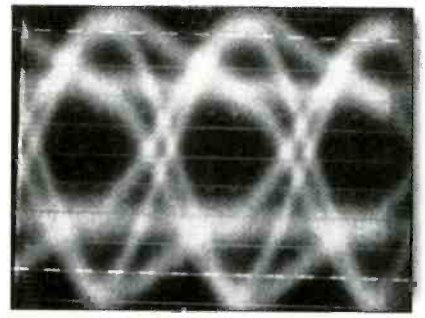

Figure 6. SDI signal output of 200-meter cable after equalization

The distribution of the bit-serial digital video signals over landlines, on-air transmitters or by satellite requires a reduction of the bit rate to match the existing standard communication channel capacity. BE

Michael Robin, a fellow of the SMPTE and former engineer with the Canadian Broadcasting Corp.'s engineering headquarters, is an independent broadcast consultant located in Montreal, Canada. He is co-author of Digital Television Fundamentals, *published by McGraw-Hill, and recently translated in to Chinese and Japanese.*

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The "accidental" system administrator

BY BRAD GILMER

It is interesting how one becomes a system administrator. In my case, it sort of snuck up on me. A new piece of equipment arrived, and it required a user name for anyone who was going to use it. Since I was the one in charge of installing the equipment, it was natural for me to start issuing user names. A short time later, another project came up that involved installing a computer network and a server. Because of my previous experience, I was tapped for the project. Before long, I was involved in all sorts of tasks — from backing up the server, to removing users who no longer needed to access the system, to connecting the server and network to other networks in the company. Almost overnight, I had become responsible for many of the tasks required to keep our critical computer infrastructure up and operating. In the end, I was asked to take my sleep (see figure 1.)

I became a system administrator by accident. Certainly I did not have any formal education in the field; I was an engineer, not an IT person. And yet, I ended up performing all of the tasks normally assigned to a system administrator. I suspect I am not the only person this has happened to, so I thought I would explore the topic of system administration in this month's column, with the goal of helping others who may find themselves in a similar position.

Almost overnight, I had become responsible for many of the tasks required to keep our critical computer infrastructure up and operating.

Many system administrators in the post and broadcast space started out doing other things. In my case, I was the engineer who was interested in computer-related projects. In many cases, you have other work to do, so the system administrator tasks get put on the stack with all the other engineering duties. This can cause problems as you're pulled in several directions. If you are lucky, your organization will realize that it has grown to the point that it needs someone to devote dedicated time each day to system administration tasks. This will give you the time you need to perform the necessary "care and feeding" that any computer or network installation requires. Even if you are not given dedicated time, it may help you to recognize that simple networking projects here and there have established you as a system administrator.

So, how do you know if you are a system administrator? Here are some signs. You have so many username or password combinations on different systems that you cannot remember them all. You find yourself dreaming about firewall configurations. You wish there was someone else who could help you with all the administration tasks you are doing, but you do not have time to train them. No one can assign an IP address on your network without consulting you. You have had to come in to work on two of the last four weekends for at least 15 minutes to deal with a computer problem. While the symptoms may seem humorous, they may be indicative of a problem. You are in a position of growing responsibility and need proper planning and support.

There are several things you can do. The first is to recognize that you are a system administrator. Once you recognize that you have made this transition, several other things will become clear. For example, you will probably need training. You may have gotten some training on the equipment you are responsible for when it was delivered, but I would venture that you have not received any education in system administration. One of the first things you should do is get training on the operating systems you support. The training should be specific to system administration if possible. You

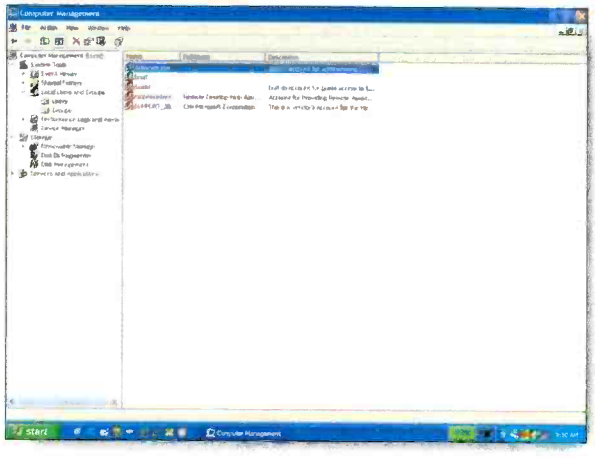
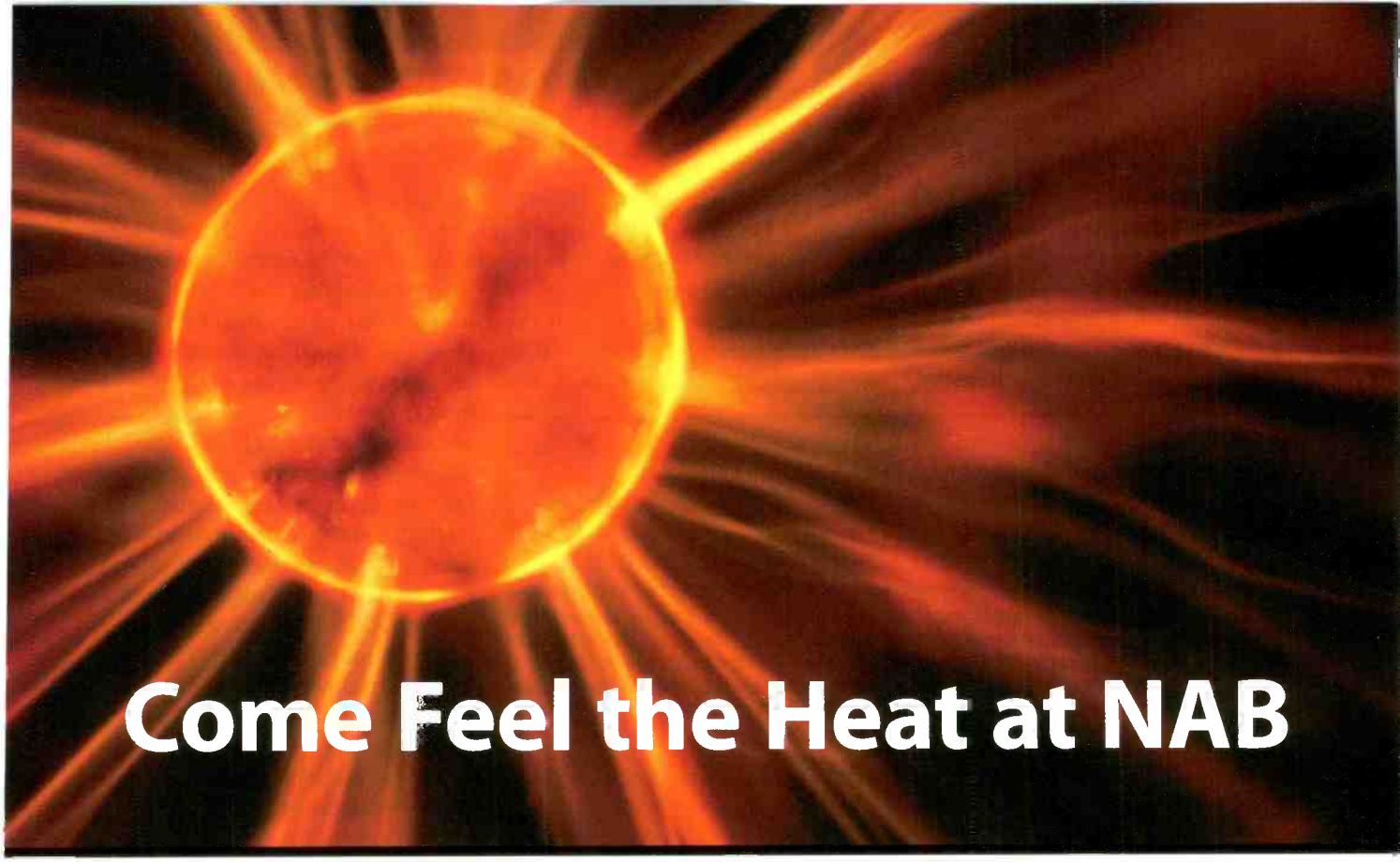


Figure 1. The Computer Management Console is a program many Windows system administrators will learn well. It is one of the tools an administrator can use to create and manage user accounts.

care of a large number of MAC, Novell, UNIX, DEC and Windows servers on several different networks. I found I could use system management tools in



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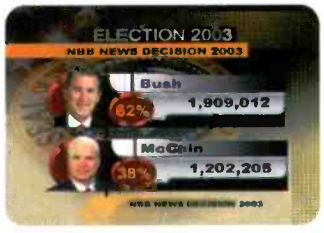

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should also get training on networking fundamentals. You should read everything you can get your hands on. There are many books specifically targeted at the job of system administration. Usually these are written with a specific operating system in mind.

```
# crontab -l
7 0-23 * * * /usr/sbin/ntpdate 62.202.14.109 >/dev/null
17 5 * * * /usr/local/bin/supsource
#
```

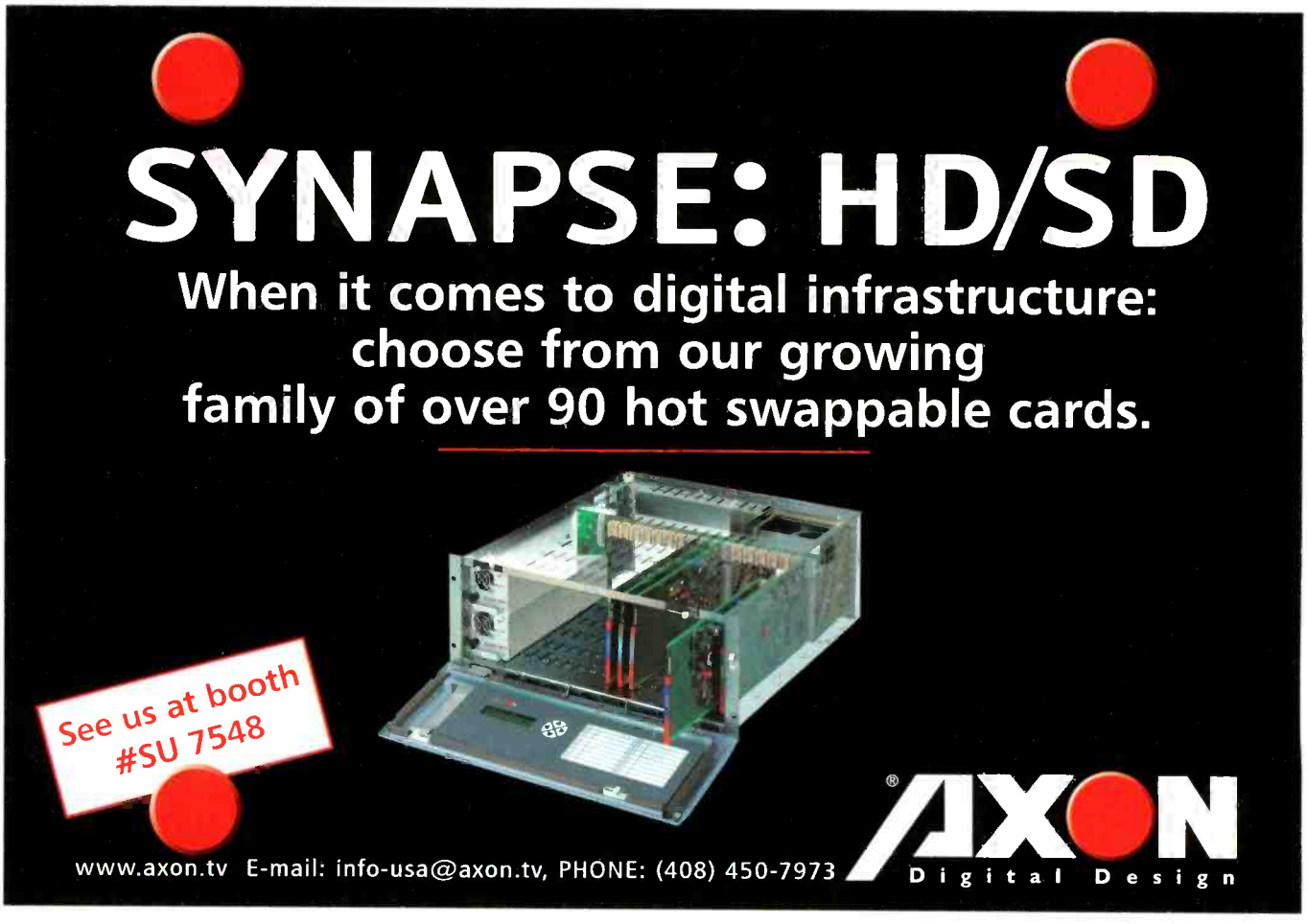
Figure 2. System administrators should learn to make use of automated features of any systems they administer. In UNIX, Cron is a utility that automatically runs commands contained in the crontab file. Here, the first command sets the system clock. The second command updates source code files. The numbers and stars to the left of the commands are instructions on when to run the commands.

Every operating system has specific administrative commands and maintenance tasks, and these differ from OS to OS. Because computer books are frequently expensive, I suggest you check Internet auction sites. Powells Books in Portland, OR, is another valuable resource for used technical books (*www.powells.com*).

Next, you should learn about the many automated tools that are available to help you perform routine tasks. (See Figure 2.) You should specifically find information about schedulers (called CRON in UNIX), scripts and scripting languages. These will help you automate repetitive tasks.

Once you gain some knowledge, I strongly advise you to share it with others. See if you can find someone else in your organization that is technically inclined. Share everything with them. Once you start trying to teach someone else, you will find out just how much more you need to learn. In the process of sharing your knowledge, you will establish a partnership with another person in your organization who can help you with administrative tasks. Contrary to what you might think, you will not be working yourself out of a job. In fact, it is likely that your organization will only acquire more IT-related television technology as time goes on. By getting someone else up on the learning curve, you will be helping yourself to deal with what will inevitably be an increasing workload.

Find a mentor — you will need one. This person does not need to be in the same company. One of the best ways



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to find a mentor is to regularly read one of the Internet newsgroups associated with the operating systems you maintain. (To search these groups go to *www.google.com*, select "groups" and then look under comp.os. You will find groups dedicated to almost every operating system known to man.) Make note of someone who contributes to the group on a regular basis and writes in a way that you can understand. The next time you get stuck with a problem, send them a short e-mail asking if they would mind helping out with your problem. In almost every case, these people are extremely eager to share their knowledge.

As you move into your new role as a system administrator, there are a couple of pitfalls you should look out for. The first is that you may get caught between those who create company policies and the employees who must follow them. For example, you may be required to disable Internet access to some computers in an area because the employer has found that people were using the Internet in inappropriate ways. In a healthy organization, management will convey this information directly to the employees before you go in and shutdown Internet access. Sometimes this does not happen. You should be aware that this might put you in a difficult position. Try hard to get management to separate policy decisions from your tasks as a system administrator.

The second and perhaps most important pitfall you should avoid is that of becoming a jerk. You probably have heard the saying, "Power tends to corrupt and absolute power corrupts absolutely." I have observed several times that perfectly reasonable and pleasant people become difficult to deal with when they become system administrators. As a system administrator, you will find yourself as a gatekeeper for many activities. People will need to get information from you. They will need to have users added, they will need ports opened on firewalls, and they will need to have deleted e-mail recovered. As you move into this new role, you must realize that you are there to serve others. Your main job is to make the technology serve the company and the others who work there. If you hold back information — if you are unresponsive to requests from others — you may find yourself up to your elbows in mineral oil changing rectifier stacks at the transmitter, rather than taking care of the core IT systems that will support your organization for the future. BE

Brad Gilmer is executive director of the AAF Association, executive director of the Video Services Forum, and president of Gilmer & Associates.

Send questions and comments to: brad_gilmer@primediabusiness.com

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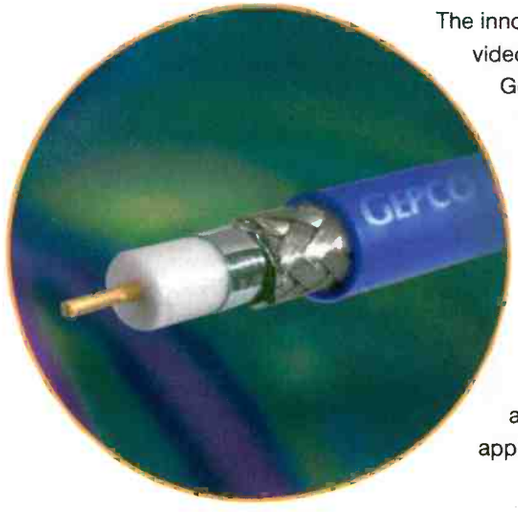

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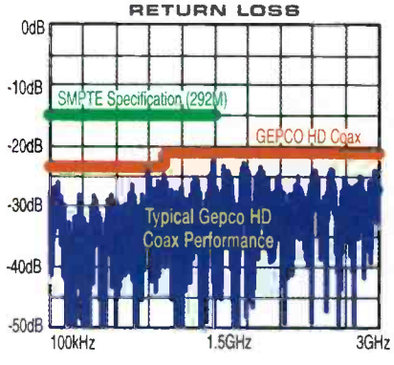

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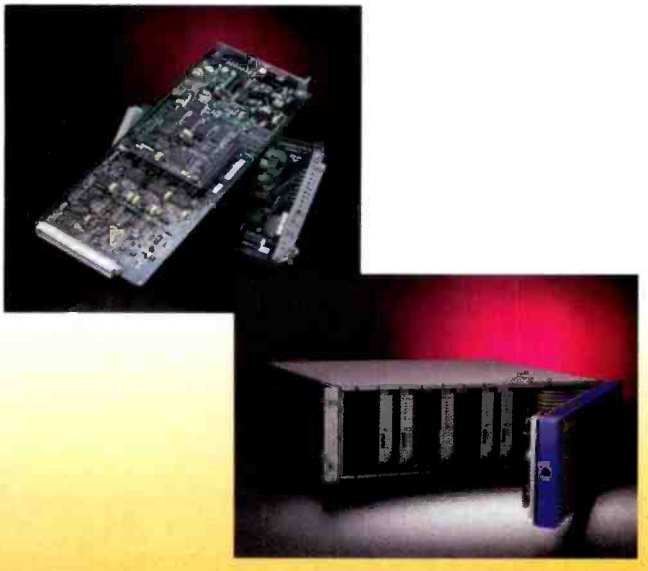

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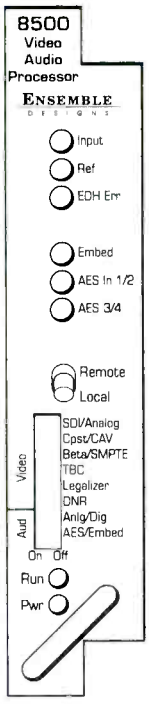


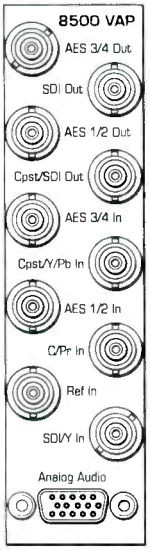
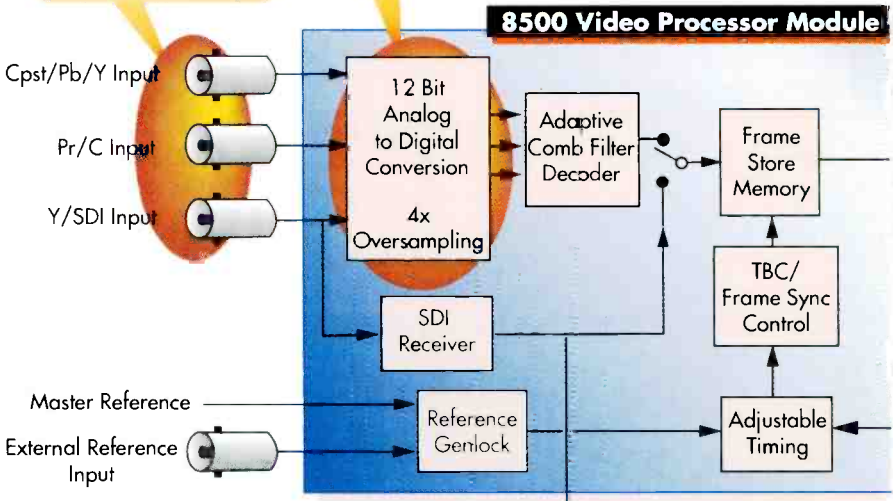
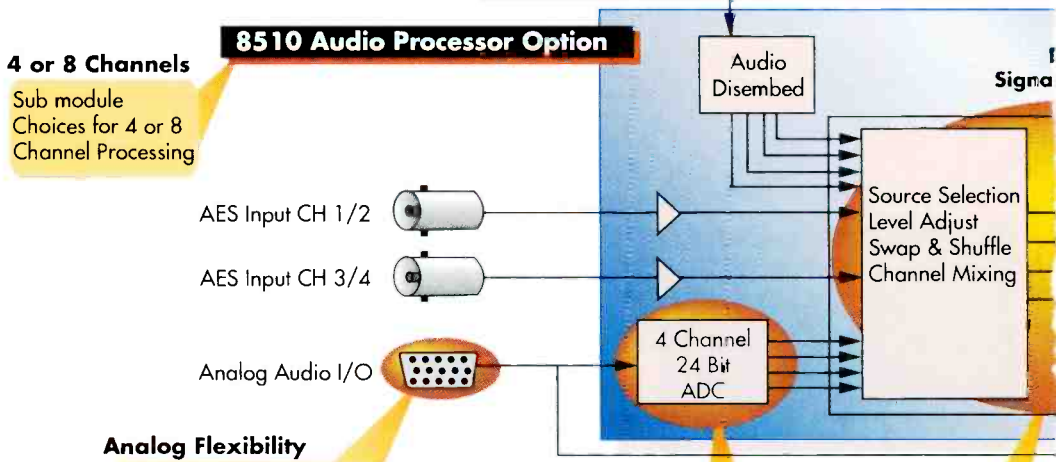


Image Quality
12 bit Analog to Digital Conversion
4 Times Oversampling

Input Flexibility
Composite and S-Video
Component
SDI





4 or 8 Channels
Sub module
Choices for 4 or 8
Channel Processing

Analog Flexibility
User Configurable as:
4 Balanced Inputs
4 balanced Outputs
or 2 Inputs and 2 Outputs

Sound Quality
24 Bit Conversion and Processing
for Fidelity and Accuracy

Input Flexibility
Balanced Analog
Digital AES
Embedded Inputs

Video Processing Frame Syncs	Audio Sub Module Options
7500 - HD SDI I/O	8410 - 4 channel embedded audio handling and AES I/O
8400 - SD SDI I/O	8415 - 8 channel embedded audio handling and AES I/O
8500 - SD SDI and Analog I/O	8510 - 4 channel embedded audio handling and AES I/O and

Avenue 8500 Video and Audio Processor

- Analog and Digital Inputs
- Analog and Digital Outputs
- TBC/Frame Sync
- Digital Proc Amp
- Digital Noise Reducer
- Embedded Audio Processing
- 4 or 8 Channels
- Tracking Audio Delay

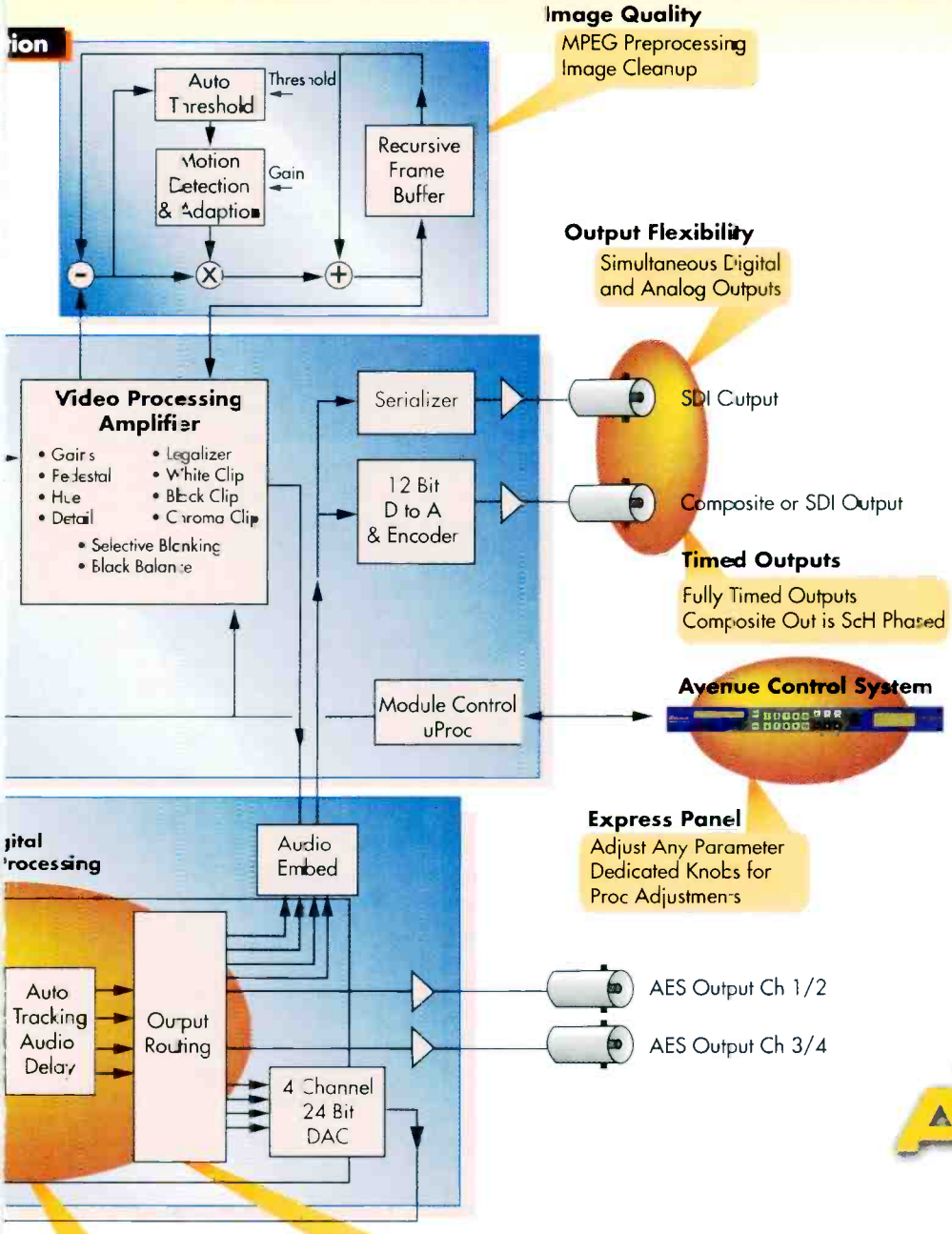


Image Quality
MPEG Preprocessing
Image Cleanup

Output Flexibility
Simultaneous Digital and Analog Outputs

Timed Outputs
Fully Timed Outputs
Composite Out is ScH Phased

Avenue Control System

Express Panel
Adjust Any Parameter
Dedicated Knobs for Proc Adjustments

Audio Horsepower
Control All Levels
Mix, Swap and Shuffle
any input to any output

Perfect Lip Sync
Automatically Tracks the Delay imposed by Video Frame Sync

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Noise Reducer Option

8520 - Digital Noise Reducer

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Total Flexibility

The Signal Acquisition Solution series works for you in SD and HD, and supports digital or analog signals. And if you need to handle embedded audio, AES or analog audio, there are options for 4 channel or 8 channel audio processing. All three of the Signal Acquisition Solution modules, 7500, 8400, and 8500, cleanly accepts switched digital inputs. If there is a loss of input, the module can freeze on the last good frame of video or mute to black.

8500 - The SD Solution for Analog and Digital

The flexible architecture of the 8500 makes it a multi-purpose, "Do Anything" module, with uncompromising attention to image quality and fidelity. With both SDI and 12 bit analog inputs (composite, component, or S-Video (Y/C) formats), the 8500 is ready to take on any signal acquisition challenge. And you can deliver that signal simultaneously in both SDI digital component and 12 bit analog composite. In between those inputs and outputs lie a rugged frame synchronizer and a powerful proc amp. An infinitely adjustable timing system genlocks to your house reference. An optional audio processor with analog and digital I/O, and an optional Digital Noise Reducer round out the 8500 Series—it's the total solution to signal acquisition and handling. No matter what sources you have - now, or in the future - the 8500 is ready.

Rock Steady TBC/Frame Synchronizer

Input video is synchronized to your house reference by an agile TBC/Frame Synchronizer. Even noisy and jittery analog sources are faithfully tracked to provide a steady, genlocked output. Robust signal handling ensures proper time base correction for virtually any source, even a consumer VHS machine. Select the SDI input and the 8500 is a serial digital frame sync.

8400 - The SD Solution for Digital Only

For facilities that are strictly digital, the 8400 provides all of the functionality of the 8500, without the analog I/O. Adjusting levels and synchronizing SDI signals is easy. Audio tracking delay and audio adjustments can be done through one of the sub module options, no need to take up an extra slot in the frame.

7500 - The HD Solution

If you need to synchronize HD signals and adjust video levels, the 7500 is the answer. Adjusting proc levels and synchronizing HD to house is made simple. HD formats supported include 720p, 1080i, 1080p and 1080sF. The 7500 can lock to analog reference or tri-level sync. Audio is handled by the optional 8415 sub module.

Audio - 4 or 8 Channels Handled Flawlessly

Embedding, disembedding or adjustments to audio that is already embedded is accomplished with sub module choices. Sub modules fit on the main processing module and do not take up a slot in the frame. There are three different audio sub modules available for use with the Signal Acquisition Solution modules. The 8510 sub module offers AES and analog I/O, handles adjustment for embedded audio, and provides tracking delay. The 8410 is similar, but does not have analog I/O. They can be used with either the 8500 or 8400 modules. The 8415 handles 8 channels of audio. It can be used with any of the Signal Acquisition Solution modules - 7500, 8400, and 8500. All audio processing is performed at 24 bits of resolution. All audio sub modules also provide a full-featured, audio mixer. Assignment of input channel to output channel is completely flexible, making it possible to swap any input to any output, or produce a mix of any input combination on any output.

10 Channels Per Frame

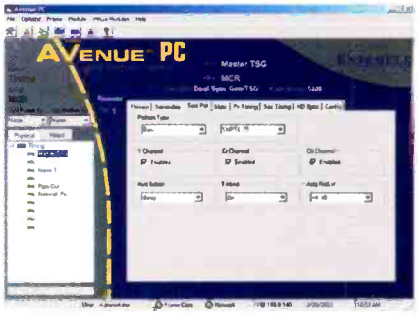
Ten Signal Acquisition Solution modules - any combination of 7500s, 8400s, and 8500s, including both the Audio and DNR Options, can be accommodated by the Avenue 3RU Frame. Now that's an efficient use of real estate!

Signal Integration

Avenue is a tray based signal integration system housed in a 3RU or 1RU frame. Avenue allows you to populate any combination of HD, SD, DVB-ASI, analog video and audio processing modules in the same frame. The 3RU frame holds ten modules and has optional redundant power, while the 1RU frame holds 3 modules. Frames are 1.5 Gb/s capable.

Powerful Control System

Built in networking lets you tie your Avenue system together, streamlining control and monitoring. All frames and modules in the system can be accessed from multiple locations in a facility, including remote locations via the internet. Any number of 1RU and 3RU frames can be connected together through the AveNet intraframe LAN bus to create an Avenue network. These networks can then communicate over Ethernet using the AveNet Over IP feature (AVIP). Avenue PC software gives you control of all module parameters and alarms. Modules settings can be easily saved and restored through Avenue PCs elegant user interface. SNMP monitoring can also be used to check module and signal health.



Comprehensive management and control is achieved by using any combination of Touch Screens, Express Panels and/or Avenue PC software. Front edge controls are also available for each module.

Express Proc Adjustments

The new Express Panel is one of the control surfaces available in the Avenue system. It has been designed specifically for signal acquisition applications and has dedicated knobs for video, chroma, pedestal and hue. Its intuitive interface with both dedicated knobs and a soft menu area make it a perfect fit for ingest and QC applications. In addition to proc controls, all modules parameters, such as timing and user levels, can be easily accessed through the Express Panel.

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Other Modules in the Avenue System:

- Video and Audio Converters
- Proc Amps
- Test Signal Generators
- Sync Pulse Generators
- ASI Modules
- Embedders
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- Logo Inserters
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BrightEye™

Video, Audio and Optical Converters

The BrightEye line of compact video converters from Ensemble Designs is a complete conversion solution. These self-contained converters interface to the full range of standard definition video formats: SDI, analog component, analog composite, and Y/C (S-Video). Audio converters, embedders and disembedders offer solutions for desktop and broadcast facilities. Additionally, with fiber optic I/O choices, BrightEye can take you farther than any ordinary converter.

Whether you're connecting a tape deck to a non-linear editor, digitizing a wild camera feed on a remote truck, or converting SDI to analog component to drive a video projector, BrightEye is there to help. With their multi-format inputs and outputs, BrightEye converters are the flexible answer to any conversion requirement. BrightEye's easy configuration interface and signal status indicators make it simple to install and troubleshoot a system. Their compact size lets you put conversion where it is needed: at a monitor, work station, or VTR. 525 (NTSC) and 625 (PAL) line standards are supported with automatic input sensing and switching.

BrightEye may offer the world's smallest TBC/Frame Synchronizer, but the features, specifications, and performance are far from tiny. All analog I/O is performed at 12 bits of resolution. Composite decoding incorporates sophisticated comb filters, and all internal processing meets or exceeds ITU-R601 specifications. BrightEye converters provide superb video quality where fine detail and subtle shading are faithfully reproduced.

Rackmounting BrightEye converters is easy. With an optional mounting kit, you can install 6 converters in just 1 rack unit. Since BrightEye converters are less than 6" deep, you can even rack them behind other equipment when space is at a premium.

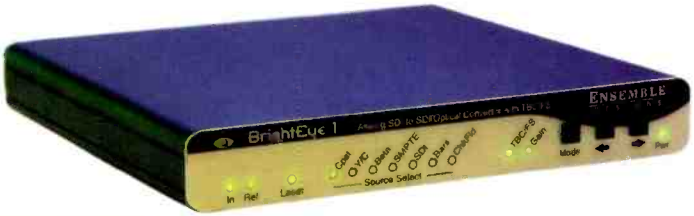
When distances take you beyond the reach of ordinary copper cable, look to BrightEye's fiber optic interfaces. With both laser diode fiber drivers and photodiode receivers, BrightEye can handle both ends of a fiber optic link. Fully compliant with SMPTE 297M, BrightEye's optical interfaces operate at a wavelength of 1310 nm. Integral SC type connectors make it easy to connect into fiber infrastructure.

6 BrightEye Units in 1RU

BrightEye 1

BrightEye™1

Analog/SDI to SDI/Optical Converter with TBC and Frame Sync



BrightEye 1 is a comprehensive solution to signal acquisition. With analog component, analog composite S-Video (Y/C), and SDI video inputs, it can take on any video source. The built-in Time Base Corrector/ Frame Synchronizer provides a rock steady output - even with marginal inputs. The reference input is used to genlock the converter output to house reference such as color black. Front panel controls select input source and format and adjust video gain. Simultaneous SDI (electrical) and Optical outputs are provided, so you can deliver the signal just about anywhere. Both Color Bars and the SDI Checkfield (Pathological) test patterns are included to facilitate transmission path testing.

Specifications

Serial Digital Input

Signal Type	SMPTE 259M
Impedance	75 Ω, BNC
Return Loss	> 15 dB
Max Cable Length	300 meters

Analog Input

Type	Beta/SMPTE, Y, Pr, Pb NTSC, PAL Composite NTSC, PAL S-Video
Impedance	75 Ω, BNC
Return Loss	> 40 dB
Input DC	+/- 1 volt DC
Input Hum	< 100 mV

Serial Digital Output

Type	SMPTE 259M
Impedance	75 Ω BNC
Return Loss	> 15 dB
Output DC	None (AC coupled)

Optical Output

Type	SMPTE 297M (Optical equivalent of 259M)
Wavelength	1310 nm
Power	- 7 dBm
Budget	11 dB
Maximum length	20km
Fiber Type	Multi or Single Mode
Connector	SC

Analog to SDI Performance

Bit Resolution	12 bit input quantization 4 X oversampling
Signal to Noise	> 62 dB, weighted
Minimum Delay	90 µsec

Frequency Response

Composite and Y	± 0.1 dB , 0 to 5.5 MHz
Pr, Pb	± 0.1 dB , 0 to 2.75 MHz

Reference Input

Type	1 V p-p Composite Video, PAL or NTSC
Impedance	75 Ω, BNC
Return Loss	> 40 dB

General Specifications

Size	5.625" W x 0.8 " H x 5.5" D (143 mm x 20 mm x 140 mm) including connectors
Power	12 volts, 7 watts (100-230 VAC modular power supply provided)
Temperature Range	0 to 40° C ambient
Relative Humidity	0 to 95° (noncondensing)

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BrightEye™

Video, Audio and Optical Converters

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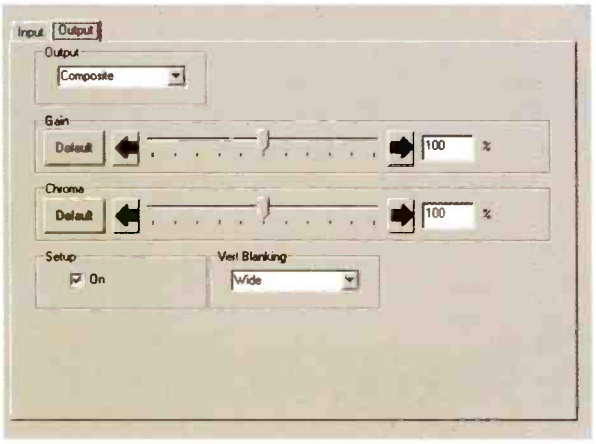
- **BrightEye 2**
  Analog to SDI Converter
- **BrightEye 3**
  Analog to SDI Converter with TBC and Frame Sync
- **BrightEye 4**
  SDI Electrical to Optical Converter
- **BrightEye 10**
  Optical/SDI to Analog/SDI Converter
- **BrightEye 11**
  SDI to Analog Converter
- **BrightEye 12**
  Optical to SDI Electrical Converter

NEW

- **BrightEye 20**
  Analog & AES Embedder or Disembedder
- **BrightEye 21**
  AES/SDI Audio Embedder
- **BrightEye 22**
  SDI/AES Disembedder
- **BrightEye 23**
  Analog Audio/SDI Embedder
- **BrightEye 24**
  SDI to Analog Converter and Disembedder
- **BrightEye 30**
  Audio ADC and DAC, Bi-directional
- **BrightEye 54**
  Sync Generator and Test Signal Generator

BrightEye PC can control a single BrightEye unit or any number of units connected to a USB hub. Additionally, BrightEye PC can be used to upgrade BrightEye units as new software versions become available.



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Local weather networks

BY ILEANA ENDOM AND JAMES AMAN

One of the best ways to connect with the viewer is to provide accurate local weather forecasts and conditions. While it sounds simple, it's actually quite complex. Local weather information can only come from local weather sensors. To get accurate information from a variety of locations, stations need remote sensors throughout the communities they serve.

One solution to gathering weather data throughout a station's service area is to rely on the resources of the weather services located at airports. While there's nothing inherently wrong with this approach, there may not be airports at all the locations for which a station would like to report weather information.

Distributed measurements

To accurately and effectively provide hyper-local weather data, more than 100 broadcast meteorologists use a new approach to build their own local forecasts by monitoring weather at the micro-climate level. At the same time, they can tap into a shared nationwide network of more than 6000 weather stations. In the United States, this network is owned and operated by WeatherBug Media Services in partnership with local TV stations.

There are three key components to this all-digital network.

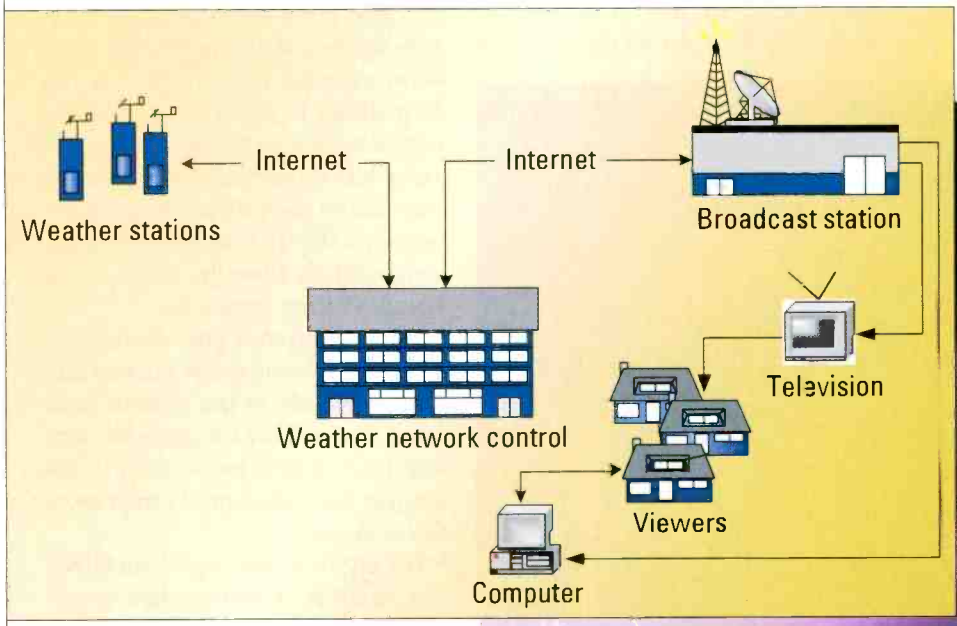
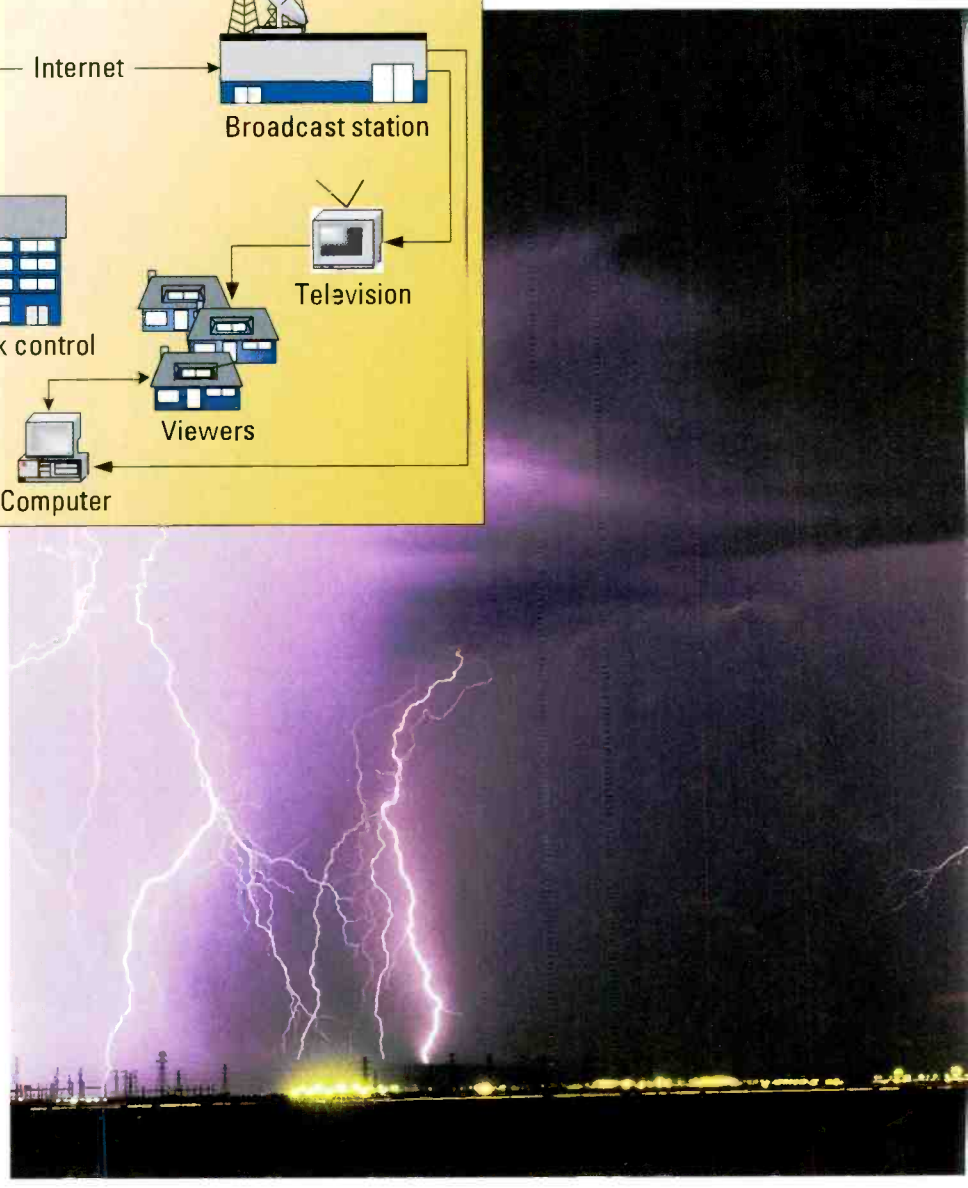


Figure 1. A network of 6000 local sensors allow the weather presenter to assemble data for any group of sensors over a defined area. This information can be combined with prepackaged data assembled by meteorologists at the network.



They include the individual weather stations, a network center to collect and parse the data, and the local TV station's presentation. (See Figure 1 on page 43.)

Approximately 6000 weather stations are located throughout the United States. They provide pinpoint-accurate data on weather conditions at each location. A centralized network control center gathers and parses the data from these weather stations for use by the local TV station meteorologists. This data can be used as a resource for forecasting or for on-air presentations and streaming real-time data.

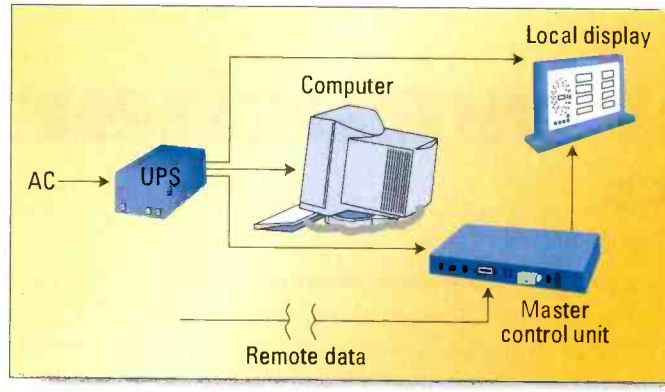
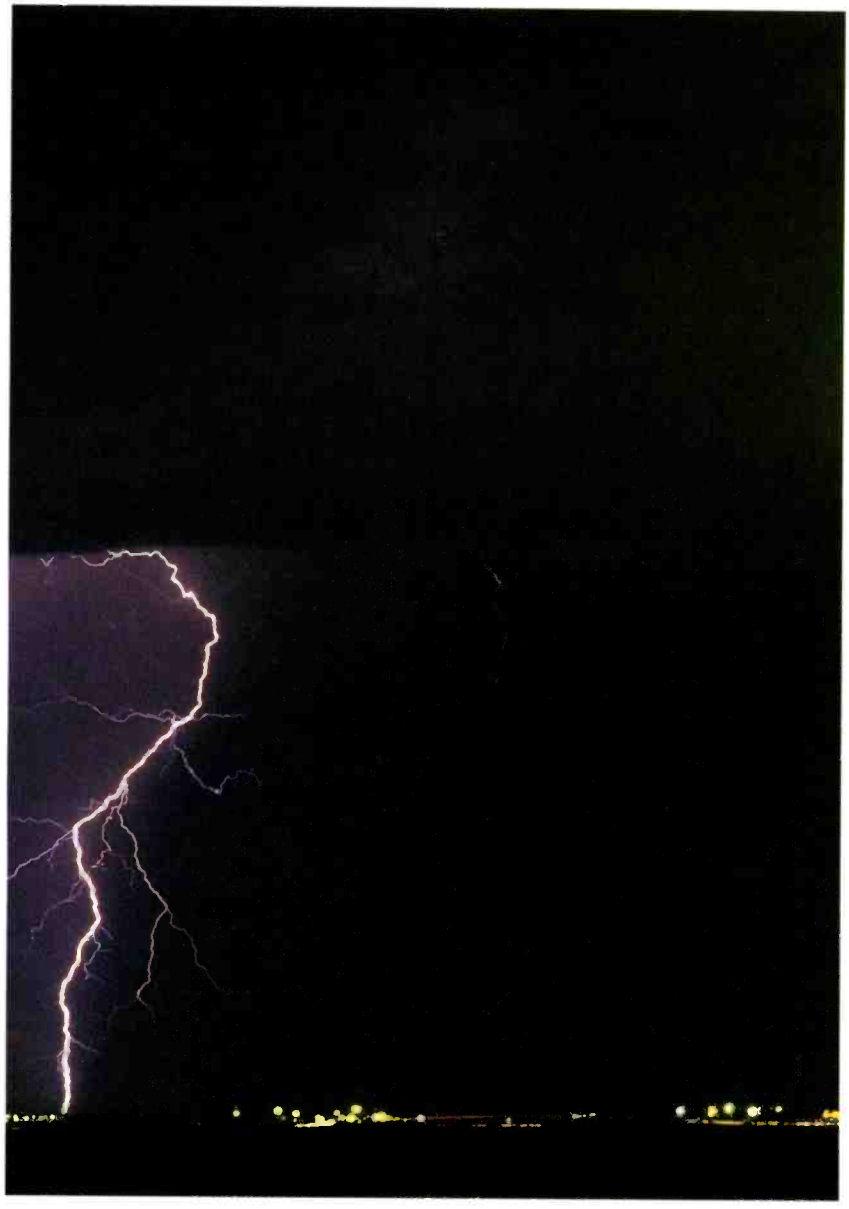


Figure 2. The key school installation consists of a PC, master control unit and remote display of weather parameters.



The weather station

Each weather station houses a variety of meteorological equipment and consists of both outdoor and indoor components. (See Figure 2.) Key equipment includes a thermometer, hygrometer, dew point and barometric pressure sensors, anemometer and wind vane, a rainfall sensor, and cameras. In addition to the regular meteorological equipment, the system provides A/D converters and an Internet interface so the data can be easily accessed via TCP/IP. Cameras installed in some stations allow live images to be broadcast from those sites.

A streaming server provides the real-time weather data to the Internet and simultaneously to the remote computer. The weather stations with cameras have images transmitted to the weather network control center every five minutes.

The entire system is self-contained and operates 24 hours a day, providing real-time, up-to-the-second weather observations. Most of the network's weather stations are based at local schools that subscribe to an in-classroom curriculum program called WeatherBug Achieve.

The first consideration is where to locate the outdoor weather station instruments. (See Figure 3 on page 46.) Consider that these systems are not like antennas and should not be mounted multi-stories above ground or on high structures. When possible, they should be located at ground level because that's the environment that viewers experience. Look for an open area clear of wind obstructions that is far away from ventilation and heat sources. They should be safe from vandalism and far away from large asphalt or concrete

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26x7.8AIF Tele Super Zoom

TL Mobile Television, Inc.
Springfield, MO

"We own two Thales Angenieux 26 X Telephoto Zoom lenses (along with five other lenses from Thales Angenieux) that we started using in June of 2003 after consulting with industry peers and comparing glass from competitive manufacturers. We found Thales Angenieux lenses to be just as good, if not better than competitive brands – and their prices were very attractive – which provides a significant cost-performance advantage," said Troy Fain, President of TL Mobile Television, Inc.

26 x 7.8AIF.HR Tele Super Zoom
26 x 7.8AIF.HD Tele Super Zoom

"Our clients love the quality, and our operators have found the 26X Thales Angenieux lenses great for handheld camera work because they deliver the extra range we want for sports coverage while providing that extra degree of mobility" concluded Mr. Fain.

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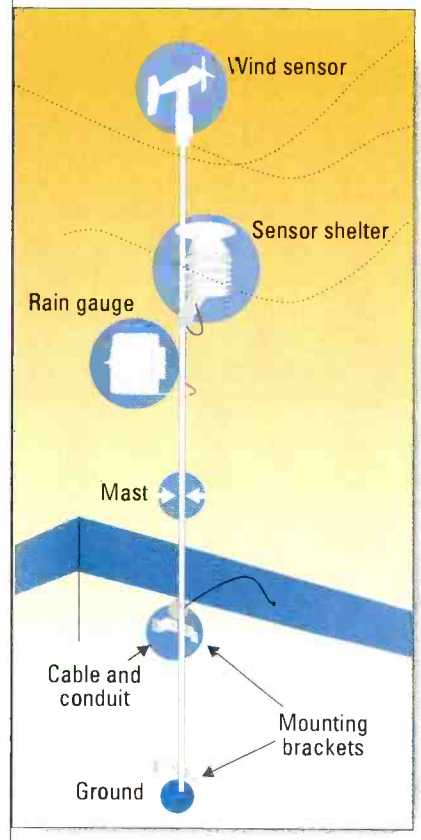

Figure 3. The outdoor sensors should be mounted at ground level if possible, away from heat sources or large heat re-reradiating surfaces.

parking lots or building walls because these surfaces re-radiate heat.

If the system is located near a school, an optional set of classroom equipment can be installed. This consists of a PC connected via cable to the remote station and its sensors. The PC station also houses indoor barometric pressure, temperature and auxiliary temperature sensors. An optional LED display is continually updated with daily temperature highs, lows and rates of change.

The local perspective

Supported by the network of weather stations and the data provided by the company's meteorologists, broadcasters can develop compelling weather presentations at the micro-local level. Broadcasters with the Zoom product can create presentations that include real-time weather data combined with time-lapse image loops. Presenters also can combine time-lapse images with associated weather data onto one map background and then zoom into each one for detailed, real-time weather information. The software relies on a simple-to-learn layout, complete with predefined templates, and it is highly configurable for local applications.

As television stations better understand the benefits from an emphasized local presence, new tools such as customized local weather will become even more important. This approach to gathering local weather data for on-air presentation is simple, versatile and applicable around the world.

Weather is a common human interest. When stations add this level of localism to their weathercasts, they can begin to build an even stronger attachment with viewers. BE

Ileana Endom is a product manager and James Aman is a meteorologist with WeatherBug Media Services.

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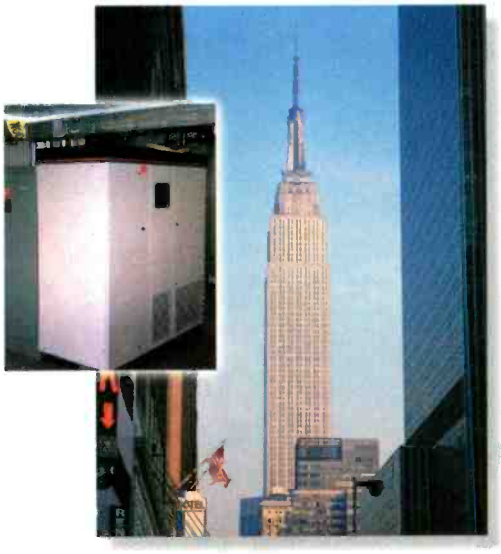

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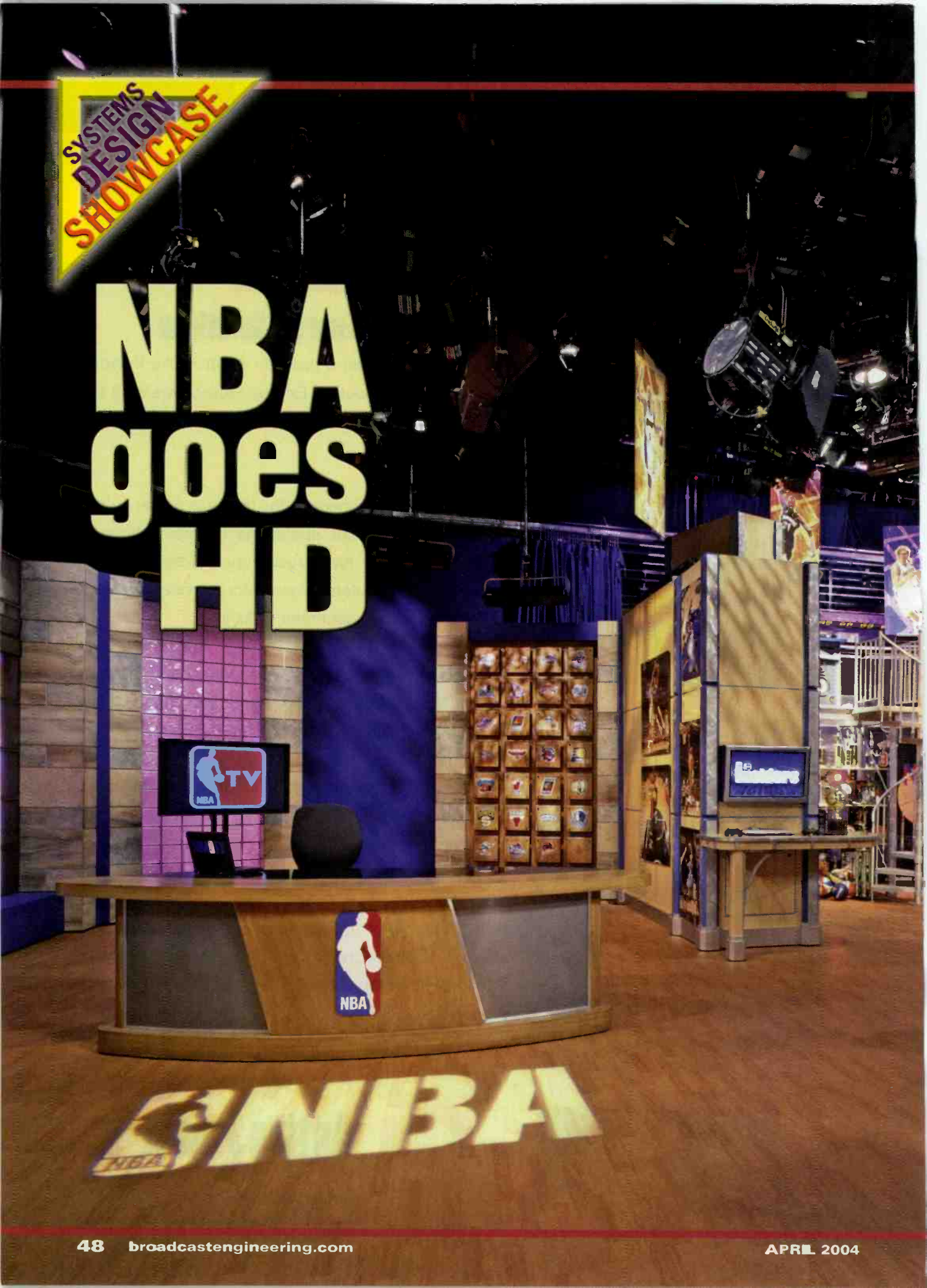
SYSTEMS DESIGN SHOWCASE
NBA goes HD
NBA TV
NBA
NBA

The NBAE's recently upgraded production and broadcast facilities in Secaucus, NJ, are now able to accommodate high-definition production, enabling the channel to produce around 50 games in the 1080i HDTV format this season. Photos courtesy Dave King/NBAE/Getty Images.

BY MICHAEL GROTTICELLI

In today's crowded field of sports broadcasting, it's not easy to stand out. But, with a series of significant carriage deals on direct-broadcast satellite and cable television, and some shrewd technology choices, the National Basketball Association Entertainment (NBAE)'s NBA TV channel has managed to do just that.

NBA TV recently upgraded the NBAE's existing production and broadcast facilities in Secaucus, NJ, to accommodate high-definition production. The channel now reaches over 45 million households and will produce roughly 50 games in the 1080i HDTV format this season. Many of the game telecasts will include Dolby Digital multichannel audio. The 24-hour sports channel will produce 95 regular-season NBA games and select NBA playoff games in 2003-2004.

NBA TV was launched on Nov. 2, 1999, and transmitted its first digital HD telecast, a game between the New York Knicks and Los Angeles Lakers, in January 2003. As a league that has always recognized the value of new technology for its sports production, the NBA produced its first analog HD game in 1992 (using the 1125-line system, in tandem with Japanese broadcaster NHK) for the All-Star game in Charlotte, NC.

Yet, HDTV is more than just great pictures. Mike Rokosa, senior director of engineering at NBAE, said that, besides the pristine images the NBAE wants to give the fans at home the entire experience, including the sights and sounds, of sitting courtside. He said, that even for those consumers who don't have surround sound systems or digital TV sets, paying attention to the outgoing audio signal makes a difference to the analog experience as well.

That's why the NBAE has installed a Solid State Logic (SSL) C100 digital broadcast audio console as the centerpiece of a new networked audio suite that can handle both stereo and a live 5.1 Dolby Digital AC-3 mix from the

The centerpiece of NBAE's new networked audio suite is Solid State Logic's C100 digital broadcast audio console. It is configured with 96 channels and 48 faders, and can handle both a stereo and live 5.1 Dolby Digital AC-3 mix from the same interface.

same interface. Rokosa said the SSL C100 has streamlined audio production and made program and live game setup fast and easy. The board's redundant features and digital audio signal-routing capabilities have also helped move signals around more reliably than the NBA ever could before. It includes built-in mix-minus features, eight audio subgroups, two program outs (for second-language programming), clean-feed buses, 24 auxiliary sends and metering for every input and bus output.

The console's audio metering uses high-resolution TFT displays instead of traditional bar graphs, allowing the NBA audio engineers to monitor closely the incoming and outgoing audio levels during a live game broadcast. There are also redundant power supplies throughout the board and a self-healing DSP function to ensure against on-air failure.

The NBAE completed the renovations and transition of the entire facility from mostly analog to standard-definition digital (and HD) equipment last fall. Rokosa supervised the move to an expanded and completely restructured signal-distribution infrastructure, which can now handle virtually every analog and digital signal — audio and video — that comes into the building. During construction, the channel's Secaucus facility was off the air a total of three days (when it operated off servers located in the NBA's master-control facility in Stamford, CT).

The NBAE completed the renovations and transition of the entire facility from mostly analog to standard-definition digital (and HD) equipment last fall.

Constantly in a state of frenetic activity, the new facility supports NBA TV productions, other NBAE productions and programs produced for other networks, such as "Inside Stuff" for ABC, "Matchup" on ESPN, "NBA Action" on FOX Sports Net (seen in more than 100 countries) and "NBA Jam," a youth-oriented program distributed internationally. The facility produces video news releases for outside corporate clients as well.

The NBAE facility is also responsible for content flowing through the NBA's online properties, including its popular NBA.com Web site. On most game nights, video highlights, box scores and player statistics are available on the Web site within 15 minutes of (and sometimes immediately after) their live occurrence on the court. In addition to sharing information, the TV and Web groups at NBA TV have adjoining newsrooms that allow reporters to collaborate on breaking news and programs.

The HD facility upgrade included new plant routing, miles of super-wideband-capacity fiber cabling, a new production-control room, a new digital audio suite and new Sony HDC900 studio and HDC950 portable HDCAM cameras.

The production studio control room features a Sony MVS-8000 HD switcher, an NVISION wideband router, a Solid State Logic C100 digital audio broadcast console and an adjoining "game room" based around a Leitch Technology Opus

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master-control switcher that handles live game coordination. One operator handles both the SD and HD game broadcasts from a single Leitch control panel.

Because of the efficiency and reliability of the equipment, staffing is kept to a minimum. Besides the on-site production crew, a producer, graphics operator and master-control operator in Secaucus produce each NBA TV program. When the NBA partners with another broadcaster, as it does regularly with FOX Sports Net and other locals on game coverage, all the NBA will send is an associate producer to coordinate the production.

The on-site truck sends live feeds from particular games back to the game room in Secaucus through satellite backhaul transmission. The graphics operator in Secaucus produces player titles and other graphics for the games on both SD and HD Chyron Duet systems, and the master-control operator inserts them into the appropriate feed there prior to each broadcast. A special software interface (designed by the NBA) synchronizes the two Chyron graphics platforms. The software automatically receives statistical data from each game in the league and displays it either as a lower-third key or as a full page such as a box score.

Because of the efficiency and reliability of the equipment, staffing is kept to a minimum.

Courtside NBA statisticians generate the game/player stats, key in the data and send it back to Secaucus through IP transmission. Within seconds of their input, the statistics appear on viewers' screens through pre-designed templates inside the Duet systems. There's virtually no human intervention. Both Duet systems are set to "Auto Reveal" mode to make it happen immediately.

Because of the Duet systems in place, the NBA TV does not need to send graphics people to each game, saving time, money and valuable resources. The strategy also provides NBA TV art designers with more creative control, according to Rokosa, and a consistent graphics look for all NBA TV games.

Game-clock, shot-clock and

This shot of NBATV's equipment room shows Panasonic AJ-HD150 DVCPRO HD machines and AJ-FRC27 frame rate converters in the first rack and Sony HDW500s in the second rack. The third rack has a Sony HDWM2100 machine. The rest of the racks, for the most part, hold standard BVW and DVW tape machines.

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scoreboard information from each arena is also displayed in real time, thanks to a hardware/software system co-designed by Leitch engineers and the NBA.

Making the pictures sound good

Wherever possible, NBA TV sends a 5.1 Dolby Digital AC-3 mix with the HD broadcast, using the new SSL C100 audio console that's configured with 96 channels and 48 faders. Otherwise, the games air in stereo. In some cities, depending upon truck capability and availability of local HDTV feeds, the NBA has partnered with a local digital broadcaster to present the full HD experience. NBA TV employs Dolby E technology to transmit the multichannel audio with the video back to Secaucus.

NBAE uses the SSL C100 console to handle a discrete mix of the game with studio elements and distributes it throughout the facility to the appropriate person for finishing before re-encoding it for the 5.1 broadcast. SSL recently released a new software upgrade (V1.5) that offers new console-redundancy, control-management and third-party router-integration features.

Equipment in the new NBAE audio suite includes a Telos Systems crew-communication system, a Telex ADAM digital intercom system, a 360 Systems Instant Replay audio-clip server and a digital cartridge machine. The suite is tied into a large audio-clips server that holds over 300,000 music and audio titles used to drive the NBA's productions. The NBA developed the music-clips system using an IBM server running MSoft software to locate and retrieve specific clips instantly.

Fiber optics completely connect the audio-production area to the rest of the facility. For example, it seamlessly links the console to the Sony production switcher and NVISION router, allowing the console to handle a variety of productions with a few button pushes (salvos) that call up stored audio presets. With the C100 console, NBA TV can produce an SD studio show in the morning, mix an HDTV game in the evening, then go back to a SD highlights show at night. The console also instantly converts audio from stereo to multichannel and back. Rokosa said, that during a four-hour programming block of game coverage they sometimes switch between formats during commercial breaks.

Andy Surfer, senior systems engineer at NBAE, likes the fact that the SSL C100's TFT monitors display a wide range of information and use a minimal amount of buttons to reveal system subgroups and features. He can configure the monitors in a number of ways to control individual features. In addition, these preset salvos make it easy for freelancers to work the console, as is often the case at the Secaucus facility. The board's power supplies and faders are hot-swappable, enabling NBA engineers to change components while the board continues to operate. On-site training from SSL and Sony has helped keep the gear productive.

HD video provides a competitive advantage

The video-production division at the NBAE facility includes 14 nonlinear-edit rooms with Thomson

Design team

Mike Rokosa, senior director of engineering, NBAE
Andy Surfer and Takashi Kohiyama, senior systems engineers, NBAE
CBS Engineering and Construction, New York City

Equipment list

Solid State Logic C100 broadcast audio console
Thomson Grass Valley
- PVS-3000 HD servers
- NewEdit live editing

Sony
- 900 and 950 HDCAM cameras
- MVS-8000 HD production switcher
- SRW-5000 HDCAM VTRs
- CRT monitors

Pinnacle Liquid post-production editing
Chyron Duet system (both SD and HD)
Hammerhead Graphics (clock and score bug)
Quantel iQ HD video editing
Leitch
- Opus master control
- LogoMotion (both HD and SD)
- NEO modular products

Fairlight Dream post sweetening system
Evertz upconverters and sync generators
Panasonic format converters
NVISION routing switcher
Philips plasma monitors
Dolby E, Dolby D (AC-3) and Dolby Pro logic encoders and processors
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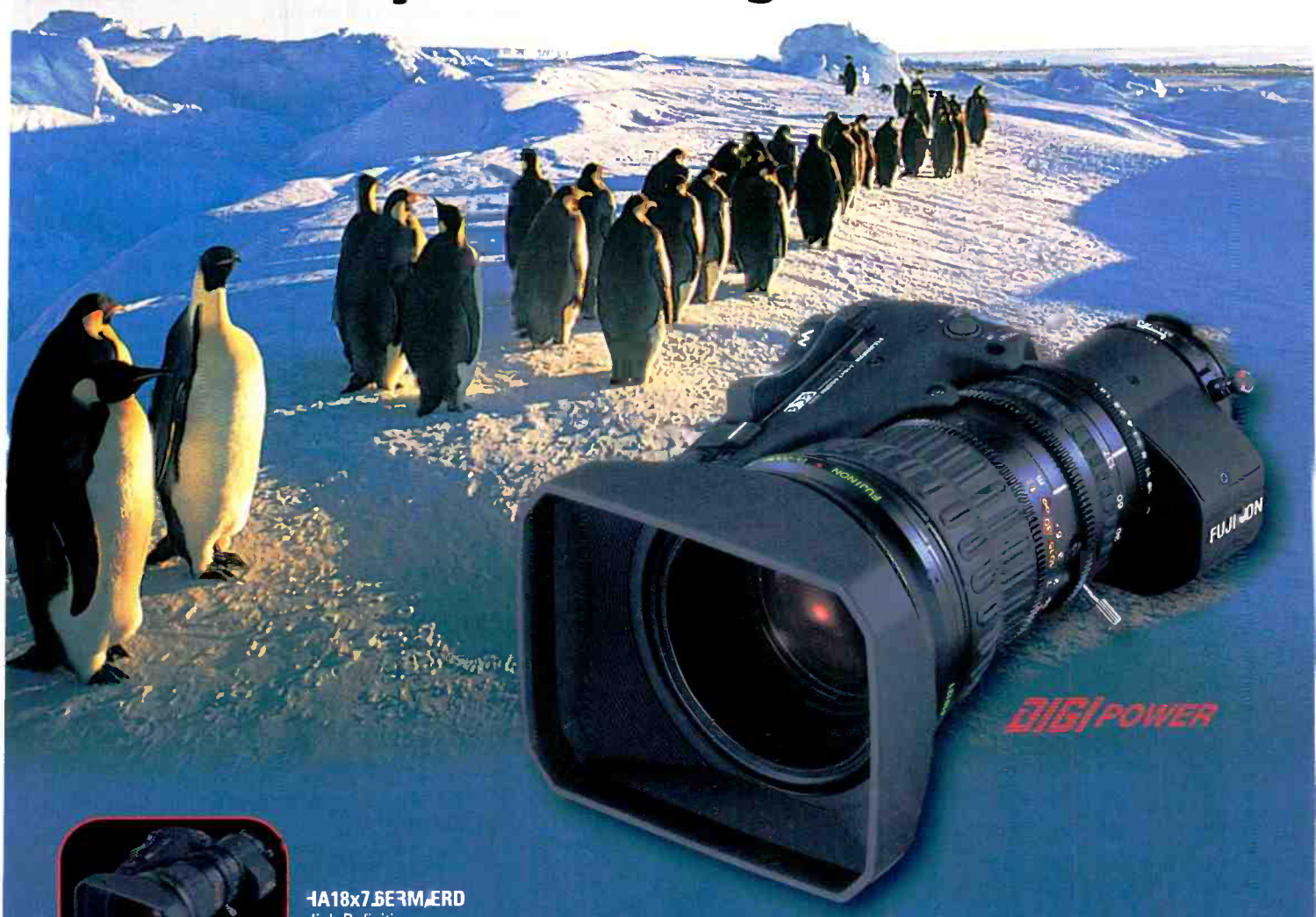

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Desktop browsing with a Virage low-resolution file system allows producers and reporters to preview incoming video feeds and make basic edit decision lists at their desktops. The final step in the building's transition, according to Rokosa, is to create an asset-management system with hierarchical storage to be used by both the facility and other NBA facilities around the country that will share the material on demand.

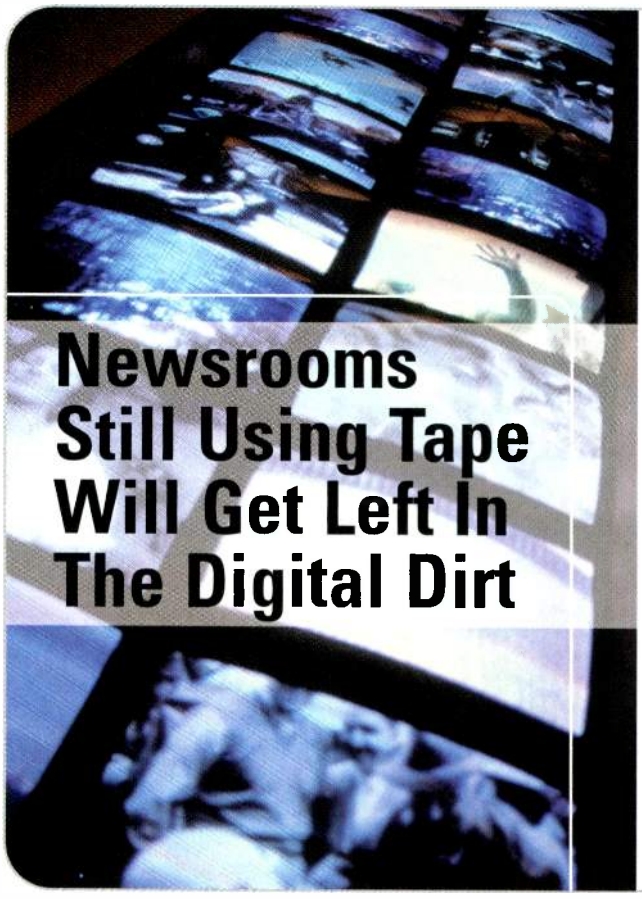
The NBAE's video library is probably its most valuable asset, Rokosa said. It offers game footage that dates back to the start of the league in 1946 up to the present. Video footage is currently archived on digital Betacam or HDCAM videotape in an archaic database-library system. NBA statisticians log in games, with individual plays assigned specific time-code numbers, which makes them easy to locate and retrieve at a later date when building highlight reels.

The NBAE's video library is probably its most valuable asset.

Although he's responsible for the entire facility, Rokosa is sensitive to the audio complement of the NBA TV's feed. Back in 1987, he helped introduce Dolby Surround sound to live sports during the Super Bowl. He's quick to stress the importance of a good audio feed to the home. The choice of equipment, Rokosa said, was critical to the league's vision (and sound).

So, the next time you're watching a professional basketball game on NBA TV, close your eyes for a moment and listen to the surround-sound mix. It brings the game into your living room. The NBA thinks that's a good way to beat the competition. BE

Michael Groticelli regularly reports on the professional video and broadcast technology industry.



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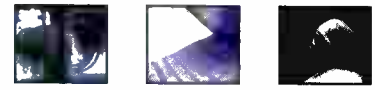

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Television antenna systems

BY DON MARKLEY

In the past few months, this column has discussed many issues involved with propagation. But it might be helpful to look at a broad overview of television transmitting antennas in general. This might benefit those who have recently entered the broadcast field or those who are being driven to move from VHF to UHF by DTV.

No magic stick

The first thing that the newcomer to the television RF business should realize is that there is no magic radiating stick that will cure all the station's ills, including its advertising rates. Second, there are usually several antennas available that will do a decent job of serving a market, especially when you are considering simple, nondirectional systems. In fact, there are only a few antenna combinations that you should avoid.

VHF batwing antennas

For the VHF band, the old tried-and-true standby is the batwing, or superturnstile, antenna. It uses broadband radiators mounted around a pole. At each level on the pole, the batwing radiators are arranged in two pairs. Each radiator in a pair works with its counterpart on the opposite side of the pole. Each pair of radiators is fed a signal that is 90° out of phase with the other pair at that level, generating a fairly omnidirectional, horizontally polarized signal. The four radiators at each level constitute what is usually called a bay. In other words, if there are four levels of batwing-radiating elements, the system is called a four-bay batwing or superturnstile. The advantages of this type of antenna are good bandwidth, simple design, good long-term stability and relatively low cost. The disadvantage is that there are numerous pieces involved. Power dividers send cables to each radiator. A six-bay batwing needs 24 radiators, 24 transmission lines cut to exact length, at least two power dividers (probably four) and at least two fine matchers. In time, the owner of this type of antenna will need to replace the feedlines and maybe the power dividers.

The batwing is primarily a nondirectional antenna. But broadcasters can achieve some directional patterns by varying the power-division scheme and/or the phase of the power to the elements. These methods are commonly used, although obtaining varying amounts of beam tilt and null fill is common and easily attainable. Remember, think of the batwing as an antenna with a parallel feed — that is, the power is divided down until each radiator gets its own feedline. A big advantage to antennas of that type is that they allow broadcasters to manipulate the power and phase of individual elements — almost like an AM array — to get the desired pattern and performance.

A big advantage to batwing antennas is that you can manipulate the power and phase of individual elements.

VHF panel antennas

VHF TV stations also use panels of one type or another. These are usually wrapped around the tower and may have three, four or five panels at each level. Individual radiators are mounted in front of the panel. The radiators can be simple dipoles, crossed dipoles for circular polarization, cavity-backed radiators, or other configurations for horizontal, elliptical or circular polarization. As with the batwing, the power is divided down until the radiator on each panel receives its signal from its own transmission line. These usually employ only one radiator per panel because of the relatively large wavelengths involved.

FRAME GRAB

A look at the consumer side of DTV

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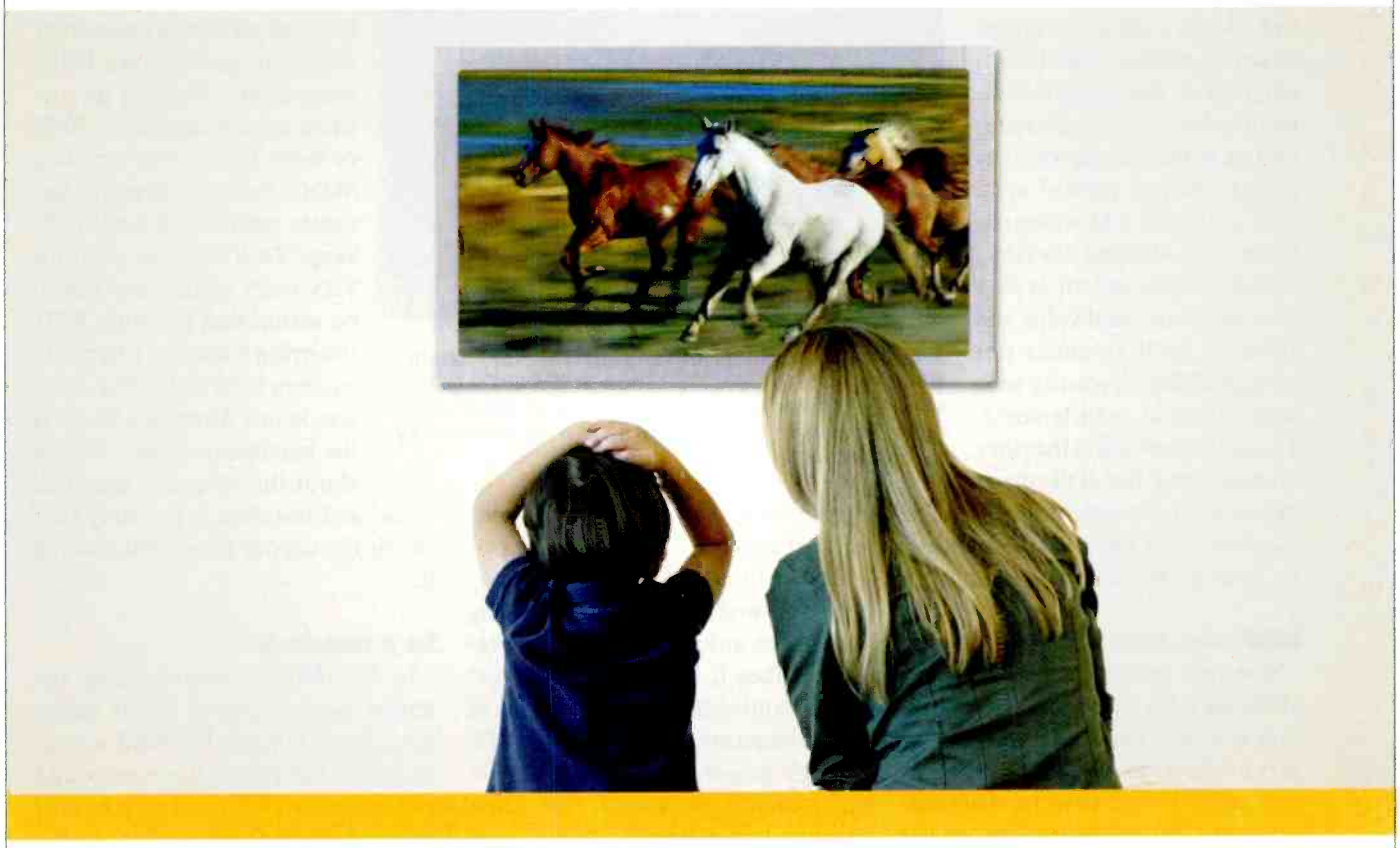

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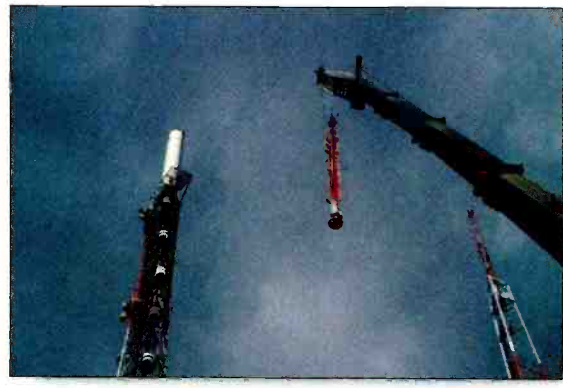
At UHF frequencies, the smaller wavelengths allow antennas to have one or several smaller radiators mounted on each panel.

VHF dipole antennas

Finally, some VHF stations use large dipole arrays mounted around a mast. Usually, they do this to achieve directionality, circular polarization or both. The dipoles may be fed either in parallel or in series like an FM antenna. Some VHF stations use large, traveling-wave antennas that have excellent bandwidth and stability. Such antennas can have good life expectancy with only minimal maintenance. The only drawback is that they are a bit heavy. But, if the tower can support the weight, they provide the ability to be directionalized and offer great performance.



A crane lifts a superturnstile antenna for installation atop a DTV-panel antenna at KUAT-TV in Tucson, AZ. The three levels of batwing-shaped radiators identify the antenna as a three-bay superturnstile.

UHF slot antennas

Now let's consider UHF antennas. Here, the odds-on favorite configuration is a slot. These antennas use either a cylinder or panels with an opening cut in them that will radiate well at the desired frequency. The signals feed the slots either in an end-feed or center-feed configuration. Convention attendees often hear arguments that favor one configuration or the other. Suffice it to say that both configurations work — period.

Slot antennas offer some big advantages. They have good bandwidth over a single channel, although some are usable over several channels. Generally speaking, their power-handling capacity is limited only by what the feed system will handle. They are normally stable and require little maintenance. They are available in a broad range of power-handling capacities, from small types such as the Scala SL-8 up to models that will handle over 300kW input power. Much to the favor of the front-office suits, both models — nondirectional or directional — are relatively inexpensive.

Some antennas use slot radiators mounted in sections, which are then fed RF power individually. The transmission lines run from power dividers that are either internal to the cylinder or mounted below the tower top with multiple feedlines coming out of the antenna. This configuration makes it a little easier to get broad bandwidth. Several versions of this antenna are available, from LPTV to high power. Some of the LPTV configurations use a few slots mounted in a bay fed by a single transmission line. This enables the broadcaster to stack several bays for added gain.

Caveat engineer

Now let's look at what to avoid. First, avoid any antenna whose maker claims it has enormous gain coupled with small physical size. Manufacturers of such antennas are conjuring the gain from either snake oil or magic because they sure won't find it in physics. An antenna's gain is always going to be a function of its size in wavelength. Lest the author be accused of heresy, the reader is advised to check any text on antennas and/or antenna design. The size of the aperture in wavelength is always involved in gain. For a given pattern, the antenna has to be longer to offer more gain. It is possible to increase gain in one or more directions by reducing the gain in others, but the RMS value of that pattern remains a function of aperture length.

Next, retreat post haste from anyone who claims that one or more components on the antenna aren't critical or sensitive to antenna performance. In the process of adjusting an antenna for a return loss of 30dB or more all the way across a 6MHz channel, everything becomes critical and touchy. To keep VSWR down around 1.05, every adjustment has to be within that last little RCH (referring to the Red Chaffrich, an often loud and rather abrasive South American bird). If the manufacturer isn't touchy about the antenna's handled, tuned and installed, it probably isn't worth the copper he wasted making it.

In a nutshell

So, for VHF, the most common antennas use batwing or dipole radiators, either mounted around a mast or in front of panels that are around a pole or tower. For UHF, the most common antenna is a slot-type radiator. The slots may be cut in a cylinder and fed by a coaxial scheme, cut into small panels fed by multiple lines, constructed two or more to a small antenna with several such antennas stacked, or simply cut into the sides of a circular waveguide. Some UHF antennas use other radiator types, but their use is often specialized for a unique set of requirements. Before buying any antenna, check carefully with the consulting engineer. Usually, he will be experienced in selecting transmitting antennas to meet the station's general or specialized needs. BE

Don Markley is president of D.L. Markley and Associates, Peoria, IL.

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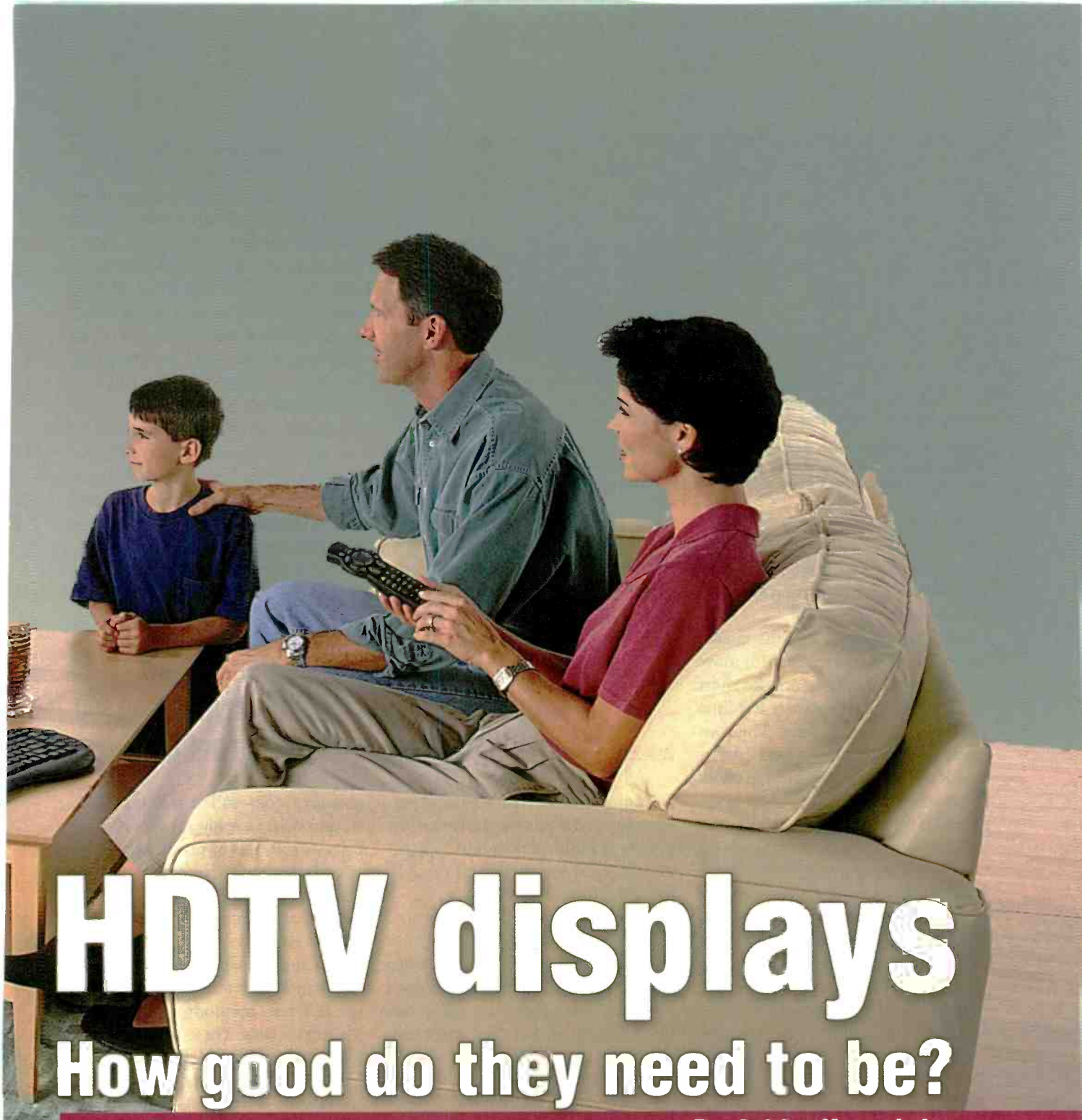
Broadcasters talk to viewers through their displays, and should take the needs and capabilities of the human eye into consideration when creating and delivering content. Information must be presented in a way that will result in a relaxed and enjoyable home viewing experience. Pictured: RCA's HD50THW262.



HDTV displays

How good do they need to be?

By Jukka Hamalaien

Just as color TV technology did some 50 years ago, digital HDTV is finally beginning to enter American homes. Unfortunately, for a time, the limited amount of programming and high cost of the HD sets created a roadblock to widespread and rapid adoption. The situation is changing now as a result of the FCC mandate requiring TV broadcast receivers to include DTV reception capability in large-screen receivers beginning this year, and for all TV reception equipment starting July 2007. Combined with these factors are exciting new display technologies and lower set prices, which have helped to finally launch HD as the standard by which viewers will describe their video experience.

The question for display quality then becomes "How good is good enough?" Broadcast professionals are expected to be the experts on this question. And the image quality viewers expect to see on their own TV sets will affect the equipment, programming and even creative decisions made in stations and production houses.

As price and technical capability merge, what should consumers expect from the new display technology, and

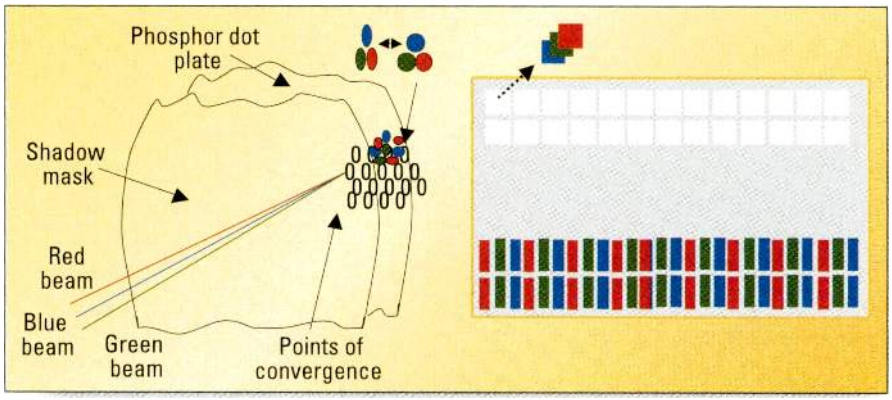


Figure 1. Comparison between analog CRT (left) and today's digital displays (right). The three-level flat or projected displays afford vastly improved resolution, in part because of the closer spacing between picture elements — pixels.

how should performance be evaluated? This discussion covers high-quality display technology for home entertainment, information and education applications.

First, keep in mind that the images television provides are primarily moving. Still shots are shown only for short periods. Second, the viewer has little control over those images. The program director, producer and editors decide what is seen. Viewers don't walk closer to the TV screen in order to see details. If the producer decides that the viewer needs details, he provides a close-up. This means that the viewer has little choice in where his attention is directed. At best, all he can do is move his attention from one area of the screen to another.

Crucial to this discussion is that displays talk to viewers through the eyes. It is therefore useless to display anything on the screen that a viewer's eyes cannot perceive. Finally, whatever information is presented on the screen should not strain the eyes. The goal is for the viewer to be relaxed and enjoy the entertainment and performances. All this means is that the quality of the display should approximately equal the needs and capability of the human eye.

The displays talk to viewers through the eyes; therefore it is useless to put anything on the screen that a viewer's eyes cannot perceive.

Display technology

Let's first look back at old-style video display screens. Perhaps the biggest problem with older (and most current) displays is that they don't have enough scan lines. While 525 lines (NTSC) or 625 lines (PAL) are the standards, useful display area is limited to about 400 lines for NTSC and 500 lines for PAL. An obvious major disadvantage of these old systems is that the line structure is too visible. One solution often used on high-end home theater projector displays is line doubling. While not HD quality, it's a step in the right direction. And, in fact, that's just what the new HD standards do, double the vertical resolution.

A major change, common to all new displays, is that images are no longer scanned line-by-line. The new displays address the screen as a matrix of rows and columns, much like random address memories. Screens are in fact RAMs. For short periods, the desired brightness values are stored in memory cells called pixels. Thus, screens don't have lines any more, only rows or columns of pixels. Each pixel is composed of three-color sub-pixels. (See Figure 1.)

While conventional analog CRTs rely on the electron beam scanning the screen surface, where it is amplitude (or intensity) modulated, new displays use different methods of presenting the digital data. These methods vary from pulse width modulation (PWM) to displaying the binary digits directly. (See Figure 2.)

In an eight-bit digital system, each pixel has to be addressed eight times (once for each bit) to define the brightness of each pixel on the screen. This means that each video frame becomes eight subframes. In case of the PWM, the first subframe carries the least significant bit value (0 or 1) of each pixel with the shortest exposure time. The next bit (0 or 1) is written during the second subframe and exposed longer.

All of this would be worthless were it not for the eye's ability to "store" in-

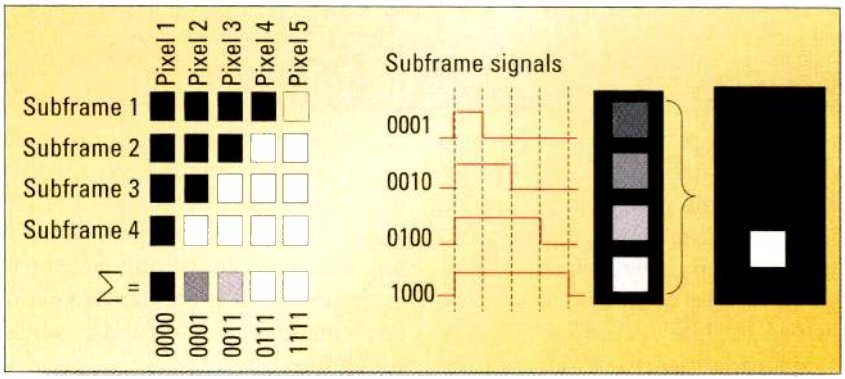
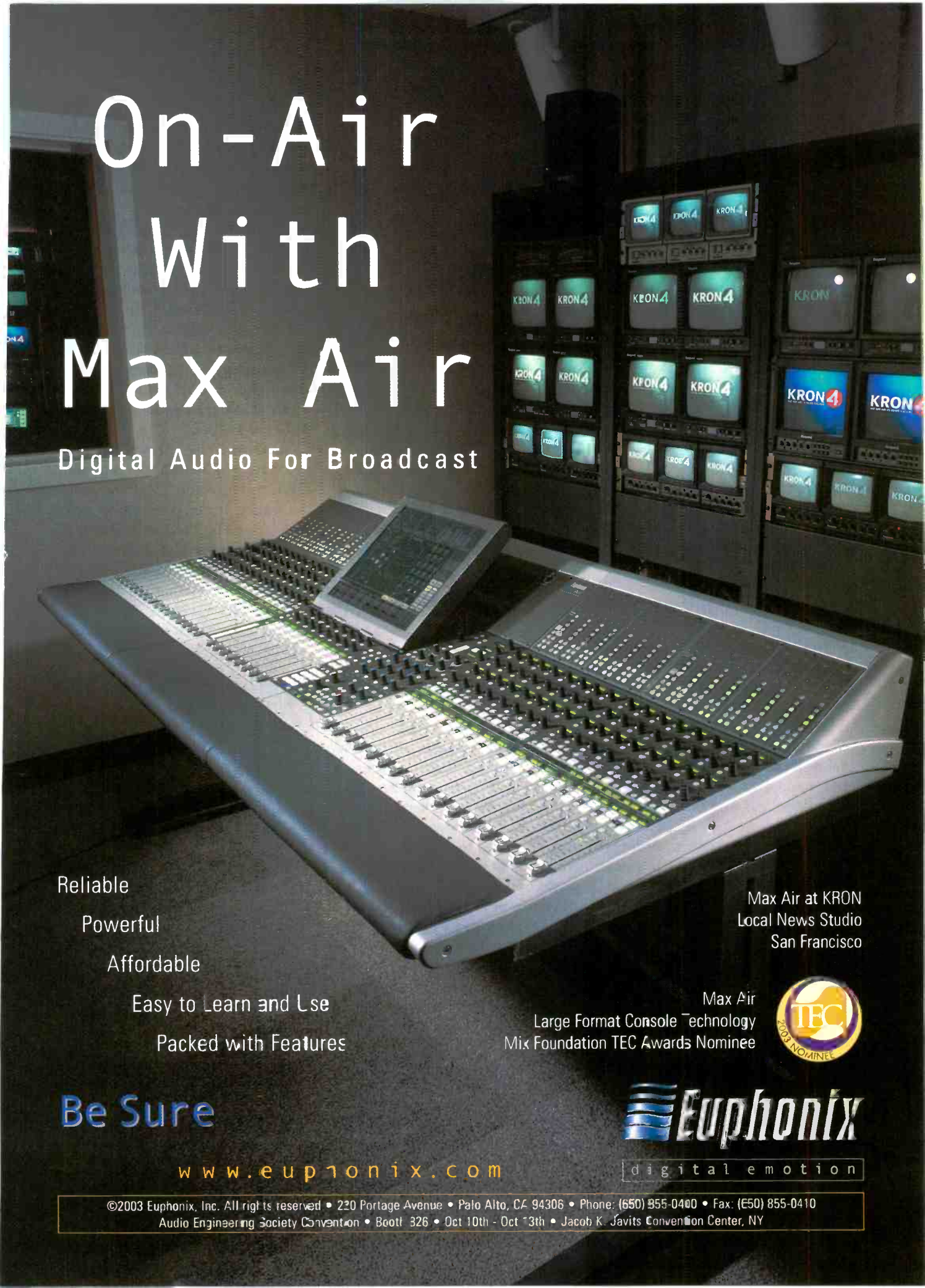


Figure 2. Digital displays typically rely on an eight-bit architecture. This produces 256 levels of gray or more than 16 million colors. A four-bit example is shown above.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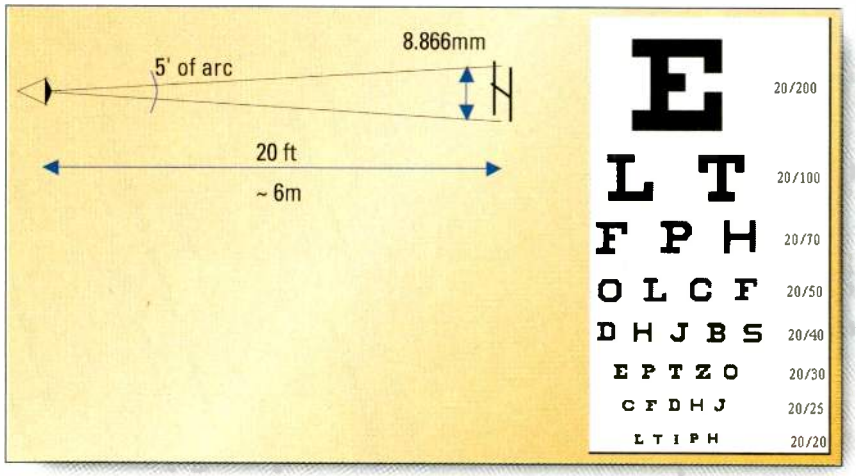

Figure 3. Snellen eye chart. A person with 20/20 vision should be able to see an image with a height of five minutes of arc at 20 feet.

formation. Areas at the back of the eye are covered with what are called "cones." They are photosensors with the ability to remember. Thus, it's possible to have a pixel change values rapidly and these subframes add within the eye to provide the correct brightness value for each pixel. The value of each bit (0 or 1) is transmitted sequentially, relying on the memory of cones in the eye to combine the pulses into a single image.

An eight-bit digital system can display up to 256 levels of gray, which is more than the eye can perceive. Considering that display systems rely on three eight-bit colors, combining them in all possible ways creates the familiar palette of 16 million-plus colors often mentioned in display panel advertisements.

So how good should a TV display be?

The next question should be "So how good does a TV display really need to be?" The answer is that it does not need to be any better than what the viewer's eye can interpret. It makes no economic sense to create products that are capable of producing image quality that the human eye cannot perceive.

So, how good is good enough? To answer that question, let's first examine the visual accuracy of the human eye. The familiar Snellen eye chart is shown in Figure 3. Perfect vision is normally identified as 20/20.

Humans really use only the *fovea centralis* of the eye, the area of best visual acuity.

A person with 20/20 vision should be able to just decipher a letter that creates an image corresponding an angle of 5/60° or five minutes of arc in the fovea (the center part of the eye/retina). The Snellen letters in the chart are constructed so that the size of the critical detail is one-fifth of the total height of the letter.

In terms of the eye chart, each letter can be created with five vertical and horizontal pixels; therefore, one criteria for high-quality video displays is that a pixel should correspond to 1' of arc (in square) or less.

The human visual acuity is 20/20 at any distance if the height of the recognized letter or object is such that the visual angle is five minutes of arc or 0.0833°. The visual angle is one of the most practical ways of expressing the quality of human vision. An interesting side note is that, although the total visual perimeter of the eye is approximately 140°, humans really use only the *fovea centralis* of the eye, the area of best visual acuity. This represents less than 1°, or about 60 minutes of arc. To maximize the eye's perceived resolution, the eye remains in constant motion, bringing the part of visual interest to the fovea.

Normal printed text is typically printed larger than the minimum size specified by 20/20 vision. For example, a common newspaper or magazine article utilizes letters sized about 2.5mm (1/10 inch). This represents a visual angle of 0.31° or 18.8 minutes of arc if the reading distance is 18 inches or 45.72cm.

The above angle corresponds to a vision acuity of about 20/55. However, this text size is more comfortable for the reader. Under these conditions, 8x8 pixels are typically used for letters. The letter size for 20/20 vision at this distance would be 0.66 mm or 0.033 inches, same or less than the fine print in many sales ads and contracts. Try reading that size text for 10 minutes!

In television, text or subtitles are

Improving display technology, and lower set costs, give viewers increased access to the high-quality images broadcasters produce. Pictured: RCA's HD44LPW163 widescreen HDTV.

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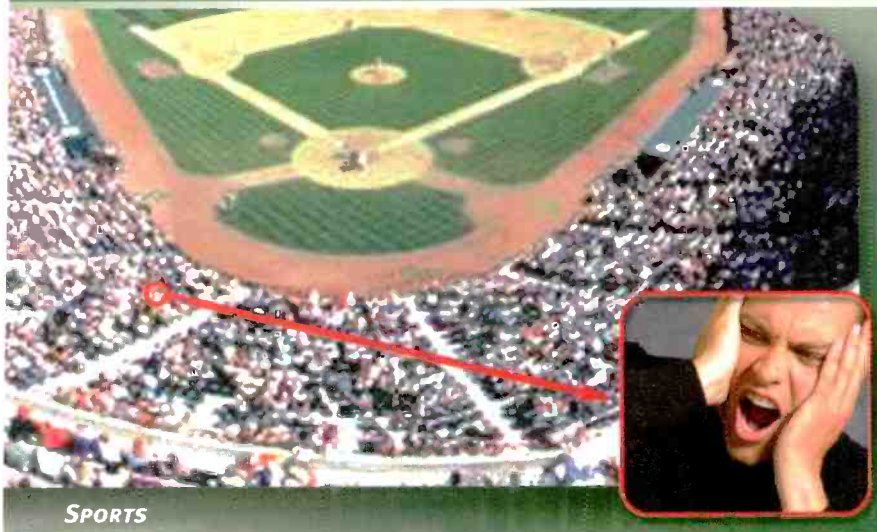

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normally about one twentieth of the picture height, or 40 to 50 pixels. Video displays must be designed for average viewers' vision acuity, and a relaxed viewing experience, even though many people have better than 20/20 vision.

HD standards and differences

The U.S. HDTV standard has 18 different formats, but let's focus only on key display issues, primarily the number of vertical pixels. Here the standards specify 720 or 1080 pixels vertically. Let's compare these display standards with normal human vision.

In the case of 720p, allowing for 20 percent spacing between pixels, this creates a vertical 14.4° viewing angle. Based on this, the "critical 20/20 viewing distance" becomes approximately four times the height of the display panel.

In the case of the 1080i HD standard, to create 1° of arc, the screen must be brought closer because the pixels are smaller. The viewing angle now becomes 18° plus a manufacturing guardband corresponding to a critical viewing distance of 2.62H, in the case of progressively scanned images. Including the interlace effect, the critical viewing distance becomes 3.74H, which approximates value for 720p display images. (See Figure 4.)

These numbers correspond with the traditional recommendation for the typical viewing distance of four to five times the picture height. However, a 16:9 widescreen aspect ratio screen might push the viewer a foot or two further away from the screen.

As a result, it is proper to conclude that both U.S. HDTV standards meet the requirements based on this criteria and human visual acuity.

In the case of home theaters, the viewer is normally closer to the screen than in a movie theater, typically about two to three times the picture height. However, remember, in these environments, the viewers are now seeing images on screens that display almost seamless filmlike images, with no visible spacing between pixels. The reality is that display resolution, or picture sharpness, is an important but sometimes overrated parameter. There are other factors that affect the picture quality as well.

Simply put, producers must generate high quality images from the get-go.

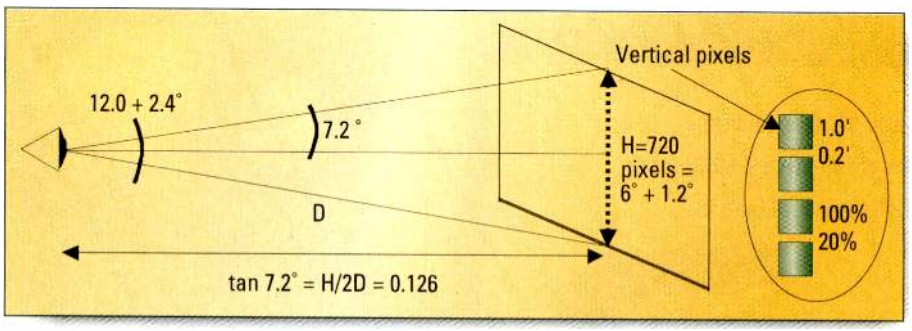

Figure 4. Critical viewing distances for both 720 and 1080 displays is four to five times the picture height. For widescreen displays, the viewer may choose to be about a foot closer.

Display quality factors

Other factors that affect perceived image quality include color fidelity, brightness, contrast ratio, gray scale and the frame rate. Many of these are interactive. The best example of this effect is brightness. The brighter the image, the more flicker becomes noticeable, whether it is frame flicker or caused by interlace. Films typically use a frame rate of 48fps (24fps with a double shutter). Computers use 72fps or higher to reduce the eyestrain.

Viewing distance in a home theater setting can be closer than in a movie theater (typically two to three times the picture height), because images are almost seamless, with no visible spacing between pixels. Image courtesy RCA.

If high brightness or contrast ratio can be tolerated, say in a bright image, each step of the gray scale can be seen better, and the image is perceived as sharper.

Ultimate quality

When it comes to answering this question, the answer in reference to the home viewer is fairly straightforward. Simply put, producers must generate high-quality images from the get-go. This means that both resolution and the bit depth (10 to 12 bits instead of the transmitted eight bits) should be used for acquisition and post production. This will provide the needed headroom for editing and other processing, which affect the final product's image quality.

Broadcasters have had the digital tools to create high-quality images for several years. Now consumers have access to cost-effective and high-quality displays to enjoy the products produced by broadcasters. BE

Jukka Hamalaien is a consumer display consultant based in New Jersey.

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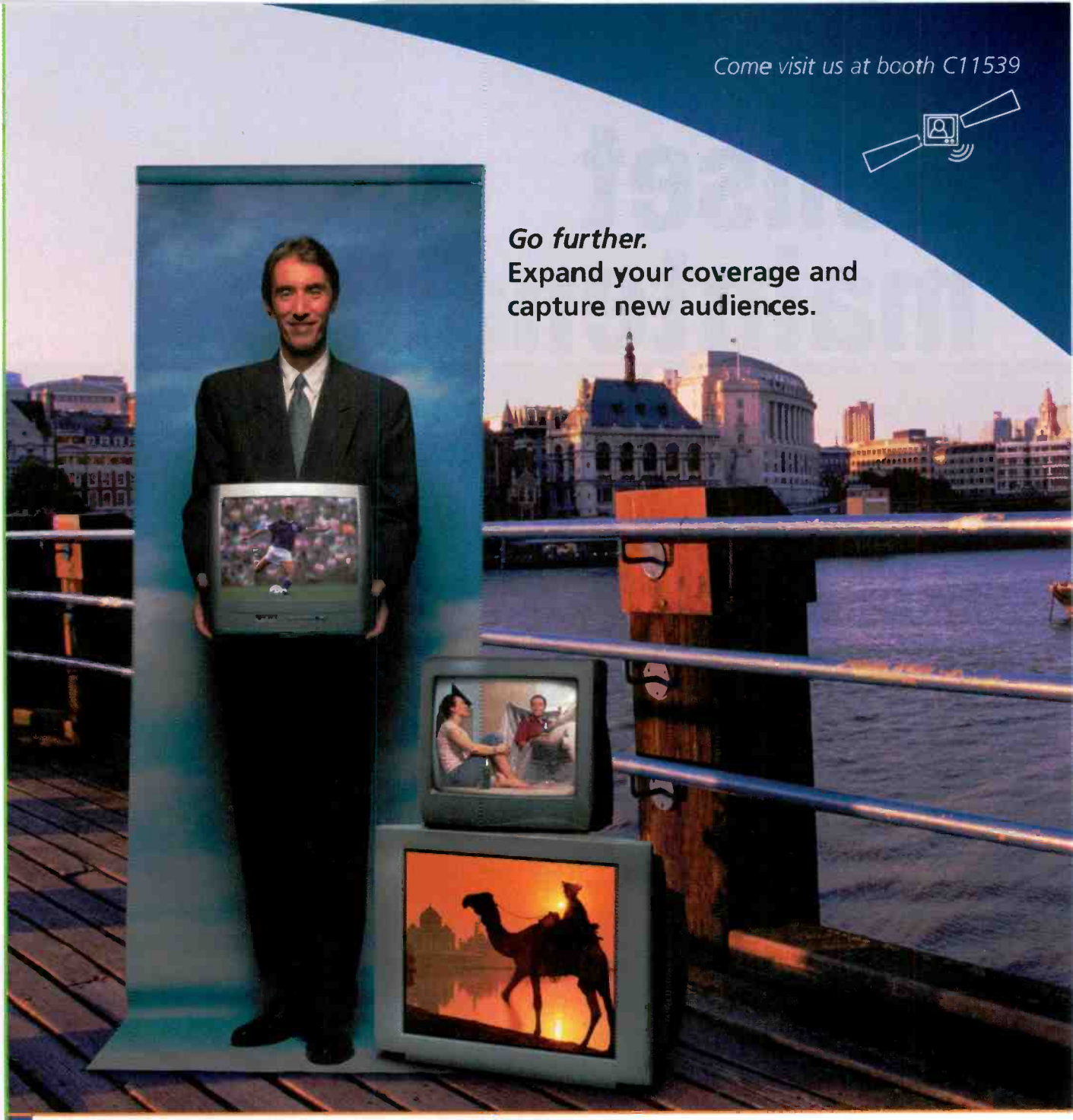

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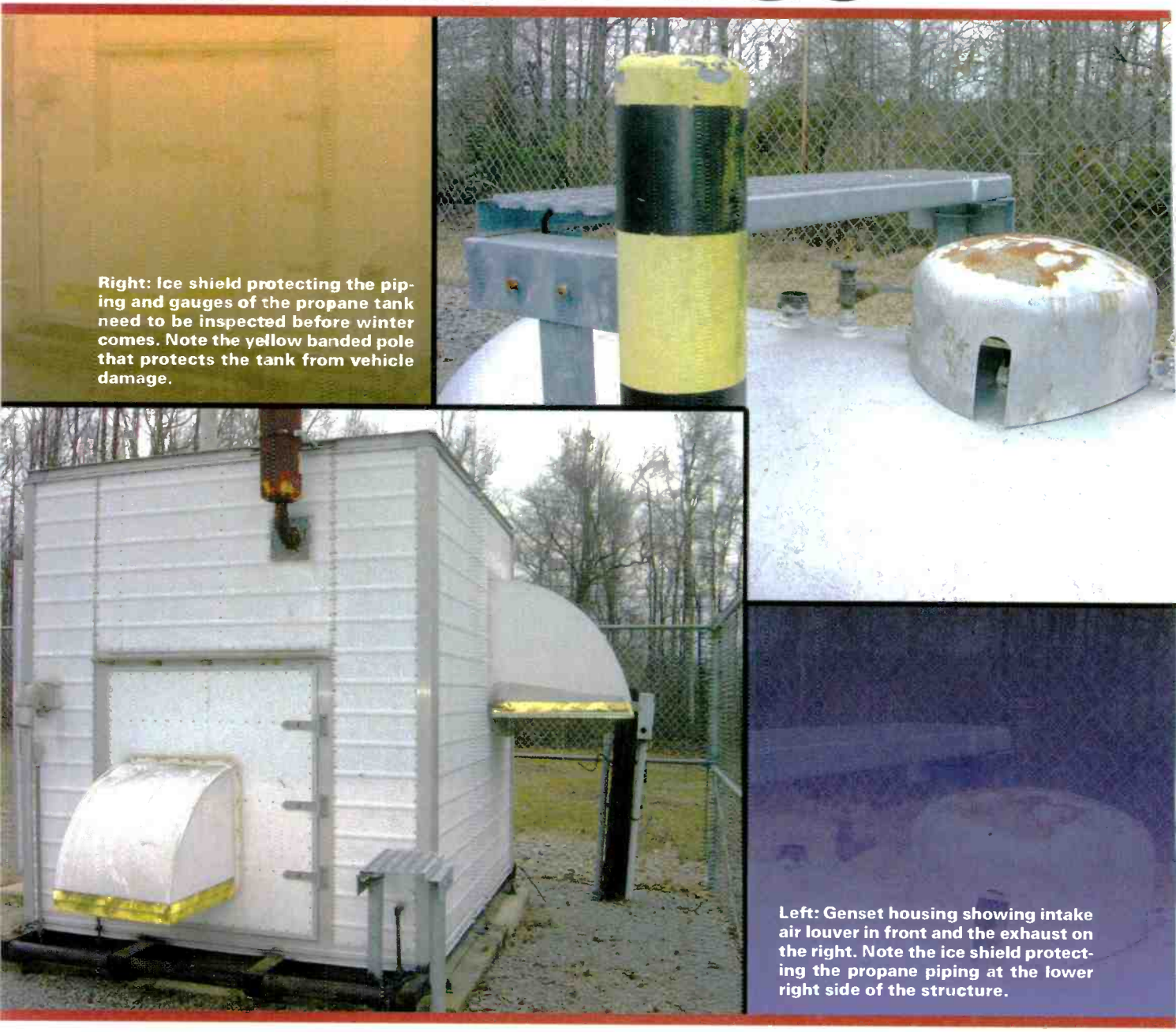

Right: Ice shield protecting the piping and gauges of the propane tank need to be inspected before winter comes. Note the yellow banded pole that protects the tank from vehicle damage.

Left: Genset housing showing intake air louver in front and the exhaust on the right. Note the ice shield protecting the propane piping at the lower right side of the structure.

BY ROLIN LINTAG

Preventive maintenance for generator set (genset) systems is an integral part of station operation. Engineers should do basic checks to ensure proper genset operation. The worst thing for a station is to discover that the genset does not work when it's needed most.

Figure 1 shows a functional block

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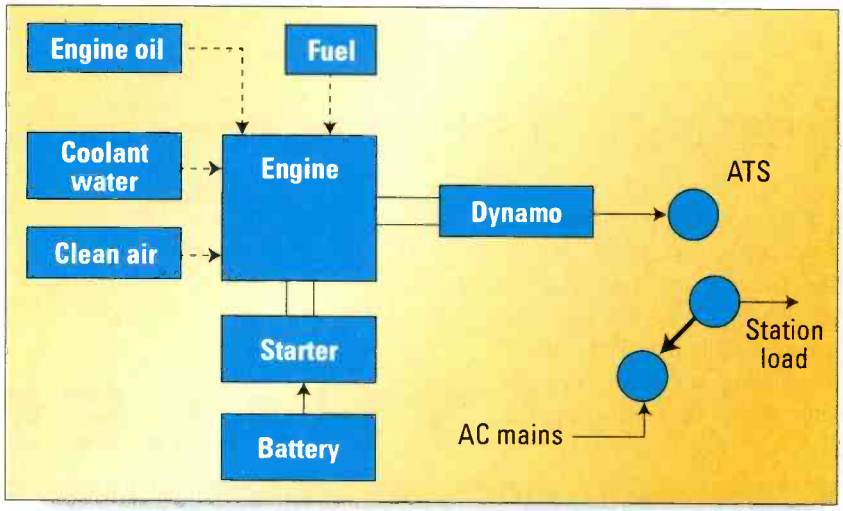


Figure 1. Some elements of preventive genset maintenance include checking for free airflow into the genset building, and maintaining engine oil levels and battery condition.

diagram of a typical genset system for reference in this discussion of preventive maintenance.

Functionally, a genset is mainly composed of a dynamo and its prime mover, an engine. The engine supplies the mechanical energy, and the dynamo turns it into electricity. Maintaining the engine is similar to maintaining that of a vehicle, while maintenance of the dynamo is the same as for an electric motor.

The battery

The battery provides power to the engine starter. It should be checked at least weekly for its capability to run the starter. Check the battery terminals to ensure that they make a good mechanical and electrical connection to the starter and the charger. Maintenance-free sealed batteries are the best to use, but lead-acid batteries can do the job at a lower cost. Just be sure to check the electrolyte levels of the lead-acid type on a monthly basis.

Coolant water

The coolant is usually composed of automotive-grade glycol to prevent freezing during winter. Check the level on the radiator on a regular basis, similar to what would normally be done on a car. Use a temperature gauge to ensure that the freezing point of the glycol mixture is much lower than what is required in the genset's location. Also, check the water hoses used on the engine for wear and cracks. Hoses can be deformed by old age and overheating, and they may need to be replaced before any serious leaks occur.

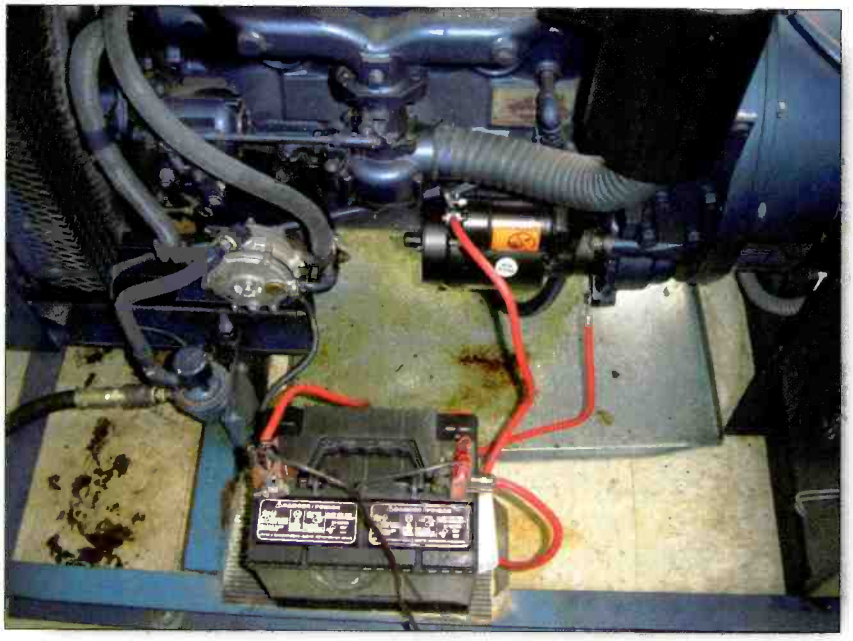
Inspect to ensure that clean air gets into the engine through the air filter.

Clean air

Inspect to ensure that clean air gets into the engine through the air filter. If the genset housing has a window with a louver intake, make sure that this louver opens when the genset is operating. The mechanical arm can sometimes become so stiff that there is not enough air coming into the genset building. Also, a screen should be installed to prevent the intake window from being clogged by insects. This screen should be inspected regularly to ensure free airflow.

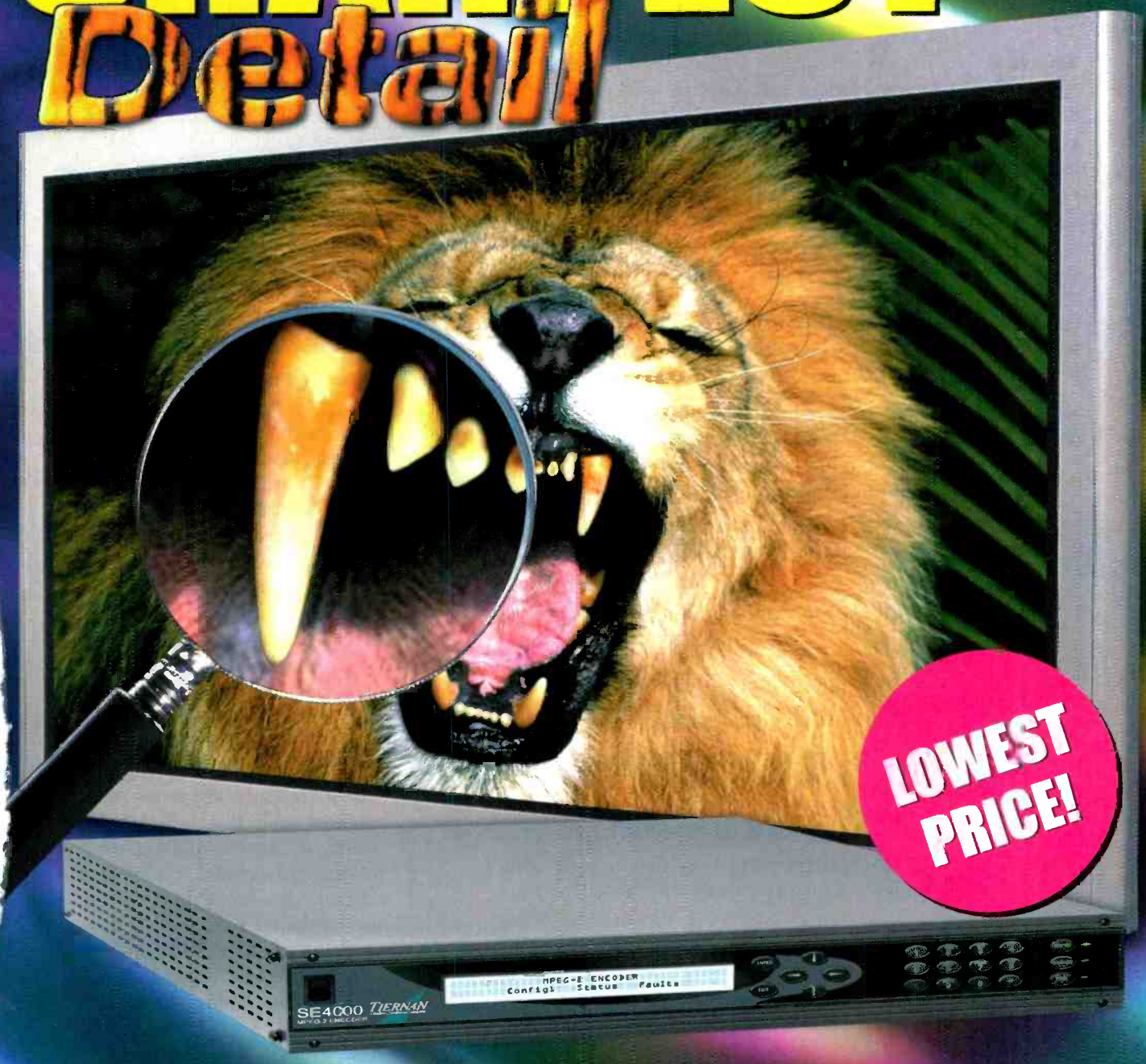
Engine oil

Preserve the genset engine by keeping an eye on its engine oil. Use the right grade and check regularly for the proper oil level. The oil filter should be checked and replaced at the same time as the oil is changed. The engine manufacturer should have recommendations as to how often the oil and filter need to be replaced. Ensure that the



Battery terminals and connections need to be tight. Wires going to the charger and the starter should be properly sized and in good condition.

SHARPEST Detail



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cap of the dipstick is properly replaced after every inspection to prevent spillage during operation.

The fuel

Depending on location, diesel is economical in the long run for big generator sets, while propane provides longer hours for smaller gensets. The hours of genset operation need to be logged at least weekly and the tank reservoir inspected. If using propane, check for leaks with soapy water and a sprayer at least weekly. Ensure that ice shields for any exposed part of the fuel piping are intact and can bear the brunt of ice storms in the area.

The engine

Have a genset dealer or representative do a load bank testing of the genset once a year. This may also include compression and timing tests to ensure that the engine is operating at optimum performance.

The ATS

Mechanical parts of the ATS have a tendency to get stuck if not used regularly. Activate the automatic transfer switch (ATS) during a maintenance night to exercise it. Refer to the manufacturer's recommendations for proper lubrication of any moving parts. Use a laser-operated pyrometer to test connector temperature. This is particularly useful for determining if bolted connections for wires carrying high current are overheating. It enables the engineer to determine if the connection is overheating without making any physical contact with it, thereby making it a safe procedure.

Check glycol level and the integrity of the hoses.

Weekly
• Check battery connections for signs of corrosion, looseness or leaks. Tighten or take appropriate action as necessary.
• Record front-panel readings, especially hours of operation. If genset has been used extensively, check fuel level in reservoir tank.
• Check coolant water/glycol and add more as needed.
• Check engine oil for level and leaks. Add oil as necessary
• Check for proper operation of the battery charger.
• Clean the genset building as necessary.
Monthly
• Check air filter and replace as needed. Check all air intake louvers for proper operation. Fix as needed.
• Test operate the genset system on load. Inspect and operate the ATS to ensure proper operation.
• Take corrective action as needed.
• Check electrical connections in fuse panels and ATS box, exercising extreme caution.
• Disengage power to the box before proceeding with any maintenance.
• Replace engine oil and filter as needed.
• Check water hoses for leaks or deformation due to old age or extensive use. Replace or fix as needed.
Annually
• Implement a load bank test on the genset.
• Implement compression testing and timing as needed.

Table 1. This suggested maintenance schedule for genset systems is divided into frequency of implementation, which may vary according to factors including the size and age of the genset.

The maintenance schedule

Table 1 is a suggested genset maintenance schedule. It is divided into frequency of implementation (weekly, monthly and annually). These frequencies may vary according to specific needs such as the age and size of the genset, its site location and available manpower. Develop a schedule that ensures optimum genset performance. BE

Rolin Lintag is an RF engineer in Little Rock, AR.

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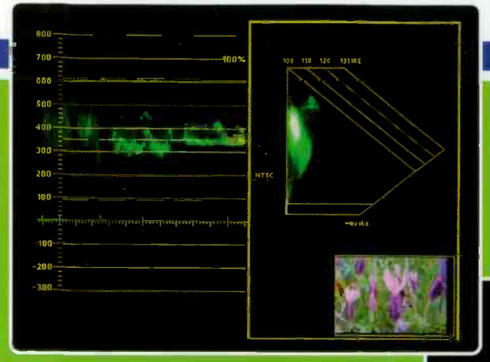

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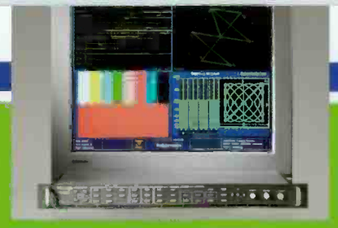

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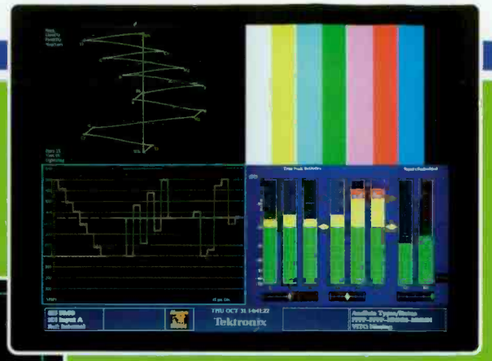

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- ☐ I am interested in literature only.

☐ Please have my account manager contact me.

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Email me relevant measurement information ☐ Yes ☐ No

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Name .....

Title.....

Company .....

Address .....

City/State/Zip.....

Priority Code .....

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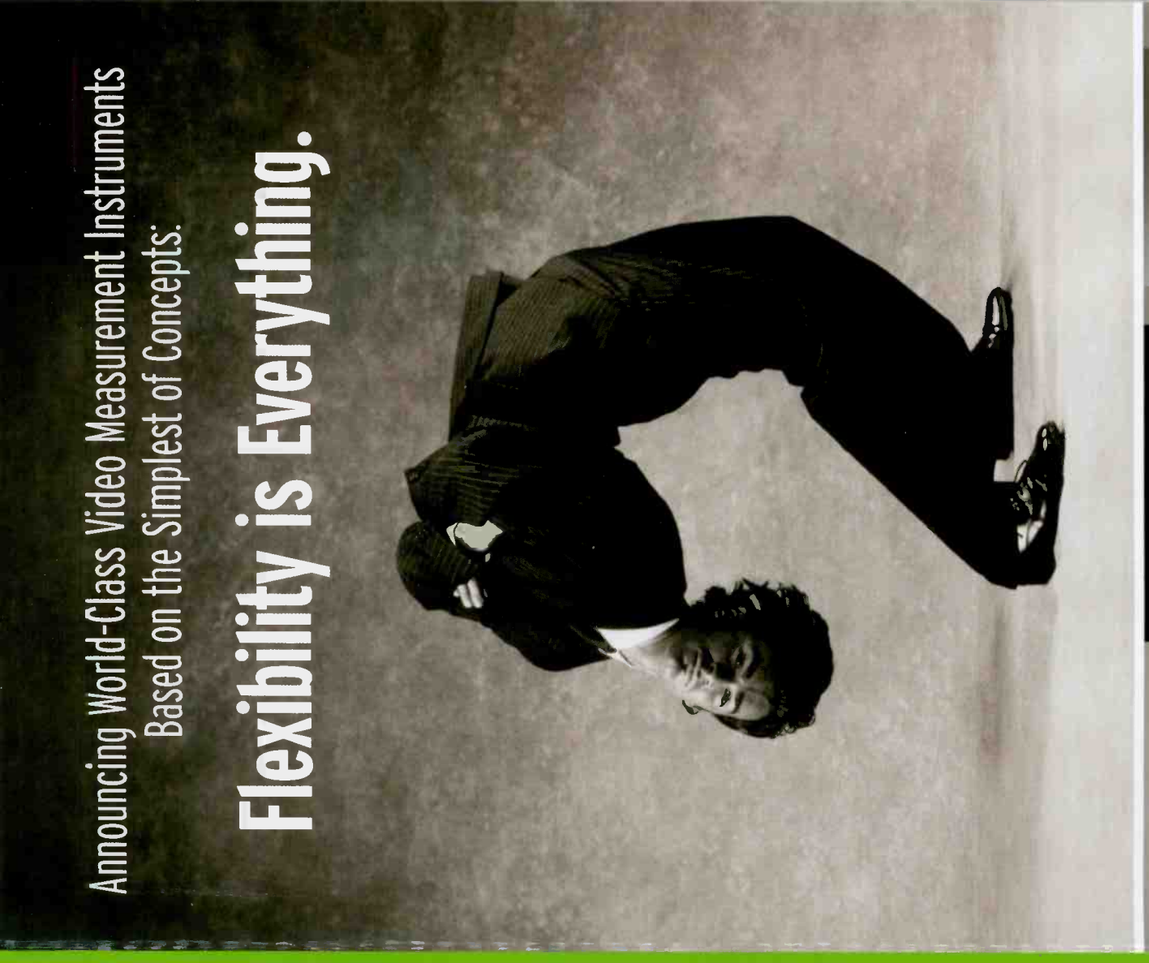

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PSIP

PSIP is the machinery behind the electronic program guide (EPG), enabling the EPG to display program information, station branding and program promotional information.

by the numbers

BY JIM BOSTON AND MARK BROWN

By now, most broadcasters are probably aware of the Program and System Information Protocol, better known as PSIP. And some may be implementing it in one form or another. This article explores the architecture of PSIP, covers some of the "gotchas," and investigates a few of the issues that may affect the way a station represents itself to the viewer through PSIP.

In brief, PSIP helps viewers receive programs and helps broadcasters represent themselves to the viewers. PSIP displays program information, station branding and program promotional information on an electronic program guide (EPG) generated by the viewer's set-top box (STB). A good working knowledge of PSIP is essential for a station to stand

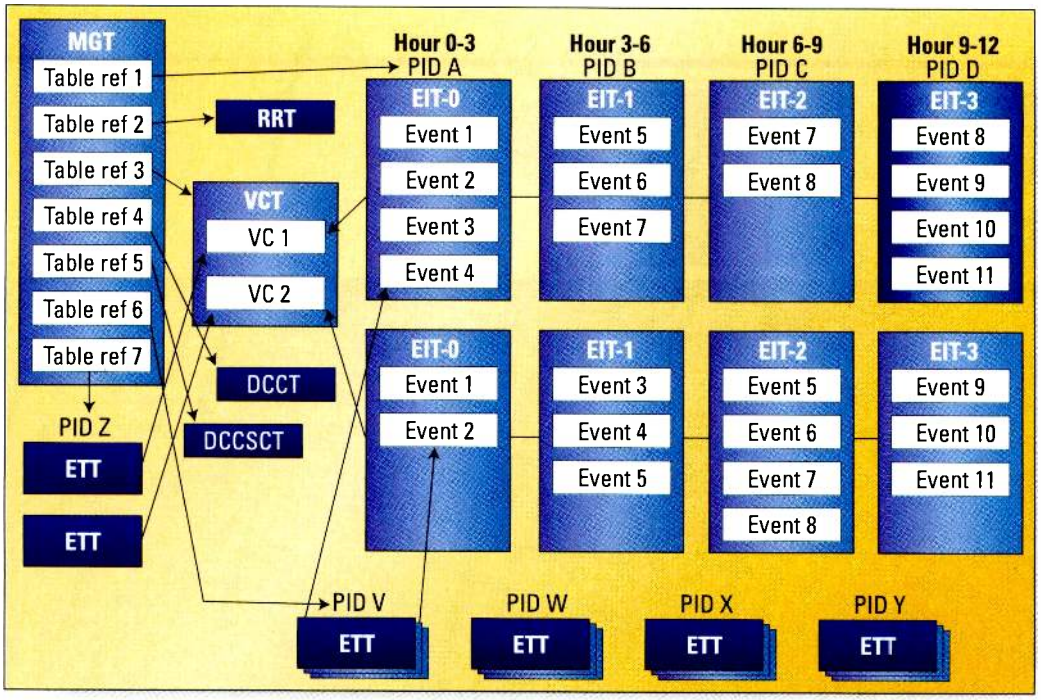


Figure 1. Much like MPEG, the PSIP stream is built around information organized as tables. The Master Guide Table (MGT) indicates the IDs of the other tables that comprise the guide. Images courtesy Triveni Digital.

out from the plethora of available ATSC services, and to control the description of its programming.

PSIP is a collection of nine tables that allows the DTV transport stream to provide information about a station's services and programming. These tables are:

- Master Guide Table (MGT)
- System Time Table (STT)
- Virtual Channel Table (VCT)
- Rating Region Table (RRT)
- Event Information Table (EIT)
- Extended Text Table (ETT)
- Data Event Table (DET)
- Directed Channel Change Table (DCCT)
- DCC Selected Code Change Table *(DCCSDT)*

Figure 1 shows how these tables relate to each other in a typical application. A station may use some or all of these tables, depending on its ATSC service offerings and capabilities.

At the top of the table structure is the Master Guide Table (MGT). The MGT is the roadmap to PSIP tables in the ATSC transport stream. In addition, the MGT provides program-identification (PID) locations so a receiver can find the other tables, and informs the receiver of changes or table updates.

The System Time Table (STT) allows a broadcaster to present GPS time and daylight-savings time indicators to the consumer's STB so that the STB has the same notion of "now" as the broadcaster.

Branding

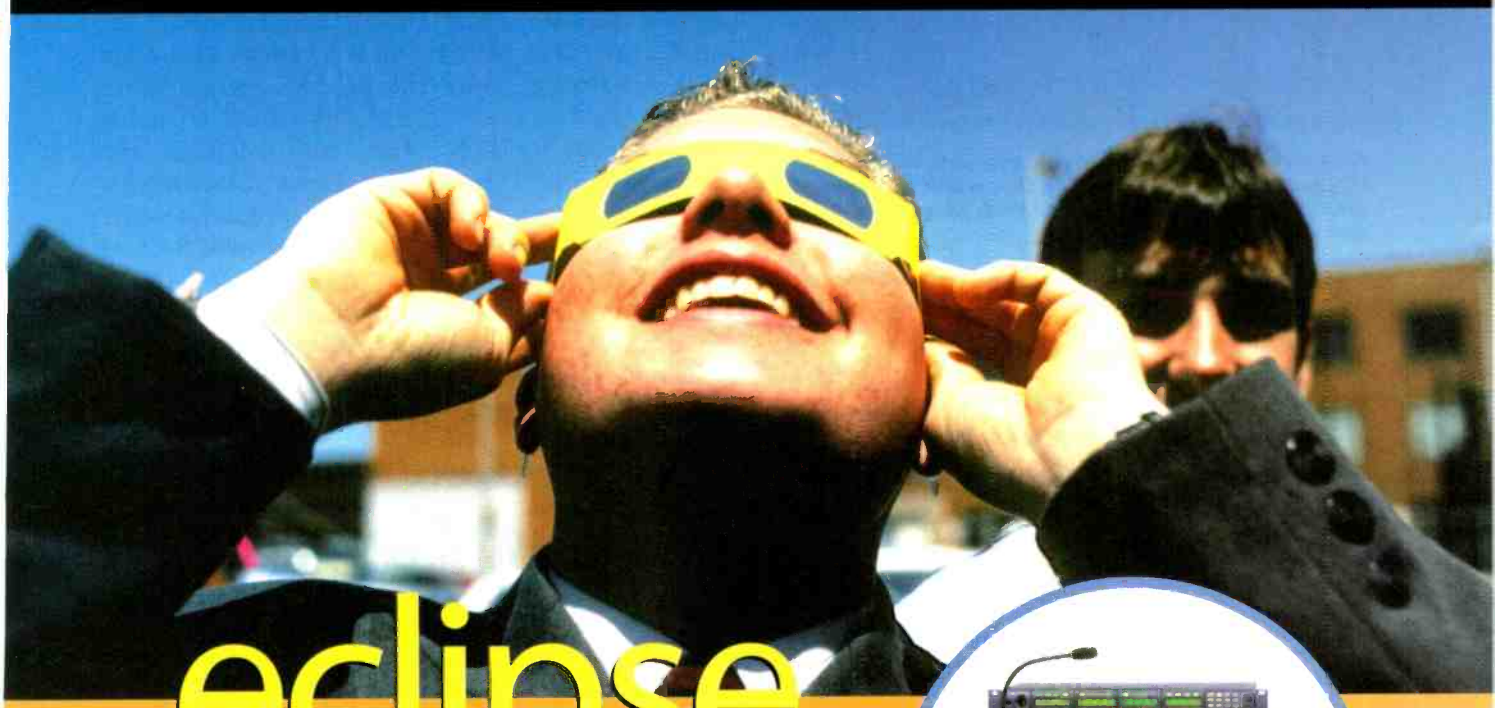
PSIP provides three important services for the broadcaster as well as the viewer. First, it preserves a station's branding in the transition from NTSC to ATSC. One of the tables in PSIP is the Virtual Channel Table (VCT). Similar to the MPEG-2 Program Association Table (PAT) and Program Map Table (PMT), the VCT identifies associated major and minor channel numbers, tells the receiver whether a broadcaster is broadcasting multiple program channels and, if so, how to find them. In addition to listing virtual channels, the VCT provides a link to the DTV channel's analog equivalent. The purpose of the VCT linkage is to translate a station's branding from the analog RF channel to the digital spectrum. This helps a station preserve its investment in channel branding because it allows DTV receivers to electronically associate the two channels. This allows the viewer, through the STB, to easily navigate between a station's current analog channel and its associated DTV channels or services.

Branding over cable

It goes without saying that maintaining channel branding over cable distribution is important for broadcasters. The existence of differing cable-channel lineups is causing concern among many broadcasters because it implies that cable will be tearing apart terrestrial multichannel ATSC streams and reassembling them based on the cable operator's agenda or channel plan. But the FCC considers PSIP information to be related to the primary digital video signal, and has ordered cable operators to pass this information through their systems. The NCTA and CEA agreed in February 2000 that cable operators will pass most PSIP tables (STT, MGT, VCT, and EIT-0 through EIT-3) when they appear in the stream (subject to fairly stringent bandwidth limits). But this set of tables doesn't include all the tables typically needed to build a robust program guide, since the NCTA exempted higher-level Event Information Tables (EITs) or Extended Text Tables (ETTs) from the agreement. Of course, broadcasters would like cable companies to allow all the PSIP tables in the broadcast stream to pass through, so they must sort out obvious issues with cable companies. Finally, if the FCC orders cable operators to carry all digital video channels broadcast to the general public, it stands to reason that it will require cable operators to pass channel-mapping PSIP information for these channels as well.

Program-specific information

A second service that PSIP brings to DTV is program-specific information for viewers as they scroll through the EPG (see Figure 2 on page 84). At least



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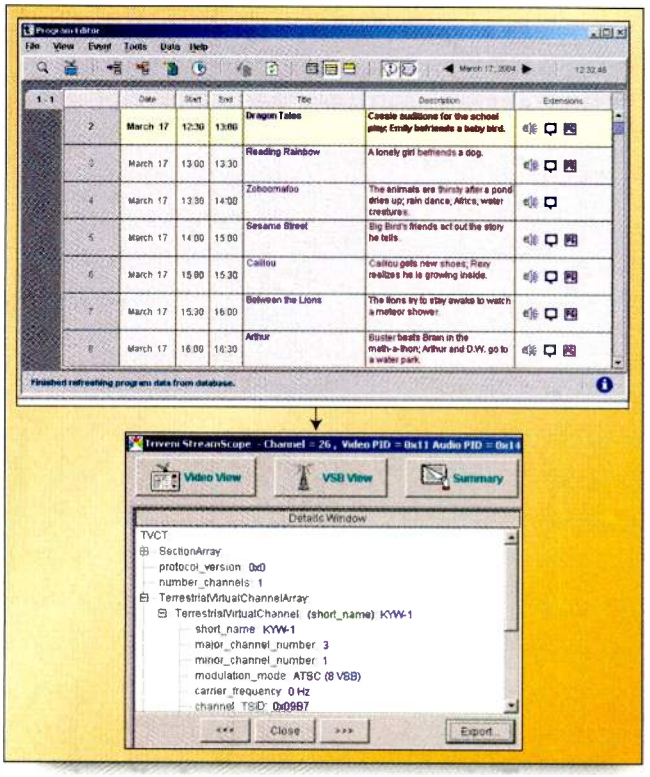

Figure 2. Products that provide dynamic PSIP usually present easy-to-use GUIs that mask the complexity of PSIP data tables and their programming and channel information.

four EITs and associated ETTs provide these program-information data. The EITs, which are associated to a specific virtual channel in the VCT, contain TV program (event) information such as event ID, start time, duration (in seconds) and event titles, and point to the location of extended text in the ETT. As previously noted, the EIT also supports associated metadata such as closed-caption, content-advisory, broadcast-flag and AC-3 audio descriptors. The EIT allows the broadcaster to control the description of his programming as he chooses.

The ETT is fundamentally responsible for providing broadcasters the ability to support extended program-description information in the EPG. The EIT carries the name of the program, while the ETTs carry longer text messages for describing events and virtual channels. Each EIT entry has a pointer to allow connection to the appropriate ETT, as does the VCT. In addition, the ETT can support descriptions in multiple languages. To reduce bandwidth, text strings in the ETT may use Huffman coding. The MGT defines sizes, PIDs and version numbers for all of the EITs and associated ETTs.

There can be as many as 128 EITs. Each table describes the events for a three-hour interval. Thus, the station can send as many as 16 days of programming in advance. At minimum, every transport stream must include the first four EITs, and the station should include at least 24 EITs (about three days' worth). As mentioned earlier, the cable operators have only ensured that they will pass four EITs. Each EIT representing a time slot can have multiple instances — one for each virtual channel.

Enhanced services

Finally, let's take a quick look at the remaining PSIP tables: the Data Event Table (DET), Directed Channel Change Table (DCCT) and DCC Selected Code Change Table (DCCSDT). Currently, these tables are not in wide use, but stations will likely make more use of them as the ATSC market matures.

The DET announces the data portion of a video/audio/data event when the data event doesn't exactly match the video/audio event in duration (in which case, the EIT carries information about the data). This is an important factor in datacasting applications and advanced STB applications. Essentially, the DET allows the station to announce data-enhanced services. This allows a viewer looking at the program guide to see which DTV program streams carry enhanced data such as statistics for sports programming or Web-page content to supplement the audio and video streams. Additionally, PSIP can announce the existence of stand-alone data, either related to programming or totally divorced from it, such as computer software or media files like AVI files. In the future, it is quite possible that broadcasters, instead of transmitting many real-time program streams, will send some combination of real-time and non-real-time files. The STB could then stream out the multimedia files at the viewer's request.

The DCCT instructs the receiver to change channels based on viewer preferences, demographics or geographical location. This table from the broadcaster works in conjunction with a DCCSDT in the STB. The table defines the classification scheme that viewers use to express preferences during receiver setup. This feature could become important if HD channels are brought up while SD channels are temporarily dropped.

Doing it right

Correct implementation of PSIP is essential. Some broadcasters have already found that incorrect implementation of PSIP can render some or all of their NTSC and DTV services unavailable to DTV receivers. In ATSC's infancy, the mis-programming of PSIP data allowed DTV stations to "hijack" other DTV stations' virtual channels inadvertently through the STB. PSIP has been designed to allow broadcasters to take advantage of new digital-transmission capabilities. Along those lines, an interesting ability of PSIP is to tie the virtual channels of separate physical DTV channels together. In the DTV realm, duopolies will be able to combine the two stations seamlessly

Broadcasters would like cable companies to allow all the PSIP tables in the broadcast stream to pass through.

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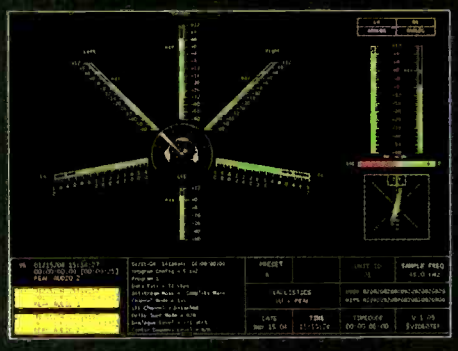

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Reducing static

PSIP, although not currently explicitly required by the FCC, is an ATSC requirement. Many DTV stations to date still use only static PSIP produced by the encoder/mux. At this most simple operational level, the station manually enters the VCT and MGT tables, along with four (generally blank) EIT tables, into the ATSC mux (the mux must dynamically generate the STT). This minimum implementation does not support audio language selection, closed-caption selection, broadcast flag, V-chip or program guide. The broadcaster also gives up PSIP's promotional capabilities.

If STBs are ever to build worthwhile electronic program guides, then broadcasters will have to fill all the aforementioned tables and do so at an ever-changing rate. Dynamic PSIP requires a separate subsystem — either a separate stand-alone box or modules added to a vendor's mux that accept a constantly updated datastream — to continually update the PSIP tables. Updated tables are available from companies such as Tribune Media Services, Scout, or organizations such as the PBS National Database (NOLA), and from traffic and even automation systems. A station can generate dynamic PSIP without human intervention by taking advantage of information updates from systems they already use (see Figure 3).

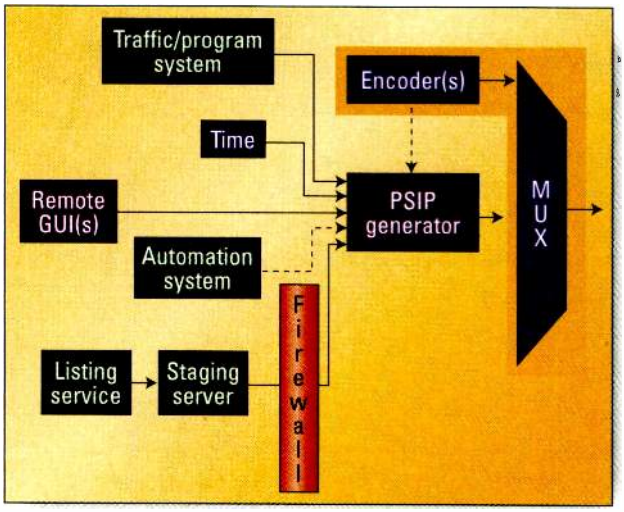

Figure 3. Dynamic PSIP can be considered an additional service, much like additional programming is an additional service, except that it is in the form of information about the bundle of services. As such, it draws from a number of sources to present its data for multiplexing into the ATSC stream.

Some PSIP generators can even synchronize with encoder/mux configurations, dramatically easing transitions from a single HD virtual channel to/from multiple SD virtual channels. Static PSIP will certainly have become dynamic before the FCC decides to clamp down on ATSC broadcasts in the areas of closed captioning and the broadcast flag so widely discussed today. It is known as the redistribution-control descriptor, and the broadcast flag's purpose is to signal to the STB whether or not it should allow the viewer to record a particular program. Dynamic PSIP indicates the presence of closed captioning and the broadcast flag.

In static PSIP environments, closed-caption data are often flagged as available. The problem with marking every program as having captioning service available, whether or not it is actually available, is that some STBs have been known to crash occasionally and require resetting. As for the redistribution-control descriptor, it will need to be set on a show-by-show basis based on contractual agreements.

By the time NTSC is currently scheduled to go dark, 100 percent of all new non-exempt programming must have closed captioning. And, by 2008, 75 percent of pre-rule programming must also have closed captioning. There are several exemptions, including programs created before 1996 that do not have contractual obligation to provide closed captioning, any program whose provider can convince the FCC that captioning presents too great a burden, programming done in any language other than English or Spanish, programs having lengths of less than 10 minutes, and local programs that have no repeat broadcast value. Other exemptions include startup broadcasters (with a four-year grace period) and extremely small broadcasters. In all, the commission has 13 items that can exempt captioning. But, for the average broadcaster, most will never apply. Since many STBs require the presence of the closed-caption descriptor in PSIP to decode the closed-caption data, using dynamic PSIP is the only way to completely comply with the FCC's mandates for end-to-end closed captioning.

By the time NTSC is currently scheduled to go dark, 100 percent of all new non-exempt programming must have closed captioning.

Implement PSIP now

As the ATSC market continues to mature now and in the future, one thing is sure: Competitive and legislative pressures will affect how broadcasters continue to support PSIP. Be prepared. It is in a station's best interest to adopt dynamic PSIP. Alternative systems that take away the broadcaster's control of branding and promotion are showing up in the marketplace. As the old saying goes: "Use it or lose it." BE

Jim Boston is senior director of technology and Mark Brown is chief technology officer for SignaSys.

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952-917-0231; *www.adc.com*

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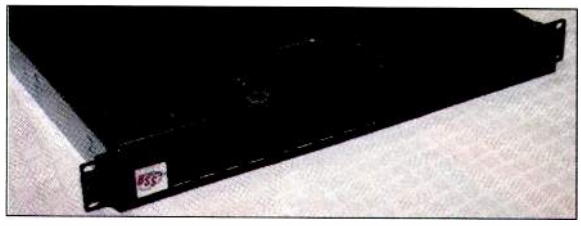


CG

Broadcast Software Solutions CGXPress+

Features Xpress animation; performs quick crawls, continuous crawls, time and temperature, logos and EAS; provides the ability to network and animate logos, all in a 1RU chassis.

800-273-4033; *www.broadcastsoftware.tv*

Booth: SU7173

LAYERING MIXER

Chyron C-Mix HD

Features simultaneous SD and HD outputs; includes four SD video and key inputs as well as a background layer, an SD mixer and an HD upconverter; the four video and key sources can come from a Chyron product or any other device with SD outputs, when used with Lyric software, the mix information becomes part of the CG message timeline.

631-845-2000; *www.chyron.com*

Booth: C4742

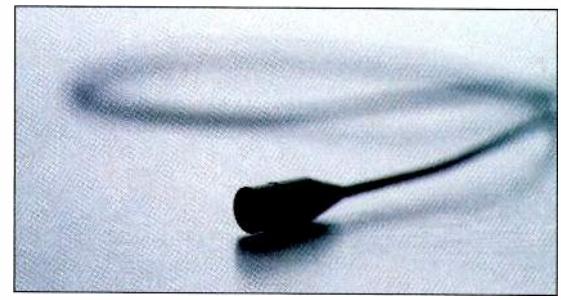
NEWS PRODUCTION SYSTEM

DaletPlus News Suite

Provides real-time access to and editing of video, audio, wires, stills, feeds and CGs over a standard IT network; supports MPEG-2, DV and DVCPRO; controls CGs, teleprompters, video servers and other newsroom devices; users can edit, write scripts and manage rundowns from their desktop; built-in newsroom workflow provides controlled access and task assignment functionality.

212-825-3322; *www.dalet.com*

Booth: SL3842



MICROPHONE

DPA Microphones 4071-BM

Body-worn microphone has a maximum sound pressure level (SPL) of 144dB before clipping; can be used with the DAD6024 adapter and DAK4071-F accessory kit for miniature microphones; omnidirectional microphone inherently cuts down wind and pop noise, keeping the proximity effect low; features a fixed soft boost grid, giving the microphone a 5dB boost between 4kHz to 6kHz.

+45 4814 2828; *www.dpamicrophones.com*

Booth: N2536

BROADCAST CONSOLE

Euphonix System 5-B

Flexible, modular surface and I/O design; multiple-CPU-based system runs low-level VX Works OS for reliability; features eight knobs and 100mm touch sensitive moving fader per channel; TFT displays are located at the top of each channel for metering, EQ dynamics, and pan graphs and routing; features SnapShot Recall of all console settings; has 48 layouts for different surface configurations.

650-855-0400; *www.euphonix.com*

Booth: N3616

SCALABLE TDM DIGITAL AUDIO ROUTER

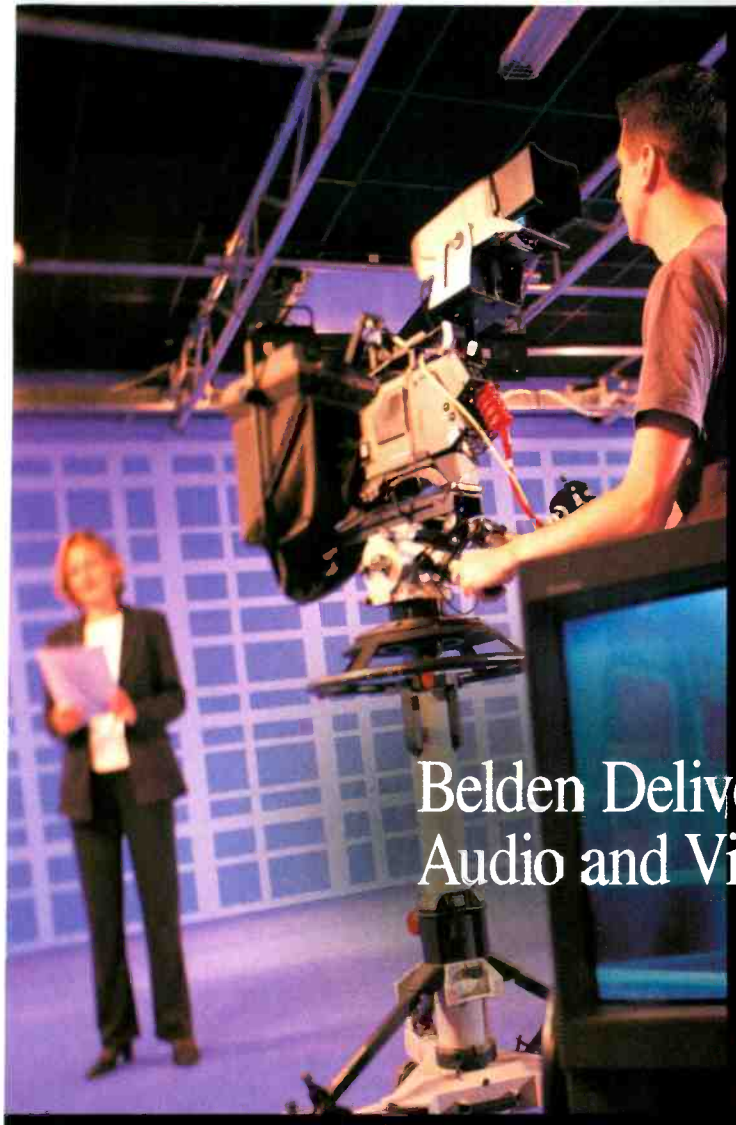
NVISION NV7512

Supports analog as well as digital audio signals; is linearly expandable to offer 2048x2048 channels; MADI-format multichannel digital I/O also is featured; analog inputs and outputs are converted to and from digital using high-performance 24-bit converters; ideal for broadcasters and post facilities that need to manage large numbers of mixed-format audio signals.

530-265-1000; *www.nvision1.com*

Booth: SU7552

Color indicates advertiser



Belden Delivers Flexibility To Your Audio and Video Digital Conversion.

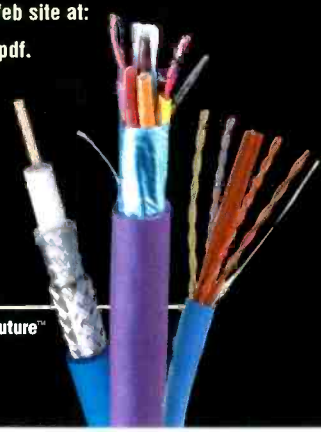
Analog, Digital or Data — More Broadcast Engineers Choose Belden Than Any Other Brand of Cabling Products.

Why? Because broadcast engineers know that Belden has an extensive line-up of digital cabling products — including data cables — and the quality to match.

Whether you're installing cable in a television or radio studio, a video post-production facility, an indoor or outdoor sports arena, a film production studio, a church, a government chamber, or an entertainment venue — any area where a high quality signal is important — Belden has the digital cable to meet your needs.

To make your selection process easier, we're offering a 3rd Edition of our "Digital Studio Cable Guide." This Guide will help your understanding of digital cables, SDI and AES/EBU specifications, HD Radio concerns, key electrical/distance parameters, and why Installable Performance™ is important to cable performance.

Look to the leader. Call 1-800-BELDEN-4 and get a *free copy* of the definitive "Digital Studio Cable Guide." Or download a copy from Belden's Web site at: www.belden.com/th65.pdf.



BRILLIANCE®

Belden

Performance Delivers The Future™

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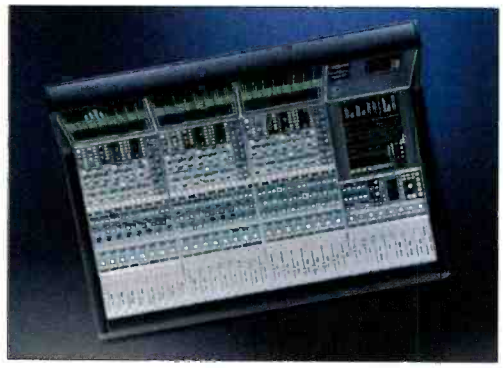
Product Highlights



DIGITAL BROADCAST CONSOLE

Solid State Logic C100

Designed for on-air and live-to-tape production applications; both the console operation and underlying technology have been designed for freelance-friendly, reliable operation.

212-315-1111; *www.solidstatelogic.com*

Booth: N2412

BOX LENSES

Thales Angenieux 70X HD

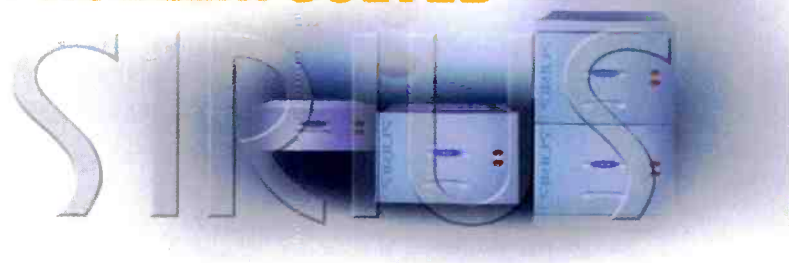
New series of box-type lenses, including 70X HD remote broadcast/sports lens, features a unique advanced display system.

973-812-3858; *www.angenieux.com*

Booth: C5412

CONFUSED ABOUT WHICH ROUTE TO TAKE?

PROBLEM SOLVED



It's hard to know what your future routing needs will be, but whichever direction you choose, SIRIUS can take you there.

- Built-in analog & digital conversion for audio & video signals
- Mix & match different formats in the same chassis including HD
- Modular architecture for up to 256 x 256 in blocks of 8

pro-bel

Master Control Signal Management Automation

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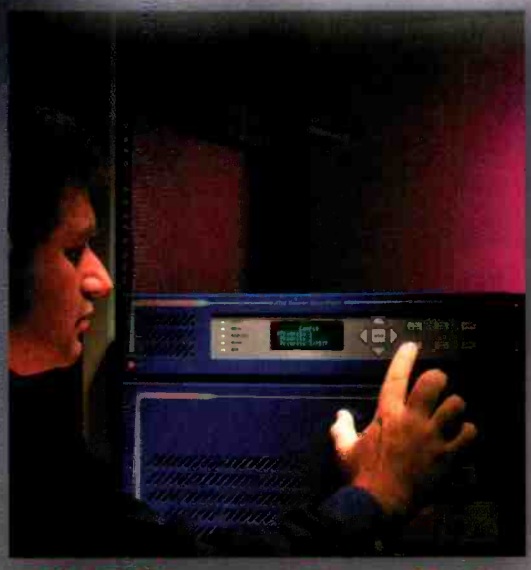
SENCORE

Exclusive Test Instruments For Your MPEG and HDTV Needs.



TMS 1720 Transport Stream Monitor

- MPEG-2, ATSC, and DVB Monitoring
- Remote Monitoring
- Logging and file capturing

MNA 1420 MPEG-2 Network Analyzer

- Real Time Monitoring
- Data Logging
- Portable, Battery Operated

TS 1692A Transport Streamer

- Multiple Stream Playout
- Supports Multiple Standards
- Remote Controllable

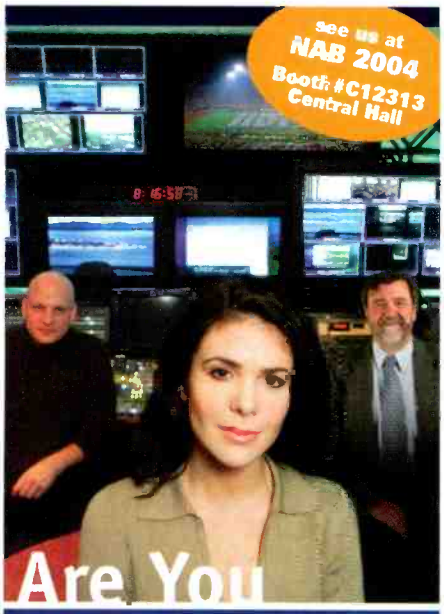
SLM 1456 Digital Signal Meter

- Full Spectral Display
- Measures Analog and Digital
- BER and MER levels

Includes 8 VSB

Stop By Our Booths At NAB (SU11011 and C10343) To See What's New

Call 1-800-SENCORE (736-2673) or Visit www.sencore.com



The viewers at home sure are. Broadcasters now face the daunting challenge of modernizing their broadcasting infrastructure to deliver digital.

One design, consulting and integration firm is leading the way. Venue Services Group's roster of top broadcast engineering professionals are experts in HD integration and infrastructure, delivering everything from the first all-HDTV sports broadcast to the world's first native 720p mobile truck.

When your organization is ready for HDTV modernization, call on the leaders with real HDTV experience since 1998.

RECENT PROJECTS

- HD 4 Mobile Unit (NMT) used for ABC's Monday Night Football
- Fox Sports Net New England control room and studio
- HDTV Retrofit Cabling Infrastructure -- Fenway Park
- Technology Consultant for the NFL

VSG

Venue Services Group

914-682-2111 www.vsg.tv

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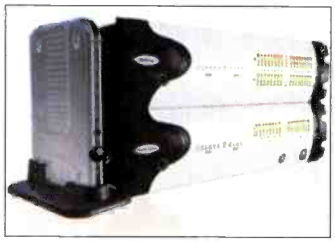
SYSTEMS INTEGRATION SERVICES

A.F. Associates (AFA)

Services include design and integration of turnkey systems for broadcast, cable and satellite clients; able to offer expanded technology resources through the acquisition of the former Sony Systems Integration Center; the Systems and Technology organization offers complete design and construction services and support, as well as mission-critical field service and network management.

201-767-1200; *www.afassoc.com*

Booth: C4722



EDITING SYSTEMS

Avid film/video post production

Will introduce enhancements to all products in the DNA family; new editing features and expanded networking and workflow capabilities for next-generation Avid DS Nitris, Media Composer Adrenaline and Avid Xpress Pro with Mojo systems; HD option for the Media Composer Adrenaline system will allow it, Avid DS Nitris systems and Avid Unity Media Network to share high-quality HD media in post production.

978-640-6789; *www.avid.com*

Booth: SL4761

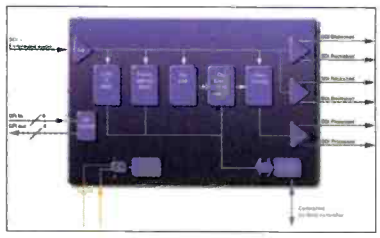
GRAPHICS SYSTEM

Barco iPresent

Capable of showing a multitude of video and graphical windows; produces smooth transitions from one display wall layout into another; projection modules support 3200K color temperature to match studio lighting; offers wide viewing angles for maximum flexibility of camera positions; controller optimized to support dynamic moving and scaling of windows.

770-218-3211; *www.barco.com*

Booth: SL3936



SIGNAL INTEGRITY MONITOR

Axon Digital Design SIM10

Designed for the Synapse modular range; checks the integrity of the SDI signal and gives a monitor output that shows any reported errors, as well as indication of several metadata values; the four reclocked outputs make the card an ideal input card to a central router with direct connection to a routed monitor wall.

+31 1351 166 66; *www.axon.tv*

Booth: SU7548

UHF ANTENNA

Dielectric TFU-WB

Designed for bandwidth requirements of up to 30 channels; typical configuration is a directional array with a directivity of 1.9 times; available in high-power (20- to 80kW) and low-power (5- to 20kW) with configurations of eight to 32 bays; is supplied with a full radome and can be used in top- or side-mounted configurations.

207-655-4555; *www.dielectric.com*

Booth: C7806

POWERED SPEAKER SYSTEM

Azden APS 25

Features two audio inputs for modular, user-installable, wireless mic receivers - VHF (30 channels available), UHF (63-channel switchable) or infrared (two channels available); two other inputs for a wired microphone and a wired line output device such as a CD player.

516-328-7500; *www.azdencorp.com*

Booth: N4016

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Booth SL 3842

New choices in digital newsroom technology

Dalet plus News Suite

GOALS FOR 2004
- ✓ Lower news production costs
- ✓ Go digital

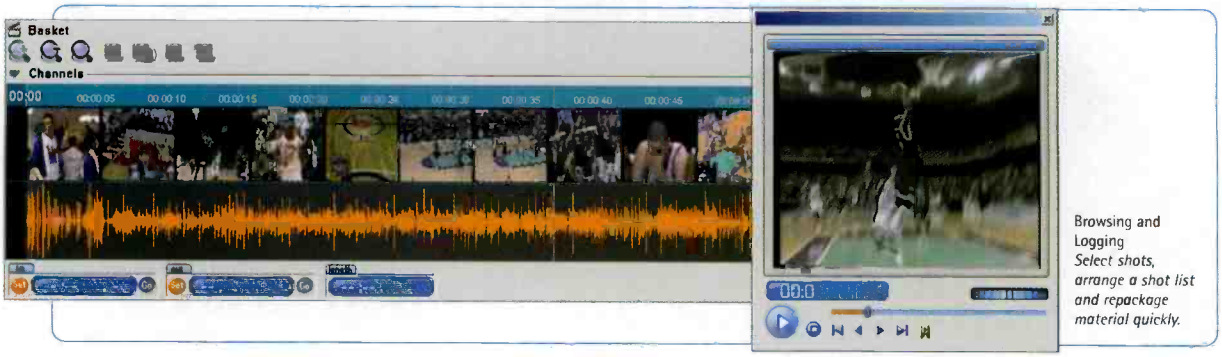
THINGS TO SEE AT NAB 2004
- ✓ Easy archiving and asset management system for news
- ✓ Affordable newsroom computer sys.
- ✓ Automated feed ingest
- ✓ Newsroom browse and editing
- ✓ News playout automation
- ✓ Multi-site transfer and sharing

www.dalet.com

dalet
Digital Media Systems

News Ingest

Automated ingest scheduling, manual recording, flexible logging and multi-resolution recording

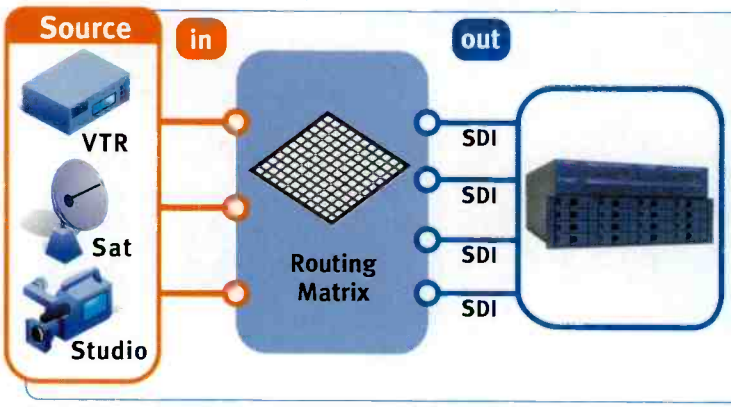


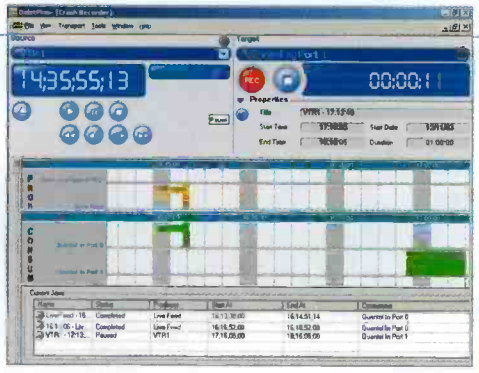
Browsing and Logging
Select shots, arrange a shot list and repackage material quickly.

DaletPlus News Suite supports multiple ingest workflows and resolutions. Any authorized user can schedule recordings. Recordings can be continuous, scheduled days, weeks, and even months in advance or manually controlled for crash recordings.

DaletPlus News Suite manages routers and VTRs, allocating them to available recording channels.

Feeds and events can be scheduled in advance and recorded automatically in multiple resolutions including MPEG-2, DV, DVCPRO and Windows Media. Without altering the original feed, multiple users can simultaneously preview ingest channels and log and track clips while recording is in progress. For breaking news, crash recordings can be initiated by pressing a single button.





From their desktops, users can simultaneously preview several ingest channels and start crash recordings by pressing one button.

Fast Editing
Fast desktop news editing with logging, titling, voiceover capabilities.

Canal Sur

The Canal Sur installation in Spain is one of Dalet's largest television and radio newsroom endeavors. DaletPlus is installed on 800 workstations. It facilitates the production of 30 television shows and 70 news radio spots per day. Through DaletPlus, Canal Sur television and radio journalists have shared and immediate access to centrally stored news materials and stories.

Fashion Show Media Network

Fashion Show Media Network has implemented DaletPlus to manage media content and campaigns for its fashion retail complex, The Fashion Show, located on the world-famous Las Vegas Strip. DaletPlus simultaneously schedules, choreographs, and synchronizes multi-channel playout, video signal routing, audio, projection, lighting, and more.

Weather Channel

The Weather Channel has chosen Dalet to power an Internet-based distribution system that allows affiliates to view customized weather updates and download broadcast quality audio weather forecasts.

XM Satellite Radio

XM Satellite Radio is the first commercial digital satellite radio service offering 100 digital channels of music, news, and talk programming across the US. To take on the Herculean task of managing over 2 million titles, more than 250 Dalet workstations are simultaneously producing, scheduling and playing out content.

About Dalet

Operating worldwide, Dalet solutions are used in over 50 countries by 1,700 customers including ABC, ARD, BBC, Cadena Ser, Canadian Broadcasting Corp, Catalunya Radio, Deutsche Welle, EMAP, Emmis, Entercom, ITN, Journal, Lagardère Media, Macquarie University, MBC, Mediaset, National Public Radio (NPR), NDR, Radio France, Radio France International, South Africa Broadcast Corp, SWR, The United States Senate, Voice of America, Washington and Lee University, WDR, Weather Channel and XM Satellite Radio.

www.dalet.com

dalet
Digital Media Systems

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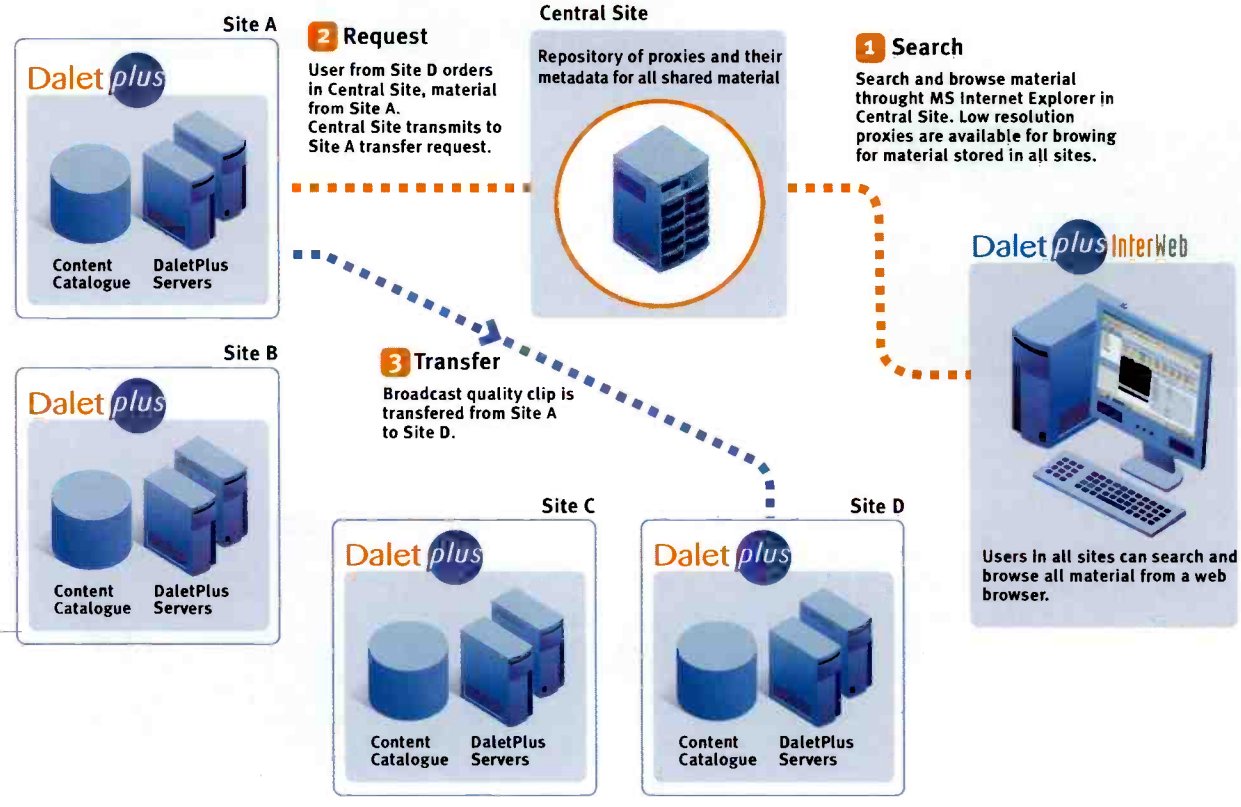
News Connect

Link multiple stations and remote journalists to video, rundowns, feeds and archive material

Expert Asset Management > Faster Retrieval

DaletPlus is a media asset manager that centralizes and catalogs all content: text, audio, graphics, and video. DaletPlus asset manager forms can be easily customized to capture any detail such as name, air date, shot sheets, and licensing information. These forms can also associate various media materials into a single asset for easy search and retrieval of packages. Media metadata can be entered at any time. Regardless of where media is stored - online, near online or offline - metadata remains online and searchable at all times. Search and retrieval of media is incredibly fast and easy.

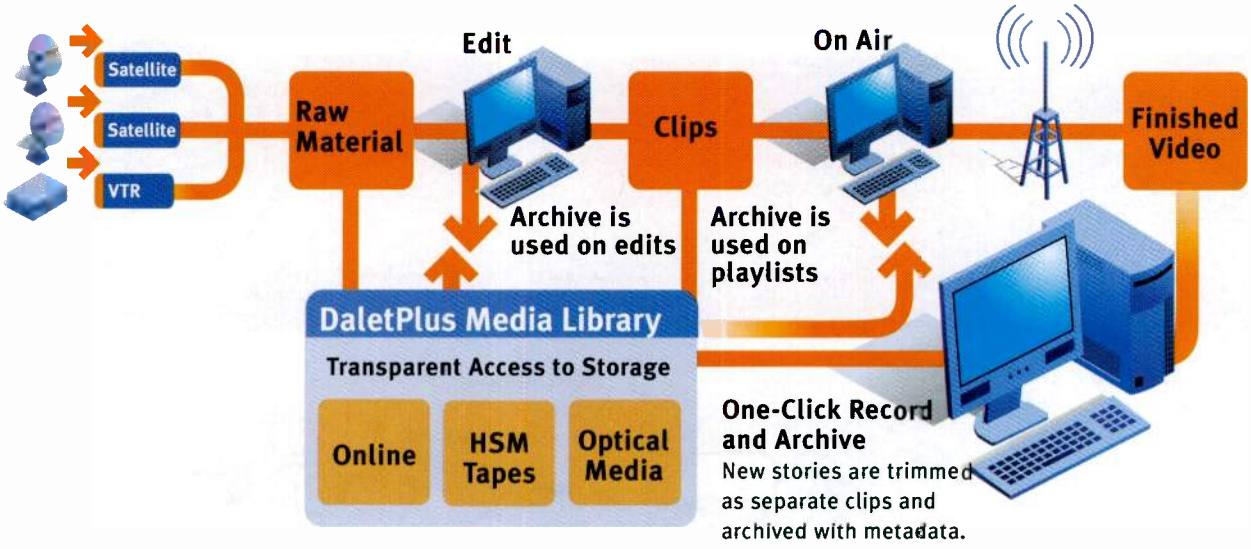


Extending the Newsroom > Remote Personnel & Multi-location Production

DaletPlus enables collaborative news production and media sharing across multiple stations and remote locations. Broadcast assets can be viewed securely across a standard WAN connection. Browser based tools allow remote journalists to access and edit feeds, wires, media, rundowns and archived materials from any location. DaletPlus automatically provides low-res versions for quick browsing. Full resolution media can be downloaded if needed.

News Archive

The first media asset management system built specifically for news



Many systems in today's newsrooms create and store news content in individual systems - valuable log and asset information is then lost. The resulting search and retrieval of video archives becomes highly inefficient, costing broadcasters both time and money.

DaletPlus News Suite is the first asset management system designed specifically for archiving and fast retrieval of news content. Customizable fields enable the cataloguing of news-specific content. Metadata is tracked throughout the entire production process, from the assignment desk through feeds, scripts and rundowns. Integrated speech-to-text allows for superfast archiving of legacy material. Regardless of where media is stored – online, near online or offline - metadata remains online and searchable at all times.

Intelligent Storage

Eliminate expensive tape handling costs by digitally archiving content on hard-disk storage, tape libraries, and removable optical media.

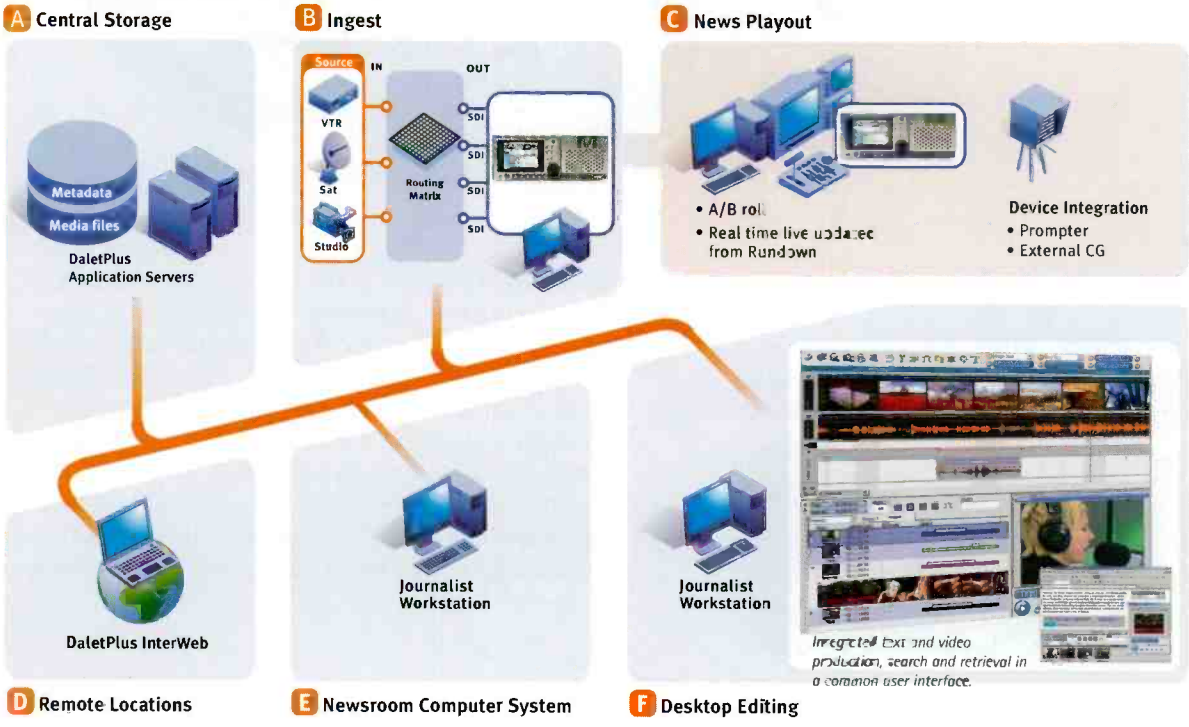
The mission critical production material can be kept online and protected using replication, backup or mirroring. Automate the migration of the original content to a less costly near-online or offline storage management systems.

DaletPlus Media Asset Management centralizes text, audio, graphics and video.

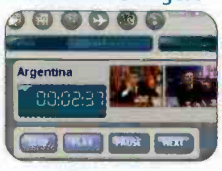
Dalet plus News Suite

End-to-end solution for managing television news

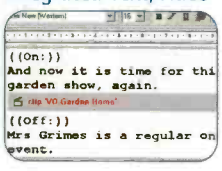
DaletPlus News Suite is a new line of innovative IT-based software modules for fast and reliable digital news production. Designed for broadcasters seeking an alternative to expensive, proprietary systems, DaletPlus News Suite delivers a complete set of open and affordable solutions for ingest, newsroom management, news editing, playout and media asset management.



Multichannel Ingest



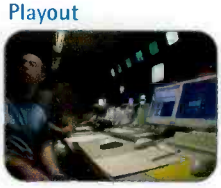
Integrated Text/Video



Browse Editing

Rundowns

Playout



DaletPlus News Suite's modular design meets the most demanding broadcast workflow requirements.
Tailor and scale Dalet's open IT-based solutions to your specific newsroom environment. Get the freedom to integrate what you need and nothing more.
DaletPlus News Suite unique approach integrates standard IT-based equipment with industry-leading video servers from Omneon, Thomson Grass Valley, Quantel, Leitch or Pinnacle.
DaletPlus manages media storage allocation allowing users to automate the transfer of material from online to more cost effective offline systems.

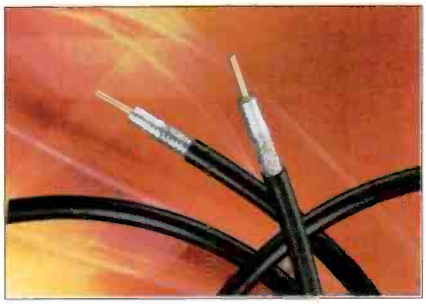
MONITORING AND CONTROL SOFTWARE

BBC Technology Colledia Control 4.5

Allows a single operator to remotely manage broadcast equipment; provides manufacturer-agnostic support while retaining consistent user interface.

800-BBC-3820; *www.bbctechnology.com*

Booth: SU8469



RADIO FREQUENCY (RF) COAXIAL CABLES

Belden RF500 and RF600 cables

50-Ω coaxial cables are ideal for use as antenna jumper cable assemblies and short antenna feeder runs in wireless communication systems such as Wireless Local Loop (WLL), Land Mobile Radio (LMR), PCS and cellular; can also be deployed in in-building wireless applications such as internal communications systems and wireless LANs (WLANs/Wi-Fi); PE jackets include a water-blocking gel embedded in the shield for additional protection in wet environments; and with flame-retardant PVC jackets and a UL listing for interior riser applications; fully compatible with industry standard connectors, tools and accessories.

800-BELDEN-4; *www.belden.com*

Booth: C3351

The Right Stuff. The Right Price.

360 Systems' Image Server 2000

WHEN THE VIDEO SERVER SALES GUY COMES CALLING, it seems there's always an Elephant in the room: *You know* storage should cost less now than ever before, but truth is, 90's-era servers can't make the change.

Which is why 360 Systems' Image Server employs a smart, next-generation design that delivers everything but the elephant-size price.

The Image Server 2000 is perfect for tape replacement, satellite ingest, graphics & animations, or as a full-time play-to-air server. Of course it's fully compatible with most automation systems and desk-top controllers. Using FTP, you'll be able to move program content over Gigabit Ethernet, and share files with other MXF enabled products.

For just $10,000, the Image Server 2000 delivers three video channels, impeccable images, great specs, and it also makes excellent business sense. Isn't it time to rethink what you're paying for video storage?

Check out the Image Server 2000 at **www.360 systems.com**, and download the new user manual while you're there. Or call us direct to arrange a demonstration at your place.

360 Systems® BROADCAST

On Air Coast-to-Coast
Tel: (818) 991-0360
E-mail: servers@360systems.com

©2004 by 360 Systems. Add $2,000 for 100 hours of storage.

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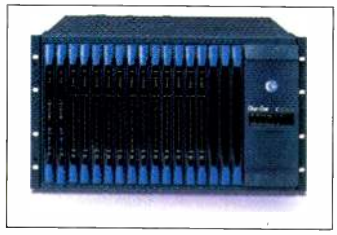
Product Highlights



DIGITAL MATRIX SYSTEM
Clear-Com Eclipse

6RU frame holds up to 208 ports; can connect up to four frames into one 832-port system; features intelligent linking between systems, dual redundant processors, 24-bit resolution with audio frequency response of 30Hz to 22kHz (+/-3dB), individual crosspoint level adjustment in 0.5dB increments, and eight GPI inputs and relays.

510-496-6666; *www.clearcom.com*

NONLINEAR EDITING AND FINISHING SYSTEM
Discreet smoke 6 SD for IBM Linux

Works with Linux operating system; offers advanced conforming and 3D capabilities; features OpenGL graphics, uncompressed SD video I/O, and a choice of Discreet's stone Fibre Channel storage arrays; offers the option for fully redundant hardware RAID 5 solutions; features multiformat capture and playback including PAL and NTSC, real-time 4:4:4 editing, and unlimited vertical timeline editing.

514-393-1616; *www.discreet.com*

Booth: SL3547

VIDEO SERVER
Doremi Labs MCS-HD

HD video server has four independent, shared-storage channels; two play channels, two record channels; selectable compression rates; VTR-like front panel.

818-562-1101; www.doremilabs.com

Booth: C2529

SIGNAL INTEGRATION SYSTEM
Ensemble Designs Avenue

1RU or 3RU frame; allows any combination of HD video, SD video, DVB-ASI and audio modules in the same frame; modules include embedders, synchronizers, converters, routers, sync gens and protection switches.

530-478-1830; *www.ensembledesigns.com*

Booth: SU11919

EMBEDDED ACCESS-CONTROL SYSTEM
Irdeto Access Irdeto Inside

Allows both enforced collection of subscriber access fees or, in the case of free-to-air services, geographical restriction of content distribution in order to comply with content-licensing agreements; is easily upgradeable to full conditional access at a later date through the addition of a smart card.

858-668-4800; *www.irdetoaccess.com*

Booth: SU10106

HD MONITOR
ERG Ventures HDM-EV80D

8.4-inch, rack-mounted HD monitor offers enhanced color and gamma adjustment functions, additional framing markers and a memory preset function; HD/SD inputs can be intermingled; offers four input options and a DC output to simplify wiring two monitors consecutively from one DC unit; features front-panel volume adjustment.

+81 3376 081 61; *www.erg-ventures.co.jp/e*

Booth: SU10609

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Inter BEE 2004

International Broadcast Equipment Exhibition 2004

November 17-19, 2004 Nippon Convention Center(Makuhari Messe)

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What does the future hold for broadcast communications? Professionals in broadcast, video, and audio technology can encounter the latest trends at this year's International Broadcast Equipment Exhibition (Inter BEE 2004).

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For more information on Inter BEE 2004, contact:

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INTERNATIONAL BROADCAST EQUIPMENT EXHIBITION
Inter BEE
Nov.17-19 2004

Exhibition Categories

- Audio Equipment
- Cameras and Related Equipment
- Recording Equipment
- Editing and Production Equipment
- Electronic Displays
- System Conversion Equipment
- Output Systems
- Relay Systems
- Transmission Systems
- Lighting Equipment
- Measuring Equipment
- Transmission Cables
- Electric Power Units
- HDTV Systems
- Satellite Broadcasting Systems
- Virtual Systems
- CG Production Systems
- DVD Systems
- Multimedia Systems
- Software
- Multiplex Broadcasting Systems
- Others

Product Highlights

AUDIO MIXER
Evertz 7720AM-AES4

Accepts four AES/EBU digital stereo audio inputs and routes them to any of four AES outputs; does channel swapping, over mixes, mix downs and on-air breakaways.

905-335-3700; *www.evertz.com*

Booth: SU11827

HD/SD MONITOR
Hamlet Flexiscope

HD capability; has a flexible architecture with low-power consumption; includes a high-quality 3.5-inchTFT display.

+44 1494 729 728; *www.hamlet.co.uk*

Booth: C3243

MPEG-2 ENCODER
Harmonic DiviCom MV 100

Ultra-low bit-rate compression; multi-pass "Look Ahead" CBR/VBR encoding; advanced filtering and processing; supports DiviTrackXE statistical multiplexing.

800-828-5521; *www.harmonicinc.com*

Booth: SU11006

NETWORKING SYSTEM
Harris NetVX

New Gigabit Ethernet interface capable of high-speed file transfer and transporting 64 real-time bidirectional video service; features packet-based architecture; allows video, audio and data to be transported over ATM or IP networks, including E-3 and DS-3 microwave networks, simultaneously; upgradeable system supports standard telecommunications protocols.

513-459-3400; *www.broadcast.harris.com*

Booth: C1906

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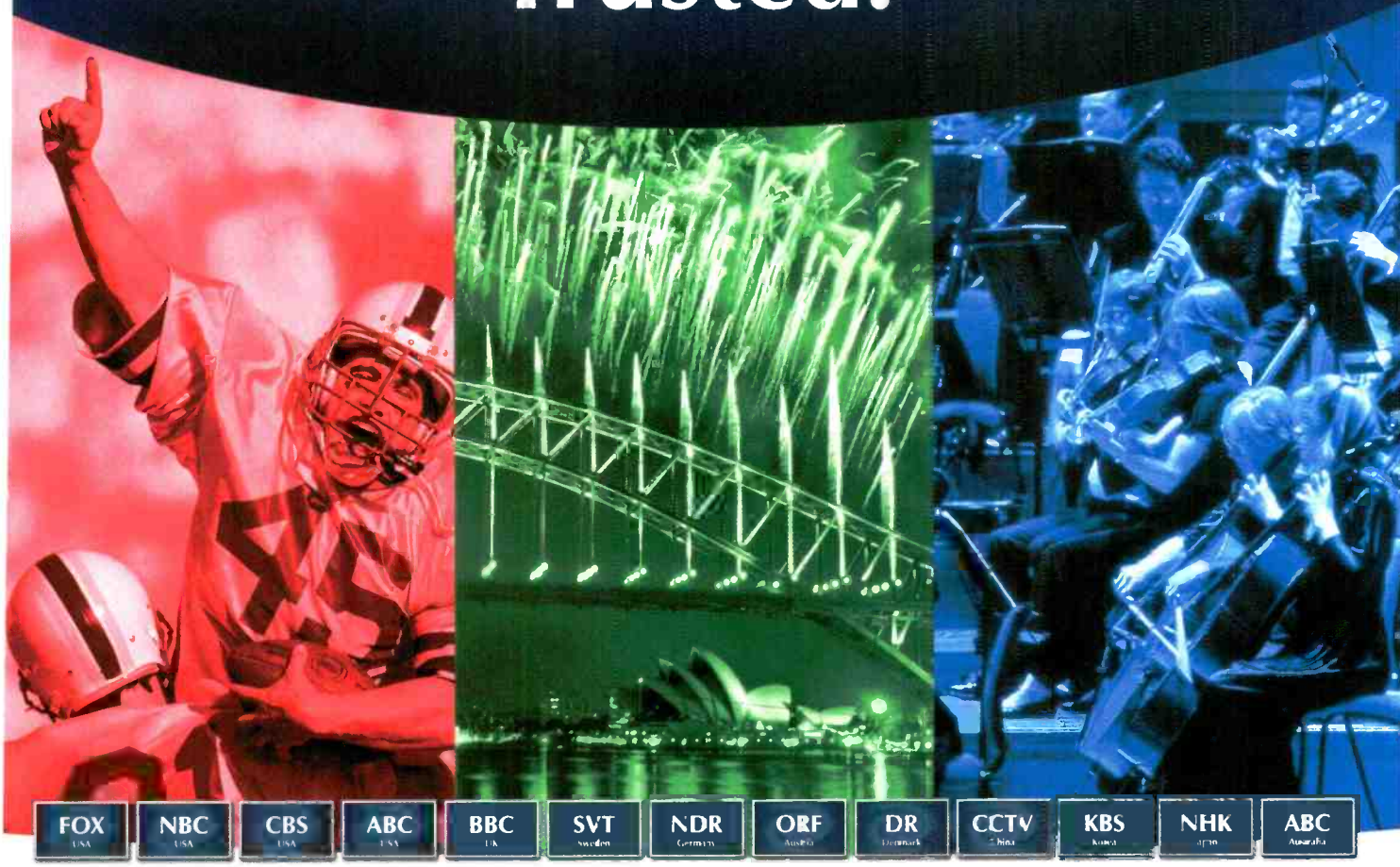

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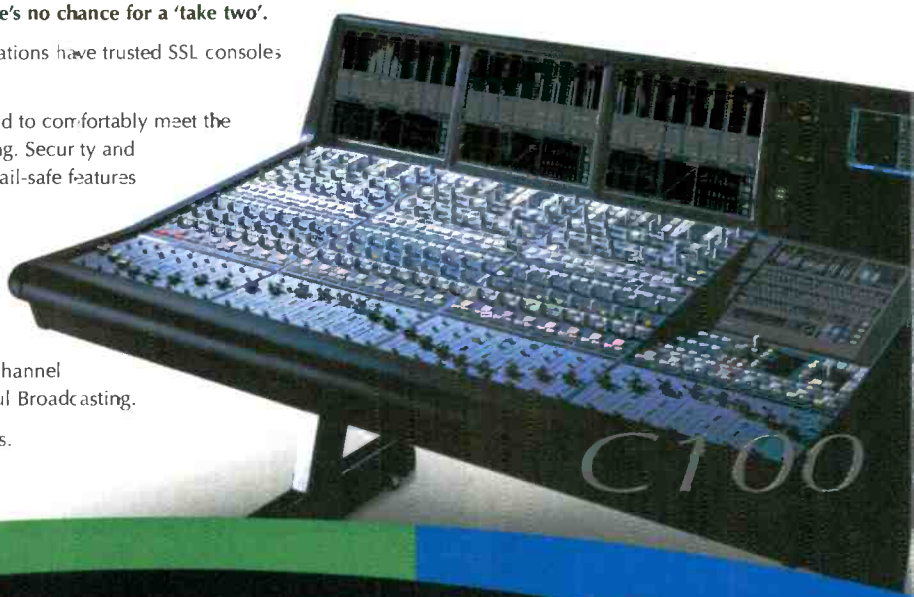
www.ssl-broadcast.com



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Product Highlights

HD NONLINEAR EDITING SYSTEM
Leitch VelocityHD

Features an enhanced version of the same intuitive software interface as its multi-stream standard-definition VelocityQ NLE.

859-371-5533; *www.leitch.com*

Booth: SU9868

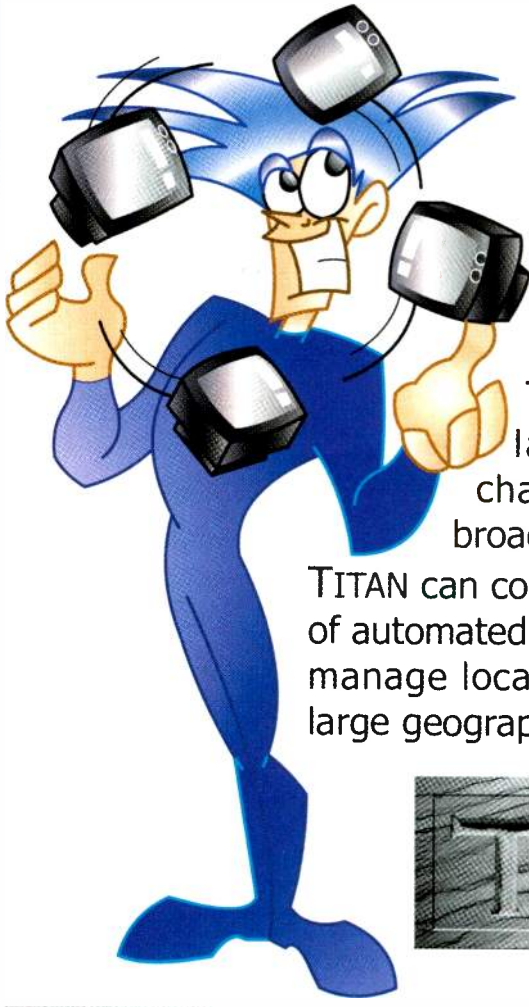
AUDIO ANALYZER
Rohde & Schwarz UVP

Digital audio interfaces up to a 192kHz sampling rate; features expanded measurement bandwidths; can perform several measurement functions simultaneously.

800-833-9200; *www.rsd.de*

Booth: C2532

Trying to Juggle Multiple Broadcasts?



TITAN™ is perfect for large scale, multi-channel, server-based broadcast facilities.

TITAN can control a large number of automated play-out channels or manage locations spread over a large geographic area.

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GRAPHICS SYSTEM
Inscriber Inca Studio

Provides multiple layers of independently controlled graphics, clocks, logos, real-time element transitions, real-time organic dissolves, and page-formatted rolls and crawls; multichannel effects are achieved on a single channel, freeing switcher rails once occupied by numerous CGs, DDRs, logo generators and other equipment.

519-570-9111; *www.inscriber.com*

Booth: SL4718

MULTI-STREAM NLE
Leitch VelocityQ 2x4

Combines Velocity software interface with the Quattrus multi-stream real-time hardware, for an integrated, advanced multi-layer NLE solution; both models feature real-time playback of four streams of video in any combination of compressed or uncompressed and up to six graphics streams; features Q3DX2 dual-channel 3D DVE.

859-371-5533; *www.leitch.com*

Booth: SU9868

VIDEO DELIVERY NETWORK
Intelsat all-digital fiber-based video delivery network

Intelsat Video PoPs in New York, Los Angeles, Washington D.C., Denver and San Francisco, with fiber interconnects into additional North American destinations, will enable sports programmers to order delivery of the coverage of a sports event — be it in MPEG-2 SDTV or HDTV — from the sports venue, all the way to its headquarters in full digital transmission, without once having to be decoded.

202-944-8223; *www.intelsat.com*

Booth: C11539

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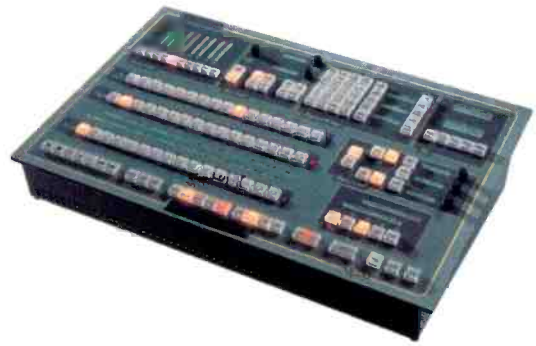
Product Highlights

LIGHTING
Kino Flo ParaBeam

24-inch by 24-inch ParaBeam can light a four-person news desk from approximately 15 feet away; sweeps back the darkness in the foreground without washing out the background on the set; with a simple rotation of the fixture, it can focus on just one of the four subjects.

818-767-6528; *www.kinoflo.com*

Booth: C9139



DIGITAL MASTER CONTROL SWITCHER
Leitch Opus

Feature-rich in a multi-channel, multiformat SD/HD environment; provides dual-channel effects/squeezes, audio processing capabilities, keys, audio overs and quick selects, and supports both HD and SD signals.

859-371-5533; *www.leitch.com*

Booth: SU9868

CONTENT MANAGEMENT APPLICATION
Leitch MediaNet

Fully integrated content management application that provides a unified view of server content whether on the local or a remote server system; equipped with powerful search and sort tools; allows users to execute smart asset mining of content and metadata; provides heightened security and content management across multiple NEXIO server domains.

859-371-5533; *www.leitch.com*

Booth: SU9868

CHANNEL BRANDING PROCESSOR
Miranda Imagestore HDTV

Has an integrated automated character generator plus easy-to-use gallery graphics preparation and data interfacing software; expandable HD processor that provides capabilities ranging from logo insertion to fully featured master control switching and channel branding graphics.

514-333-1772; *www.miranda.com*

Booth: SU10129

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Patent: US 6,493,024B1

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Product Highlights

TRANSMISSION SERVER
Leitch NEXIO NXMTS

Supports multiple SD/HD compression formats, as well as an ASI interface; provides the ability to record, process and play back MPEG transport streams; the transmission server can be integrated with the shared storage system or used as an edge server in a remote location; offers applications such as ingest, clipsync, delay and playlist; can be integrated with third-party automation.

859-371-5533; *www.leitch.com*

Booth: SU9868

VIDEO AND DATA STORAGE APPLICATION
Maxell DVD-R Plus series

Has a 4.7GB capacity; supports 8X write speeds; has a pre-recorded shelf and archival life of more than 50 years; discs are write-compatible with almost any manufacturer's general-purpose DVD-R drives and recorders; after recording, the discs are read-compatible with DVD-ROM, DVD-Video and DVD-Audio players.

858- 503-3300; *www.maxell.com*

Booth: C8228

HD MONITOR
Marshall Electronics V-R65P-HD

Portable 6.5-inch monitor weighs less than 2lbs.; offers a flexible input configuration without the need for special adapter boxes; standard inputs include active loop-through on each connection for HD-SDI/SDI (SMPTE 259M, SMPTE 292M) and composite video with PAL/NTSC automatic recognition; features a multiformat connector for HD or SD analog component signals (SMPTE 274M).

800-800-6608; *www.lcdracks.com*

Booth: SU11614

PROGRAMMABLE CONTROLLER
MicroFirst MPC-3200

Has a real-time, multi-tasking preemptive operating system (the WinMOS) that mimics WIN32 API calls; features include onboard input and control facilities, with a 20-line by 24-character backlit LCD display and a 15-key sealed-membrane keypad; can execute downloaded event schedules.

201-651-9300; *www.microfirst.com*

Booth: SU7828

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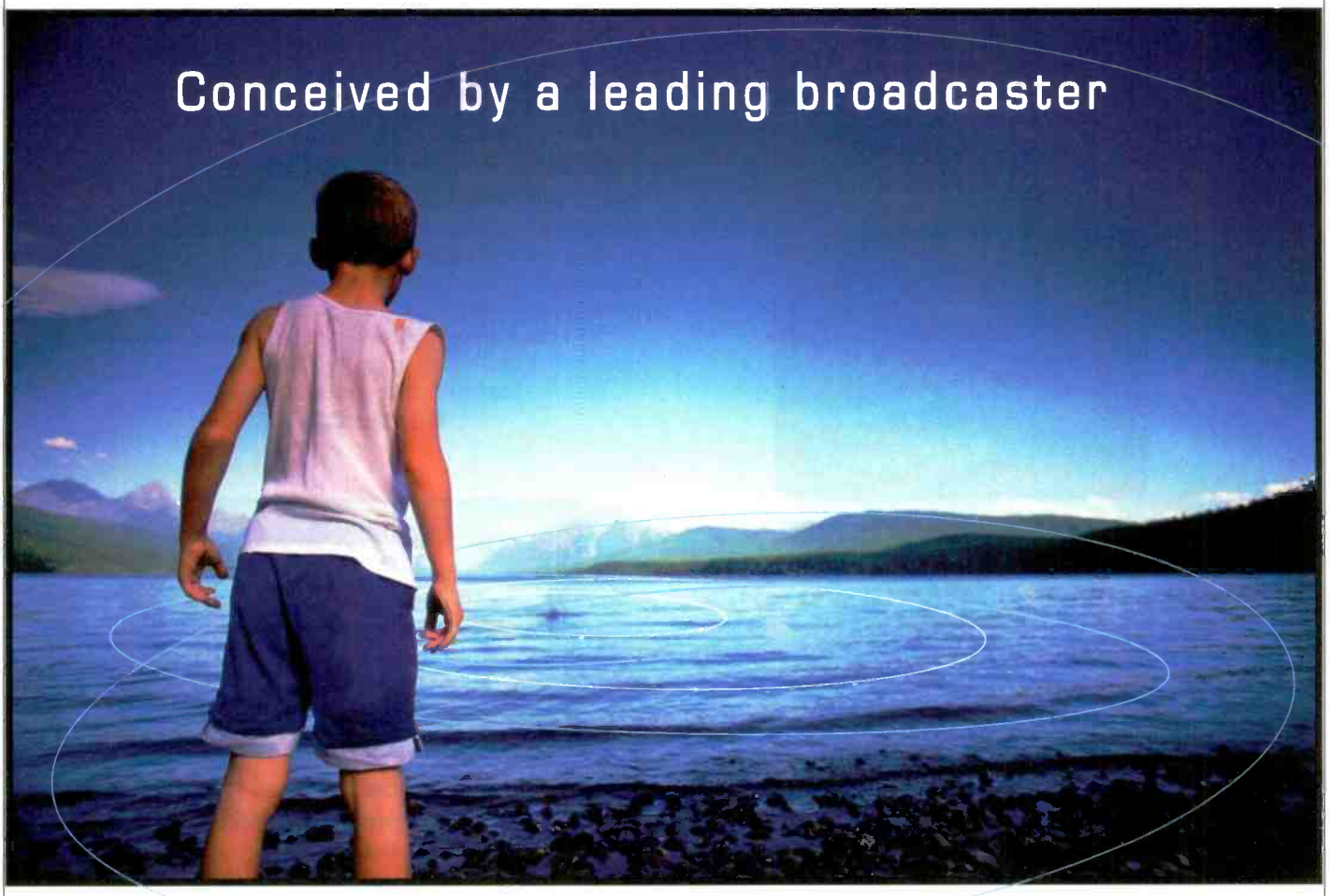

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Product Highlights

MULTI-IMAGE DISPLAY PROCESSOR
Miranda Kaleido-Alto

Designed for simpler and smaller monitoring environments requiring fewer inputs; uses the same high-quality image display technology as the Kaleido-K2 processor; features auto-sensing SDI/analog inputs and display clocks/timers, UMDs, tallies, and audio metering.

514-333-1772; *www.miranda.com*

Booth: SU10129

HD/SD MASTER CONTROL SWITCHER PANEL
Miranda PresStation

Multichannel HD/SD master control switcher panel operates with Miranda's Oxtel series Imagestore channel branding processors to provide channel branding graphics capabilities; can control clip playout, dual 3-D DVEs, automated character generation and four layers of animation/clock insertion.

514-333-1772; *www.miranda.com*

Booth: SU10129

Download FASTtrack for your PDA. Visit *www.broadcastengineering.com* for more information.

FIBER OPTIC TRANSPORT SYSTEM
Multidyne RGB-5000

Provides a long-haul, transport solution for high-resolution RGB or VGA video sources via one fiber; provides the capability for the separation of a video signal source and the monitor; systems are available to transport RGB video as well as audio, keyboard and mouse control; provides a total analog bandwidth of up to 500MHz.

516-671-7278; *www.multidyne.com*

Booth: C3151

MOBILE PRODUCTION UNIT
National Mobile Television HD4

NMT's first true multiformat HD facility; interior square footage in excess of 640 square feet; designed to eliminate jamming and the need for the trailer to be on a completely level surface; side of the trailer is expanded and retracted by use of actuators mounted below the expansion to push and pull the side; equipment in use includes Thomson Grass Valley and Solid State Logic.

914-682-2111; *www.nmtv.com*

Booth: C1906

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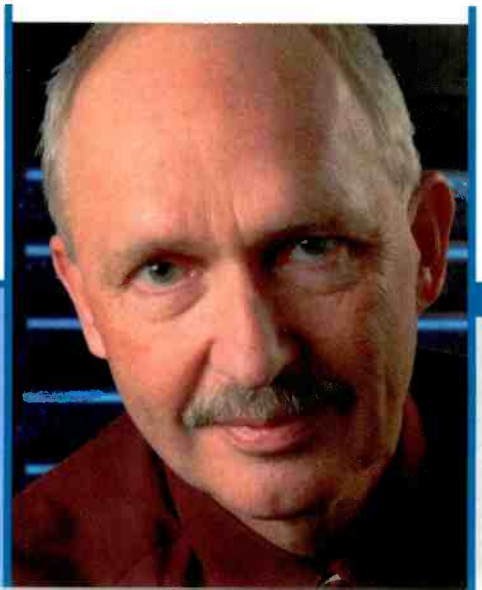
Helge Blucher
Vice President
Detroit Public Television



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Product Highlights

UHF GYSEL POWER COMBINER

MYAT iDT Star

Integrated system offers substantial advantages over hybrid power combiners by eliminating expensive phased lines and complex switching schemes needed to maintain output during faults; substantially better fault tolerance than hybrids, allows users to maintain greater signal strength and often perform on-air maintenance if a transmission component fails.

201-767-5380; *www.myat.com*

Booth: C1415

MICROWAVE TRANSCEIVER

Nucomm Channel Master

Dual-band portable microwave transmitter/receiver; offers MPEG-2/COFDM and analog modulation in a lightweight case; switchable between 2- and 7GHz bands.

908-852-3700; *www.nucomm.com*

Booth: C1425

HD FORMAT SUPPORT

Omneon SPECTRUM

Capable of supporting multiple HD formats simultaneously, including MPEG, HDCAM, and DVCPRO100; allows broadcasters to deploy a server infrastructure for HD and SD playback and gain the flexibility to add channels or services; current Omneon customers can add new HD services, including DVCPRO100, to their existing media server implementations.

866-861-5690; *www.omneon.com*

Booth: SU7466

CONTROL PANELS

Network Electronics CP-MDP

Provide TCP/IP interconnectivity to allow control over the Internet; incorporates the Expandable Panel Concept and customized surface design; features 64 configurable tri-color buttons with easy exchangeable labels; features 320x240 QVGA display capable of black-and-white or color, 16 GPI ports/16 GPO ports.

800-420-5909; *www.network-electronics.com*

Booth: SU11606

MULTI-SLOT P2 DRIVE

Panasonic AJ-PCD10

Developed for rapid ingest of DVCPRO or DVCPRO50 resolution video into NLE or server systems; enables direct access to the content in the P2 cards; material can be accessed almost instantaneously; fits in a standard PC-type 5.25-inch bay drive enclosure; supports five P2 card slots; offers high-speed USB 2.0 interface to connect to the host computer.

201-392-4127; *www.panasonic.com/broadcast*

Booth: C3811

RECORDER

Panasonic AJ-SPD850

Part of the DVCPRO P2 series; features five P2 card slots; provides up to 80 minutes record capacity at DVCPRO resolution with 4G P2 cards, and at DVCPRO50 studio quality provides 40 minutes record capacity on five 4G P2 cards; features USB 2.0 and Ethernet ports; offers IEEE 1394 and SDI with embedded audio as system options.

201-392-4127; *www.panasonic.com/broadcast*

Booth: C3811

VIDEO ROUTING SWITCHER

PESA Premiere

Small, expandable switcher available in matrix sizes based on 8x4, 12x8, 16x8 and 16x16; accommodates composite, Y/C, RGB and RGBHV video, and stereo audio.

800-328-1008; *www.pesa.com*

Booth: SU9530

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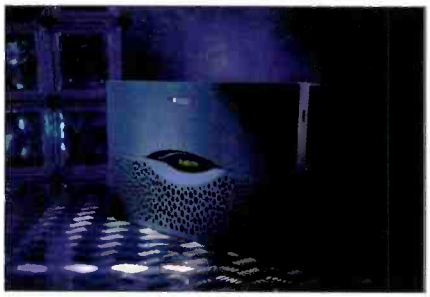
Product Highlights

MULTIFORMAT DIGITAL VTR
Panasonic AJ-SD93

Facilitates 4:2:2 quality video transfers at 50Mb/s over IEEE 1394 to NLEs; has optional analog and SDI inputs and outputs; can record onto small, medium or large DVCPRO cassettes; has a maximum record time of 184 minutes; can play back DV and DVCAM tapes; features on-screen display setup menu, and video monitor and audio monitor outputs.

201-392-4127; *www.panasonic.com/broadcast*

Booth: C3811



CHARACTER GENERATOR
Pixel Power Clarity family

Extended to include a multichannel CG combined with integrated still store and clip player; features up to four output channels; includes keyframeable animation, integrated multichannel video and audio clip player, and four live DVE inputs; available in a single- or dual-channel HD configuration, or a single HD channel can be combined with dual SD channels.

954-943-2026; *www.pixelpower.com*

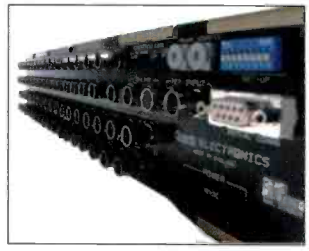
Booth: C5442

AUDIO/VIDEO DELAY
Prime Image D1 Pipeline

Features up to 10-second variable delay standard with up to 20 seconds additional delay available; has 10-bit video processing; primary and auxiliary/alternate video inputs and 24-bit audio processing; has AES/EBU audio, digital or analog; includes four auxiliary/alternate audio inputs; audio can be switched with or independent of video; fits in standard 2U-high rack space; has a built-in synchronizer.

408- 867-6519; *www.primeimageinc.com*

Booth: C5634



VIDEO ROUTERS
Quartz Electronics Topaz

Family of compact, low-cost routers in 16x16 and 32x32 sizes; handles SDI, HD-SDI as well as analog video and audio; can stand alone or integrate into larger system.

888-638-8745; *www.quartzus.com*

Booth: SU9812

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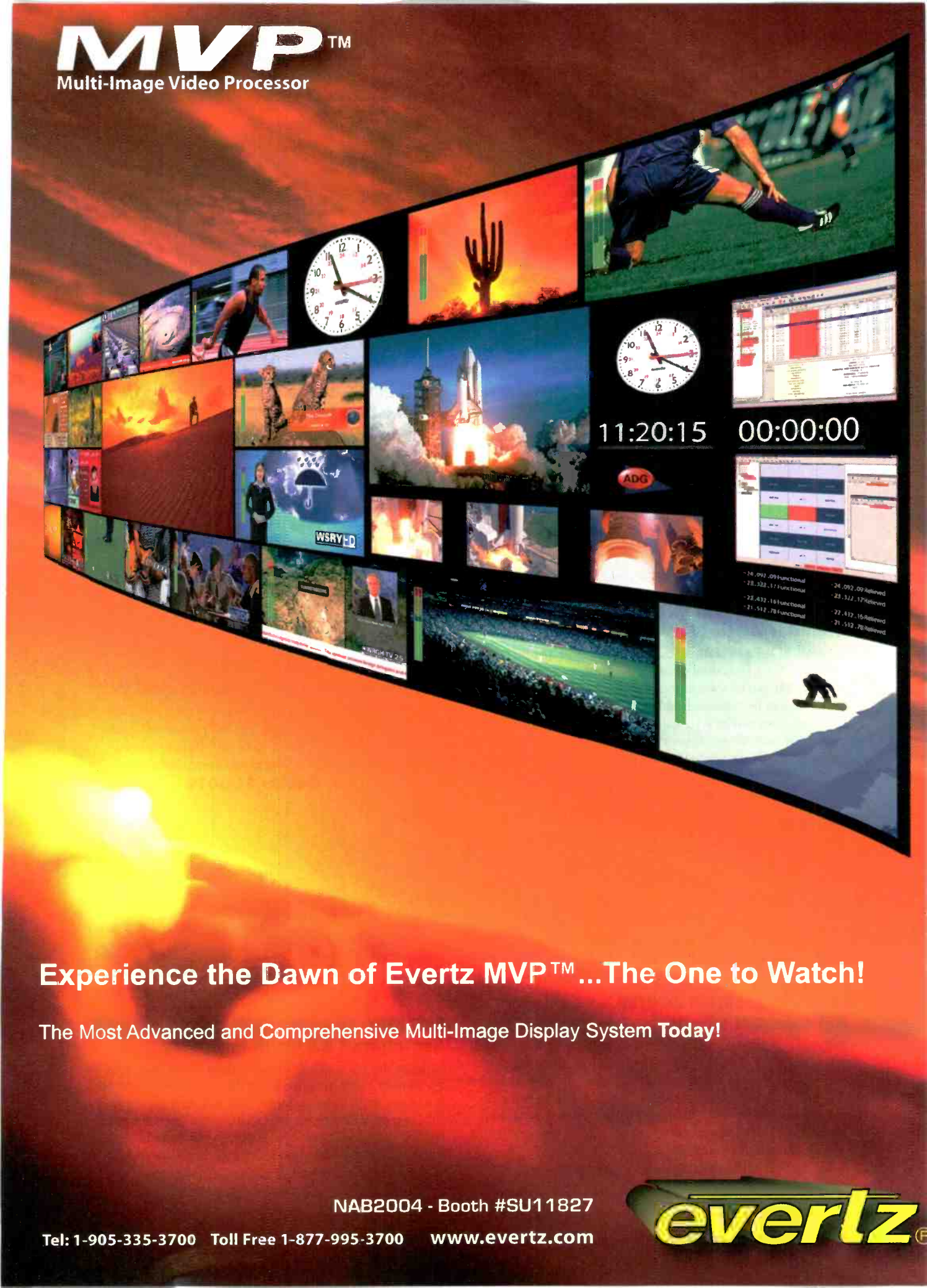
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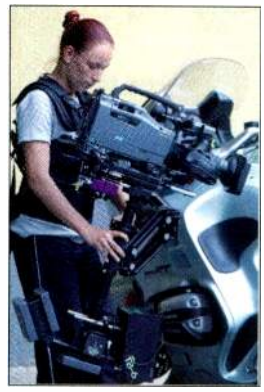
Product Highlights

HDTV ENCODER
Tiernan Radyne-Com Stream THE15A

Provides compliant ATSC or MPEG-2 transport streams; when operating under the MPEG-2 profile, transport stream rates of up to 108Mb/s are available; supports one HDTV service in 1080i, 720p or 480p; video input is a 1.5Gb/s SD, per SMPTE 292M; video encoding process provides motion estimation across all picture areas; factory configurable for 4:2:2/4:2:0.

602-437-9620; *www.radynecomstream.com*

Booth: SU11300



CAMERA-STABILIZATION SYSTEM
Sachtler Artemis

Artemis SDI Pro's connection cable is able to handle high-data transfer; offers dual-dynamic balance, including a third battery that can be independently adjusted; focus remote receivers can be mounted on both sides to improve the camera's center-of-gravity balance; Artemis Cine/HD system (shown above) features three video lines so operators can use HD RGB video cameras without downconverters.

516-867-4900; *www.sachtler.com*

Booth: C7628

ENCODER
Scopus CODICO E-1800

HD encoder provides multiformat, 1080i, 720p and 480p support; 4:2:2 and 4:2:0 encoding at up to 45Mb/s; audio multiplexing and MPEG-2 and Dolby Digital (AC-3) encoding.

609-987-8090; *www.scopus.net*

Booth: SU11814

PROGRAM INSERTION MONITOR
Sencore DPI montior

Provides an analysis of each ad message sent and received; provides SCTE 35 message syntax analysis, in detail, for each DPI message sent; monitors up to eight ASI transport streams simultaneously, and logs SCTE 3 activities for 25 programs per transport stream; displays, in real time, the bit rates of the different components (PIDs) present in the MPEG-2 transport stream.

800-SENCORE; *www.sencore.com*

Booths: SU11011, C10343

HEADPHONES
Sennheiser HD650

Combines flat frequency response (10Hz to 39,500Hz/-10dB) with natural dynamics; includes an upgraded cable; offers reduced distortion in the high frequencies; features hand-selected, matched transducers with tight tolerances (+/1 dB); computer-optimized magnet systems for minimizing harmonic and intermodulation distortion; neodymium ferrous magnet systems for high efficiency.

860-434-9190; *www.sennheiserusa.com*

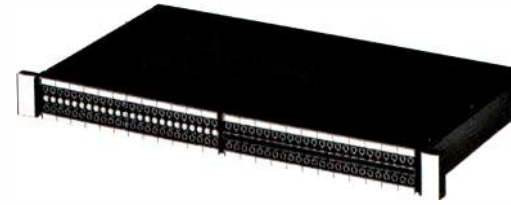
Booth: N2812

REMOTE MONITORING SOFTWARE
Thomson Grass Valley NetCentral IV

Upgraded software uses SNMP and Syslog; links any electronic document with device alerts; "agents" run monitored products, "manager" monitors products.

530-478-3000; *www.thomsongrassvalley.com*

Booth: SU8076



PATCHBAY
Switchcraft EZ Norm Patchbay

Change the normalling configuration of an audio patchbay by turning a cam mechanism with a standard screwdriver; normals can be changed from full to half to none in one process; opaque designation strips allow the cam to be hidden from view; backpanel options include PPT punch downs, EDAC style connectors and three-pin style.

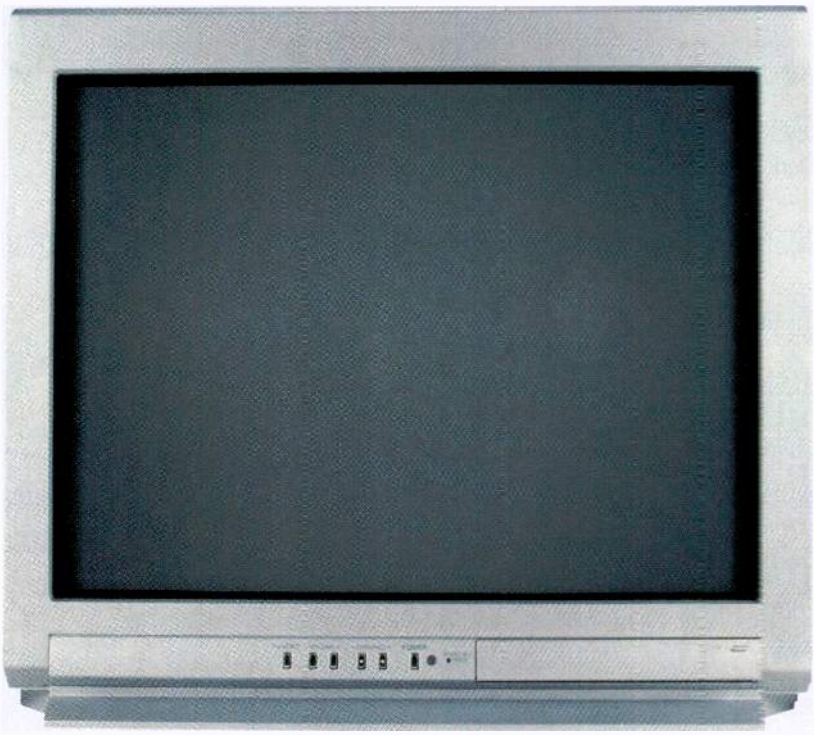
773-792-2700; *www.switchcraft.com*

Booth: C3322

Color indicates advertiser

What can you REALLY do with

19.39 Mbps?



SEE HARMONIC'S BROADCAST SOLUTIONS AT NAB 2004, BOOTH SU11006.

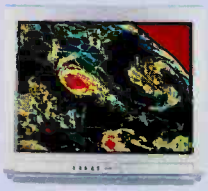
Harmonic

A lot. And, you can make changes

06:21:42.04

NETWORK

WEATHER / TRAFFIC



KIDS ENTERTAINMENT

EDUCATION

PAID PROGRAMMING

LOCAL ACCESS

13:47:00.11

NETWORK

KIDS ENTERTAINMENT

EDUCATION

from time to time.

Harmonic

20:35:07.29 01:18:44.15

NETWORK

SYNDICATED PROGRAMMING

EDUCATION

PAID PROGRAMMING

Delivering More Content with the Highest Picture Quality Per Bit.

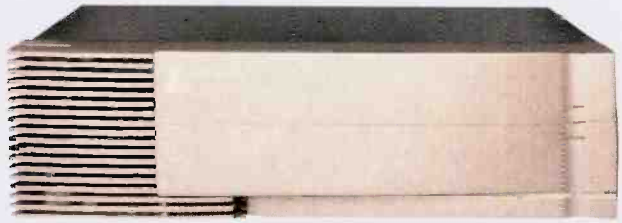
Harmonic

DiviCom® MV 100

- Highest performing standard definition (SD) encoder in the industry delivers beautiful digital video at ultra low bit-rates.
- Advanced noise reduction technology improves picture quality and further reduces bit-rate.
- Platform for the future supporting MPEG-2 as well as MPEG-4/AVC and Windows Media 9 (VC9).

DiviCom MV 450

- Flexible, low bit-rate, high definition (HD) digital video encoder delivers an exceptional HD experience.
- Provides standards-based HD digital program insertion (DPI).
- Supports up to two Dolby E passthroughs and 4:2:2.

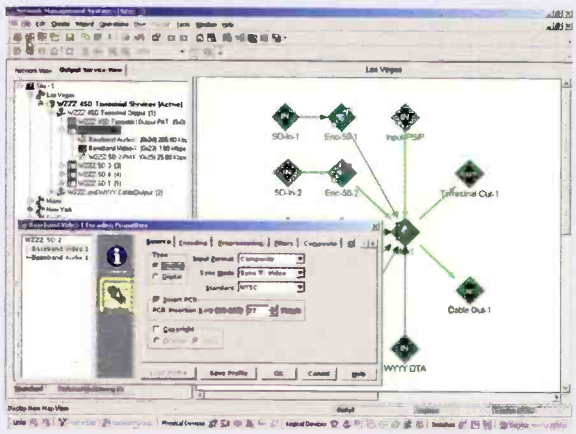


DiviTrackXE™

- Third generation closed-loop statistical multiplexer maximizes channel carrying capacity while preserving picture quality.
- Supports a mix of SD and HD VBR and CBR encoders along with data in the same pool.
- Offers a variety of input/output options to integrate with virtually any environment.

Broadcast Network Gateway (BNG)

- Gigabit Ethernet output enables efficient IP-based transport of HD and SD digital video to carrier headends.



NMX Digital Service Manager™

- Manages video infrastructure as a series of services rather than discrete hardware and software components.
- Enables seamless change in system mode according to time-of-day and day-of-week.
- Interfaces with third party conditional access, PSI/SI and automation systems.
- Supports a wide range of redundancy designs and automatically reprovisions the infrastructure, ensuring the highest levels of service reliability and availability.
- Permits centralized and distributed service management.

Harmonic Inc. • 549 Baltic Way • Sunnyvale, CA 94089 • Tel: 1.800.828.5521 or +1.408.542.2559 • Fax: +1.408.490.6001
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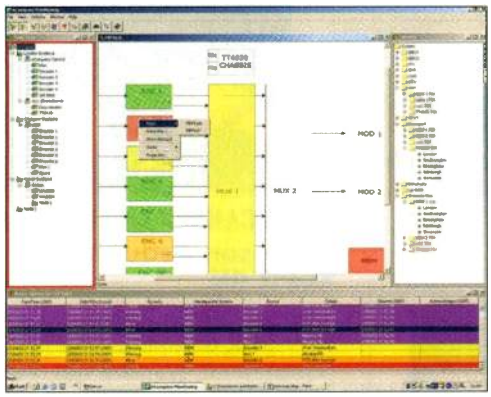


NETWORK-MONITORING SYSTEM

TANDBERG Television nCompass 3.0

Software monitors the health of MPEG services across a video network; inspects actual service at probe points and compares with required transmission.

407-380-7055; *www.tandbergtv.com*

Booth: SU8755

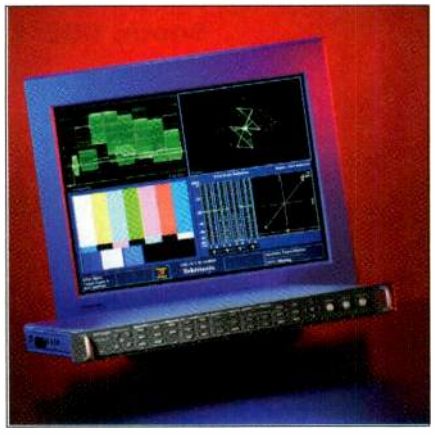
HD PRODUCTION PACKAGE

Thomson Grass Valley
HD production kit package

Includes LDK 6000 km II camera, Kayak HD 1-M/E switcher, Concerto series router, Kameleon media processing system and PVS 3000 Profile XP Media Platform.

530-478-3000; *www.thomsongrassvalley.com*

Booth: SU8076



WAVEFORM RASTERIZER

Tektronix WVR600

Supports mixed analog and digital, video and audio; fitted with alarm and logging capabilities; uses Flex Vu technology and comprehensive error alarms and logging.

800-426-2200; *www.tektronix.com*

Booth: C7128

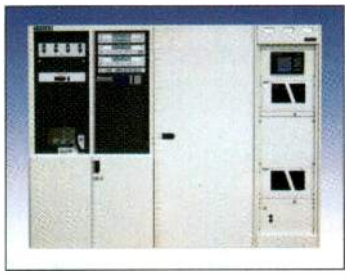
STUDIO CONSOLE

TBC Consoles "Bone"

Desktop height adjustable from 25-5/8-inch to 39-1/8-inch; recessed monitor platform supports three-inch by 21-inch monitors; two-bay base cabinet, 10RU/bay, open back, laminate riser.

888-266-7653; *www.tbcconsoles.com*

Booth: SU8068



MSDC-IOT UHF DIGITAL TRANSMITTER

Thales Broadcast & Multimedia
DCX Paragon

Available in oil- and liquid-cooled versions for both NTSC and DTV operation; for high-power UHF stations; can be twice as efficient as a conventional IOT and four times as efficient as a solid-state transmitter; has increased reliability because it uses Soft Arc Technology instead of a crowbar.

413-998-1116; *www.thales-bm.com*

Booth: C4709

HD SWITCHER

Thomson Grass Valley
1-M/E Kayak HD

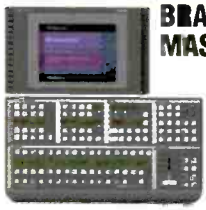
Compact, 3RU-high switcher supports 1080i and 720p HD native productions; 16 inputs, four keyers, 10 auxiliary busses; switchable to SDI 525 (NTSC) and 625 (PAL).

530-478-3000 *www.thomsongrassvalley.com*

Booth: SU8076

Color indicates advertiser

Product Highlights



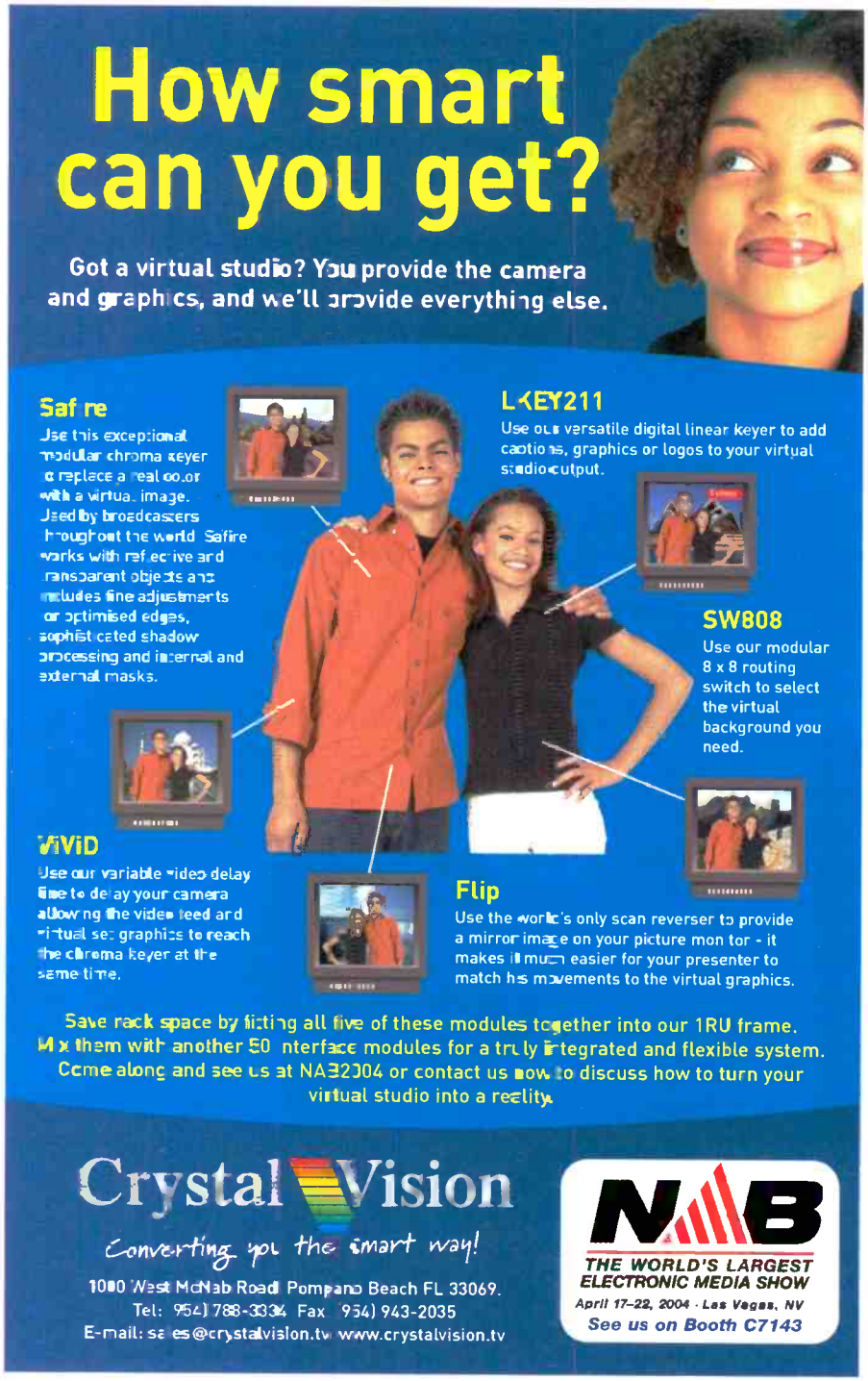
BRANDING AND MASTER CONTROL

Thomson Grass Valley Maestro

Includes SD and HD Maestro MC modules, touch-screen control panel, Kameleon media processing system frame, PVS 3000 Profile XP Media Platform; supports SD, HD, AES, embedded audio, analog audio and Dolby E; stores hundreds of logos, animations and audio clips; up to eight audio channels; flexible keying.

530-478-3000; *www.thomsongrassvalley.com*

Booth: SU8076



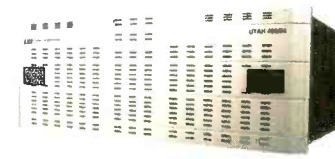
FILM SCANNER AND DATACINE

Thomson Grass Valley Spirit 4K

Supports 35mm, Academy 35mm, three-perf, four-perf, eight-perf (VistaVision), standard and Super 16mm; native 2K scanning in real time, true 4K scanning at up to 7.5fps.

530-478-3000
www.thomsongrassvalley.com

Booth: SU8076



ANALOG I/O OPTION

Utah Scientific UTAH-400

All UTAH-400 switchers now can be ordered with analog I/O modules; the eight-channel option modules are fully compatible with the other SD, HD and AES I/O options for the UTAH-400, allowing the analog ports to be freely added to any UTAH-400 digital routing switcher.

801-575-8801; *www.utahscientific.com*

Booth: C5912

DIGITAL VIDEO/AUDIO MONITOR

Videoframe A/V VNODE

Monitoring and I/O device with a wide range of software interfacing options, implemented protocols and 100Base-T Ethernet; integrates into SNMP-based systems.

530-477-2000;
www.videoframesystems.com

Booth: SU8648

Color indicates advertiser

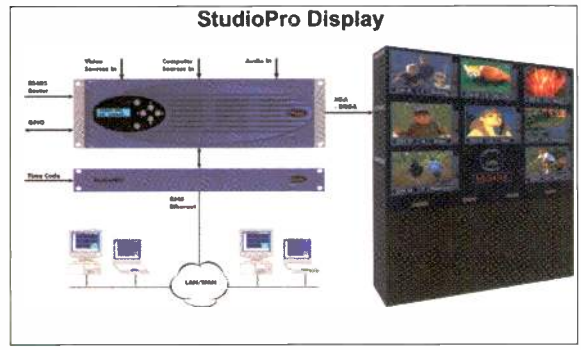
DIGITAL TAPELESS NEWSROOM

Video Technics VT NewsFlow

Incorporates automated ingest/playout servers, NLE studio editors, low-res media browsers and editors, and centralized media storage for instant accessibility of media anywhere on a network; users can work simultaneously from a common pool of digital media; browse, log or edit material in real time even as it is being captured.

404-327-8300; *www.newsflow.tv*

Booth: C9125



MONITORING MODULE

Zandar StudioPro

Can be combined with the FusionPro 3RU modular rack to provide an integrated and intuitive interface for the setup, operation and maintenance of the virtual monitor wall; enables graphically enhanced displays, the inclusion of logo or bitmap files, and the display of clocks; generates alerts to connected users via SNMP of alarm conditions, which are also logged to file and visually indicated.

321-939-0457; *www.zandar.com*

Booth: SU9915

NEW for NAB

HD from Marshall Electronics

The World's Most Affordable Portable HD Monitor

HD/SD/ Analog/Digital Included

Introducing the world's most affordable portable 6.5-inch Wide Screen HD monitor. The V-R65-HD is compact and lightweight, can be camera mounted and accepts any type of HDSDI/SDI or Analog HD/SD signal.

HD/SD Screen Formats	Signal Formats
•1080-60/50i	•HDSDI (Digital)
•720P-24/25/30/60	•SDI (Digital)
•PAL or NTSC	•Y-Pb-Pr (Analog)
•480P-24/25/30/60	•RGB/RGBHV (Analog)
•1080 30/24/25P	•Composite (Analog)
	• XGA

- Operates on 12-17 Volt D.C.
- Bright-380 nit High Resolution Display
- 6 Frame marker overlays
- Zoom for focus function
- Monochrome function
- Direct access for all adjustments
- Three LED tally
- 110-220V power supply included
- Optional Battery Pack

$3799

The World's Lightest Wide Screen 17" HD Monitor

with Universal Input feature

Occupying only 6 SRU and weighing just 12 pounds, the V-R171P-HD features a 17" High Resolution LCD Display and includes our universal input configuration.

- Accepts all HDSDI/SDI and analog HD/SD signals
- Direct access for all adjustments
- CRT style 170° viewing angles
- XGA with automatic scaling
- 6 Frame marker overlays
- Three LED tally
- Zoom for focus function
- Rackmount or Desktop Configurations
- Monochrome function
- 110-220V power supply included

HD/SD Screen Formats	Signal Formats
•525-(NTSC)59.94i, 60i	•HDSDI (Digital)
•625 (PAL) 50i,	•SDI (Digital)
•640 x 480-59.94i, 60i, 30P, 29.97P, 59.94P, 60P	•Y-Pb-Pr (Analog)
•640 x 575-50i, 25P, 50P	•RGB/RGBHV (Analog)
•1280 x 720-23.97P, 24P, 25P, 29.97P, 30P, 59.96P, 60P	•Composite (Analog)
•1920 x 1080 - 23.97P, 24P, 25P, 29.97P, 30P, 50i, 59.94i, 60i	•Y/C-S-Video (Analog)
	• XGA

We offer over 50 models of LCD monitors designed to meet virtually any application

Tel.: 800-800-6608 • Fax: 310-333-0688 SEE US at NAB BOOTH SU11614 LCDRACKS.COM

Color indicates advertiser

Product Highlights

DIGITAL AUDIO MIXING CONSOLE

Wheatstone D-9

Features 5.1 digital surround, a host of mix-minus clean feed outputs, individual channel bus-minus outputs, six-band digital equalization, digital dynamic processing and integrated routing; 25 inches front to back, making it ideal for remote truck installations.

252-638-7000; *www.wheatstone.com*

Booth: N2802

DIGITAL BATTERY

Anton/Bauer Dionic

Weighs 1.7lbs; can be safely added to any inventory of existing Anton/Bauer batteries; can be charged on any Interactive 2000 or TITAN series charger; automatically compensates for load and environmental conditions; time and state of charge indications are integrated into a single, full-time display.

203-929-1100; *www.antonbauer.com*

Booth: C3806

AUDIO OPTION FOR VTM SERIES

Videotek VTM Option 9

Provides integrated audio monitoring and analysis on a high-resolution XGA output for use with a standard PC monitor; features four analog stereo inputs, four AES/EBU inputs and 16 channels of embedded audio as well as Dolby E and AC-3 inputs for both HD and SD video.

610-327-2292; *www.videotek.com*

Booth: C4717

PORTABLE MODULE FOR VIDEO CAMERAS

BMS Carry-Coder II

Performs wireless digital transmission of audio and video signals; offers 4:2:2/4:2:0 MPEG-2 encoding, and a low-delay, COFDM digital demodulation, as well as RF amplification in a compact package; can be used in a backpack configuration or plugged directly on to the back of most professional video cameras.

800-669-966; *www.bms-inc.com*

Booth: C1406

Color indicates advertiser

LOUDNESS METER UPGRADE

Dolby LM100

Upgrade includes enhanced loudness measurement, logging features and error reporting; event log monitors several input statuses, alarms and error conditions.

415-558-0200; *www.dolby.com*

Booth: SU10443

GRAIN REDUCTION

Cintel Grace-in-a-box

Works in all resolutions, from SD through to 2k and 4k data; is film gauge and image format independent; is fully programmable; can provide grain reduction without the need for recursive filtering and additional frame stores.

+44 1920 463939; www.cintel.co.uk

Booth C11506

DIMMER MICRO-FILL KIT WITH COMBO ACCESSORY

Frezzi Dimmer Micro-Fill Kit

Instantly provides more diffusion with flip-up frosted glass; both dichroic and diffusion filter can flip into position instantly with further control provided by side barn doors; includes the Frezzi FNP-1S 30 Watt Hour battery, FTC-NP1 trickle charger, Dimmer Micro-Fill with NP connector and NP1 Pouch; features all light heads include all necessary mounting hardware for any video camera, runs a 35 watt bulb for 45 minutes and a 20 watt bulb for 75 minutes at maximum brightness (longer run-times are achieved at lower intensities); compact, light-weight, and reliable camera top lighting; full kits available with batteries; advanced pulse width modulation variable control emits no interference with video signal.

800-345-1030; www.Frezzi.com

Booth SU10512

NEW for NAB

SEE US at NAB BOOTH SU11614

V-R25P-SDI
Ten 2.5" displays in 3U. Ready to mount in 19' rack. Each display accepts an SDI (ITU-R601) signal ($4599)

V-R171P-SDI
17" wide LCD screen with 170° viewing angle. Standard inputs for composite, Y/C and SDI plus XGA with automatic scaling ($3499)

V-R191P-SDI
19" LCD screen with 170° viewing angle. Standard inputs for composite, Y/C, and SDI plus SXGA with automatic scaling. Weighs 14.6 lbs. Only 8U high. ($4599)

GOING DIGITAL? →→→

go with Marshall Electronics ...

BC-0103-10
Precision Analog Video to SDI Converter. ($499)

BC-0301-10
Precision SDI to Analog Video Converter ($379)

BD-0914-D
HDSDI / SDI Distribution Amp. ($699)

Marshall Electronics Tel.: 800-800-6608 • Fax: 310-333-0688 LCDRACKS.COM

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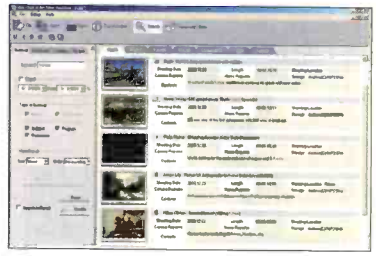
Product Highlights



DIGITAL ASSET-MANAGEMENT SYSTEM
Konan DigitalArchive

Creates an accelerated and efficient workflow process; integrates legacy systems such as audio archive systems, MIS and tape-management systems; open architecture offers flexibility and scalability; transforms what was previously a linear production workflow into a networked system where many users can simultaneously access, search, edit and use content once it's ingested into the archive.

+82 2 3489 1000; *www.konantech.co.kr*

Booth: SL2159

MASTER CONTROL SYSTEM
Pro-Bel TX500

Provides solutions from a simple mixer to a multichannel master control system with multi-level audio support for surround sound.

631-549-5159; *www.pro-bel.com*

Booth: C8123

It doesn't show but reveals.

See what's been hidden with ERG's new ultra-high resolution 6" diagonal HDM-EV30D HD monitor. To further improve your view, it offers enhanced color and gamma adjustment functions, adjustable framing markers, and a convenient memory preset function. In addition, its rugged, compact design and low power consumption make it ideal for location shooting. All of which can help you look more closely. Find the new ERG HDM-EV30D at NAB 2004, Booth #SU10609.

erg-ventures.com, erg@erg-ventures.co.jp, U.S.: +1-949-263-1630, Japan: +81-3-3760-8161

ERG HD Monitors

AUTOMATION SYSTEM
Pro-Bel Morpheus

Manages systems from single channels up to the most complex multichannel environments; features the MediaBall concept, which provides a way to handle secondary events such as interactive TV.

631-549-5159; *www.pro-bel.com*

Booth: C8123

PLAY-TO-AIR SYSTEM
SeaChange Broadcast MediaLibrary

Embodies the Broadcast MediaCluster; scales to 24TB of centralized storage that supports any media file format, as well as devices (editors, VTRs, servers, etc.) throughout television operations.

978-897-0100; *www.schange.com*

Booth: SU9661

PLUG-INS
VDS GenArts Sapphire plug-ins

VDS' plug-in product, Synapse, is designed to support After Effects plug-ins on Quantel's generationQ range; Sapphire plug-ins offer a collection of more than 175 image processing and synthesis effects, are resolution-independent and include multi-processor support for faster rendering.

631-249-4399;
www.videodesignsoftware.com

Booth: C6748

TRANSMITTER/RECEVIER
MRC STRATA

Digital COFDM microwave transmitters and receivers are configurable for analog, digital or switchable analog/digital service; can also be swapped between ENG, mobile, airborne or fixed applications; includes the TXU transmitter unit, TCU control unit and HPU high power unit; can save several system configurations, which is helpful for setting either analog or digital configurations, frequency, channel offset, and modulation schemes.

978-671-5700; *www.mrcbroadcast.com*

Booth: C3206

COLOR CORRECTOR AND LEGALIZER
Crystal Vision CoCo104

Features an auxiliary output that can be connected to a monitor to allow previews of any adjustments; can wipe horizontally or vertically between the processed and unprocessed signal; overall gamma is used to lighten or darken the picture without crushing the blacks or the whites; also allows independent adjustment of red, green and blue gamma.

+44 1223 497 049; *www.crystalvision.tv*

Booth: C7143

Color indicates advertiser

Clarity 2

Calling Clarity a Character Generator is very misleading.

Fast, multi-channel CG with SDI previews

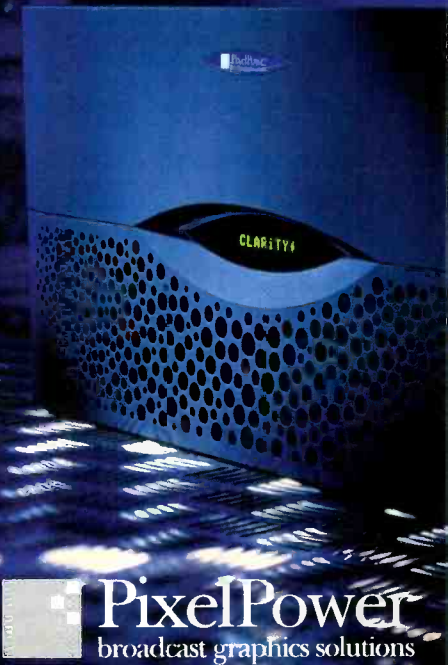
2 streams of uncompressed video clips with key

2 live inputs with dual 2D DVE per channel

Unlimited layers of text, stills, clips and animation in each channel

Dual downstream keyers with fault sensing relay bypass

Interfaces with all common automation systems



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broadcast graphics solutions

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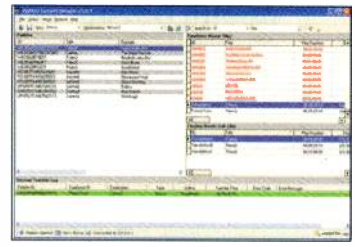
HD ENG/EFP ZOOM LENS

Fujinon HA18x7.6BERM/BERD

Designed to complement 2/3-inch high-definition video cameras; works well for handheld HD production; has improved optical characteristics, such as reduced chromatic aberrations, minimized flare and minimized focus breathing; equipped with exclusive GO- Technology that enables the optimization of all optical components in the composition of the lens.

847-945-8923; *www.fujinon.com*

Booth: SU11542



DELIVERY INTERFACE

Sundance Digital Pathfire Content Manager

Interfaces with Pathfire's Automation Connect gateway to manage the transfer of new media from Pathfire's cache server to the facility's transmission server; also updates the Sundance media database with the metadata available from Pathfire, including frame-accurate segment timings.

972-444-8442; *www.sundancedigital.com*

Booth: SU7470

ENCODER

Dolby DP563

Encodes up to five channels of program material within the digital domain; left total/right total (Lt/Rt) used for two-channel analog and digital applications.

415-558-0200; *www.dolby.com*

Booth: SU10443

VIDEOTAPE

Sony DigitalMaster DVCAM

Reduces the rate of dropouts by 50 percent or more and causes 90 percent fewer errors compared to MiniDV tape; features a dual layer of 100 percent magnetic material to deliver a 2dB increase in the carrier-to-noise ratio, and 30 percent more DLC coating; comes in a variety of lengths, including 32-, 40-, 64-, 124- and 184-minute cassettes.

800-686-SONY;
www.sony.com/professional

Booths: SU11051

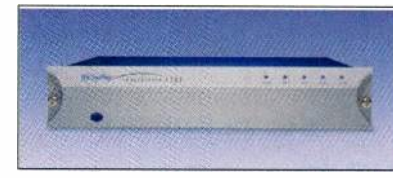
FLEX CONTROL NETWORK MODULES

DNF Controls VTR Control and Clip Control

VTR Control module features record, play, stop, rewind, fast-forward, jog, shuttle, slo-mo, loop play and search-to-time; the Clip Control module allows Flex Control users to load and play video clips on video servers and DDRs easily within Flex's Ethernet-based, distributed control environment.

818-898-3380; *www.dnfcontrols.com*

Booth: SU8965



BROADCAST VIDEO SERVER

360 Systems Image Server 2000

Provides MXF support; offers frame-accurate head and tail trimming, with time code windows for in and out points; can also be used to segment long-form program material; can rapidly build, edit, name and save playlists; protocols that work with the server include VDCP, "P2" and Odetics.

818-991-0360; *www.360systems.com*

Booth: C9606

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Fischer HDTV Fiber Optic Connector

Booth SU9515

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Tel: 678-393-5400
Fax: 678-393-5401
www.fischerconnectors.com

fischer™
CONNECTORS

Product Highlights

MEDIA INTEROPERABILITY

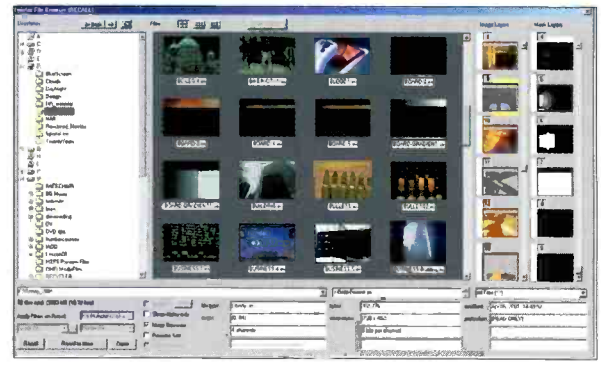
Sony XDCAM interoperability

Content captured on Sony's XDCAM professional disc system will now be compatible with Avid's native MPEG IMX (30-, 40- and 50Mb/s) and DVCAM nonlinear editing systems, including NewsCutter and Media Composer; initial support for XDCAM content will allow users to transfer high-resolution A/V clips across IP networks at high speed; metadata compatibility will also be provided through Sony's and Avid's support of MXF media file format.

Sony: 800-686-SONY; *www.sony.com/professional*

Avid: 978-640-6789; *www.avid.com*

Booths: SU11051 (Sony); SL4761 (Avid)



FIELD EDITOR

Sony XPRI Mobile

Windows-based nonlinear field editing software application runs on most laptop PCs, and can be used with the XDCAM professional disc system to create an end-to-end production chain; transfers proxy data captured by the XDCAM system at 20x real time; compatible with the XPRI MetaStation desktop editor; edits high-resolution DVCAM and MPEG IMX content from the XDCAM system at 30Mb/s.

800-686-SONY; *www.sony.com/professional*

Booths: SU11051

CONTENT CREATION TOOL

Video Design Software Twister

A complete paint, graphics content creation and I/O solution; runs as a stand-alone application, or as a plug-in for content creation, editing, management and display systems; can operate in any resolution and is available with real-time paint I/O in a variety of SD and HD formats; includes the ability to capture on the fly, and get a real-time view of work in progress on an SD or HD monitor.

631-249-4399; www.videodesignsoftware.com

Booth: C6748

Color indicates advertiser

DESKTOP EDITOR
Sony XPRI MetaStation

Compatible with XPRI Mobile field editing software application; enables engineers in the studio to reproduce timelines created in the field by importing a compatible EDL, including effects and titles; can be used with the XDCAM professional disc system for improved production workflow; transfers proxy data captured by the XDCAM system at 50x real time; edits high-resolution DVCAM and MPEG IMX content from the XDCAM system at 30-, 40- and 50Mb/s.

800-686-SONY;
www.sony.com/professional

Booths: SU11051

ENG/EFP ZOOM LENS
Fujinon A18x7.6BERM/BERD

Features a wide angle of 60 ° at 7.6mm, focal length range of 7.6- to 137mm and 18x magnification; lens complements a 2/3-inch camera; offers easily programmable digital features, allowing the operator to customize the lenses to their preference; the lens can be controlled remotely via a PC's RS-232 control port; inner focus, a servo module with Digi Power, quick zoom, one-shot preset, cruise zoom and RS-232 control ports are standard features.

847-945-8923; *www.fujinon.com*

Booth: SU11542

DISTRIBUTION AMPLIFIER
Sonifex RB-DDA6W

DA distributes a master BNC TTL world clock source to up to six pieces of BNC equipment that need to be synchronized from the master.

207-773-2424; *www.sonifex.co.uk*

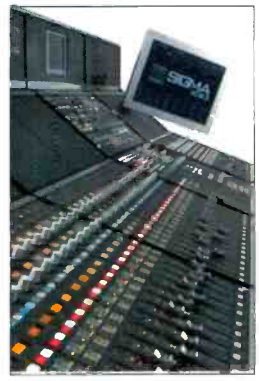
Booth: C5236

SNMP MONITORING PACKAGE
Sundance Digital Sentinel

For Sundance installations; designed to provide a single interface to back-room software modules; gives engineering staffs the ability to monitor the health of various Sundance components within their systems from a single, easy-to-use interface.

972-444-8442; *www.sundancedigital.com*

Booth: SU7470



AUDIO CONSOLE
Calrec Sigma 100

Compact console available in four processing/input configurations, three frame sizes and a variety of optional input and output interfaces.

+44 142 284 2159; *www.calrec.com*

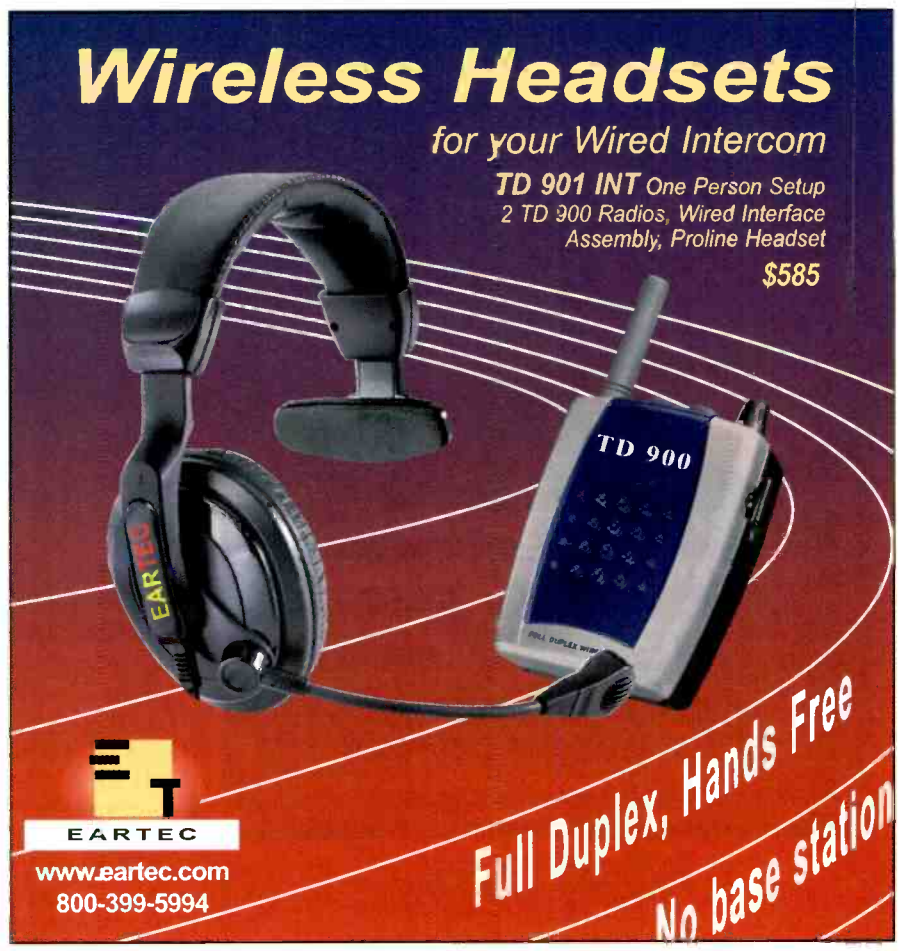
Booth: N1012

TRANSMISSION AUTOMATION SYSTEM
OmniBus Systems TxPlay

Transmission automation system based on G3 technology; scalable system for facilities operating from one to eight channels; complements OmniBus Colossus large-scale multichannel transmission automation.

704-319-2231; *www.omnibus.tv*

Booth: C7634



Color indicates advertiser

Product Highlights

ZOOM LENS

Canon XJ100x9.3B IE-D

Triple-digit zoom lens; allows users to customize useful digital tools to enhance production; is required equipment on almost all HD trucks being built.

516-328-5000; *www.canonbroadcast.com*

Booth: SU9649

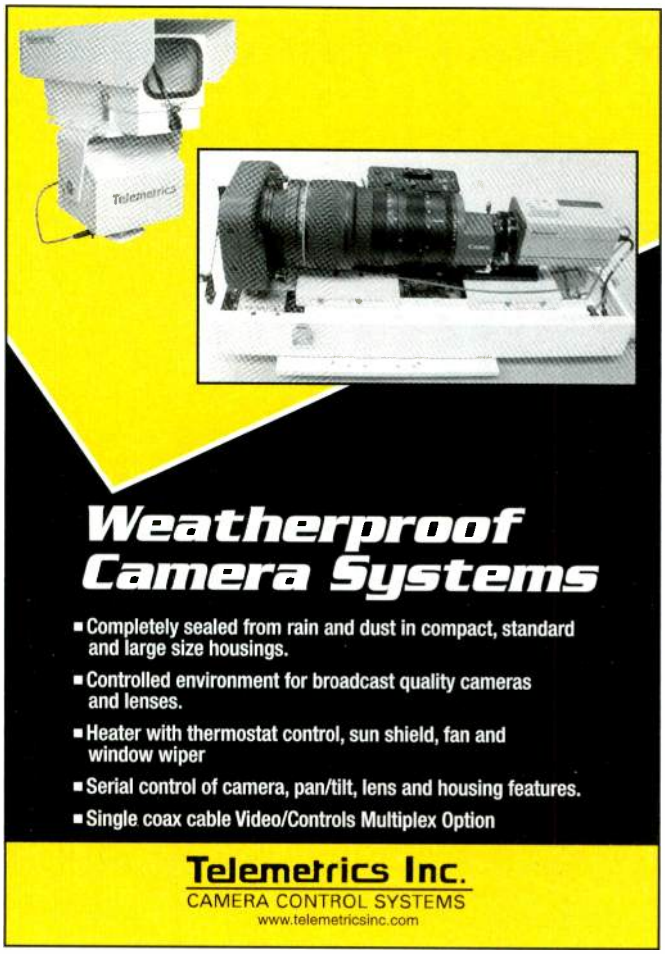
CONTROL PANEL

Radamec (see Vinten/Radamec) Enhanced Linux-based touch control panel

Numerous enhancements include a robotic digital key frame control mode that memorizes the camera's position and orientation as the operator moves it; allows robotically controlled cameras to achieve creative shots previously only accomplished by manual control.

845-268-0100; *www.vinten.com; www.radamecbroadcast.co.uk*

Booth: SU9643



POWER/LIGHT CONTROLLER

Sonifex RB-LC3

Three-way power/light controller has been designed specifically for TV studio light signalling, so that "on-air" and "mic/live" signs can be powered and controlled remotely from a mixing console; features three mains outputs, which can be independently controlled; telephony input allows the lights to react from a telephone call.

207-773-2424; *www.sonifex.co.uk*

Booth: C5236

TWO-CHANNEL CHARGER

PAG Freelancer

Similar in size to a PAG L95 battery; will fit into a camera bag; will sequentially charge all PAGlok batteries; can be powered from almost any AC power supply worldwide, or from a vehicle battery with a PAG AC/DC adaptor; designed as an economical travel or backup charger, incorporating PAG ACS software capable of extending battery life.

818-760-8265; *www.pagusa.com*

Booth: C8235

NETWORK-CONTROLLABLE PAN/TILT/ZOOM SYSTEM

Canon NU-700N

Ideal for everything from traffic management to high-end security, weather observation and remote city views; combines Canon 3-CCD camera electronics with a Canon 20x lens under a weatherproof housing; fully controllable via either a Web browser with Canon's camera server software, or a remote control panel; provides a conveniently complete network-controllable P/T/Z system, for a wide range of applications from broadcast to pro video.

516-328-5000; *www.canonbroadcast.com*

Booth: SU9649

Color indicates advertiser

CAMERA
Ikegami HL-60W

SD camera combines newly developed DSP features with compact size and low power consumption; three 520k-pixel CCDs; switchable between 16:9 and 4:3.

201-368-9171; *www.ikegami.com*

Booth: C6428

GRAPHICS SYSTEM
vizrt viz artist

Real-time 2-D and 3-D presentation of live-to-air graphics; extended plug-in API; script-language support, advanced animation editor, font-style editor, remote control.

212-560-0708; *www.vizrt.com*

Booth: SL3436

CHARACTER GENERATOR
Compix Media Multiple CG

Two full-complement character generators in one workstation; allows simultaneous frozen background and crawls, or multiple crawls.

310-320-8937; *www.compixmedia.com*

Booth: SL5521

HD/SD DDR
Accom WSD/HDe

Based on Accom's WSD platform, WSD/HDe is targeted at long-form applications such as telecine, digital film, DVD encoding, post production, broadcast playout, stage presentation and scientific visualization.

650-328-3818; *www.accom.com*

Booth: SU8058

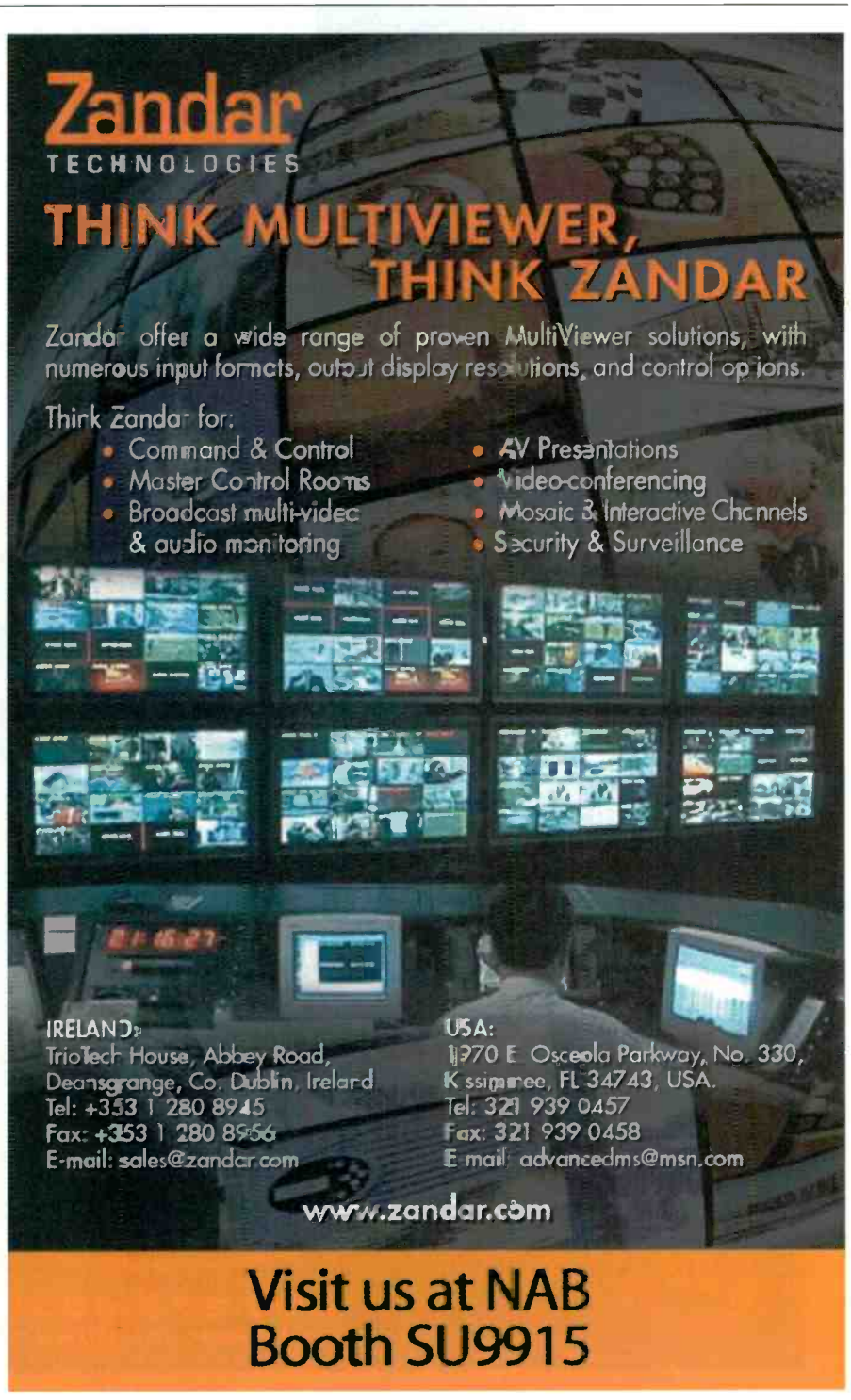
Color indicates advertiser

LI-ION BATTERY ALTERNATIVE
PAG L95 Power Circle

Has a capacity of 95 watt-hours and weighs only 1.67lbs.; two L95 batteries provide enough power for a day's shooting with most camera and lighting setups; the battery incorporates a micro-driven coulemetric capacity indicator, which displays charge status in terms of percentage.

818-760-8265; *www.pagusa.com*

Booth: C8235



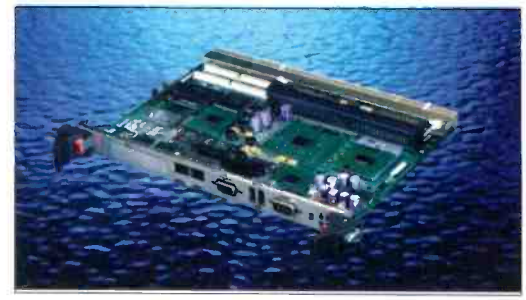
Product Highlights

CAMERA SUPPORT SYSTEM
Vinten/Radamec Pro-6DC

Low-cost, lightweight camera support system is useful for MiniDV cameras; comprises a pan-and-tilt head, Pozi-Loc two-stage aluminum tripod with adjustable leg locks, a floor spreader and soft case; the head provides smooth control and movement through 360° of pan and +90° to -60° of tilt with continuously variable fluid drag; an illuminated level bubble is provided for convenient setup in low-light situations.

845-268-0100; *www.vinten.com; www.radamecbroadcast.co.uk*

Booth: SU9643



SINGLE-BOARD COMPUTER
Trenton Technology CP16 CompactPCI

Uses the Intel Pentium M processor; key features include a front-access PMC slot, local storage options, dual Gigabit Ethernet ports and support for up to 2GB of DDR220/266 memory; a rear transition module, RTM25, is available with or without dual Ultra320 SCSI interfaces and provides rear access to the SBC's I/O ports and status LEDs; complies with a variety of PCI Industrial Computer Manufacturers Group specifications, including packet switching backplane, hot swap and Intelligent Platform Management Interface.

770-287-3100; *www.trentontechnology.com*

Booth: SL5252

NEW XPress Animation Module for Master Control NEW

- Digital: input, output & key
- 21 EAS codes + Amber Alert
- Continuous crawls with logo
- *i* Temp official NWS temps
- 16 programmable GPI's
- Quick and easy crawls
- Drag & drop interface

XPress

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- One click logos
- True type fonts
- *i* Headlines (option)
- XPress Animation (option)
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BSS BROADCAST SOFTWARE SOLUTIONS

800-273-4033
www.broadcastsoftware.tv

NAB THE WORLD'S LARGEST ELECTRONIC MEDIA SHOW
Booth SU7173

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PROMPTING SOFTWARE

BDL-Autoscript +WinPlus+

New features include implementation of MOS software and new newsroom interfaces; operates as a standalone system or networked to major automated newsroom system; able to operate in any language, supported by Windows and Unicode; prompter text can be output as data for closed captioning; new PCI PromptCard has full NTSC or PAL color capability with optional genlock; can be controlled by an unlimited number of local or remote desk/foot speed controls using the ControlNet system with standard coax video cable connectivity.

516 799 3869; *www.bdlautoscript.com*

Booth: C8039

PRODUCTION LIGHTS

ARRI Sky Panels

Soft, virtually shadow-free light is based on OSRAM's flat Planon source; ARRI and OSRAM have combined to produce two new Softlights optimized to the specific requirements of film; the 5600°K Sky Panel matches true daylight, and the 3200°K panel mixes perfectly with tungsten sources.

845-353-1400; *www.arri.com*

Booth: C9128

2-D/3-D GRAPHICS SOFTWARE

Chyron Advanced Lyric

New features include improved 3-D rendering and effects, as well as multichannel back-to-back clips; the movie objects feature enables playback of multiple .AVI and .MOV files as animated objects within a Lyric scene; now includes comprehensive asset management and browser functionality.

631-845-2000; *www.chyron.com*

Booth: C4742

NONLINEAR EDITING SYSTEM

EVS Broadcast HD XT-servers

HD LSM-XT and other HD XT-servers will be demonstrated networked and supported by the XFile automatic archiving unit; units serve live slow-motion replays; can be used as highlights editors and for the playout of pre-produced material; XFile enables remote content to be restored without loss in quality; XBrowse can feed various third-party systems including central storage; combination of SportServer/CleanEdit enables efficient editing; finished edits can be rendered and returned to an XT-server for playout.

973-575-7811; *www.evs.tv*

Booth: C3332

SINGLE-PAIR AUDIO CABLES

Gepco 61801EZ

Available in 20 different colors; includes a new riser-rated PVC jacket; has 10 new jacket color options including lime green, tan, royal blue, plum and chrome; features stranded, tinned-copper conductors that facilitate quick soldering or punch down, and a high-grade polyethylene dielectric; each pair is shielded with an easy-to-strip, bonded foil shield with drain wire.

800-966-0069; *www.gepco.com*

Booth: C1429

PRODUCTION LIGHTING KITS

ARRI Cool Kits

Professional lighting kits include the Studio Cool 2 fluorescent fixture and ARRI 150-, 300- or 650W Fresnels; kits combine the low-wattage, soft-source characteristics of the Studio Cool fluorescent and the precise flood-to-spot beam control and durability of ARRI Fresnels; ideal for interviews or tight locations where space and power are limited.

845-353-1400; *www.arri.com*

Booth: C9128

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ClarityHD
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The power of dedicated hardware & the convenience of Windows
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Configurable HD/SD switchable and HD+SD simultaneously
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Interfaces with all common automation systems
PixelPower
broadcast graphics solutions
www.pixelpower.com

Product Highlights

SIGNAL MONITOR
Audemat-Aztec GOLDENEAGLE Analog TV

Off-air monitoring system has remote-control capabilities; from one antenna, it monitors automatically, in real time, the quality and continuity of up to 40 TV programs and notifies the relevant person of any problem by sending an alarm; offers audio and video streaming, audio recording, picture storage, automatic scanning, and measurement consultation and storage.

305-692-7555; *www. audemat-aztec.com*

Booth: N1426

DIGITAL INTERCOM SYSTEM
Drake 4000 Series II

Production communications solution designed to meet the needs of today's broadcasters; all 4000 Series II intercom matrices have been designed to share the same core functionality, range of user panels and accessories.

800-542-3332; *www.drake-uk.com*

Booth: SU6776

VIDEO DATA PROCESSOR
Alpermann+Velte Rubidium 1

Modular video-data processor organizes the handling of DVITC, LTC, VITC, VPS, ATC, UMID and other metadata in individually configurable 19-inch racks; features front-bus communication between modules, user-selectable module combinations (functionality) and an easy setup procedure using redesigned Windows configuration software.

+49 202 244 1110;
www.alpermann-velte.com

Booth: SU7073

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VIRTUAL MONITOR WALL

Avitech MCC

Media Command Center can handle 120 video sources on a single display and up to 960 video sources in a single system; can put HD, SD, analog video, computer-generated graphics, analog audio, digital audio and embedded audio on the same display; output resolution can vary from 800x600 to 1600x1200.

877-284-8324; *www.avitechvideo.com*

Booth: SU6779

CAMERA SUPPORT

Cartoni P20 pedestal

A versatile, compact, portable and cost-effective pedestal for DV cameras up to 25Kg (55lbs.); consists of a single elevation pneumatic column and a foldable dolly that can be used in studio and remote-broadcast applications.

+39 064 382 002; *www.cartoni.com*

Booths: C8235, C10439

CAMERA CONTROL

Cartoni e-Sensor

e-Sensor, a dedicated encoded head for virtual studios and virtual reality, is compatible with all existing 3-D packages; the encoders perform high-resolution and absolute camera positioning.

+39 064 382 002; *www.cartoni.com*

Booths: C8235, C10439

DIGITAL INTERCOM SYSTEM

Drake FreeSpeak Lite

Allows PiCo, the smallest of Drake's 4000 Series II range of matrices, to have FreeSpeak connectivity for the first time; gives smaller Drake systems access to the FreeSpeak digital, wireless and license-free intercom.

800-542-3332; *www.drake-uk.com*

Booth: SU6776

CAMERA SIGNAL MULTIPLEXER

Camplex PRO-X1

Coax/triax signal multiplexer interfaces prosumer camcorder with production switcher for live multicamera studio work at distances up to 3000 feet between the remote camcorder and the director's control center; uses a single 75Ω cable to deliver the camcorder's video, program audio and intercom signals to the production-control center.

620-342-7743; *www.camplex.com*

Booth: SU10318

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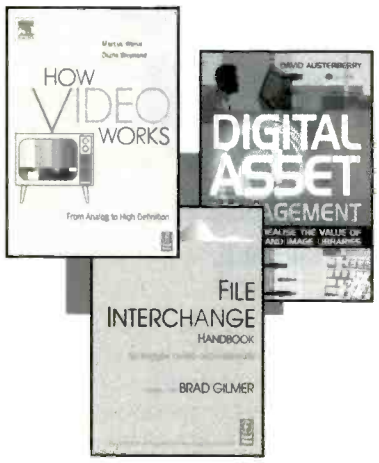
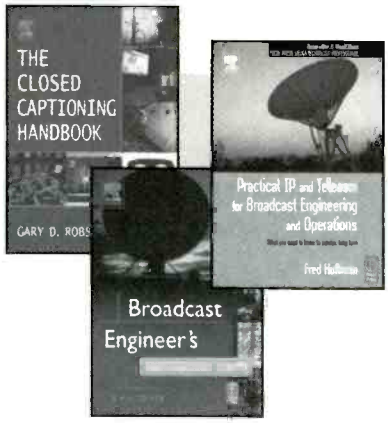
Streaming
Digital Media
File Interchange
Broadcast





Also available:

Get Streaming! Quick Steps to Delivering Audio and Video Online
by Joseph Follansbee

An Introduction to Video and Audio Measurement, 3/e *by Peter Hodges*

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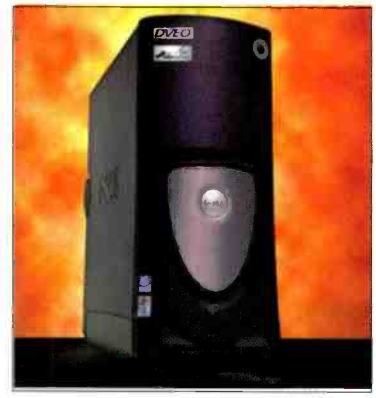

MPEG ENCODER
DVEO Maestro

Real-time, PC-based, true HD-resolution encoding workstation for content re-purposing and streaming; can encode MPEG streams at 50Mb/s at HD resolutions; supports encoding of all the major 1080i/p and 720p resolutions to future-proof stations' investment in HD.

858-613-1818; *www.dveo.com*

Booth: C6747

DVB-ASI INTERFACE CARD
DVEO Quad/i

Four-port DVB-ASI PCI 2.2 interface card with hardware-based, automatic packet-size detection, PID filtering and packet-arrival time-stamping on each port; combines the functionality of four DVEO Master III PCI cards into one board receiving four separate streams from four separate sources, with each port offering selectable channels.

858-613-1818; *www.dveo.com*

Booth: C6747

MPEG MULTIPLEXER
DVEO MuxMaster

MPEG transport-stream multiplexer card is a low-cost subsystem based on PC architecture; in a PC-based workstation, the transport-stream mux card enables the seamless multiplexing of four separate single or multi-program transport streams into a single multi-program stream.

858-613-1818; *www.dveo.com*

Booth: C6747

REAL-TIME MPEG-4/H.264 ENCODER
Envivio 4Caster broadcast series

Provides real-time MPEG-4 encoding for full resolution, full-frame-rate video; the new broadcast series extends the capability of previous systems to include MPEG-4 AVC/H.264 encoding with DVB-ASI output; designed to meet the needs of all fixed and mobile professional video contribution and distribution applications.

650-875-3000; *www.envivio.com*

Booth: SL5843

Download the FASTtrack for your PDA.
Visit *www.broadcastengineering.com*
for more information.

Color indicates advertiser

CMOS HD CAMERA

JVC KH-F870U

Box-style HD camera uses three next-generation 2/3-inch CMOS chips to deliver full 1080i or 720p (switchable) HDTV output; CMOS image sensors provide a signal-to-noise ratio of 54dB and a dynamic range of more than 68dB; camera power consumption is approximately 200mW, about 20 percent that of a comparable CCD, similar to that of SD cameras.

800-582-5825; *www.jvc.com/pro*

Booth: C4728

PORTABLE HD PLAYER/RECORDER

JVC CU-VH1U

Records and plays back HD media adhering to the ATSC HD broadcast standard using MiniDV cassettes; features a 3.5-inch LCD monitor, a digital iLink interface for nonlinear editing and dubbing, component outputs for multiformat playback, and an SD memory card slot for capturing stills from tape.

800-582-5825; *www.jvc.com/pro*

Booth: C4728

PORTABLE MPEG-4 WEBCASTING SYSTEM

Envivio 4Forum Lite

An affordable and portable appliance for multi-object MPEG-4 Webcasting in enterprise, education and government environments; enables a conference room to broadcast live and on-demand MPEG-4 Webcasting with synchronized video and presenter's PC screen capture over IP networks; presenter simply plugs the VGA cable of the appliance to a laptop.

650-875-3000; *www.envivio.com*

Booth: SL5843

MPEG-4 MIDDLEWARE

Envivio 4Front

A complete service-management platform that allows network operators to integrate Envivio MPEG-4 technology into a commercial television broadcast business; creates the client GUI and fills it with metadata and business rules defined by the network operator; enables the network operator to provide the complete solution for digital television beyond just content and set-top boxes (STBs).

650-875-3000; *www.envivio.com*

Booth: SL5843

THE RIGHT

Product Highlights

VIDEO CAMERA
JVC KY-F560

Affordable three-chip, 1/2-inch CCD box camera offers remote functionality that is extendable for studio configurations; produces 850 lines of horizontal resolution and a signal-to-noise ratio of 62dB; sensitivity is F13 at 2000 lux, minimum illumination is 0.5 lux; has 16:9 widescreen capability, composite output and genlock input.

800-582-5825; *www.jvc.com/pro*

Booth: C4728

DTV DECODER
Ktech DVM-150E

Professional receiver/decoder receives off-air DTV and decodes it; can handle SD and HD MPEG-2 4:2:0 signals; inputs include 8-VSB, QPSK, 64/256QAM, SMPTE 310M and DVB-ASI; outputs include SMPTE 310M, DVB-ASI, RGB, YPbPr, NTSC, SAP, analog stereo audio, SDI with embedded audio and closed captioning, and HD-SDI with embedded audio and closed captioning.

818-773-0333; *www.ktechtelecom.com*

Booth: SU8831

SD BETCAM VTRS
Sony J-series VTRs

Updated J-series compact videotape players now have an i.LINK IEEE-1394 interface as a standard feature; enables professional users to migrate easily to a DV environment, allowing half-inch SD Betacam materials to be converted to a 25Mb/s DV signal and transferred to a compatible DV device through a single digital-interface cable.

800-686-7669; *www.sony.com*

Booths: SU11051

VIDEO QUALITY MONITOR
KWILL QuMax

Automated monitor used mainly in the video production market for DVD authoring and player validation, dubbing-quality monitoring and inspecting the quality of videos to be written to video servers; can monitor up to 12 single-end sources in real time for video and audio errors; compatible with a broad range of formats, including SDTV, HDTV, NTSC and PAL.

310-297-9205; *www.kwillcorporation.com*

Booth: C2532

VIDEO QUALITY MONITOR
KWILL VP21S

Carries out automatic, real-time quality evaluation of standard-definition (SD) video signal; can be used for debugging encoder/decoder operations; can also be used for quality evaluation of broadcast systems, automatic dubbing, DVD authoring and DVD playback.

310-297-9205; *www.kwillcorporation.com*

Booth: C2532

VIDEO STORAGE SYSTEM
Nverizon TeraStore

Video library packs terabytes of near-line storage into an affordable, compact, rack-mountable unit; modular system allows unlimited number of TeraStores to be combined into a single system; allows for seamless transition to existing video-server systems; gives facilities the option to store a massive amount of content with this network-based server expansion system.

801-485-8420; *www.nverizon.com*

Booth: SU7075

Color indicates advertiser

VIDEO CAMERA

JVC KY-F550

Offers 800 lines of horizontal resolution and a 62dB signal-to-noise ratio; three CCDs offer sensitivity of F11 at 2000 lux and a one-lux minimum illumination (F1.4); comes with multiple video outputs, including DV (IEEE 1394), RGB, Y/C and composite video; IEEE-1394 interface lets users transfer digital signals from the camera to storage devices.

800-582-5825; *www.jvc.com/pro*

Booth: C4728

VIDEO COMPRESSION CARD

Tandberg Intelligent Compression Engine (ICE)

Video and audio compression card provides a flexible and upgradeable solution for implementations of Windows Media 9 series and MPEG-4 part 10 (H.264/AVC) technologies; users can also switch between MPEG-4 part 10 and Windows Media 9 series with a simple software change.

407-380-7055; *www.tandbergtv.com*

Booth: SU8755

TEST-PATTERN GENERATOR

Laird GenDV

Multi-standard generator can output signals in NTSC 3.58, NTSC 4.43, PAL, PAL-M, PAL-N and SECAM television standards; provides 14 basic test patterns including circle, eight-step gray scale, 16-step gray scale, color bar, multiburst, color difference, moving white field, white pattern, checkerboard, crosshatch, dots, center cross and purity patterns; can derive more than 100 test patterns.

845-339-9555; *www.lairdtelemedia.com*

Booth: SL5860

VIDEO SWITCHER

Sony MFS-2000

Multiformat production switcher is available in 1- or 1.5-M/E configurations, offers three control panels for additional flexibility and scalability: a one-M/E, 12-button, 19-inch rackmount configuration, a 1.5-M/E, 12-button, 19-inch rackmount configuration and a 1.5-M/E with 20 buttons; features preset pattern effects with a variety of pattern modifiers for easy operation.

800-686-7669; *www.sony.com*

Booths: SU11051

VIDEO TRANSCODER

Laird Inertia

Converts any format to any format, including DV and SDI; performs bidirectional analog-to-DV conversion at the highest RS170A broadcast spec and bidirectional conversion of component, YC, composite and SDI formats independent of DV; live format outputs allows monitoring, splitting, recording and more; has dual analog outputs for easy monitoring.

845-339-9555; *www.lairdtelemedia.com*

Booth: SL5860

MPEG-2 ENCODER

Standard Communications L1000

Self-contained, low-delay encoder/modulator incorporates a high-quality MPEG-2 DVB encoder; has analog and digital video inputs; provides a digital encoded output and, optionally, a 70MHz modulated DVB-T COFDM or DVB-S QPSK output.

800-745-2445; *www.standardcomm.com*

Booth: C12017

Product Highlights

MATTE BOX
Ste-man Petroff Matte Box

Modular system can go from a one-stage rotating system to four rotating stages in a matter of seconds without the use of tools; 4x4, 4x5 or 5x5 will work with most of today's film and video lenses; 4x4 matte box will also work with most of today's MiniDV cameras.

818-760-8240; *www.ste-man.com*

Booth: C8235

VIDEO CAMERA
Sony HDC-X300

Compact, high-definition camera uses three 1.5-megapixel, half-inch CCDs; designed for an array of applications, including point-of-view (POV) acquisition, large-screen projection, 24p cinematography and studio automation; switchable between a range of 1080 linear shooting modes, including 59.94i, 30p and 24p; minimum illumination of 0.003 lux with slow shutter (one to eight frames).

800-686-7669; *www.sony.com*

Booths: SU11051

VIDEO SWITCHERS
Ross Video Synergy 100 MD

Single-M/E production switcher family features systemwide still stores and ME-based still stores; MediaCache feature allows for animated logos and short clip playout; FlexiClean clean-feed feature provides a positionable clean feed; AuxKeys feature offers branding capabilities; UltraChrome provides super-fine chroma key quality with automatic setup and easy-to-use controls.

613-652-4886; *www.rossvideo.com*

Booth: SU11029

COAXIAL CONNECTOR
Trompeter Electronics Mini-WECo LPMWHF

The 75Ω coaxial looping plug carries the full 1.485Gb/s of uncompressed data rate (equivalent to 2.25GHz of frequency) that is needed for HDTV; return-loss performance exceeds SMPTE 292M requirements; enables the "normal thru" feature built into some products used in broadcast stations, trucks and headend patchjacks.

800-982-2629; *www.trompeter.com*

Booth: SU10621

VIDEO SWITCHERS
Ross Video Synergy 4 MD-X

Four-M/E production switcher family features systemwide still stores and ME-based still stores; FlexiClean clean-feed feature provides a positionable clean feed; UltraChrome provides super-fine chroma key quality with automatic setup and easy-to-use controls; AuxKeys feature offers branding capabilities; MediaCache feature permits animated logos and short clip playout.

613-652-4886; *www.rossvideo.com*

Booth: SU11029

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MEDIA-MANAGEMENT SOFTWARE

SGT Media Manager

Media Manager is made up of sets of modules that are directly accessible through an HTML interface; all users, regardless of their physical locations, can easily access their workspace and the modules they need; deployment on a large number of workstations is immediate; system operates equally well on a local-area (LAN) or wide-area network (WAN).

+33 6473 7474; www.sgt.fr

Booth: not attending

NEWS PRODUCTION SYSTEM

Associated Press ENPS 4.0

Supports a wider variety of languages, including Arabic, Chinese, Greek, Hindi, Korean and Japanese; journalists may now access ENPS newsgathering assignments and program running orders remotely with WAP-enabled mobile phones and PDAs; a publishing system enables re-purposing of news story scripts to media organizations' Web sites.

202-736-1100; *www.enps.com*

Booth: SL2775

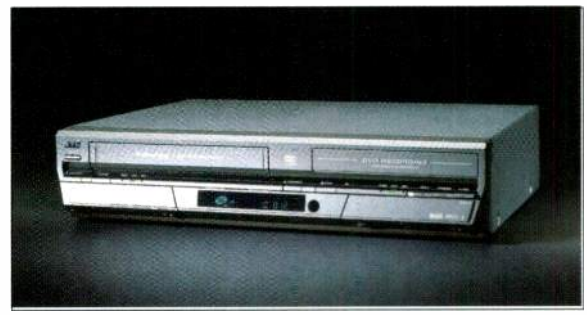
WIRELESS CAMERA SYSTEM

Sony WLL-CA55 (shown above), WLL-CA50 and WLL-RX55

Wireless camera system provides cable-free mobility for production crews covering live events or news; the system comprises two wireless camera transmitters (WLL-CA55 and WLL-CA50) that dock onto the back of compatible Sony cameras or camcorders, and a wireless camera receiver (WLL-RX55) equipped with a dual tuner, diversity switcher and MPEG-2 decoder.

800-686-7669; *www.sony.com*

Booths: SU11051



VIDEOTAPE-TO-DVD RECORDER

JVC SR-MV30U

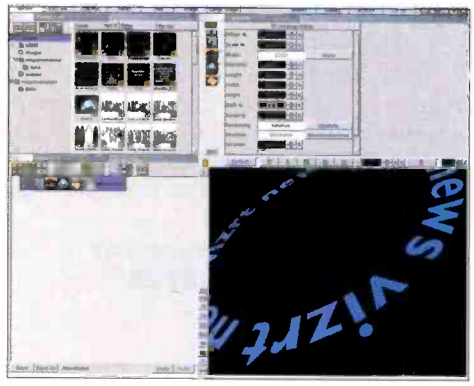
This simple-to-use product has an S-VHS/VHS source deck on one side and a DVD-R/RW disk recorder on the other, enabling users to simply and inexpensively convert their existing tape libraries into DVDs for distribution or archive purposes; cannot make copies of protected material (pre-recorded movies, etc.).

800-582-5825; *www.jvc.com/pro*

Booth: C4728

FOR YOUR

Product Highlights



3-D ANIMATION SOFTWARE

Vizrt viz|artist 3.0

Designed for the creation of real-time 2-D and 3-D animated graphics as SDI video; version 3.0 offers enhancements including an improved user interface, ease of upgrade, real-time object database, extended remote control capabilities, an advanced animation editor, font style editor, extended plug-in API and scripting-language support.

212-560-0708; *www.vizrt.com*

Booth: SL3436

ANTENNA TOWERS

SpectraSite Stainless

The company has designed, engineered and built towers in over 100 countries for the past 54 years; Stainless towers, built for every imaginable terrain, have constantly withstood extremely harsh conditions and natural disasters; company maintains designs, drawings and documentation for over 50 percent of U.S. broadcast towers.

888-468-0112; *www.spectrasite.com*

Booth: C1818

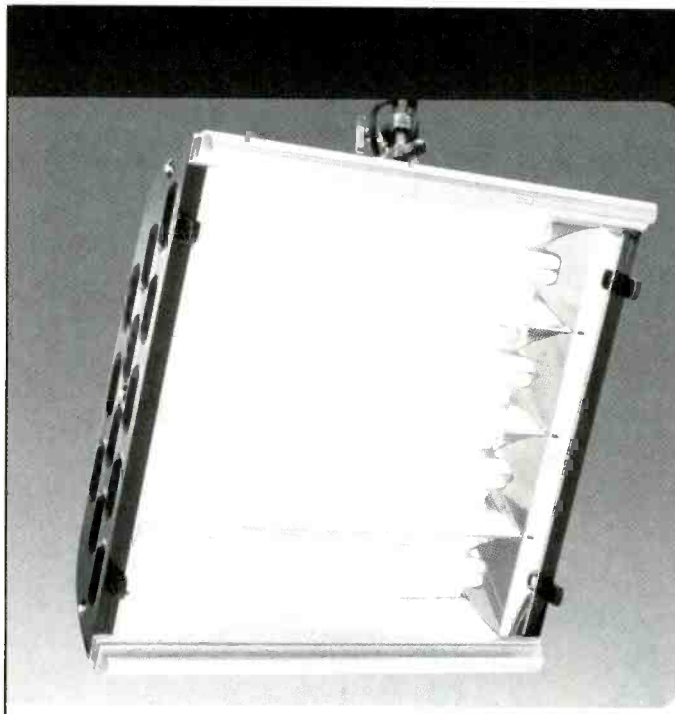
TRANSMISSION AUTOMATION SYSTEM

OmniBus Systems G3 Colossus Control

First component of OmniBus Colossus transmission automation built with G3 technology; combines multiple timeline, schedule grid and event-detail views on a single or dual high-resolution display; allows a single operator to monitor and control up to 32 channels from a single workstation; for variable-channel mix operations, enhanced Colossus Control provides selection among multiple display formats at the touch of a button.

704-319-2231; *www.omnibus.tv*

Booth: C7634



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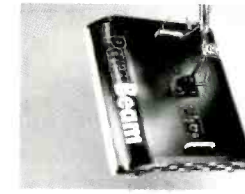

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800-399-5994; *www.eartec.com*

Booth: C3129

LCD VIDEO MONITORS

Sony LMD-320W and LMD-210

Two LCD video monitors designed for professional applications; LMD-320W measures 32-inch diagonally and has a 16:9 aspect ratio; LMD-210 has a 21-inch screen and a 4:3 aspect ratio; both monitors can accommodate a variety of standard- and high-definition analog and digital signals, including 1080/60i, 720/60p and 1080/24psf.

800-686-7669; *www.sony.com*

Booths: SU11051

DESKTOP EDITING SYSTEM

OmniBus Systems Headline Media Editor

Based on G3 technology and open-software architecture, multiformat desktop editing system features support for Windows Media 9 Series, as well as MPEG-1 and MPEG-2; enables high-speed SD and HD editing in single or mixed formats, even on a laptop.

704-319-2231; www.omnibus.tv

Booth C7634

PROJECT MANAGEMENT SOFTWARE

ScheduALL VizuALL production manager module

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IMAGE

Utah DTV translates into free over-the-air television

BY KENT PARSONS

It is now a reality. Microwave and TV translators in rural communities are relaying mountaintop-to-mountaintop 8-VSB digital television by using a statewide system. These over-the-air broadcast signals are delivering digital signals (including high definition) and also improving existing analog reception to the end viewers.

It is widely believed that Utah has the largest terrestrial-analog translator network in the world. The system provides rural viewers with over-the-air television in approximately 80 percent of the state. This is accomplished with some 600 authorized analog stations, which are true translators, not LPTV stations or ones fed by satellite signals. The network encompasses 100 sites and averages six translators per site, with as many as six hops in one chain. The south-central part of the state receives the Salt Lake City DTV stations 80 miles from the primary stations at a site called Levan. These signals are then relayed in two different directions. The path to Frisco Peak is 105 miles long and the other to Cove Mountain is 60 miles long. Microwave and translators relay the signals to additional mountaintop hubs, thus transporting the 8-VSB signals to all of the southwestern areas of the state. Other similar "hubs" feeding translators are located throughout Utah (see Figure 1).

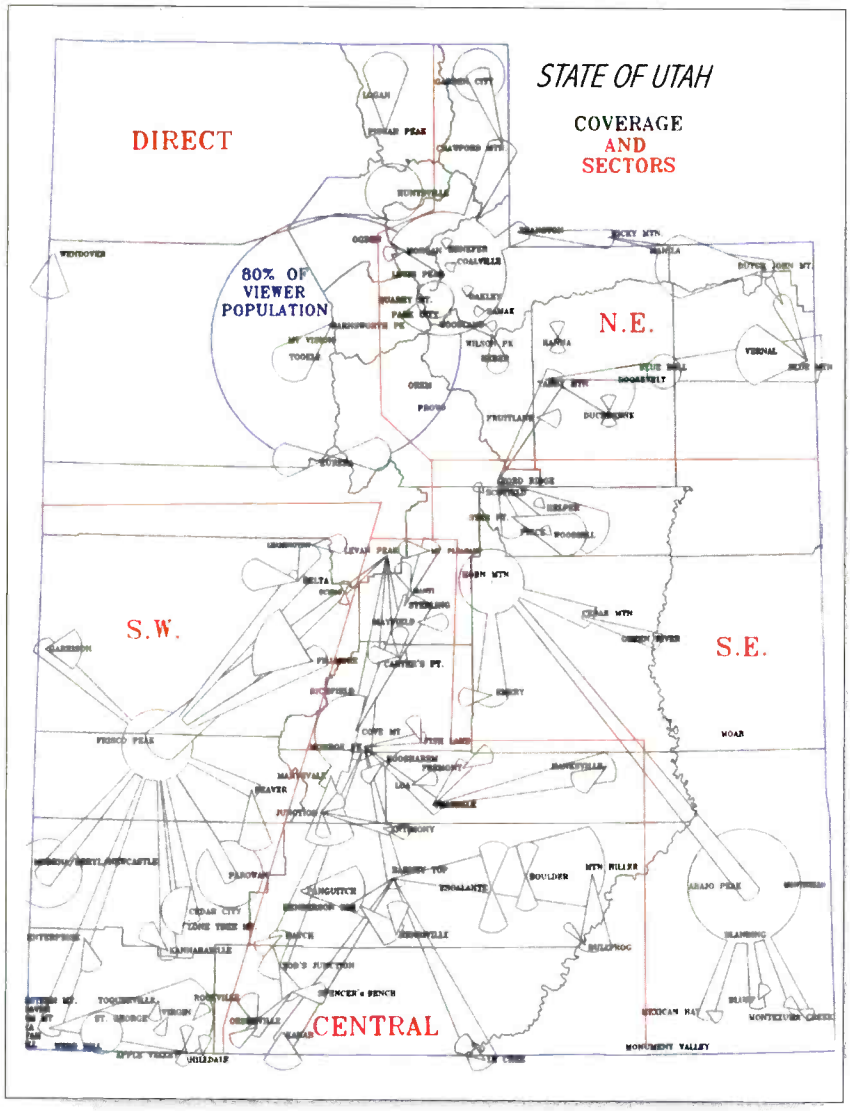

Figure 1. This map shows the locations of all TV translator sites in Utah and the "Daisy Chain" method that is in place for the local TV signals statewide. The circles indicate areas served by omnidirectional translator patterns and the fans show the directional translator signal paths. The big blue circle is the area that Salt Lake City primary stations cover. The red lines show the five sections of the state that were selected for technical purposes.

In stark contrast to an analog translator, where the quality of the signal deteriorates hop after hop, DTV translators using regenerative transcoders can reconstruct the signal at each hop if necessary. They also have the ability to correct the signal back to perfect, regardless of how many times it has been repeated.

Currently there are no FCC rules to allow translators to rebroadcast digital signals. Utah TV translator coordinators requested permission from the FCC to conduct experimental tests with digital translators, and were allowed to document different methods of increasing usable spectrum. Translators need to become part of the transition to digital operation as soon as possible. The translator coordinators

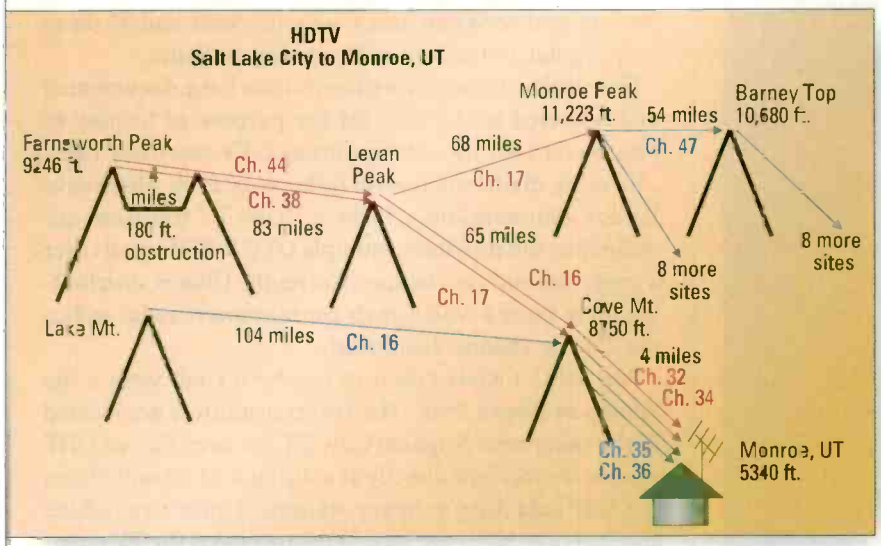

Figure 2. This diagram shows the experimental route from the primary TV stations in Salt Lake City to some of the areas in the central sector of the state as outlined by the map. It is meant to show how 8-VSB and improved local broadcast signals can be obtained for rural communities.

have been conducting these tests for the past 36 months, and have found that it is possible to use regular set-top box DTV receivers to convert the 8-VSB signals to analog for the translators. These conventional receivers convert the 8-VSB signal to video and audio, and then feed it into a modulator to drive a conventional analog translator. This dramatically improves the translator-input signal and viewers' TV reception.

The digital microwave network in development will create a "backbone" system to transport 8-VSB signals statewide. With this, the Salt Lake City DTV signals will be available to all areas of Utah (see Figure 2). We have successfully transmitted adjacent channels 31, 32, 33 and 34 digital 8-VSB stations, adjacent to analog channels 35 and 36 on these translators. This has largely been the result of using microwave feeds, and finding new ways to allow the translators to operate on adjacent channels. The signals have consistently been viewed throughout the Sevier Valley area for the past two years. This area is 150 miles from the primary

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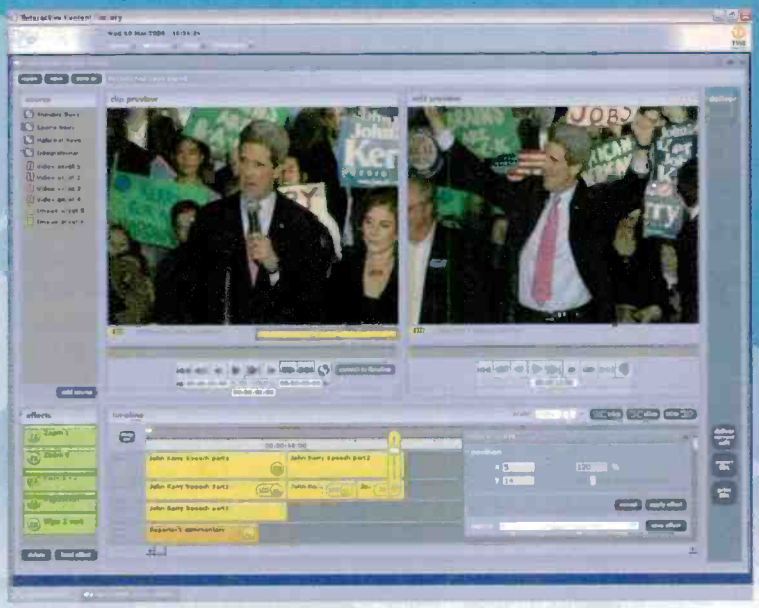

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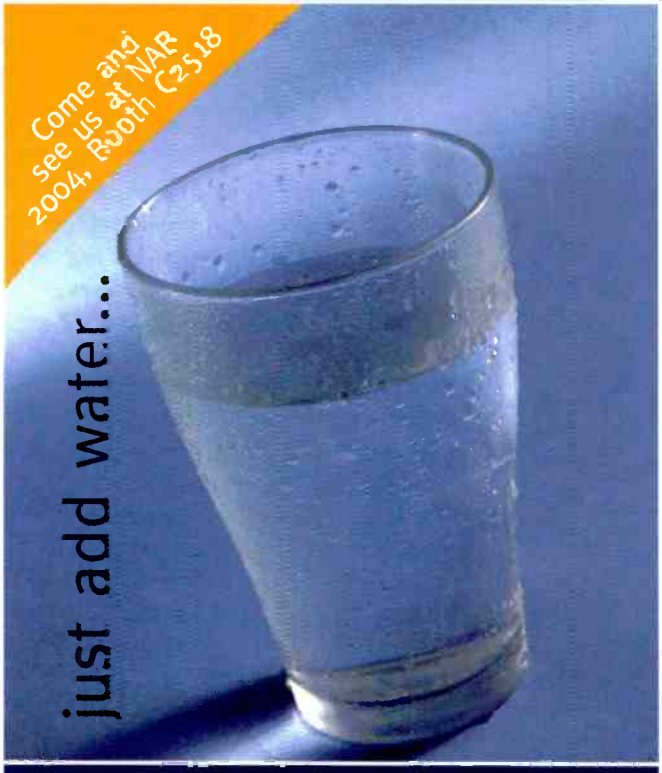

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stations and serves an area four miles wide and 50 miles long, a total 200 square-mile viewing audience.

The results of these experiments have been documented and delivered to the FCC for the purpose of helping to provide data for the new upcoming DTV translator rules.

By using digital microwave technology from Microwave Radio Communications (MRC), Utah's TV translator coordinators can distribute multiple DTV 8-VSB signals over a single microwave channel. Currently, Utah is distributing up to three 8-VSB signals per microwave radio within the 25MHz channel bandwidth.

Two MRC 13GHz radios in northern Utah serve a site known as Pisgah Peak. The two transmitters are located in the valley near Brigham City, UT. Six over-the-air UHF signals are received directly at a distance of 60 miles from the Salt Lake City primary stations. Drake heterodyne channel processors are used to downconvert the TV channels to 3, 4 and 5. These three channels are combined with a regular three-way splitter and then interfaced into the 70MHz inputs on the MRC DAR Plus transmitters. These six 8-VSB channels are then relayed to Pisgah Peak 11 miles away.

At the Pisgah translator site, the 70MHz (channels 3, 4 and 5) output of the MRC DAR Plus receiver is split using a standard three-way splitter and then fed into consumer RCA DTC100 set-top box receivers. The analog video and audio outputs from the set-top boxes are then connected to standard Blonder Tongue NTSC television modulators. The appropriate outputs are then used to drive Larcan/USA model MX100 translators. This improves all input signals to the six analog translators located at this site.

The original direct, analog off-air signals are marginal at this site; the new digital signals are far superior in both picture and sound.

Levan Peak site

Another site, Levan Peak, is located approximately 83 miles south of Salt Lake City. At this location, two DAR Plus transmitters relay six over-the-air DTV signals to Cove Mountain 60 miles away and Monroe Peak 66 miles away from the Levan Site. The Cove site is 8750 feet above mean sea level (AMSL) and the Monroe Peak site is an 11,220-foot AMSL. Cove and Monroe are nearly in-line with each other when plotted from the Levan Peak site. The two sites are only about 1.5 degrees apart, which allows DAR Plus transmitters to feed the two different receive sites. The three-channel configuration of the two microwave links is similar to what is being done for Pisgah Peak, except for the use of Zenith transcoders or remodulators. These devices are used to correct any bit errors or other degradation in the 8-VSB signal, and also reconstruct the signal back to studio quality before the 8-VSB is fed to the input of the microwave transmitter.

The University of Utah has been working on an MRC microwave system that transports 8-VSB to communities

located in northeastern Utah. It is also using MRC microwave transmitters to send 8-VSB programming to the southwestern section of Utah. The path from the Levan site to the first mountaintop is 105 miles long, crossing dry-lake salt beds. Improved television is now being delivered to the viewers in an area some 350 miles from the primary stations.

The timeline for the state network is two years, and the microwave equipment now in place is only the beginning.

What the future holds

Utah's TV translator coordinators envision a statewide microwave network capable of providing a minimum of nine 8-VSB channels to provide feeds for analog and digital translators and cable headends. Different equipment options are being developed that can be used to interface with the microwave transmitter and receivers of intermediate frequency (IFs). These options include low-cost processors, which do not provide any correction to the incoming and outgoing signal, and higher-cost improved systems that will also provide pre-correction, correct clock jitter and insert station identification. All of these corrections will be needed in a highly reduced spectrum crunch.

The timeline for the state network is two years, and the microwave equipment now in place is only the beginning. Constant planning and working to expand the microwave network is time consuming. At this time, the timeline is contingent on two factors — finances and labor. Utah TV translator coordinators are hoping the financing will become available from either the Salt Lake primary stations or the state of Utah, because mountain construction time is limited to a five-month window, and many of the sites are well above the 7000-foot level.

Without television translators, many people in rural areas of Utah and other states would not be able to receive free over-the-air television. In Utah, the support from state leaders and all of the broadcast stations is helping to provide the best television services possible to the entire populace. BE

Kent Parsons is the state of Utah TV translator coordinator.

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Dolby's DP564 decoder

BY SEAN RICHARDSON

The newest Dolby Digital (AC-3) multichannel decoder, the DP564, features Prologic II, the latest in matrix surround decoding technology. The new decoder is twice the size of its predecessor, the DP562), and yet it is much lighter. The front-panel display is larger, and Dolby added soft gel keys to the front-panel interface. On the rear panel are 75 BNC connectors for AES input and output. An optical input and an Ethernet connector for streaming audio were added. Compared to its predecessor, the upgrades add significant, much-needed utility to the device.

Capabilities for broadcast

Although the decoder is widely used in DVD authoring suites, it has attributes that can also be useful in a broadcast facility. The unit can downmix a 5.1 stream in many different ways, including Dolby Pro Logic II, Dolby Pro Logic, stereo (Lo/Ro, LT/RT), 3-Stereo, mono and Dolby Digital Surround EX. The decoder has two 75 AES inputs, an optical input and an Ethernet port for streaming audio.

The DP564 digital Dolby Digital (AC-3) multichannel decoder from Dolby offers Starz Encore improved functionality, and aids in decoding stereo tracks to 5.1.

Another feature is the dynamic-range-compression simulation, which allows users to simulate line, RF and custom dynamic-range compression modes on program material. The decoder also displays AES3 audio information such as sample rate, bit resolution and Dolby metadata information. These features let the user operate the decoder in many ways.

Transmission check

The audio staff at Starz Encore Group has been using the device for about a year. One way we used the decoder was in a transmission path by encoding Dolby Digital (AC-3) for air. We regularly monitor our transmissions using Motorola home set-top boxes and the Dolby decoder. When monitoring the audio levels of 5.1 and stereo interstitial materials on the home set-top boxes, we discovered a problem: The 5.1 materials were airing at significantly lower audio levels. But the source material downmixed fine and checked out as decoded Dolby E. Knowing that metadata is not applied at the outputs of a Dolby E decoder, we did a quick check at the Dolby Digital (AC-3) encoder prior to uplink. Then, we used the DP564, along with a Dolby LM100 broadcast loudness meter for dialnorm measurement, to analyze the emission stream and to check the metadata. The DP564 graphic display showed high-quality decoded information and good input. Therefore, no errors were logged within the stream itself. Next, we switched the decoder's status display to show the amount of dynamic-range compression information that was present in the encoded stream for both line and RF-decoder operating modes. Having this information at hand revealed a problem. There was a significant amount of RF-mode compression information (i.e., metadata gain words that indicated "cut") and a fair amount of line-mode compression present in the encoded bitstream as well. The dialnorm value indicated by the LM100 was -21dB. The authored metadata (included in the Dolby Digital bitstream) as displayed on the decoder was -27dB for the stereo material and -31dB for the 5.1 material. We set the front-panel display of the decoder to RF mode (the output most consumers use) to look at the amount of compression the encoder was applying. The answer was clear. Incorrect dialnorm settings on the encoder had led to a larger amount of compression on the 5.1 spot versus the stereo material because the set-top box decoder's operating mode defaulted to RF mode. (RF mode has an extra 11dB, so compression is heavier at certain thresholds.) The amount of compression also depends on the settings of the dynamic-range control (DRC). There was also a difference in encoded dialnorm metadata. We had to re-encode both the 5.1 and stereo spots correctly for on-air output.

The upgrades add significant, much-needed utility to the device.

Audio mixing

In the audio-edit suite, we ran the decoder through a different set of tests. First, we inserted the DP564 in place of our existing Dolby DP562. We normalized five analog outputs to a surround pre-mix input on a Multimax EX monitor and made the AES input patchable on the AES

patchbay. Next, we loaded the decoder's interface software onto a PC located in the suite and connected the decoder to the PC through the PC's nine-pin port and the decoder's front-panel RS-232 port. (The software interface is only available for PCs.) The remote software puts all of the decoder's functionality right on a desktop. In the audio suite, one of the functions of the system is to check the downmix of a 5.1 stream, but checking how stereo mixes translate is a good idea also. In fact, it's a must, considering the innumerable Dolby Pro Logic decoders in the world. As an old mixing trick, we often use the system for decoding stereo tracks (such as music) to 5.1 to add to the envelopment of the mix. In recent days, the audio staff at Starz has used the decoder quite frequently for constructing 5.1 mixes. Of course, we double-check any music or effect decoded with the system by downmixing it again. Checking the downmix of a program should be a routine task in any part of the broadcast chain. Sure, you can set up a system with no confidence checking and use it to decode stereo material live to 5.1, but this might cause problems once the material reaches the consumer. It is too easy to apply delay twice for the Hass effect in the surround channel — once in the upmix and once in the consumer's decoder. Any time you are working in this environment, you should use the Pro Logic II Music Mode and adjust the delay in all of the channels to zero.

Optical input

We found the optical input on the decoder useful during an experiment with an HD receiver. We connected the optical port from a high-definition set-top box to the optical input on the decoder, making it easy to check metadata information.

Almost perfect

After using the DP564 decoder for nearly a year, we found that it offers substantial improvement in functionality over its predecessor. It's a good tool for 5.1 mixing projects, and a reliable source both for checking Dolby Digital (AC-3) stream information, and for checking downmix information for digital broadcast program material. Its remote software offers an improved user interface and makes it easier to use. The only thing the decoder doesn't have is dialnorm, which plays an extremely important role in digital broadcast and DVD mastering. If it included a dialnorm meter, it would be perfect. BE

Sean Richardson is the manager of post production for the Starz Encore Group.

The advantage of Motion JPEG

BY TOM SAHARA AND WES MORGAN

MPEG has sometimes been cited as a preferable compression method to Motion JPEG (MJPEG) for digital video recording. This viewpoint has been based primarily on the larger memory requirements for MJPEG over MPEG. However, there has been a resurgence of interest in MJPEG and there are several factors behind this trend.

First of all, MJPEG requires a simpler hardware and data processing scheme, thus reducing the total product cost. Because MJPEG compresses similar data within each frame only, the hardware required for record and playback is not only symmetrical but also simpler and less expensive than MPEG. Also, the ability to have access to each frame of video allows for high-quality, variable-speed replay of video in both forward and reverse. This is not only a benefit in sports broadcasting and video analysis, but it also allows access to each native frame for easy implementation of graphics overlay and editing functions. Finally, the quality of recorded video using MJPEG is often better than MPEG because less compression is used.

MJPEG technology offers easy post-record editing and individual frame capture and examination.

Then there is the issue of timing accuracy. MPEG encoding can't guarantee the accuracy offered by the frame-based MJPEG compression scheme, though it does come close with MPEG intra-frame (I-frame) compression. I-frame compression compares consecutive video frames to consolidate common elements and then preserves difference information. Standard MPEG compression is based on a group of pictures (GOP) that comprises the number of bi-directional (B) and predictive (P) frames between each successive I-frame. See Figure 1 for an example of how MJPEG is used in DVR products.

Because MPEG must include these B and P frames, neither long GOP or short GOP stands up to independent viewing or editing as well as MJPEG. As a result, it is more difficult to attach a frame ID through time code or another scheme, and the possibility of encountering questionable in-between ("tweener") frames is raised. Frame-based MJPEG compression eliminates this concern, allowing for quick and efficient processing and facilitating applications that can be difficult to accomplish using MPEG compression. Variable-speed playback, such as that required in live sports broadcasts, is more difficult with MPEG but easily accomplished with MJPEG because each frame is preserved.

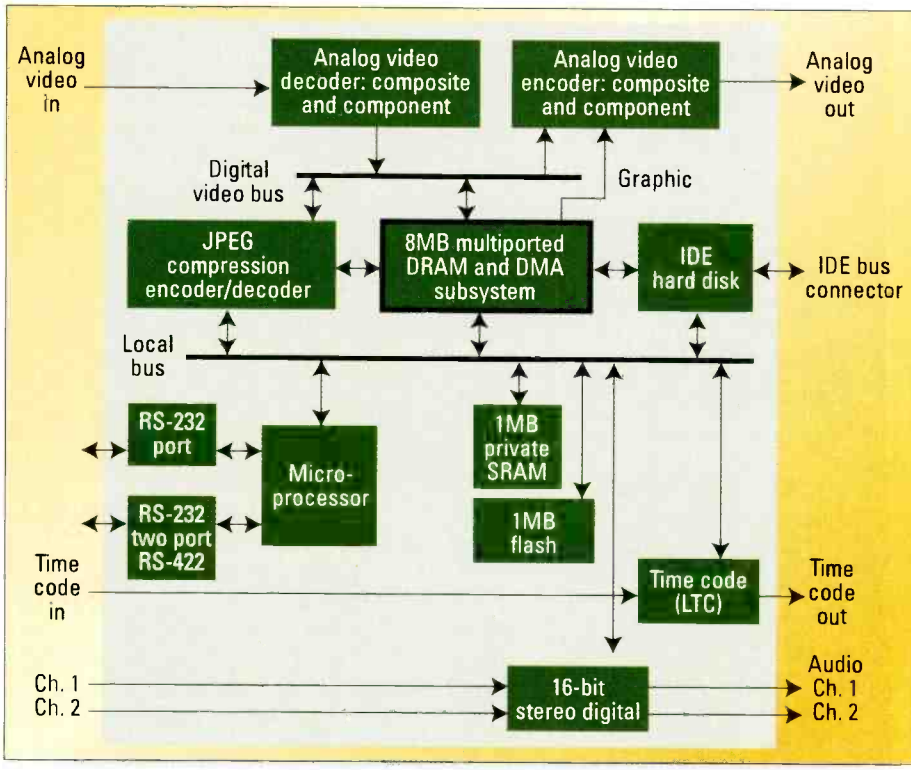


Figure 1. The above diagram of Fast Forward Video's Recon digital video recorder is an example of how MJPEG technology is used in the company's DVR products.

MJPEG in action

Turner Sports selected the MJPEG-based Omega Deck DDR from Fast

Forward Video as the solution for all major sports broadcasts seen on TNT, TBS Superstation and Turner South.

During live sports events Turner's playback operators must be able to freeze any frame and know that it will be a faultless picture each time. Using MJPEG, any frame taken in any sequence will look perfect every time. The operator can freeze a frame and then move forward or back without being concerned that a selected point may fall somewhere between two complete frames.

The Omega Deck features the familiar controls, inputs and outputs of standard analog tape decks. It provides full random access. In addition to networking and playback functions, the DDR features a LCD touch-screen menu and front-panel control. Operator selections include compression levels, recording options, playback looping, genlock timing and playlist creation, as well as dynamic tracking, slow motion, instant cueing and jog/shuttle functions. The system's low 2:1 compression ratio and CCIR-601 4:2:2 recording allows Turner Sports to play out animations, banners, logos and other graphics smoothly and quickly.

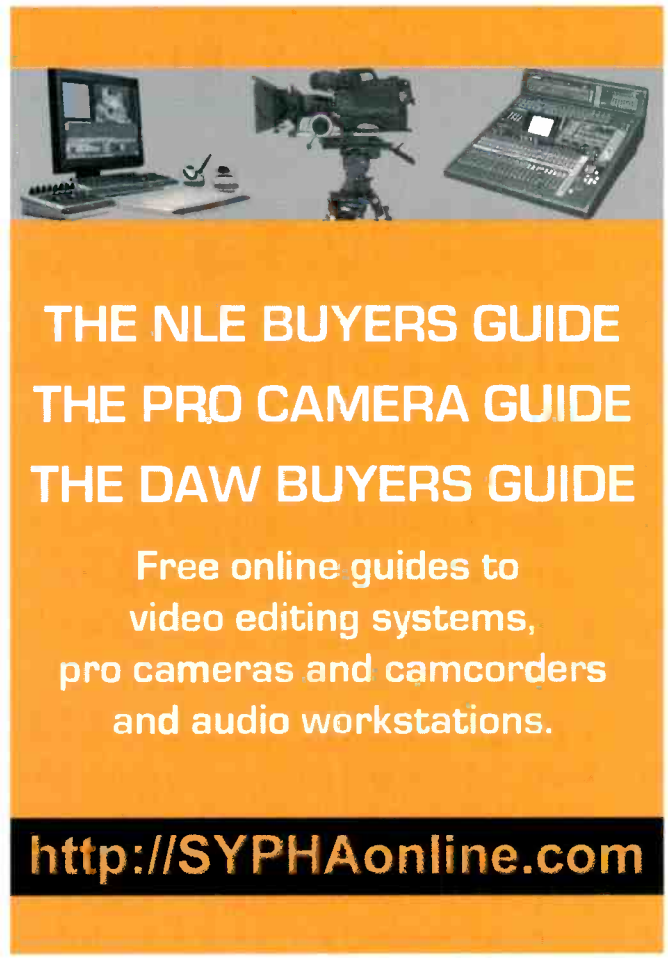
Turner Sports uses the MJPEG-based Omega Deck DDR for its sports broadcasts. The benefit of MJPEG in live sports events is that it ensures that individual frames, taken in any sequence, will look good every time.

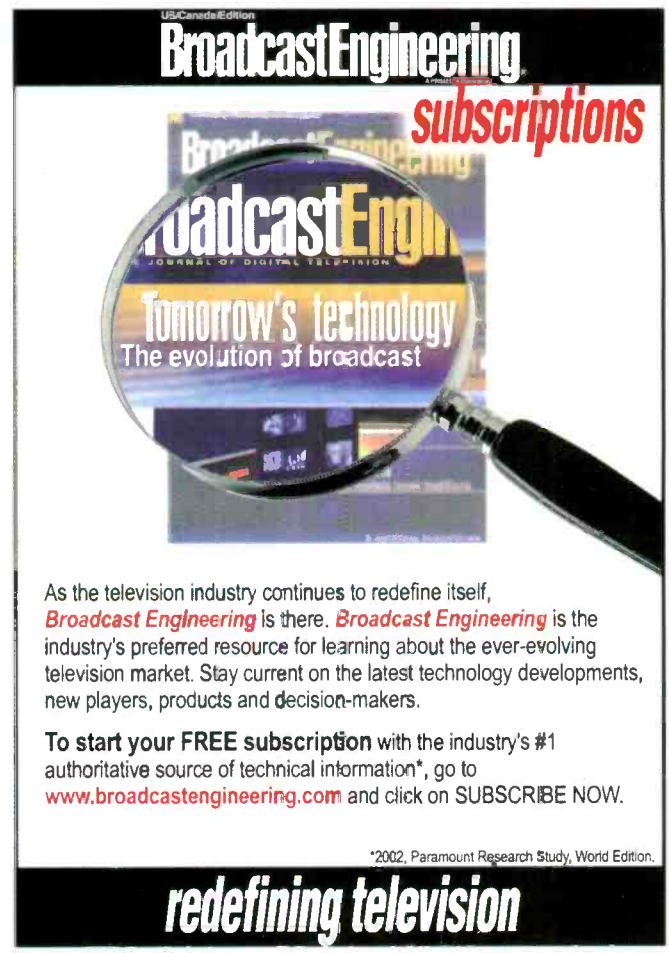
When simultaneous rolls are running from multiple channels on the Omega Deck, they are frame-accurate, and the fill and key match every time. This would be virtually impossible on an MPEG-based system.

Using the Omega Deck's loop feature, Turner Sports can create a segment of video with an opening animation and a back half consisting of a background that loops. For instance, within a seven-second clip, a four-second introduction is followed by three seconds that loop continuously. MJPEG compression makes this possible with accuracy that ensures the clips will always match with a perfect join.

MJPEG technology offers easy post-record editing and individual frame capture and examination. It also provides a flexible solution that balances the need for high-quality, frame-based, scalable compression to the requirements of the application. The ability to record and examine individual video frames with standard PC-based programs, such as QuickTime, over a networked system is a benefit in many broadcast applications. With memory costs dropping, look for even more MJPEG solutions to be available soon. **BE**

Tom Sahara is senior director of remote operations and IT at Turner Broadcasting, and Wes Morgan is vice president of business development at Fast Forward Video.





MPEG encoding systems

BY JOHN LUFF

There are plenty of misconceptions about compressed video. If you look back in the recent history of our industry much misinformation exists. Twenty years ago there were plenty of articles in the *SMPTE Journal* about "bit-rate reduction" (i.e. compression) systems. It talked about the Nyquist limit and the bit rate that might be achieved for acceptable results. The *EBU Technical Review* published an article that showed by mathematical derivation that you could not adequately represent PAL signals in less than 34Mb/s. While that information was useful in the context of the debate at that time, it clearly missed the march of technology.

Much has changed in the last decade to make compression so pervasive. Compressed-recording consumer camcorders now provide HDTV recordings at less than 25Mb/s, and the promise of advanced coding methods portends high-quality 480i at scarcely more than 1Mb/s. New coding algorithms make Internet video possible on low-bandwidth circuits. What has changed? How is this possible? And even more interesting, this being the month of the annual pilgrimage to Lost Wages, what might we see going forward?

Much has changed in the last decade to make compression so pervasive.

For the answers, one needs only to turn to the best technical journal in North America, the *Wall Street Journal*. The solution is simple: Follow the money. The increase in consumer spending on electronics that use compression technologies is a mirror of the increase in capability and the availability of funding for research into perceptual coding (i.e. compression). The fact that it gets better is driven by money, for if it were a mathematical oddity we would still be struggling to get beyond that 34Mb/s barrier.

Coding standards

The Moving Pictures Experts Group (also known as Motion Predictive Educated Guesswork) has created a family of standards for coding pictures, audio and metadata. The two generalized standards we see most often in professional and consumer products are MPEG-2 and MPEG-4. MPEG coding systems are based on economics in an important, and intentional way: put the cost at the sending end; make the encoders complex and expensive because there are few of them; and make the decoders cheap and simple because there are more receivers than transmitters. What we perhaps didn't know when MPEG was first shown to the public was that with sufficient research and development the result would create such a huge demand that encoders too would become (relatively) cheap and ubiquitously available in many professional applications.

MPEG-2 now delivers credible results with sophisticated coders delivering real-time live variable-rate bitstreams at less than 3Mb/s, and news backhaul at less than 8Mb/s, suitable for use in production. HDTV is routinely delivered with pretty good quality in the United States and elsewhere at less than 19Mb/s, with 720p60 systems performing well at even 12Mb/s. Think about the numbers for a second. 720p60 delivers a video payload of 885Mb/s with eight-bit 4:2:2 coding. Compression to 12Mb/s means a reduction to only 1.36 percent of the original bit rate, yet the picture quality is remarkably good. 1080i30 at 19Mb/s is 1.91 percent of the original bit rate. Even professional backhaul and server recording of 1080i30 at 50Mb/s is just five percent of the starting data, but the results are nearly transparent. Some researchers predict that MPEG-2 can still yield perhaps a 20 percent to 40 percent increase in coding efficiency, which of course means lower bit rates and/or better pictures. Of course, lower bit rates mean better economics as well, which is really the driver behind the research. More streams in a given occupied bandwidth, less cost, more profit.

TANDBERG Television's EN5920 real-time hardware encoder for the Windows Media 9 series delivers TV content to traditional and new media networks.

The original MPEG-4 standard did not take off in professional use due to many factors, including licensing costs, and the improvements demonstrated in MPEG-2 systems during the development of MPEG-4 systems. MPEG-4 is used in only one professional product that I know of, Sony's SRW series of HDTV recorders. It

records the MPEG-4 Studio Profile at a whopping 600Mb/s data rate.

New codec on the block

There is a new kid on the block. The MPEG-4 AVC codec, recently standardized, and adopted by ISO as H.264, includes professional extensions that have been demonstrated to produce a 40 percent to 60 percent increase in coding efficiency over MPEG-2 at similar bit rates. At IBC2003, 720p60 playback from a server at just 6Mb/s (film-based material) was shown. Real-time encoders are not yet available for HDTV H.264, but two manufacturers of MPEG equipment are expected to have H.264 real-time hardware encoders for standard definition at NAB2004. The application most exciting to many is the backhaul of HDTV at 20- to 30Mb/s using H.264. This would allow a single DS3 to backhaul high-quality 480i and HDTV at the same time at a reasonable cost. The impact on the business would be enormous. Currently it is difficult to do H.264 professional coding in real time, especially at HDTV rates. There will be hardware coming for this later this year. It is interesting to note that H.264 also works at astoundingly low bit rates for wireless and Internet delivery of content to small screens with quite reasonable perceived quality. Remember that compression is all about perception.

One DBS startup has stated that they will launch this year with MPEG-2 coding and switch next year to H.264 by downloading new microcode to the consumer STBs. The increase in the number of channels in the same bandwidth will make additional delivery channels essentially free. So why not throw out MPEG-2 and move to something really exciting? The cost of replacing the entire consumer infrastructure not capable of simple upgrade is untenable. But rest assured, new decoders will likely have microcode lobotomies in the future to allow more efficient use of bandwidth and better pictures and sound. Locking the consumer into outdated technology will become too frustrating and could kill sales.

At NAB this year, spend a little time looking at the traditional coder manufacturers, and then visit Microsoft and see Windows Media 9 (also in hardware in other manufacturers' booths). Think through the impetus behind the development of professional coding by a computer software company. Science experiment? Control of the world? Ego? Nope. **BE**

John Luff is senior vice president of business development for AZCAR.

SEND Send questions and comments to: john_luff@primediabusiness.com

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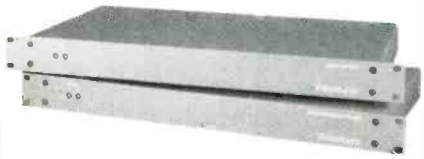

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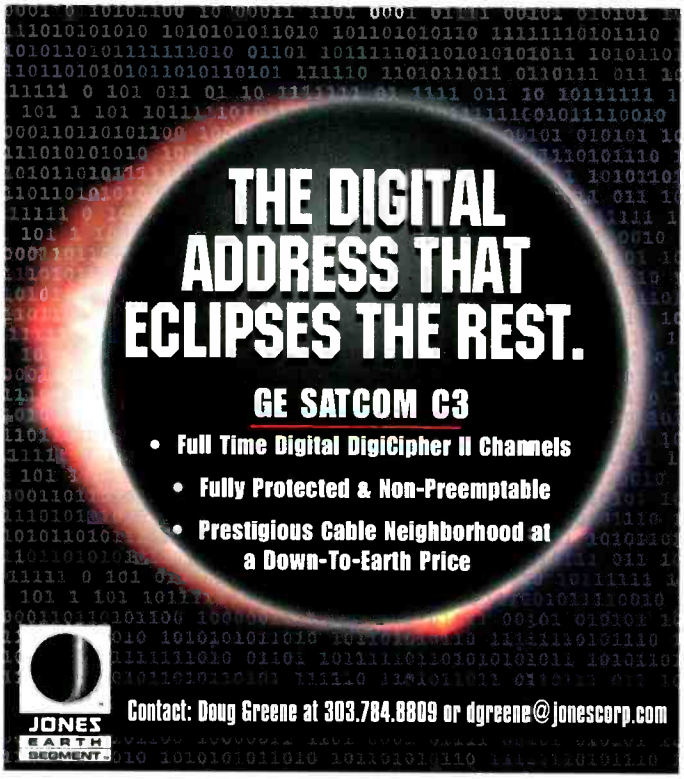

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AFA Associates	115	201-767-1200	afa@ascentmedia.com
Angenieux	46	973-812-3858	angenieux.com
Anton Bauer	53	203-929-1100	antonbauer.com
Avid Technology	4-5	800-949-avid	avid.com
Axcera	101	724-873-8100	info@axcera.com
Axon Digital	32	888-919-9379	axon.tv
Azden Corp	57	516-328-7500	azdencorp.co
Barco Projection Sys.	109	770-218-3200	barcocontrolrooms.com
BBC Technology	113	888-222-3820	bbctechnology.com
Belden	93	800-belden-4	belden.com
Bogen Imaging	111	201-818-9500	bogenimaging.com
Broadcast Software Solution	138	800-273-4033	broadcastsoftware.com
Calrec Audio	91	+44 1422842159	calrec.com
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Chyron Corp.	118		chyron.com
Clear-Com Intercom Sys.	83	510-496-6666	clearcom.co
Computer Modules	161	858-613-1818	computermodules.com CPI/
Crystal Vision	126	954-788-3334	crystalvision.tv
Dalet	97-102		dalet.com
Dielectric	51	866-dielectric	dielectric.c
Discreet	45	800-869-3504	discreet.com/smoke
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Doremi Labs Inc.	160	818-562-1101	doremilabs.com
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Video Technics	56		newsflow.tv
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How real is reality TV?

BY PAUL MCGOLDRICK

The timeline between the production shooting for a series of reality TV programs and the actual screening is finite, but never short. Because of the time spent in post production, it may be several months between the time the production staff and contenders return to civilization in the case of a "survival" series and the time that viewers see the final episode. Many newspapers now publish updates on these series, making the conclusions about as spontaneous as a soap opera cliffhanger.

Reality TV has gone from the adventurous to the ugly; it has gone from competitive to backstabbing and background politics between players. Even the business-derived "Apprentice," where Donald Trump fires a contender every week, is about as real an example of the business world as Michael Jackson is an example of a real rancher. But seeing Trump's name as executive producer on the credits tells you what the programs are all about (the money!).

No, reality TV is not real. But live TV is real.

The days before videotape recording in TV was magical. You might have had a one-hour program that was to be aired in peak viewing time. The studio would be set by the time you arrived for work at a civilized time on the day of transmission. The talent would have gone through script and basic movement rehearsals in some grubby room off-site, probably for a week or more. They would reach the studio in a basic version of their final costumes. Studio rehearsals would involve lighting changes from the original plans, and revised camera positions and shots, as well as resolving the basic problems of getting bodies from one place to another on the studio floor without accidentally getting them into camera shots.

While the technical crew was finalizing alignment of cameras; setting audio cues; double-checking that the stack of credit cards — the original ones with actor, director and designer names on them, not the pieces of plastic we carry today — were correctly placed so that an operator could switch them with two fixed cameras cross-fading between them, the cast would go to dinner and then have final make-up corrections before hitting the studio floor again.

For the one hour of the program the adrenaline would flow continually. When mistakes happened, everybody in the studio and galleries saw them and moved on; the viewers probably didn't notice. And then, when the final credits faded out, you were done: you could go get a drink, go home, whatever, but you were done. Once the studio was powered down, crews would come in and strike the set and put in the new one for tomorrow.

Adrenaline still flows in many news and breakfast shows and, of course, in sports coverage, but with commercial breaks and a fixed routine it is not nearly the same as one hour of live drama, or 40 minutes of a live comedy show in front of a real audience, with no breaks and no downtime.

Things changed with the advent of the quasi-reliable VTR. Directors felt they needed to get that perfect result in each scene, so they ended up knife-and-fork editing two-inch videotape. When electronic editing came along, directors not only sought the perfect shoot, but they also added the twist that scenes would rarely be shot in the sequence that they would finally appear. This removed all sorts of logistic problems that exist with live TV.

The biggest negative with live TV is that you cannot take it back. A couple of years ago, in this column, I urged stations that aired live programming to put video delays into their feeds. The technology had arrived to do so. If the industry had done so, we would not have had to endure the bad taste of the half-time show performers at the Super Bowl, or the live broadcast by five LA TV stations of a man being shot to death with multiple rounds by the police. These types of events, unfortunately, are more reality TV than most of us want to face.

The biggest negative with live TV is that you cannot take it back.

It was good to see the five-second delay in the live broadcast of the Academy Awards at the end of February. As you cruise the aisles at NAB this month think of that delay unit. There are at least four vendors offering delays available from a few seconds up to whatever you want. Convince your management to spend the money to put delay into service on your live feeds. Reality TV has a huge delay between production and broadcast; live TV can avoid becoming reality with just a few seconds of care. BE

Paul McGoldrick is an industry consultant based on the West Coast.

Send questions and comments to:
paul_mcgoldrick@primediabusiness.com

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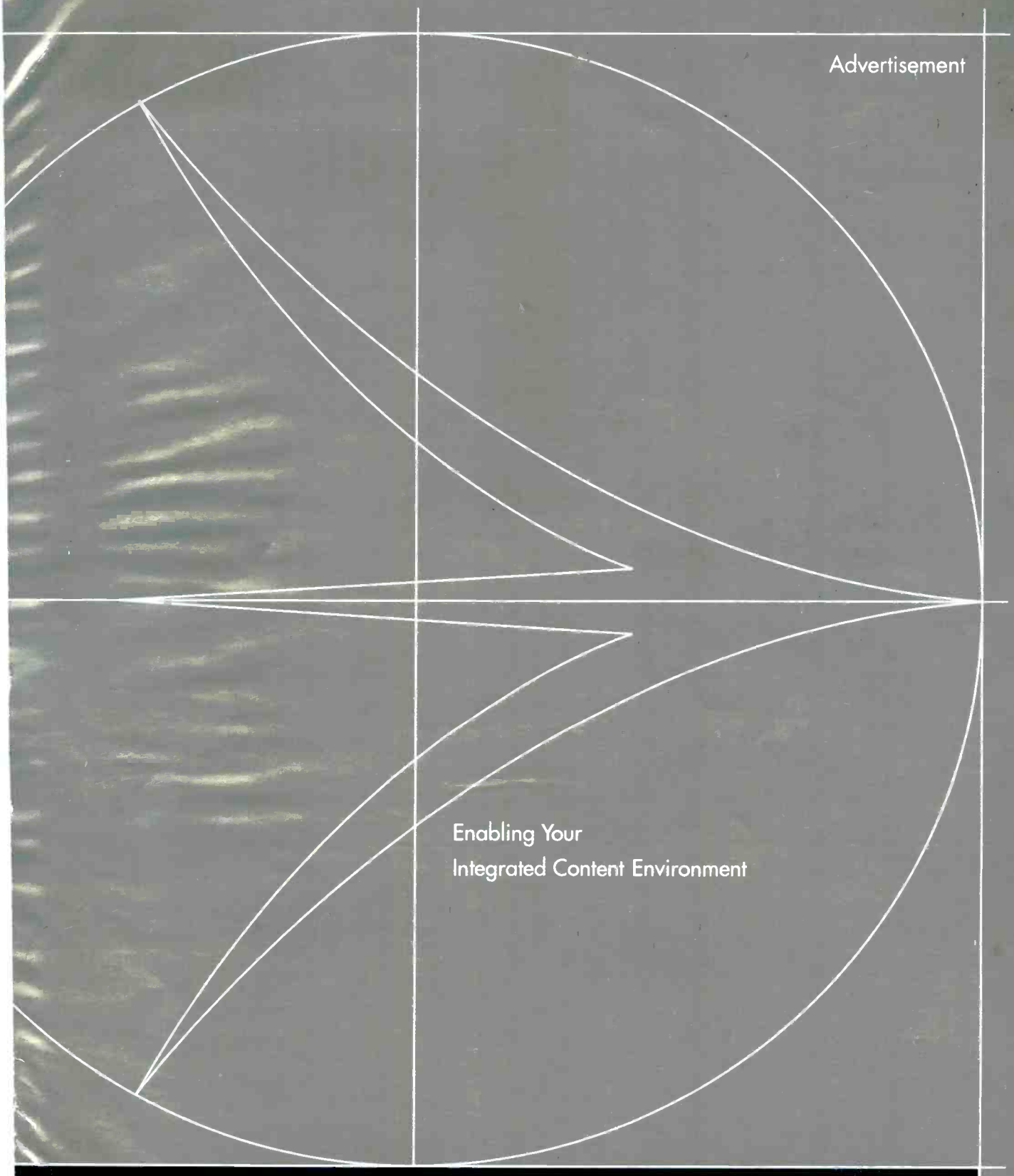
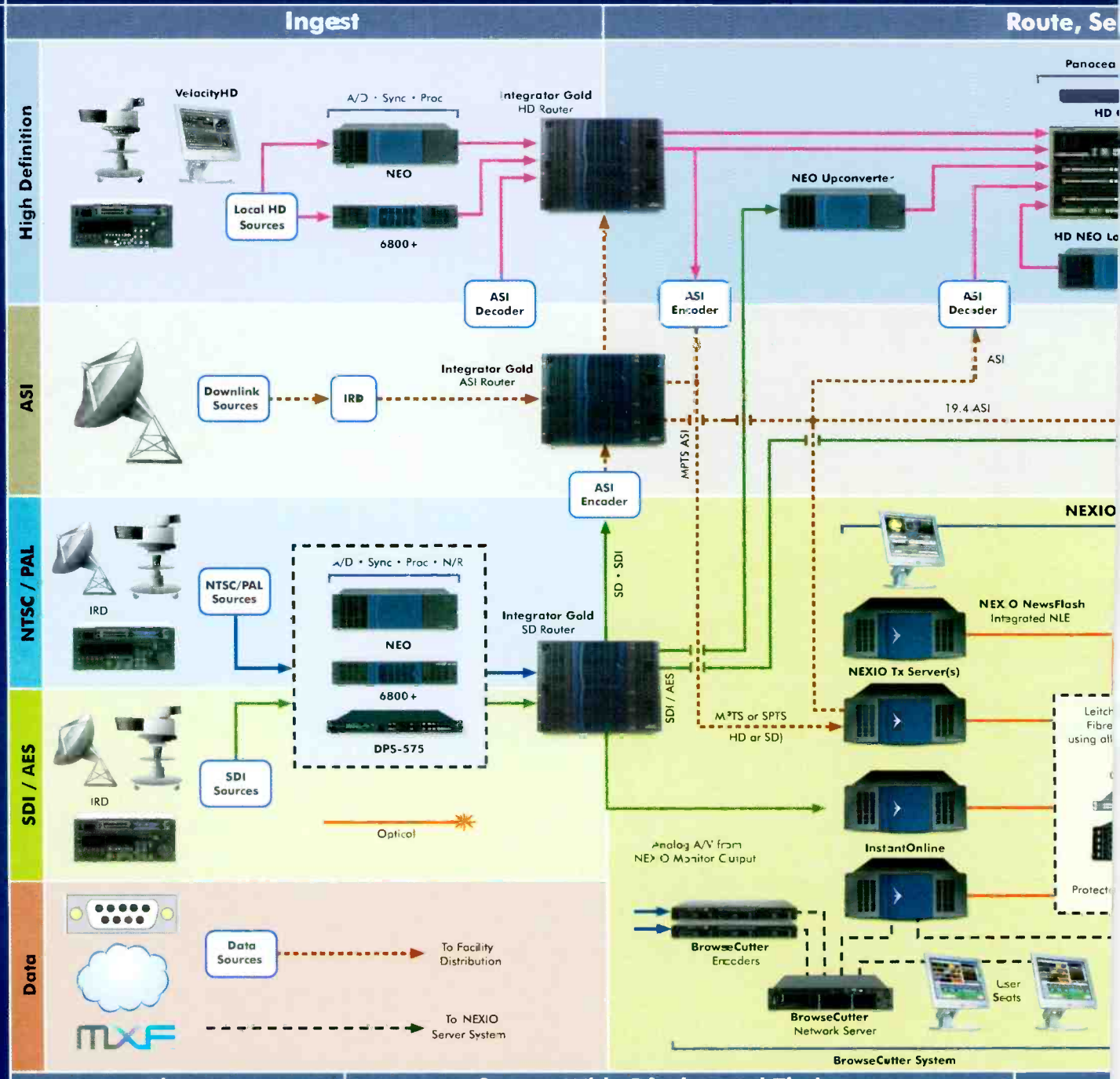


Enabling Your
Integrated Content Environment

Content Processing & Transmission Infrastructure Guide

[Integrated Content Environment (ICE) — Overview]



About

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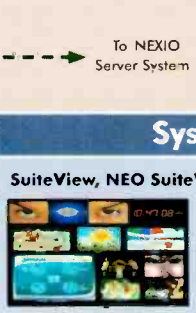
System Wide Display and Timing

SuiteView, NEO SuiteView



- Advanced, flexible, modular display processor
- High resolution for mission critical applications
- Scalable: 4 - 44 inputs

Leitch Master Clock

- Absolute Time Reference (ATR)
- Provides protocols for transmitting universal date / time reference
- Provides alignment of AV reference to data systems in sync with AV
- Defines common reference signal generation and distribution mechanisms for all TV standards

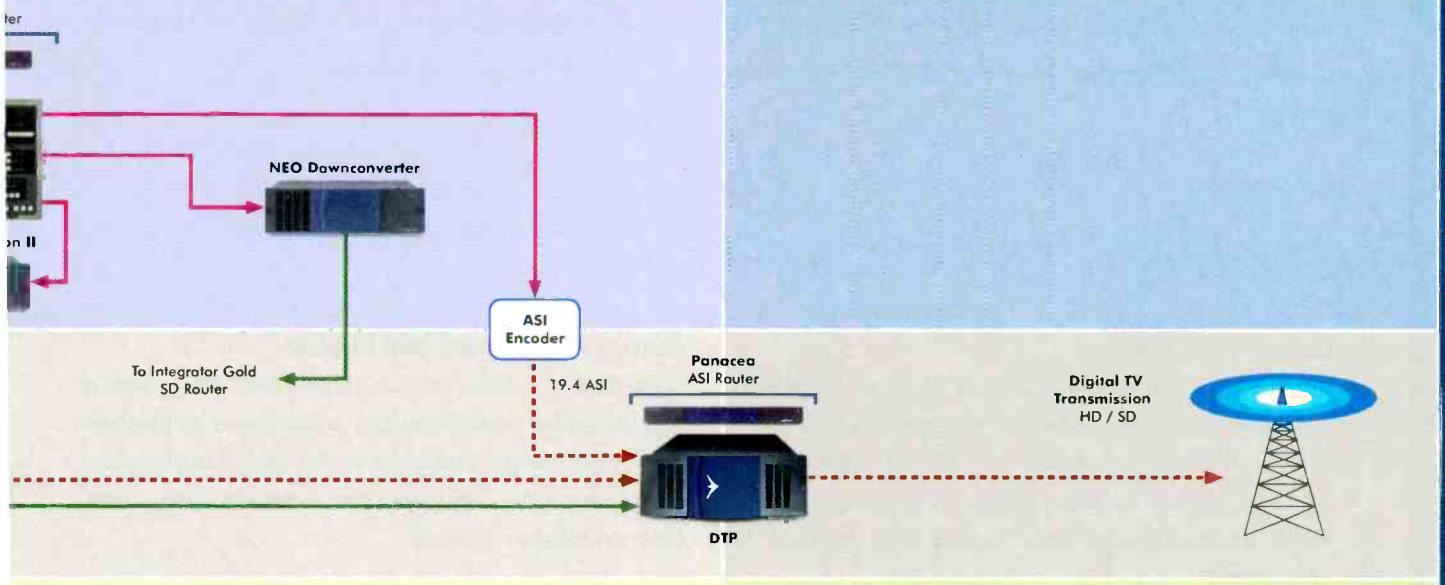
Server-Cen

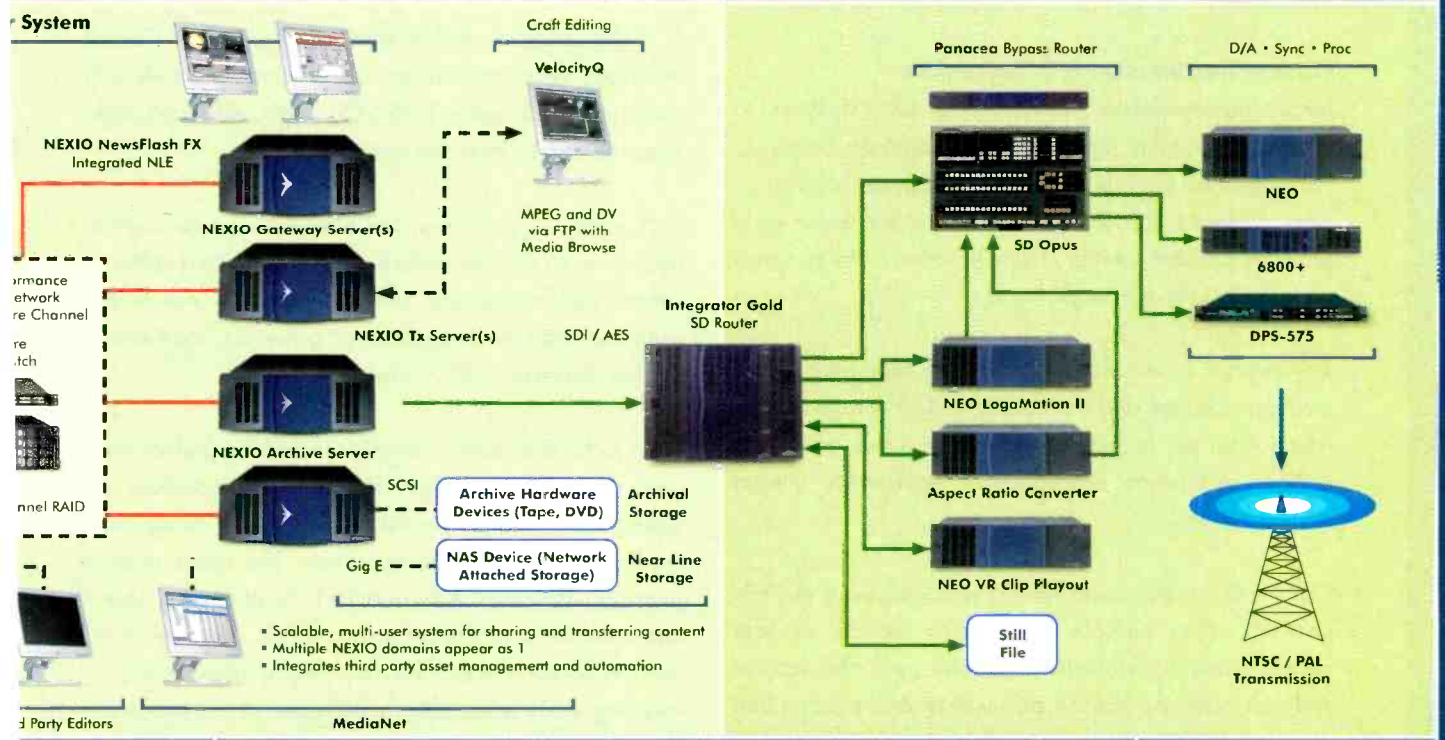
- BrowseCutter
- Ingest Contro
- NewsFlash
- NEXIO Delay
- NEXIO Media
- NEXIO Pilot
- NEXIO Resou
- Playlist
- MOS Rundo

LEITCH

Process, Edit

Transmission





ations

Applications

Command and Control

Command Control System (CCS)

- Unified control and monitoring solution
- Control CCS and SNMP-enabled devices from anywhere in the world
- Includes multiple applications, gateways and control panels
- Sophisticated, customizable GUI
- Distributed, real-time environment

CCS Pilot

- Configuration, control and monitoring interface for Leitch products
- Local or remote control
- Customizable, secure and scalable

CCS Navigator

- Extends capabilities of Pilot with user-configurable GUI
- Symbol gallery for buttons and images
- Single button can launch simple or multiple presets

Legend

- High Definition
- Digital
- Analog
- Fibre Channel
- Transport Streams
- TCP/IP

[Integrated Content Environment (ICE)]

The ultimate goal of the chief engineer or vice president of engineering at every professional television and video operation is a fully integrated environment for the streamlined production, processing, distribution and management of content, allowing audio, video and metadata to be instantly and securely accessible. When workflow is optimized — quality and productivity are improved.

Content Processing

Leitch remains the world leader in platform integration and control, offering the widest range of functions in a choice of flexible platforms — NEO & 6800+. The products offered in these platforms make processing simple and enable increased performance, productivity and control.

Content Transmission & Infrastructure

Leitch's industry-leading routing offerings allow customers to connect high-quality signals of all formats from analog to HD. Panacea provides affordable, compact routing in sizes up to 32x32. The new wideband Integrator Gold provides scalable routing of any broadcast digital signal up to 128x128 in a single frame.

Transmission is an ideal application for integration, as all media is acquired and stored on a central storage system, which can be accessed by multiple users to supply multiple distribution channels with high-quality content and branding.

Our NEXIO transmission server, which supports multiple channels using multiple compression formats in both standard and high-definition resolution, will also support ASI interfaces and has the ability to record, process and playback MPEG transport streams.

Leitch's Opus master control switcher offers an array of effects and has the ability to control up to 16 on-air channels from a single operator control panel. Opus meets multi-channel digital integration challenges for both high-definition and standard-definition formats.

Content Management and Display

Integrated Content Environments offer the greatest opportunity for productivity and performance gains when employing content management and control applications that place content, operations and remote locations under common software controls.

A major workflow enhancement is our Ingest Control Manager, which controls up to 16 server channels with associated proc amps (DPS-575), eight VTRs and eight separate routers from one control station.

CCS control applications, like Navigator, place content, operations or remote facilities under centralized software control and monitoring. These applications are further enhanced with the integration of a flexible, multi-source display processor, NEO SuiteView.

Leitch is the most trusted name for increasing performance and productivity through state-of-the-art solutions — scaling from a simple point product to full design and deployment of an entire operation. The Leitch product portfolio features multi-standard functionality, open interoperability, advanced software and user interfaces, and rock-solid viability for any future requirements — enabling each Leitch client's definition of an Integrated Content Environment.

Competition and cost pressures drive increased productivity, posing an ongoing challenge to a facility's technical infrastructure. Advances in content compression, networking and storage technology present opportunities, but without integrated, networked platforms on which to implement those advances, these opportunities cannot be fully realized in the future.

Flex your processing options with a wide range of products in both NEO and high-density 6800+, which allow processing of analog and digital signals and provide compatibility with SD, HD, fiber optics and more. You can design your system to be a cost-effective, high-quality solution that is easy to configure and operate.

NEO/6800+ — Together, NEO, 6800+ and Navigator allow you to build an integrated, cost-effective system with unprecedented real-time control, forming a winning video processing team for your Integrated Content Environment (ICE).

NEO — An advanced and integrated platform, designed to grow with your business, offers maximum functionality for analog, digital and high-definition content, allowing customers to quickly benefit from evolving standards and technology. An advanced processing platform, NEO not only hosts core, single-function modules, but also consolidates vital audio/video processing and timing functions on a single "Simplicity" module. New, award-winning, specialty modules have been added to NEO: NEO VR digital video recorder, LogoMotion II branding tool and the NEO SuiteView multi-source display processor. These applications extend the practicality of NEO beyond traditional, conventional modular applications.

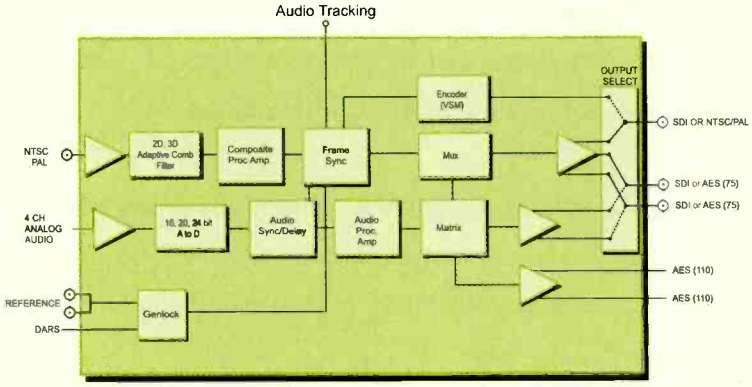
6800+ — An exceptional value and high-quality processing platform designed to reduce costs while adding enhanced functionality. An extension of the original "Digital Glue" platform, 6800+ still supports all core video processing and distribution solutions and is reliable, dependable and easy to use. 6800+ now adds the support of multiple industry standards, including HDTV, increased audio processing and optical transmission. This high-capacity platform extends features and increases the performance and functionality found in our rock-solid 6800 industry standard. We have again reset the standard in cost-effective processing.

NAVIGATOR — Reduce operational costs using Navigator's extensive real-time control and monitoring capabilities, which allow unsurpassed views of your processing systems — from a single module to racks of equipment in multiple locations — saving you time and resources. Leitch's CCS Navigator — winner of NAB 2003's highest awards for control and monitoring of content quality — and the CCS real-time system provide open access through standard protocols to components of a networked system.

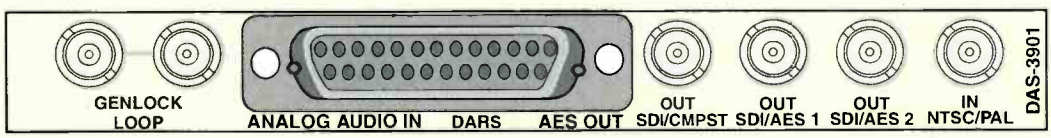
Backed by 30 years of delivering industry-leading, high-quality infrastructure for professional video and audio facilities, Leitch is uniquely able to leverage our corporate strength, experience and scope to protect our customers' investments.

NEO SIMPLICITY

DAS-3901 — Composite Video/Analog Audio Synchronizer/ Processor/Multiplexer

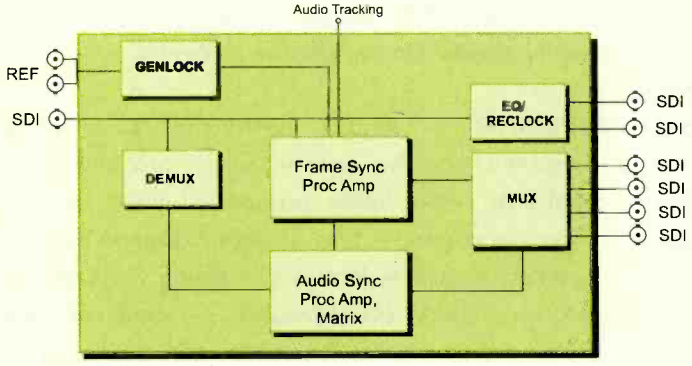


- 12-bit fully adaptive frame/field/3 line/ notch composite decoding, synchronization, processing amplifier with clipping (hue, chroma, video, setup controls)
- Line by line VBI handling and processing
- Selectable 16/20/24-bit A to D, synchronization, delay and processing amplifier (gain, swap, delay, invert, mix) for audio input
- Variable audio delay of up to 1.3 seconds
- Audio multiplexer
- Provides internal audio tracking to additional audio synchronizer

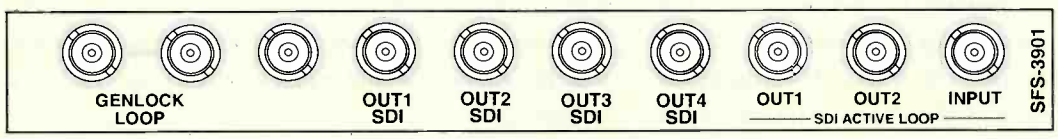


NEO SIMPLICITY

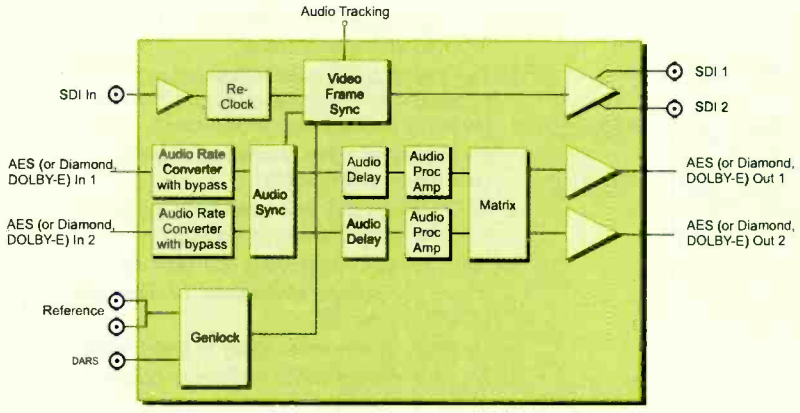
SFS-3901 — SDI and Embedded Audio Synchronizer/Processor



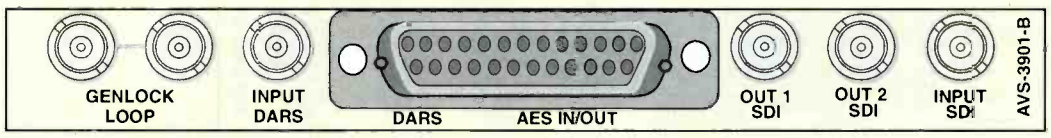
- Cleanly handles hot switch on input for video and embedded audio
- 3-color space video processing amplifier (YPrPb/ Composite / GBR)
- Up to 30 frames video delay in delay mode
- Embedded audio is demultiplexed and subsequently remultiplexed to avoid audio distortion during frame drop/repeat
- 16/20/24-bit embedded audio synchronization/delay/ processing
- Variable audio delay of up to 1.3 seconds
- Passes compressed audio data, i.e. Diamond, DOLBY-E™, AC-3™
- Provides internal audio tracking to additional audio synchronizer

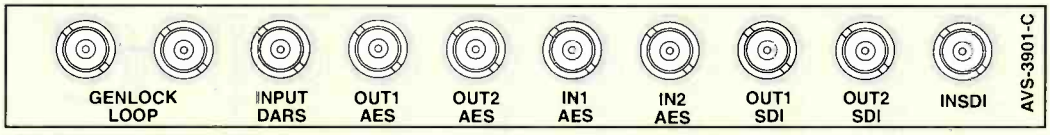


AVS-3901-B, C — SDI/AES Synchronizer/Processor

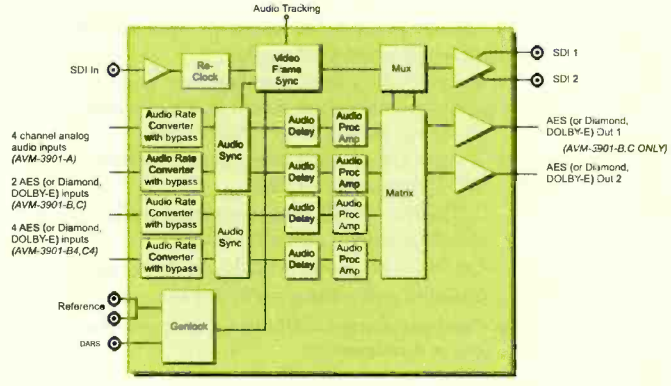


- SDI embedded input with two processed SDI embedded outputs
- Two AES streams input and output
- Selectable 16/20/24-bit audio synchronization/delay/ processing
- Variable audio delay of up to 1.3 seconds
- Audio re-sampling for 32-108kHz AES outputs, with bypass for data over AES operation Diamond or DOLBY-E™
- C,U & V bit transparency
- Provides internal audio tracking to additional audio synchronizer

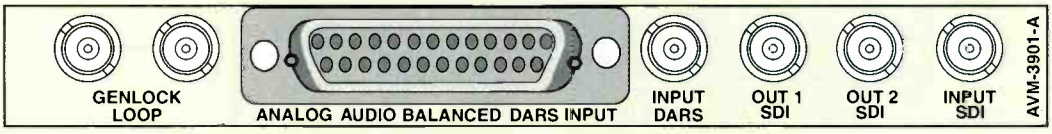


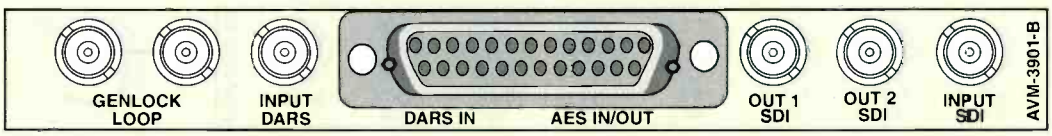


AVM-3901-A, B, C, B4, C4 — SDI/Audio Synchronizer/Processor & Multiplexer



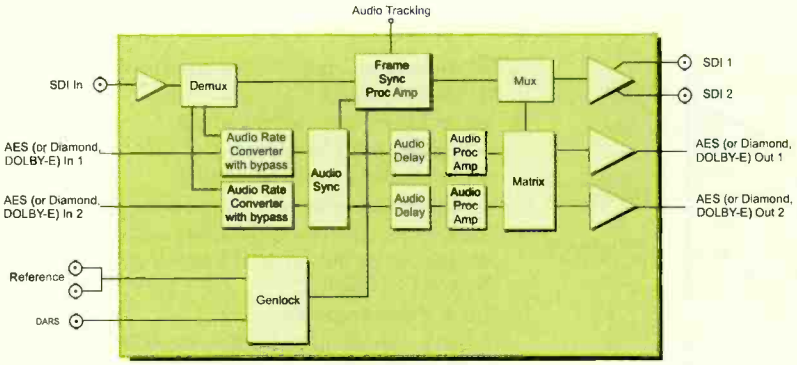
- SDI video input with two processed SDI embedded outputs
- Two SDI video outputs with embedded audio
- Two AES or four channels analog input with multiplexed and two AES outputs
- Four AES input with multiplexed output
- Selectable 16/20/24-bit audio synchronization/delay/processing
- Variable audio delay of up to 1.3 seconds
- Audio re-sampling for 32-108kHz AES outputs, with bypass for data over AES operation
- C, U & V bit transparency
- Provides internal audio tracking to additional audio synchronizer



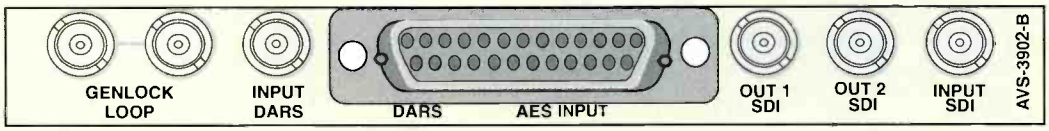


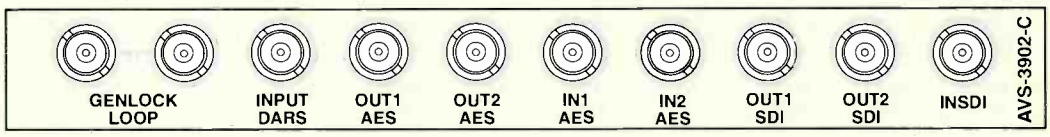
See page 29 for other back panels: AVM-3901-C, B4, C4

AVS-3902-B, C — SDI/AES and Embedded Audio Synchronizer/Processor

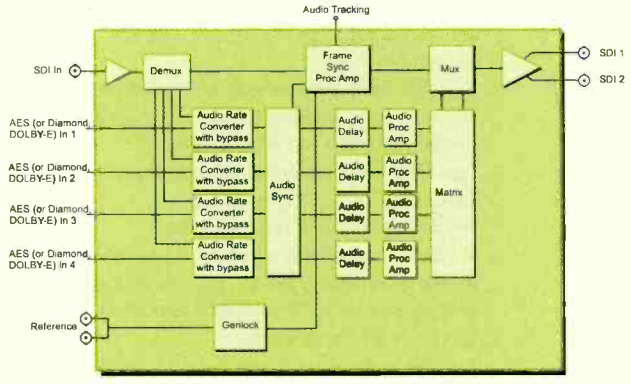


- Cleanly handles hot switch on input for video AES and embedded audio
- Embedded audio is demultiplexed and subsequently remultiplexed to avoid audio distortion during frame drop/repeat
- 3-color space video processing amplifier (YPrPb/composite/ GBR)
- 16/20/24-bit AES and embedded audio synchronization/ delay/processing
- Variable audio delay up to 1.3 seconds
- Passes compressed audio data, i.e. Diamond, DOLBY-E™, AC-3™
- Up to 30 frames video delay in delay mode
- Provides internal audio tracking to additional audio synchronizer

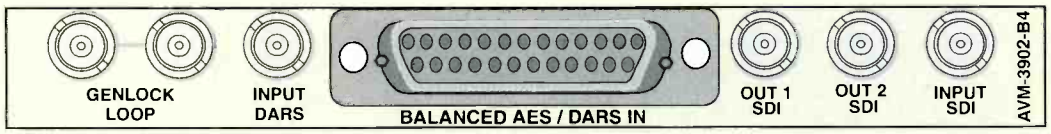


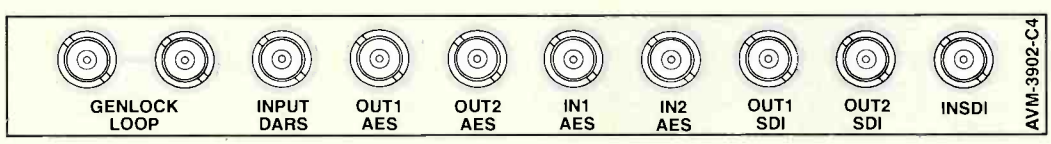


AVM-3902-B4, C4 — SDI/AES and Embedded Audio Synchronizer/ Processor & Multiplexer

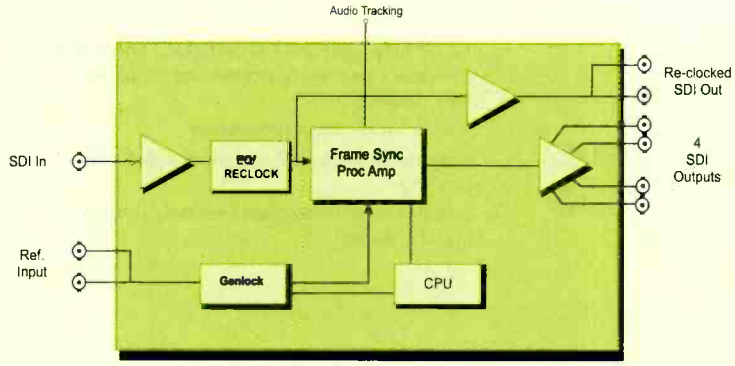


- Cleanly handles hot switch on input for video AES and embedded audio
- Embedded audio is demultiplexed and subsequently remultiplexed to avoid audio distortion during frame drop/repeat
- 3-color space video processing amplifier (YPrPb/composite/ GBR)
- 16/20/24-bit AES and embedded audio synchronization/ delay/processing
- Up to 30 frames video delay in delay mode
- Variable audio delay up to 1.3 seconds
- Provides internal audio tracking to additional audio synchronizer

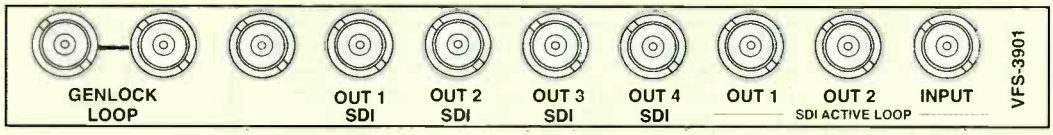




VFS-3901 — SDI Frame Synchronizer/Processor

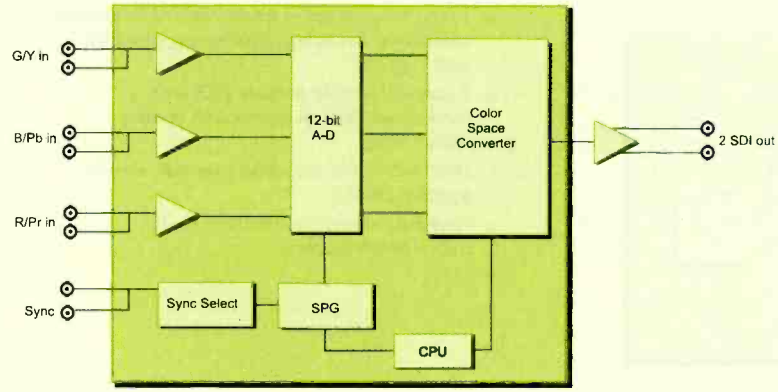


- Frame sync with infinite timing
- Video Processing Amplifier:
  black level, luminance level, chrominance level, black/white clip, hue (525 only)
- Video Delay Mode
- Provides internal audio tracking to audio synchronizers

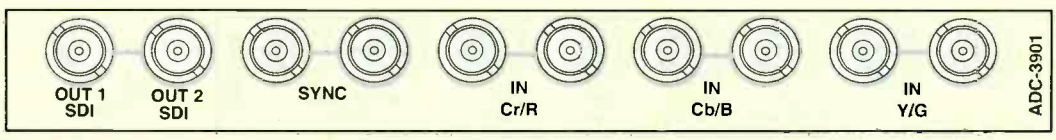


PRELIMINARY

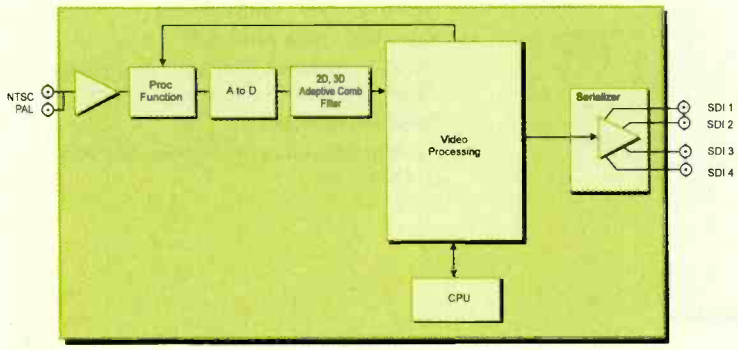
ADC-3901 — Analog Component Video to SDI Converter (illustrated)
ADC-3901-2 — Dual Analog Component Video to SDI Converter



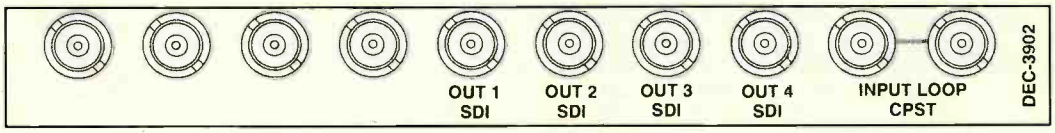
- 12-bit high-quality video conversion to SDI
- Smart clip to prevent output errors
- Looping inputs: YPbPr, RGBS
- SMPTE, EBU, MII, Betacam standard levels
- 12-bit video processing
- Dual version has 2 A to D converters and no looping inputs



DEC-3902 — Composite Video to SDI Decoder

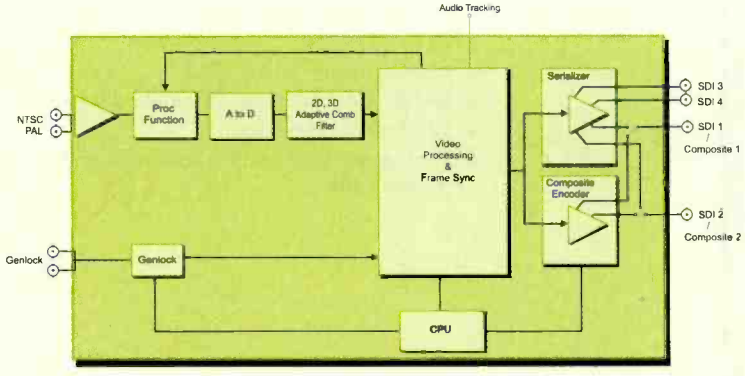


- 12-bit fully adaptive frame/field/3 line/notch composite decoding, processing amplifier with clipping
- A to D 12-bit input processing
- Input noise immunity and input video soft clipping
- Line by line VBI selection (normal, simple, bypass, delete)

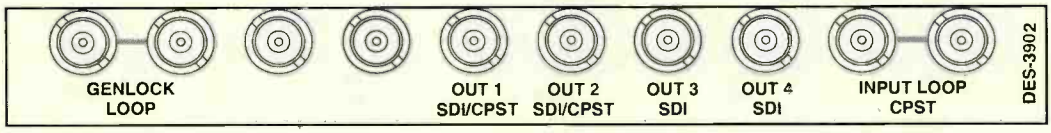


NEO VIDEO

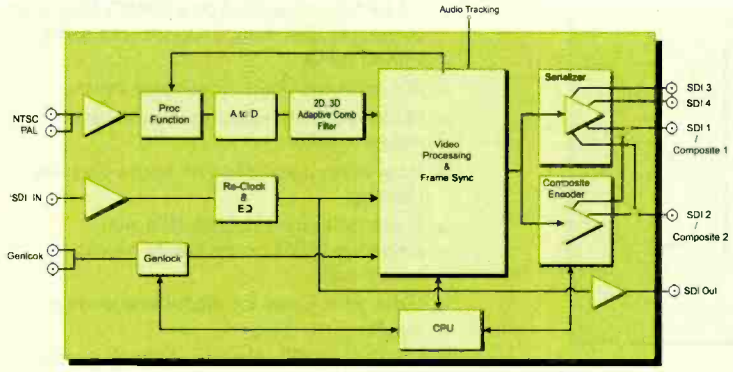
DES-3902 — Composite Video to SDI Decoder/Synchronizer



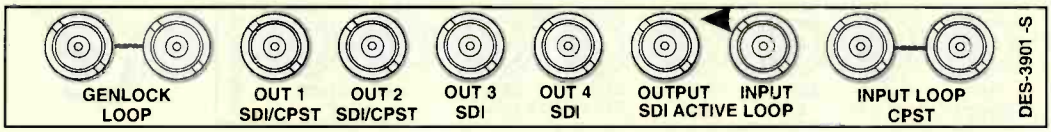
- 12-bit fully adaptive frame/field/3 line/notch composite decoding, processing amplifier with clipping
- 2 user-selectable outputs (SDI with embedded EDH or composite analog monitoring)
- Line by line VBI selection (normal, simple, bypass, delete)
- Provides internal audio tracking to audio synchronizers



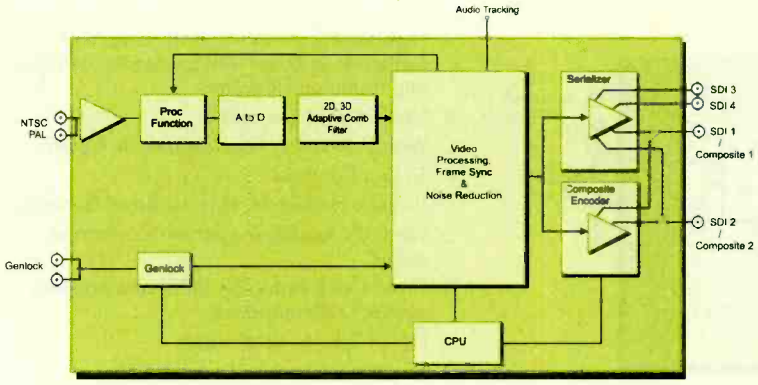
DES-3901-S — Composite Video to SDI Decoder/Synchronizer with SDI Input



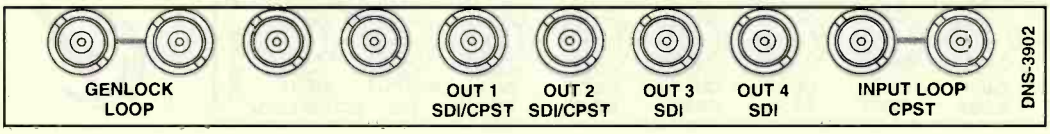
- 12-bit fully adaptive frame/field/3 line/notch composite decoding, processing amplifier with clipping
- SDI Input with internal decoder bypass
- A to D 12-bit input processing
- Video proc amps for analog and digital inputs
- Input noise immunity and input video soft clipping
- 2 user-selectable outputs (SDI with embedded EDH or composite analog monitoring)
- Line by line VBI selection (normal, simple, bypass, delete)
- Provides internal audio tracking to audio synchronizer



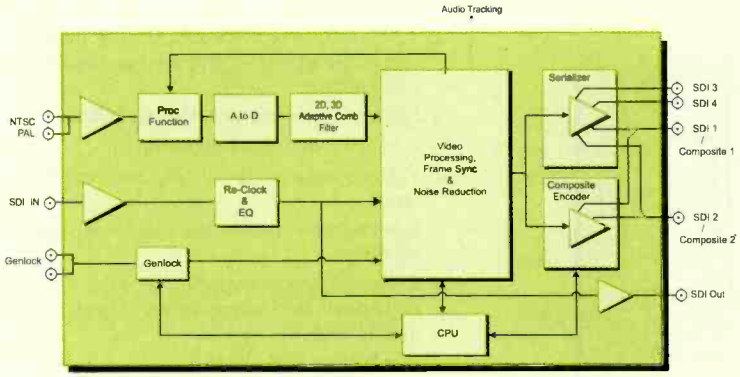
DNS-3902 — Composite Video to SDI Decoder/Synchronizer/Noise Reducer



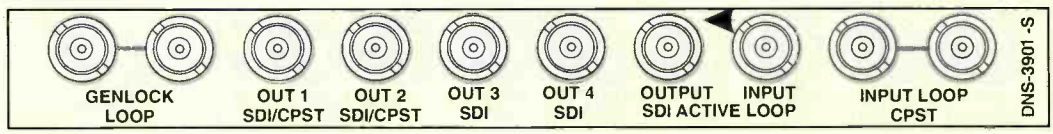
- 12-bit fully adaptive frame/field/3 line/notch composite decoding, processing amplifier with clipping
- Noise reduction removes impulse and random noise
- Input noise immunity and input video soft clipping
- 2 user-selectable outputs (SDI with embedded EDH or composite analog monitoring)
- Line by line VBI selection (normal, simple, bypass, delete)
- Provides internal audio tracking to audio synchronizers



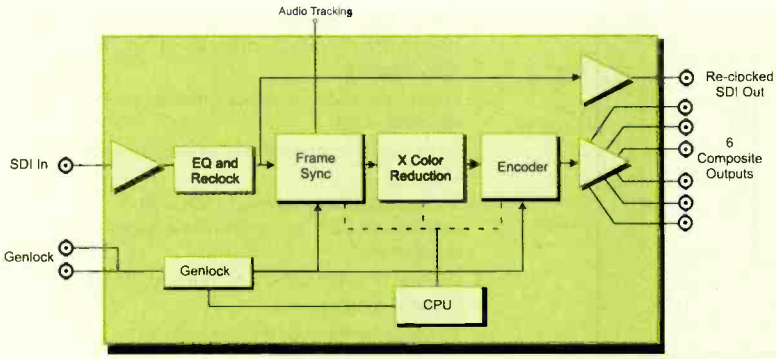
DNS-3901-S — Composite Video to SDI Decoder/Synchronizer/Noise Reducer with SDI Input



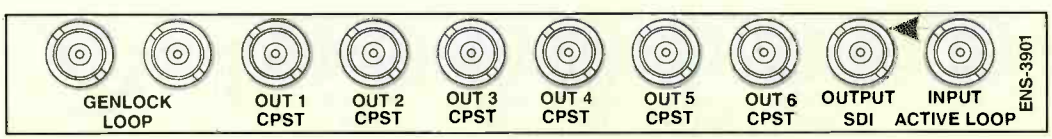
- 12-bit fully adaptive frame/field/3 line/notch composite decoding, processing amplifier with clipping
- SDI input with internal decoder bypass
- Noise reduction removes impulse and random noise
- Input noise immunity and input video soft clipping
- 2 user-selectable outputs (SDI with embedded EDH or composite analog monitoring)
- Video proc amps for digital and analog inputs
- Line by line VBI selection (normal, simple, bypass, delete)
- Provides internal audio tracking to audio synchronizers



ENS-3901 — SDI to NTSC/PAL Color Encoder/Synchronizer

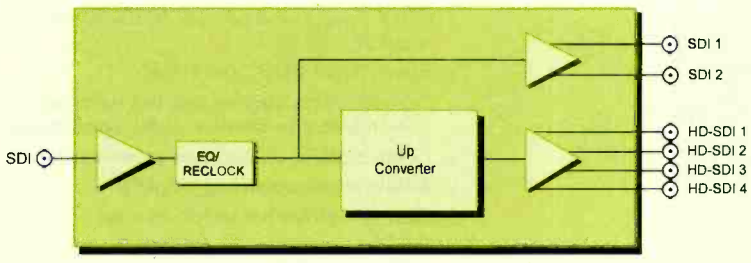


- High-quality chroma-locked, broadcast composite encoder with processing amplifier and frame synchronizer
- 12-bit Signal Processing
- Vertical Blanking Field/Line/Mode Control
- Timing Controls:
  Vertical, Horizontal, Fine SC (from Genlock)
- IQ or UV modulation for the Composite output
- Cross Color Reduction (525) and Aperture control (2 dimensional)
- Frame Sync or delay mode
- Provides internal audio tracking to audio synchronizers



PRELIMINARY

HUC-3901 — HDTV Upconverter

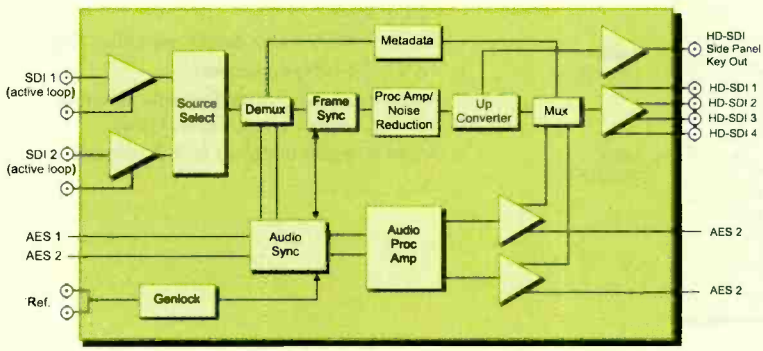


- Single-channel HDTV upconverter
- Supports 480p, 720p and 1080i formats
- Ideal for upconversion of CG graphics — key and fill
- Ideal for upconversion of existing SDI content

HDTV

PRELIMINARY

HUC-3902-B, C — HDTV Upconverter with Audio Processing



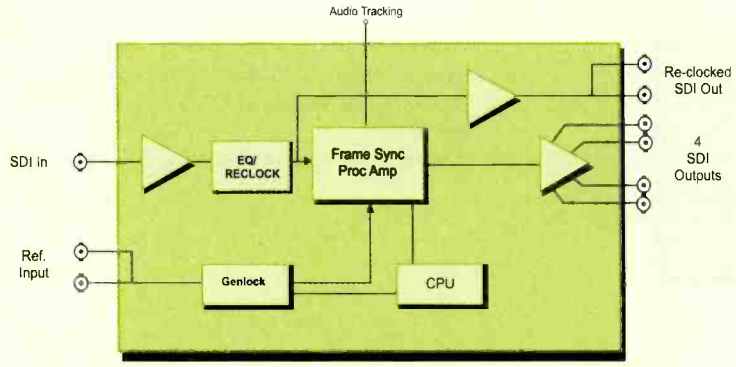
- Single-channel motion-adaptive HDTV upconverter
- Supports 480p, 720p and 1080i formats
- Hot-switched dual SDI-embedded inputs
- Separate AES inputs, timed and/or multiplexed into HDTV
- Remapping of SDI metadata into HDTV output
- Integrated video proc, audio proc and noise reducer
- User-configurable output image ARC and picture position
- Separate sidebar key channel output

HDTV

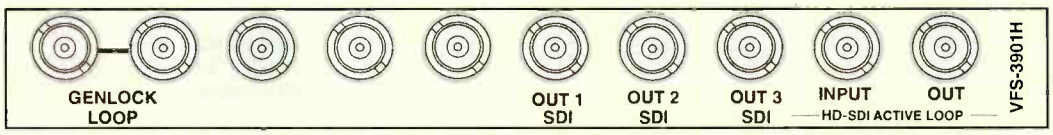
NEO HDTV

NEO HDTV

VFS-3901H — HDTV Video Frame Synchronizer/Processor

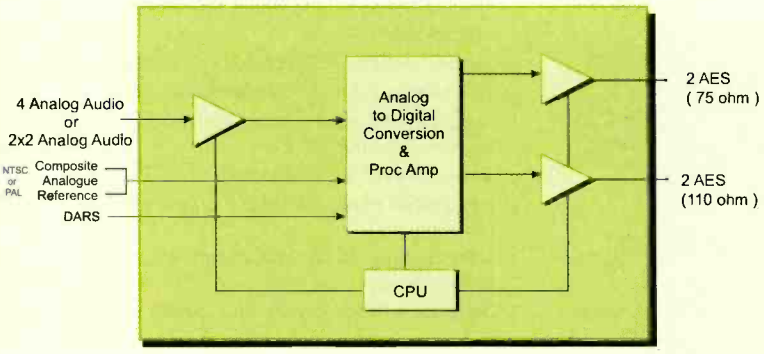


- HDTV video frame sync for 1080i-50/59.94 and 720p-59.94
- Passes entire VANC and HANC
- Provides audio tracking and hot-switching internally to a companion audio synchronizer
- Color, black or tri-level sync reference input
- Built-in video processing amplifier
- Cleanly handles hot switch on input
- Provides internal audio tracking to audio synchronizers

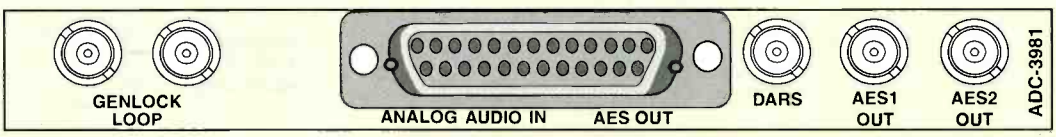


NEO AUDIO

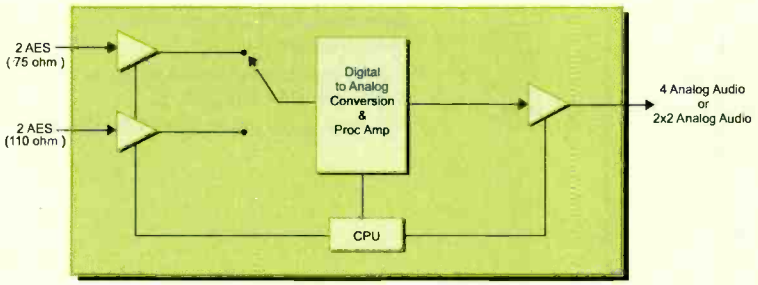
ADC-3981 — 4-Channel Analog to 2 AES Audio Converter



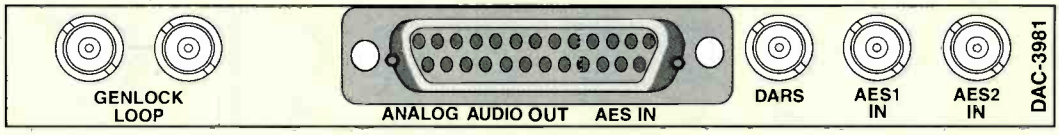
- Simultaneous balanced and unbalanced AES outputs
- 32/44.1/48/96 kHz output sampling rate
- 16/20/24-bit quantization
- Audio processing amplifier with: Channel Invert, Channel Swap, Gain, Delay
- Variable audio delay up to 1.3 seconds



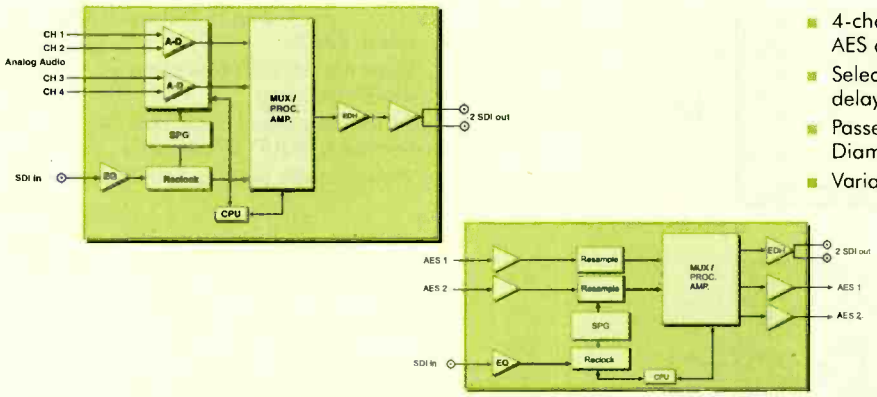
DAC-3981 (-600) — 2 AES 4-Channel Analog Audio Converter



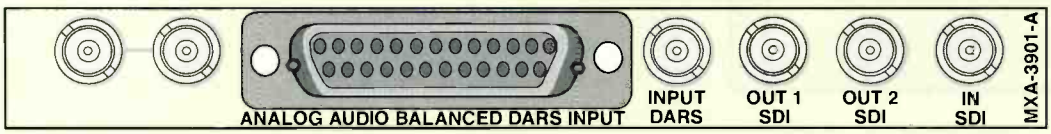
- Input signal types:-2 AES-75 or 2 AES-110 (selectable)
- Four balanced analog audio outputs (4 ch. or 2 x 2ch.)
- Audio processing amplifier with: channel invert, channel swap, gain, delay
- Variable audio delay up to 1.3 seconds
- 32/44.1/48/96 kHz sampling rate support

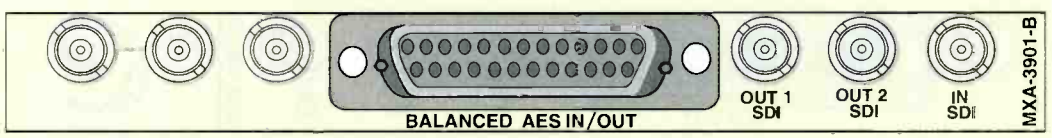


MXA-3901-A, B, C — 4-Channel Analog or 2 AES Audio to SDI Multiplexer



- 4-channel analog or 2-channel AES audio multiplexing into SDI
- Selectable 16/20/24-bit audio delay/processing
- Passes compressed audio data, ie: Diamond, DOLBY-E, AC-3
- Variable audio delay up to 1.3 seconds

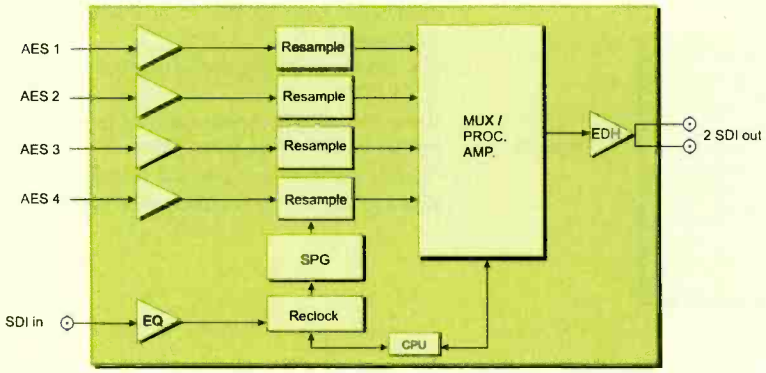




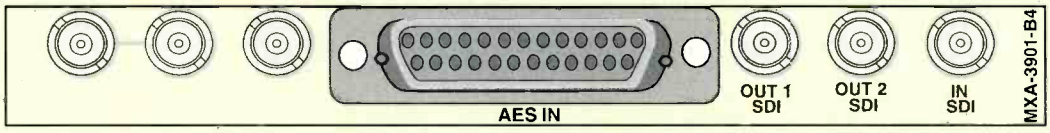
See page 29 for other back panel: MXA-3901-C

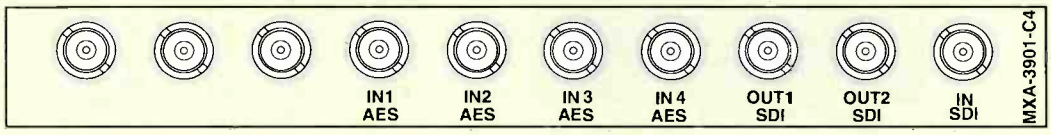
NEO AUDIO

MXA-3901-B4, C4 — 4 AES Audio to SDI Multiplexer

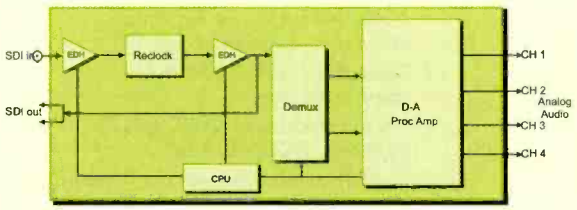


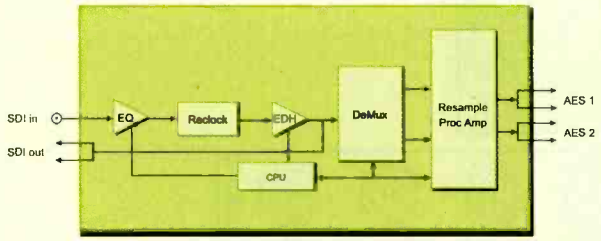
- 4-channel AES audio multiplexing into SDI
- Selectable 16/20/24-bit audio delay/processing
- Passes compressed audio data, ie: Diamond, DOLBY-E, AC-3
- Variable audio delay up to 1.3 seconds



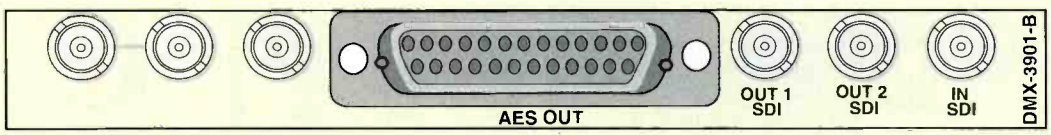


DMX-3901-A, B, C — SDI Demultiplexer to 4-Channel Analog or 2 AES Audio



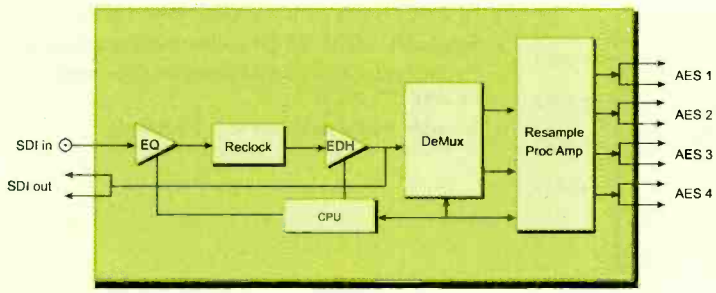


- Versions for Analog or 2-channel AES audio outputs
- Selectable 16/20/24-bit audio delay/processing
- Passes compressed audio data, ie: Diamond, DOLBY-E™, AC-3™
- Variable audio delay up to 1.3 seconds

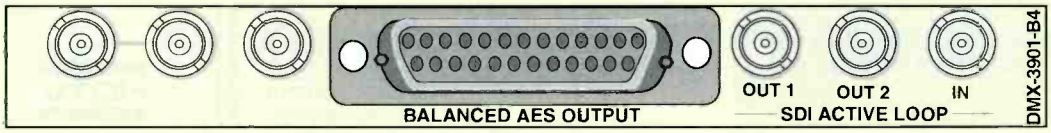


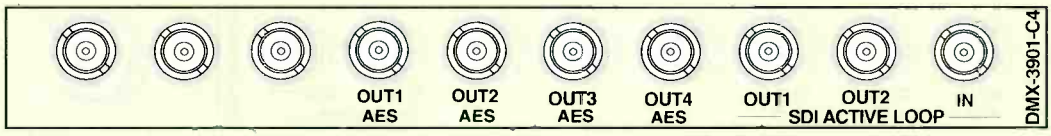
See page 29 for other back panel: DMX-3901-C

DMX-3901-B4, C4 — SDI Demultiplexer to 4 AES Audio

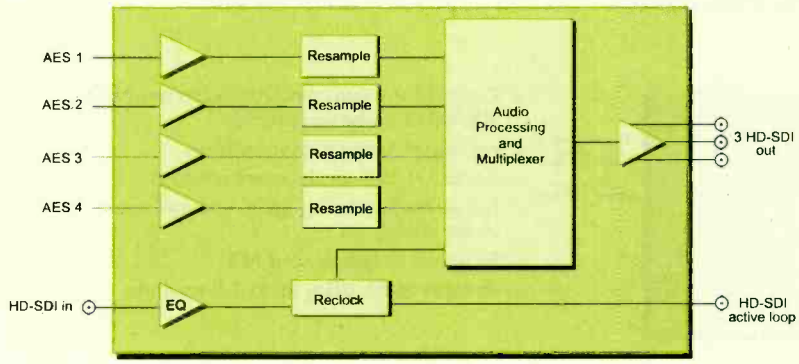


- 4-channel AES output
- Selectable 16/20/24-bit audio delay/processing
- Passes compressed audio data, ie: Diamond, DOLBY-E™, AC-3™
- Variable audio delay up to 1.3 seconds

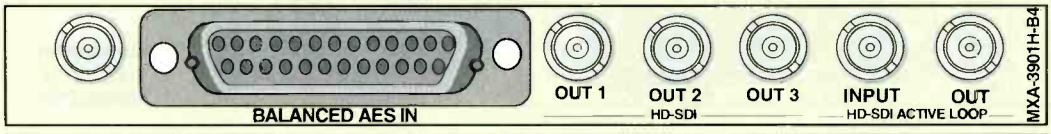


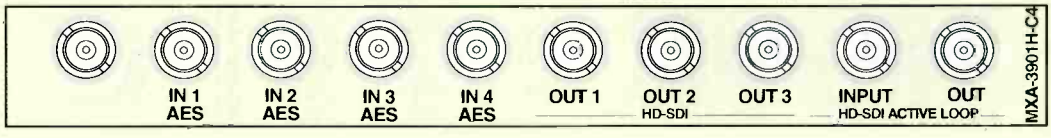


MXA-3901H-B4, C4 — HDTV 4 AES Audio Multiplexer

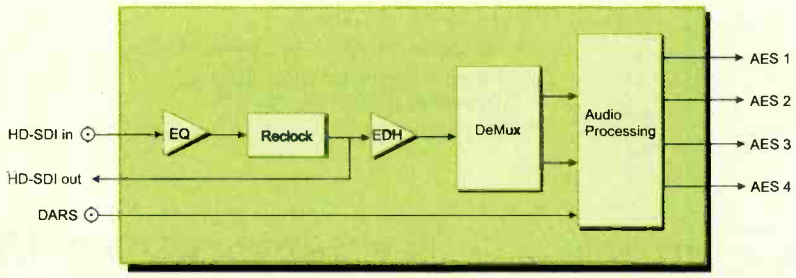


- Four AES audio multiplexing into HDTV
- Selectable 16/20/24-bit audio delay/processing
- Passes compressed audio data, ie: Diamond, DOLBY-E™, AC-3™
- Variable audio delay up to 1.3 seconds

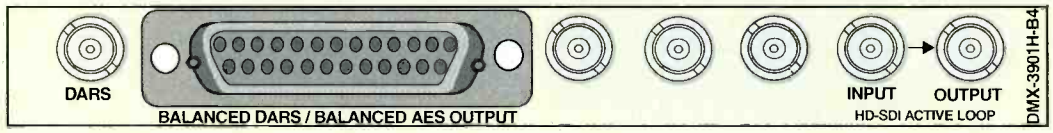


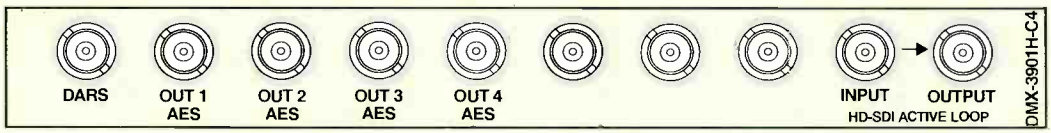


DMX-3901H-B4, C4 — HDTV 4 AES Audio Demultiplexer

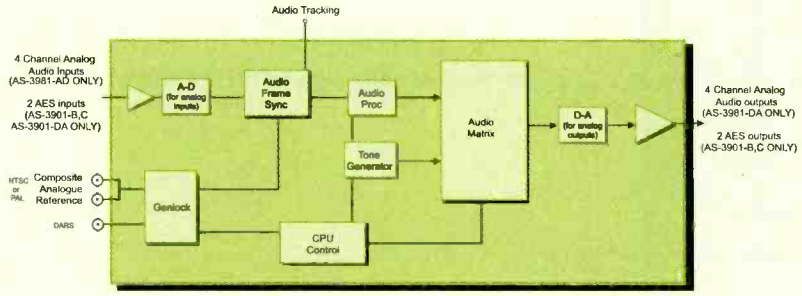


- Four AES audio demultiplexing from HDTV
- Selectable 16/20/24-bit audio delay/processing
- Passes compressed audio data, ie: Diamond, DOLBY-E™, AC-3™
- Variable audio delay up to 1.3 seconds

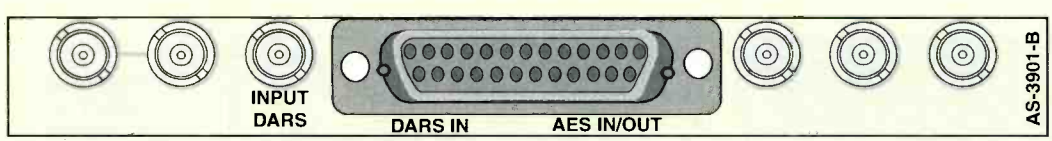


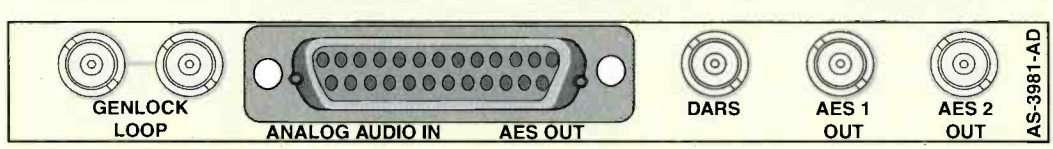


AS-3901-B, C — 2 AES Audio Synchronizer/Delay/Processor
AS-3981-AD, DA, DA-600 — 4-Channel Analog/2-channel AES Audio Synchronizer/Delay/Processor



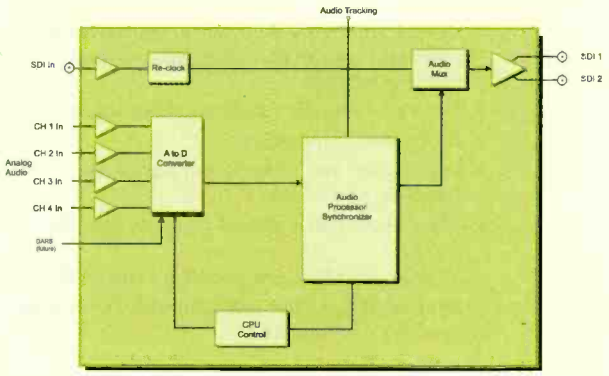
- Companion audio synchronizer to any NEO SDI/HDTV frame synchronizer
- Analog or digital audio interfaces
- Tracks to video synchronizer products
- Full audio processing (gain, channel swap, invert, delay)
- Balanced or unbalanced AES
- Variable audio delay up to 1.3 seconds



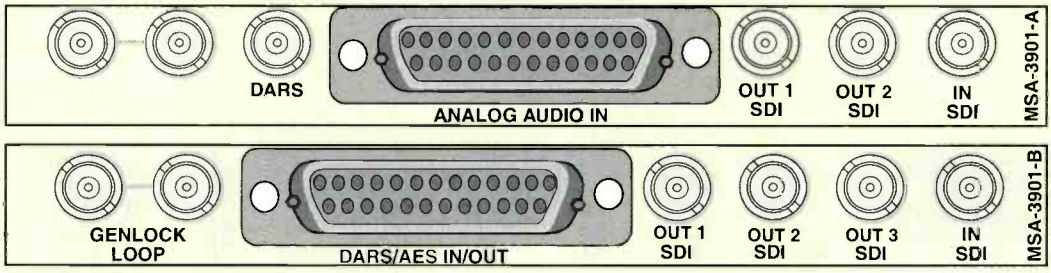


See page 29 for other back panels: AS-3901-C, AS-3981-DA

MSA-3901-A, B, C, B4, C4 — Audio Synchronizer/Delay/Processor & Multiplexer

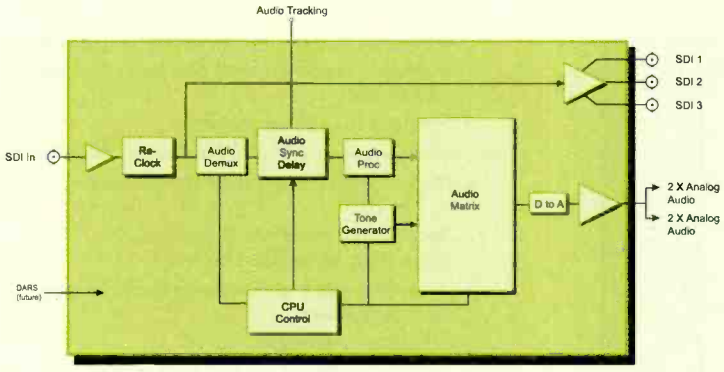


- SDI video input, 2 or 3 processed outputs
- Analog and digital audio versions
- Selectable 16/20/24-bit audio synchronization/delay/ processing
- Audio re-sampling for 32-108kHz AES inputs, with bypass for data over AES operation
- C, U & V bit transparency for AES versions
- Variable audio delay up to 1.3 seconds

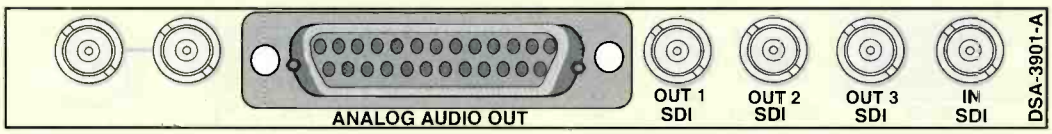


See page 29 for other back panels: MSA-3901-C, B4, C4

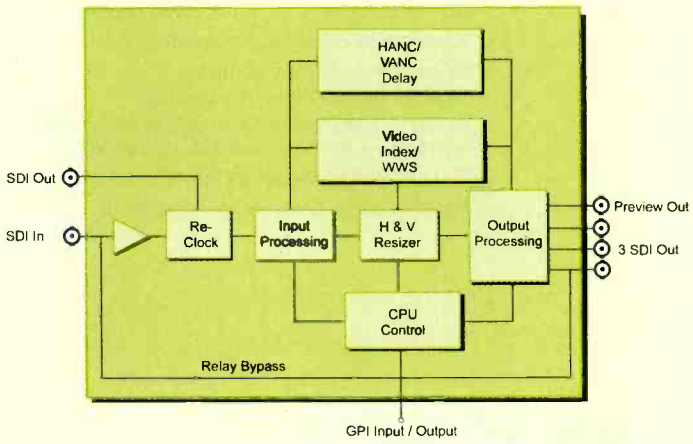
DSA-3901-A — Analog Audio Synchronizer Delay Processor & Demultiplexer



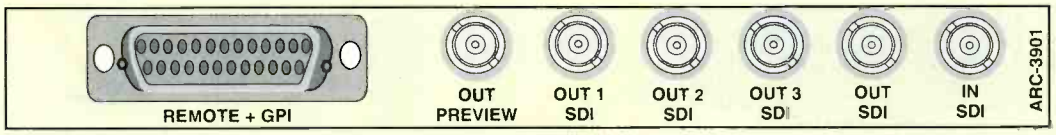
- 4-channel analog audio demultiplexer
- Selectable 16/20/24-bit audio synchronization/delay/ processing
- Audio processing amplifier: gain, swap, invert, summing
- Variable audio delay up to 1.3 seconds



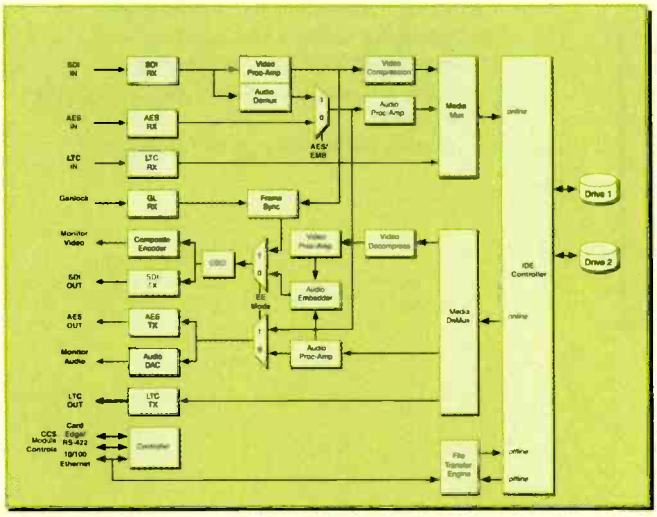
ARC-3901 — Aspect Ratio Converter



- Motion-adaptive 4-field, 4-line conversion for enhanced vertical resolution with minimal interlace artifacts
- Fixed and variable picture re-sizing ratios
- 10-bit video processing
- Video Index and Wide Screen Signaling handling and insertion
- Relay bypass upon loss of power or module failure
- VANC and HANC are passed transparently
- Monitor BNC output with selectable "used area" overlay or key output

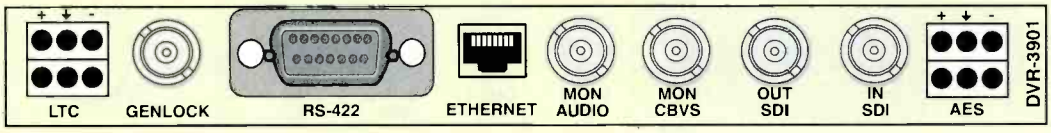


DVR-3901 — Digital Video Recorder

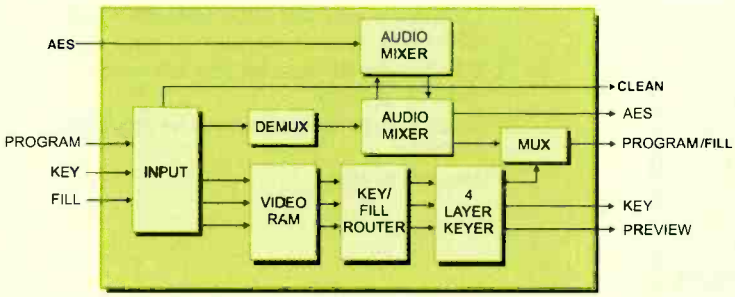


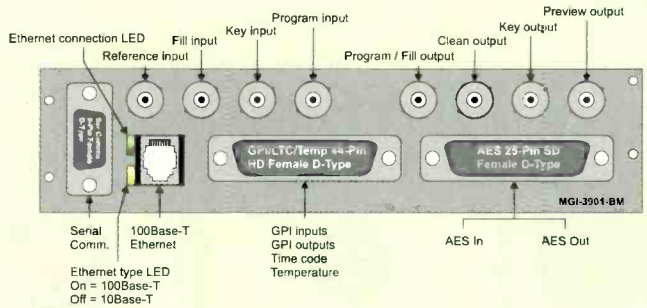
- Enhanced functionality including record and playback, variable speed playback, and jog and shuttle
- Supports RS-422 control link
- Dual onboard 2.5" IDE hard drive, 40GB each
- Motion JPEG compression ranges from 4:1 to 10:1
- Record time per drive: 2-8 hours, depending on selected bit rate
- 1 channel video and 1 stereo audio being recorded/played
- LTC input and output
- FTP file transfer of content via Ethernet connector*

* Available Q2/2004



MGI-3901 — SDI LogoMotion II
MGI-3901H — HDTV LogoMotion II





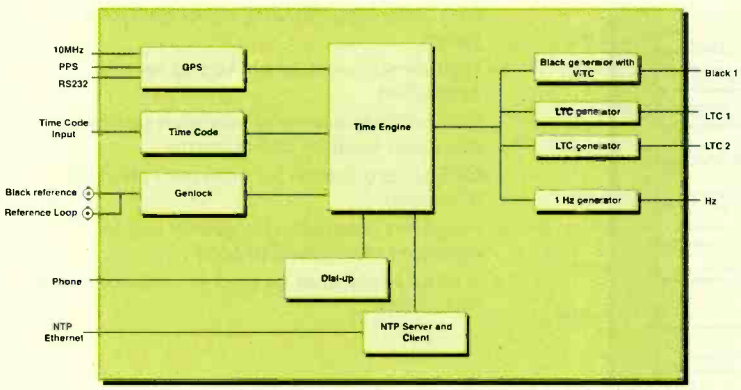
- Mix SD and HDTV modules in one NEO frame
- Bypass relay equipped as standard
- Front hot-swappable PSUs and modules
- User-configurable 'apology/trouble slide' airs automatically if loss or errors in Program or Reference inputs
- Up to four logos in SDI, two in HDTV; each layer (logo) can be:
  - Static logo, animated logo, digital clock (with or without time & temperature), analog clock or external key
- Logos may be any size and may be positioned anywhere with varying transparencies and prioritized overlap, if desired
- Up to 999 logos can be "online" and instantly accessible on any layer
- Multiple native graphics formats supported
- Transfer files using the Compact Flash Card and/or over Ethernet from other file systems, machines or servers via NFS
- Four-channel AES capability (SDI)
  - 24-bit resolution, embedded and / or discrete, associate audio clips with logos or independently
- Operates in Program / Preview or Key / Fill modes

HDTV

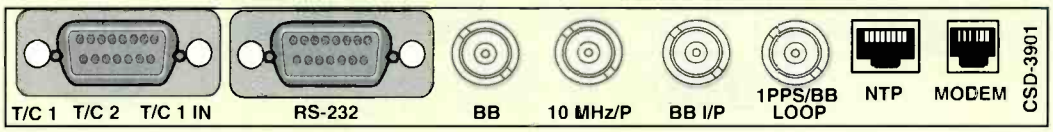
COMMAND CONTROL SYSTEM

NEO SPECIALTY

CSD-3901/2 — Master Clock Driver



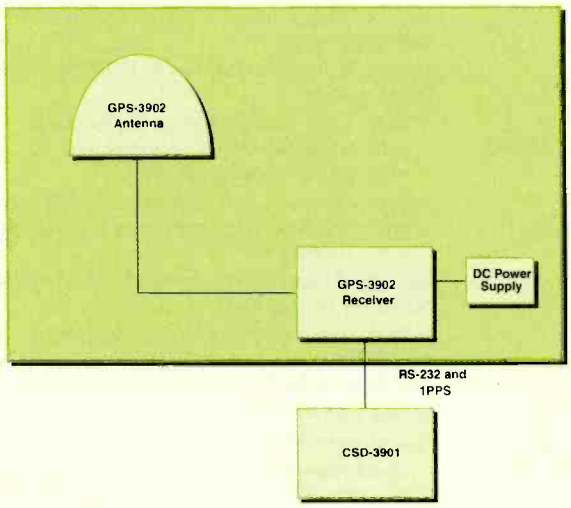
- GPS Interface for time reference (standard)
- Timecode input
- SMPTE/EBU Drop Frame or non-drop Timecode (Time/Date)
- Programmable DST Settings
- Built-in modem for dial in/out
- Dual timecode configurable for offsets and drop-frame and non-drop frame timecode
- Ethernet port for supplying NTP (Network Time Protocol)
- Impulse drive output (CSD-3902 only)



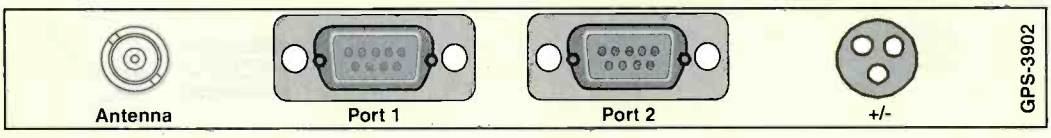
COMMAND CONTROL SYSTEM

NEO SPECIALTY

GPS-3902 — GPS Receiver and Antenna

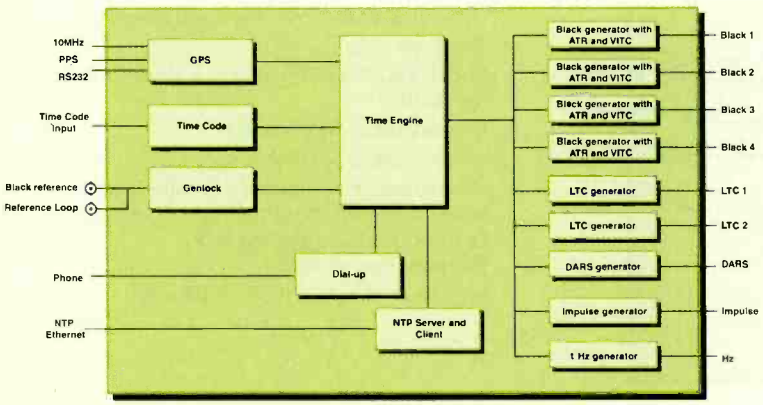


- Compatible with CSD-3901 MTG-3901 and CSD-5300
- GPS Provides an accurate time reference available globally
- Separate ontenna and receiver for mounting flexibility
- Accurate to 10ms

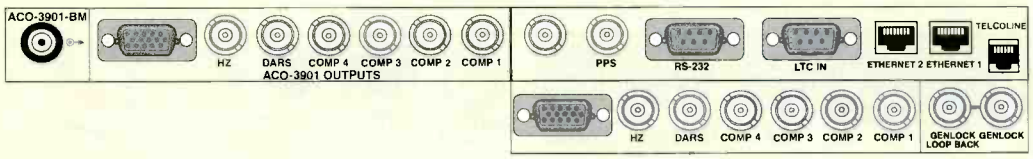


NEO SPECIALTY

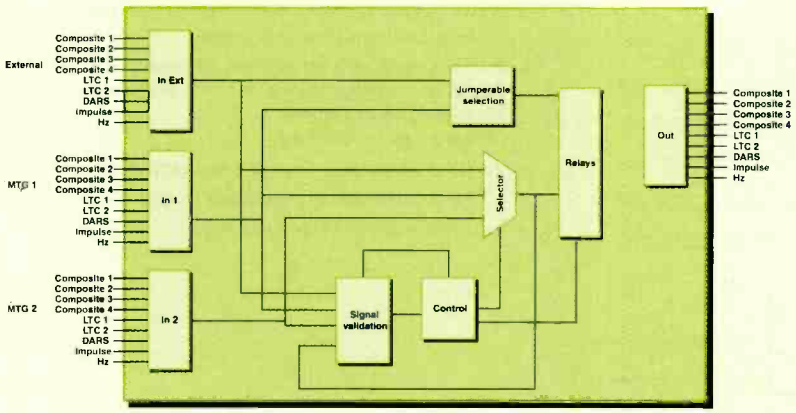
MTG-3901 — Master Timing Generator



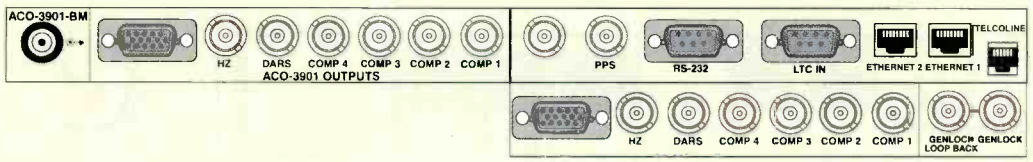
- Fully integrated reference signal generator system
- High-density modular packaging for any application
- Comprehensive array of reference signals for maximum flexibility and economy
- GPS synchronization for maximum precision (Optional)
- Integrated automatic changeover unit for enhanced reliability (Optional)
- 2 MTG-3901s must be used in conjunction with ACO-3901



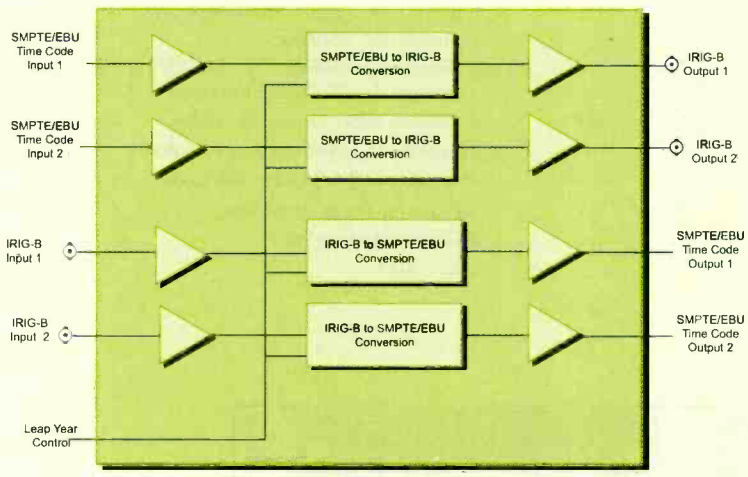
ACO-3901 — Automatic Changeover Module



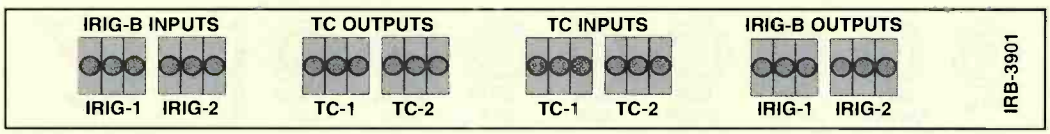
- Compatible only with MTG-3901
- Redundant switching of up to 2 MTG-3901s internally and a 3rd reference source externally for enhanced reliability
- Optional standalone power supply for enhanced reliability



IRB-3901 — IRIG-B to/from SMPTE / EBU Timecode Converter

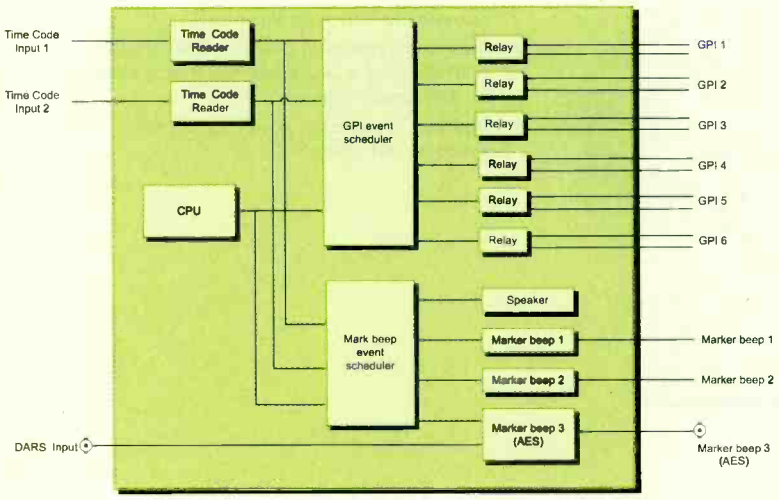


- Simultaneous conversion of IRIG-B to SMPTE/EBU timecode and SMPTE/EBU timecode to IRIG-B
- 2 IRIG-B inputs
- 2 IRIG-B outputs, each with selectable timecode inputs
- 2 SMPTE/EBU timecode inputs
- 2 SMPTE/EBU timecode outputs, each with selectable IRIG-B inputs
- Output locked to input timecode

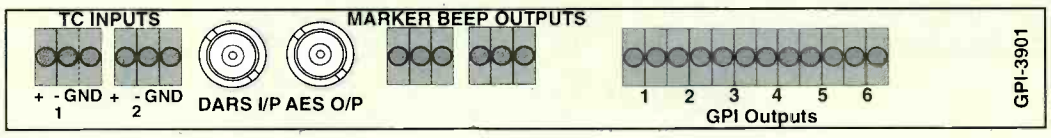


NEO SPECIALTY

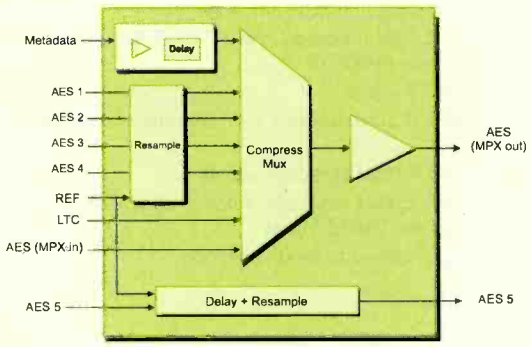
GPI-3901 — GPI and Marker Beep Module



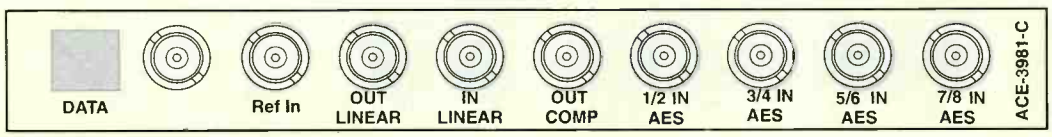
- 2 LTC inputs. Supports simultaneous operation of drop and non-drop timecode
- 6 GPI outputs with programmable events. Events are programmable for time and date, duration and recurrence. Outputs can be inverted
- 2 user-configurable marker beep outputs
- 1 AES unbalanced marker beep output
- 1 AES unbalanced reference input



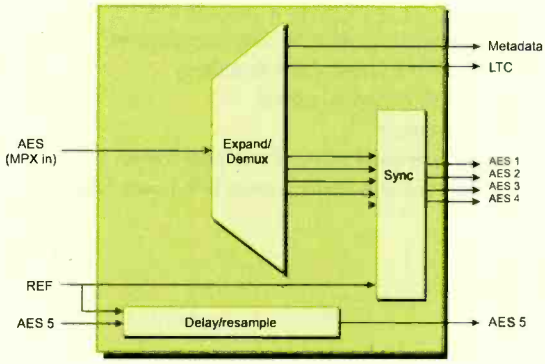
ACE-3981-B, C — Diamond Audio 4 AES Compression Encoder



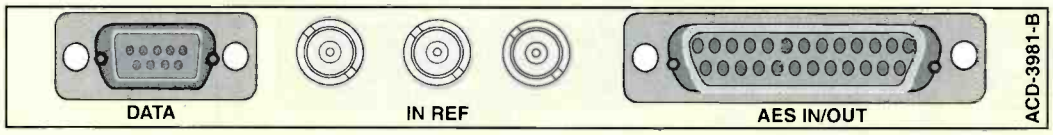
- Contribution-quality, 4-channel AES compression encoder
- Selectable encoding, e.g., 16/20/24-bit accuracy, 16/20/24-bit transport
- Extremely short processing delay
- Handling of asynchronous AES audio
- Handling of 24-96 kHz AES audio
- Bypass for linear operation
- RS485 metadata input
- LTC input

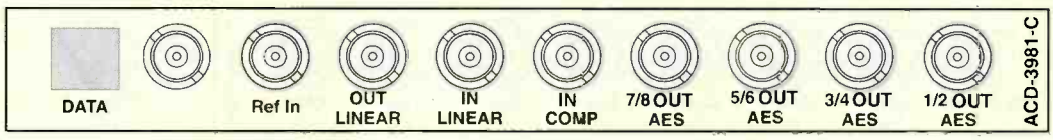


ACD-3981-B, C — Diamond Audio 4 AES Compression Decoder

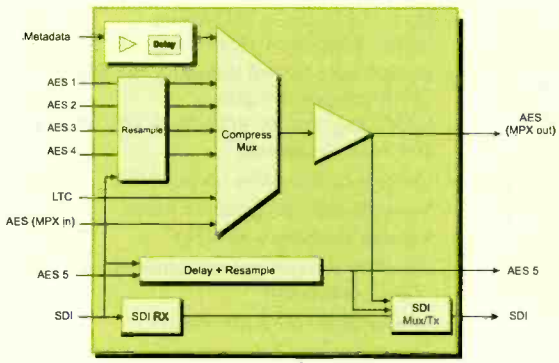


- Contribution-quality, 4-channel AES compression decoder
- Extremely short processing delay
- RS485 metadata output
- LTC output
- Autodetect of compressed input format

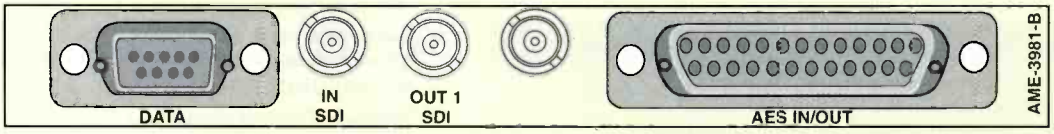


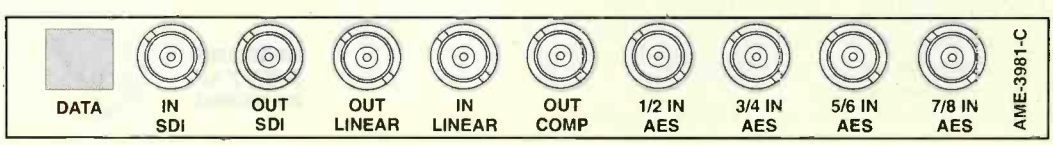


AME-3981-B, C — Diamond Audio 4 AES Compression Encoder with Multiplexer



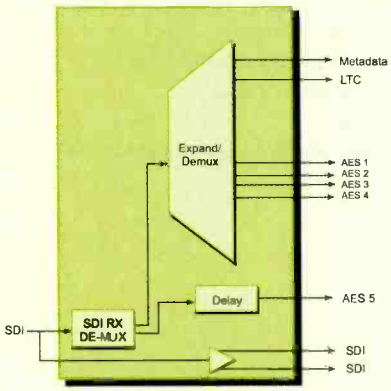
- Contribution-quality, 4-channel AES compression encoder with SDI multiplexer
- Selectable encoding, e.g., 16/20/24-bit accuracy, 16/20/24-bit transport
- Extremely short processing delay
- Handling of asynchronous AES audio
- Handling of 24 to 96 kHz AES audio
- RS485 metadata input
- LTC input



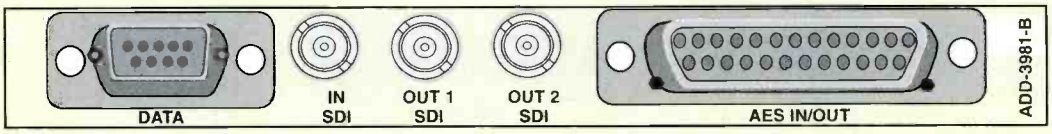


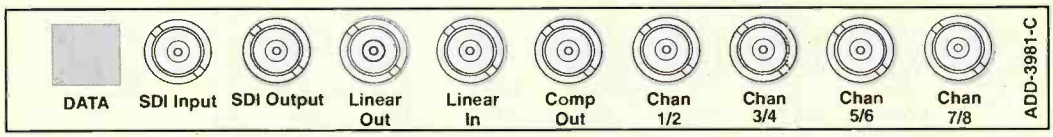
NEO SPECIALTY

ADD-3981-B, C — Diamond Audio 4 AES Compression Decoder with Demultiplexer



- Contribution-quality, 4-channel AES compression decoder with demultiplexer
- Extremely short processing delay
- RS485 metadata output
- LTC output
- Autodetect of compressed input format
- Autodetect decoder bypass with linear AES input

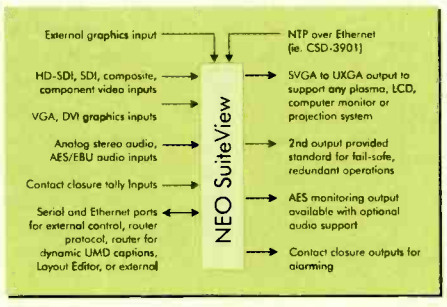




NEO SPECIALTY

NSV-xxxx — NEO SuiteView Multi-Source Display Processor

Highly scalable, modular, multi-source display processor capable of rendering multiple video & computer graphic signals in real time to plasma, LCD, high-resolution computer monitors and projection displays.



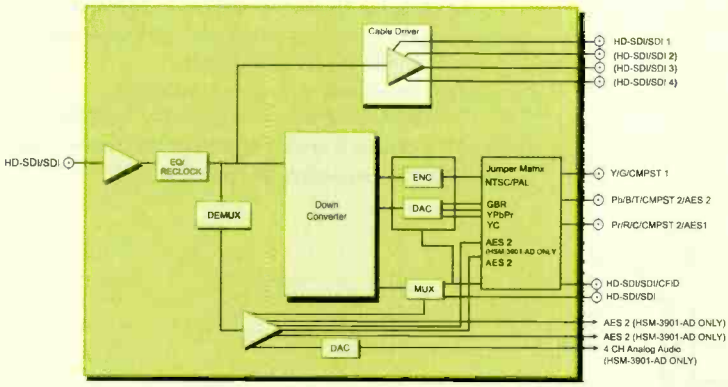
- Up to 44 inputs in 3RU frame, up to 12 inputs in 1RU frame
- Unique auto-format detecting HD-SDI, SDI & composite inputs
- NTSC, PAL, PAL-M, RGB, YUV, Y/C, VGA & DVI inputs supported
- Outputs configurable up to UXGA
- Separate external graphics input
- Reliable flexibility with NEO
  - -Ideal for mission-critical applications (24/7 operation)
  - - Redundant PSU & controllers
  - - Front-loading, hot-swappable modules
  - - Mix-n-match with other NEO modules in the same frame
- Audio metering & alarm support for embedded, analog stereo & AES/EBU audio
- Dynamic UMDs & multiple tallies
- Extensive alarming capabilities

NEO SuiteView Related Modules

NSV-H4	Quad HD/SDI/composite video input module
NSV-S4	Quad SDI/composite video input module
NSV-V4	Quad composite/dual component video input module
NSV-G3	Triple VGA/DVI graphics input module
NSV-OUT	Output module with redundant outputs
NSV-AUD16	16 stereo analog stereo audio channel input module
NSV-AES16	16 AES channel audio input module
NSV-A8+8	Audio module with 8 analog stereo audio + 8 AES channels

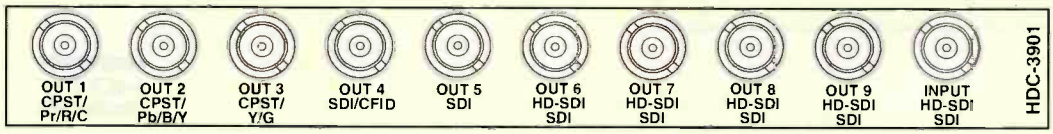
HDTV

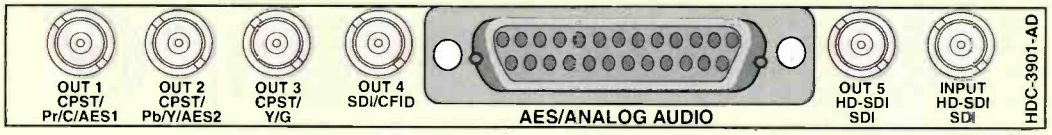
HDC-3901 — HDTV Downconverter
HDC-3901-AD — HDTV Downconverter with Demultiplexer



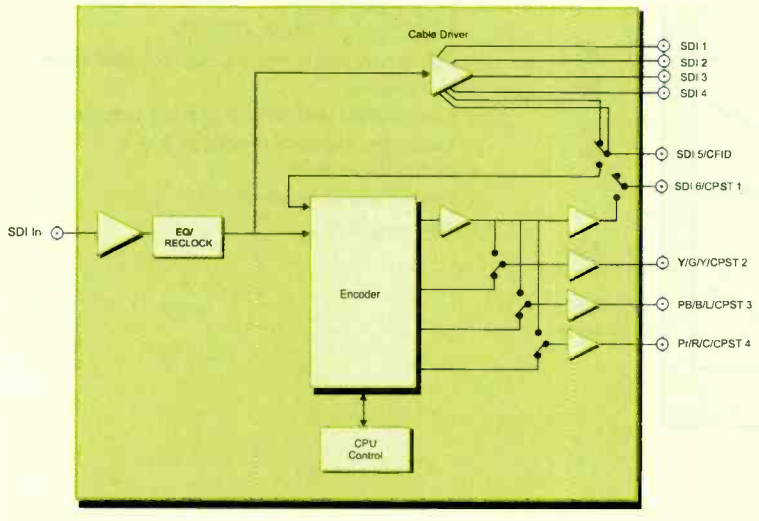
- Supports HDTV signals for 1080i/59.94, 1080i/50, 720p/59.94, 720p/50, 1080p/25 for downcanversion
- SD and HD input capability
- NTSC/PAL (3) or GBR, YPbPr (1) converted video monitoring outputs
- Supports five display types for downconverted HDTV signal:

  Anamorphic, Letter Box, Crop,14:9 and Zoom In
- Embedded audio (one group) is passed from the HD-SDI input to the SDI output
- Monitoring outputs for analog and digital audio: 2 AES audio outputs; 4-channel analog audio outputs

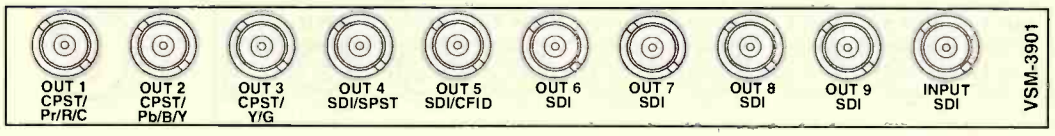




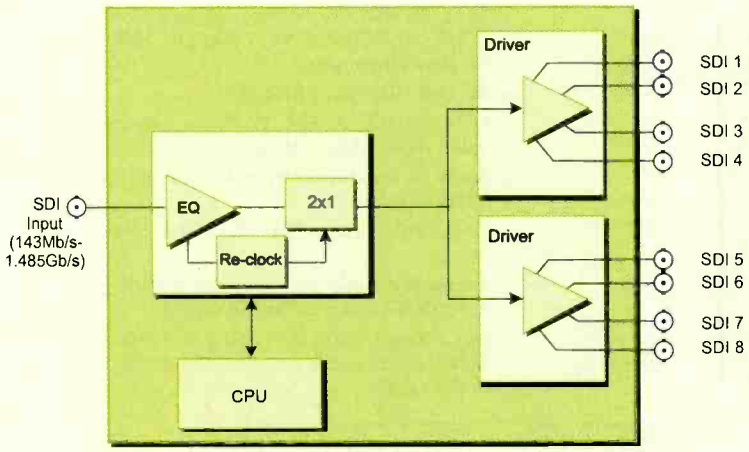
VSM-3901 — SDI Monitoring Distribution Amplifier



- 10-bit signal processing path
- Up to 6 re-clocked, equalized 4:2:2 serial outputs
- Up to 4 NTSC/PAL-B analog composite color outputs or 1 component (GBR / Y, Pb, Pr, / YC)
- Delete, chroma on/off, setup on/off, burst on/off and chroma filter bandwidth select

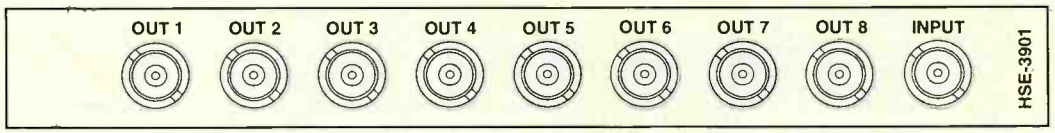


HSE-3901 — HDTV and SDI Reclocking Distribution Amplifier

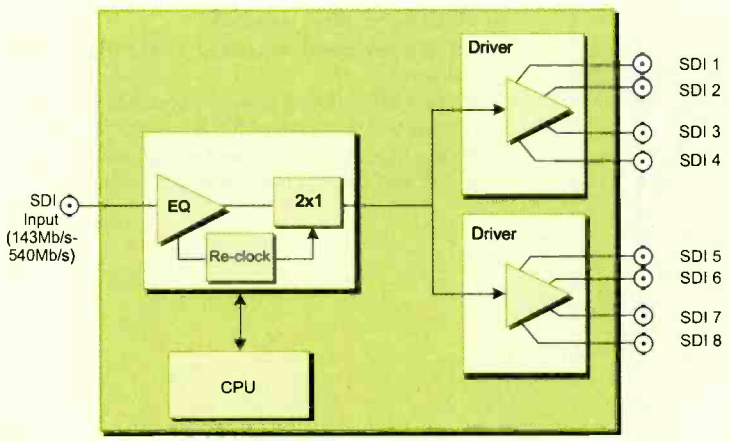


- Input signal types: SMPTE 259M, 292M, 344M
- Auto EQ for 300m (983ft.) for 270 Mb/s and 159m (483 ft.) for 1.485Gb/s
- Auto reclocking at 1.5Gb/s, 143Mb/s, 177Mb/s, 270Mb/s, 360Mb/s and 540Mb/s
- Auto bypass if unable to lock at the above rates
- DVB-ASI compatible (outputs 2,4,6,8)

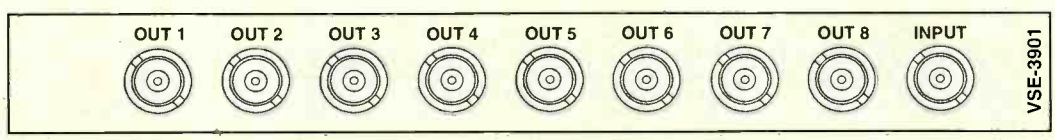
HDTV



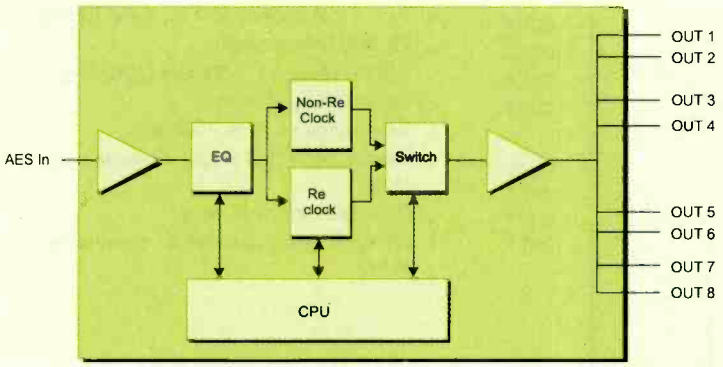
VSE-3901 — SDI and ASI Reclocking Distribution Amplifier



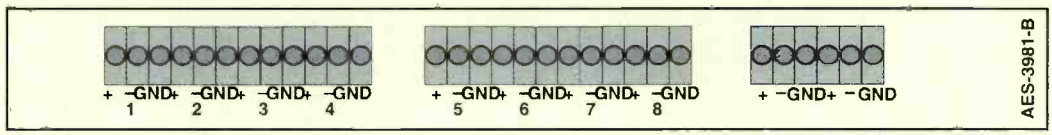
- Input signal types: SMPTE 259M, 344M, DVB-ASI
- Differential input, transformer coupled inputs and outputs
- 8 re-clocked and auto-equalized outputs
- Automatic bypass if unable to lock at the above rates
- Forced bypass capability
- ASI compliant

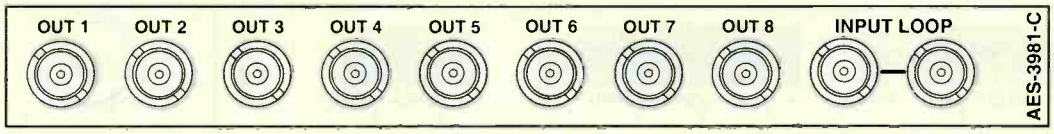


AES-3981 — AES Audio Distribution Amplifier

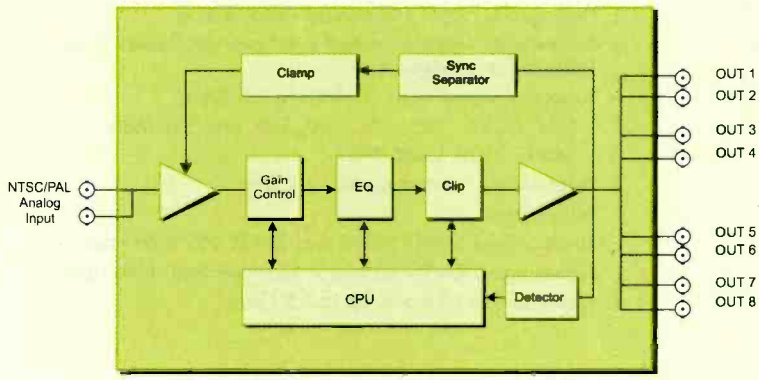


- Input signal types:
  AES 75 and 110 Ohm interfaces
- Data-only mode for compressed audio signals
- AES frame rates up to 96kHz
- Auto EQ, auto re-clock up to 96kHz

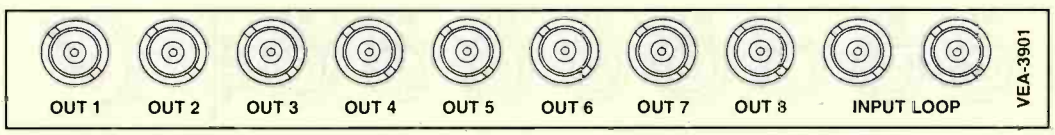




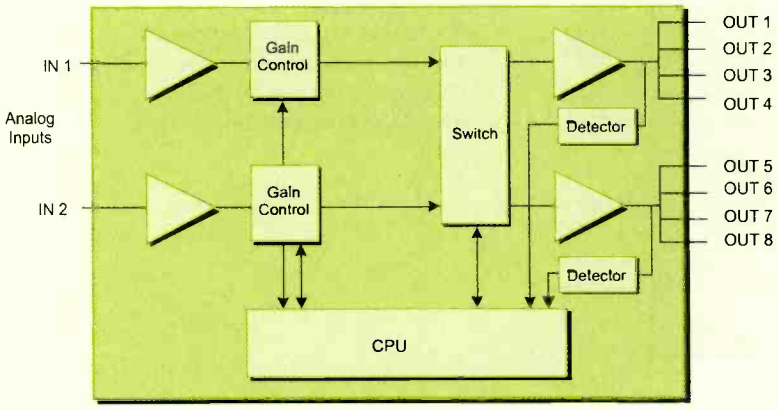
VEA-3901 — Composite Video Equalizing Distribution Amplifier



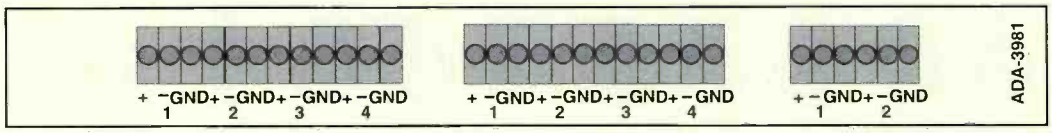
- Input signal type: passive looping 1Vp-p video
- SMPTE310M, E3 DS3 compatible
- Clamp off / soft / hard
- White clip, hard and soft
- AC/DC coupling (jumper selectable)
- Remote control of gain (-3 to + 3dB)
- Remote control of EQ (300m)



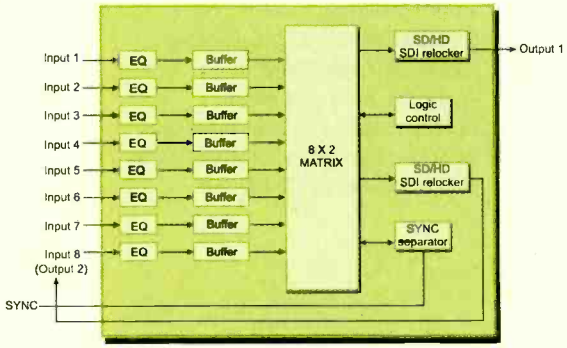
ADA-3981-66, 600 — Analog Audio Distribution Amplifier



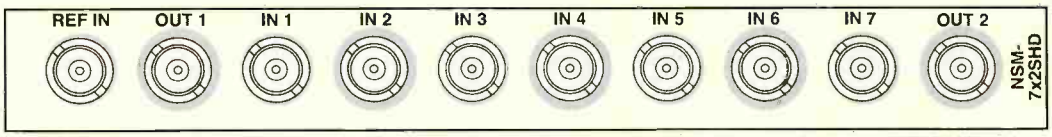
- 1 in, 8 out (mono) or 2 in, 4 out (stereo)
- 20-20kHz bandwidth
- +30Bu (66ohm), +24dBm (600ohm) maximum input level
- Gain range of -6 to +33dB
- Remote gain(.5dB steps), channel swap, mute
- Channel swap and mute
- Left and right inputs can be summed to mono

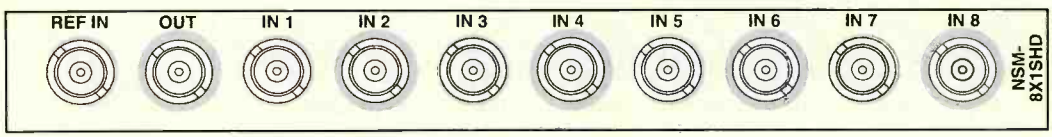


NSM-8X1SHD, NSM-7X2SHD — HDTV and SDI Video Switches

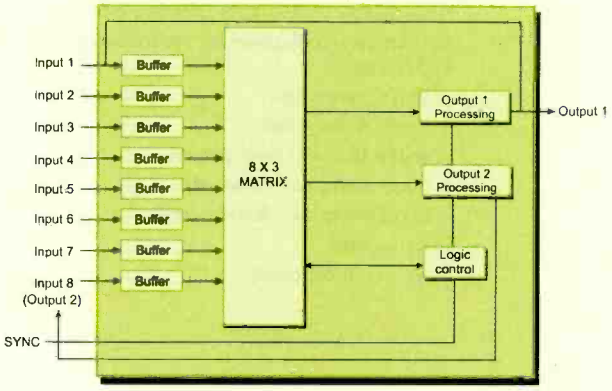


- High-quality HD/SDI wideband video routing
- 8x1 switcher with auto-detect switchover configuration or 7x2 switcher configuration
- Supported signal types (10Mb/s to 1.5 Gb/s):
  - SMPTE 259 - 143, 177, 270, 360, and 540 Mb/s
  - SMPTE 292 - 1.485 Gb/s
- Deterministic – line-accurate switching
- Relay bypass
- Re-clock both SMPTE 259M and SMPTE 292M bit rates
- Bypass operation for signals at nontraditional video rates
- Auto-equalize all inputs up to 1.5 Gb/s

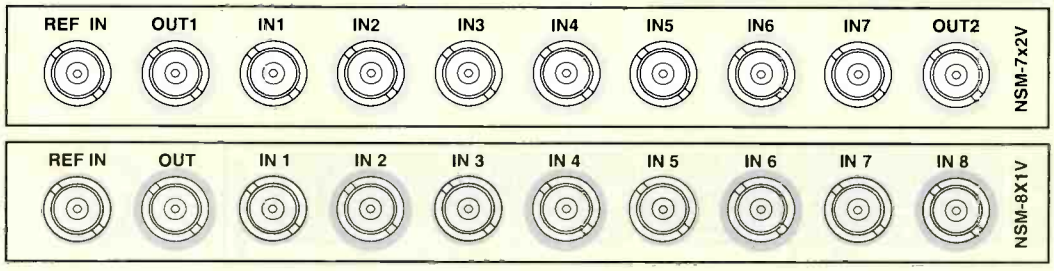




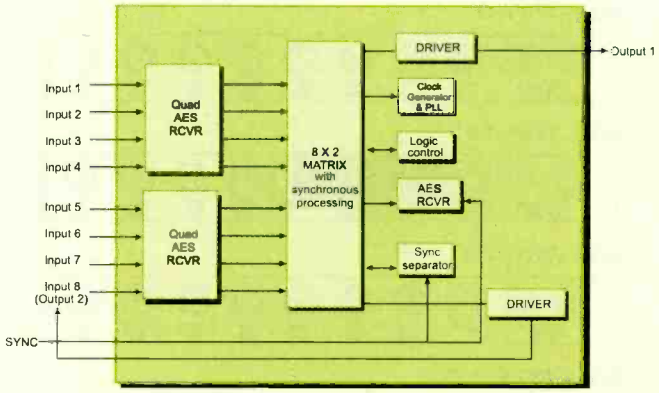
NSM-8X1V, NSM-7X2V — Composite Video Switches



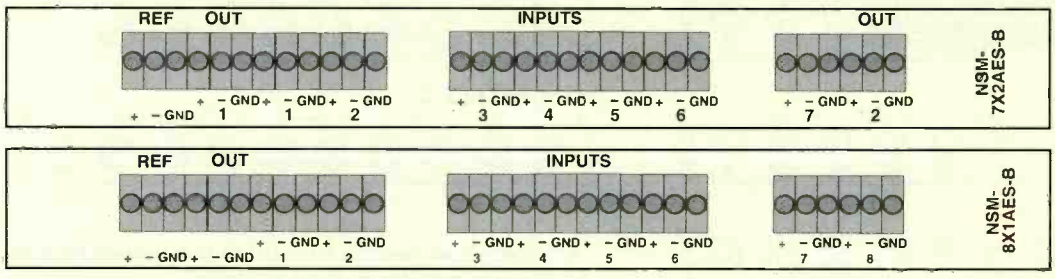
- High-quality analog video routing switcher
- 8x1 switcher with auto-detect switchover configuration or 7x2 switcher configuration
- Deterministic – line-accurate switching
- NTSC/PAL analog reference
- Relay bypass
- Bypass operation for signals at nontraditional video rates



NSM-8X1AES-B, C, NSM-7X2AES-B, C — AES Audio Switches

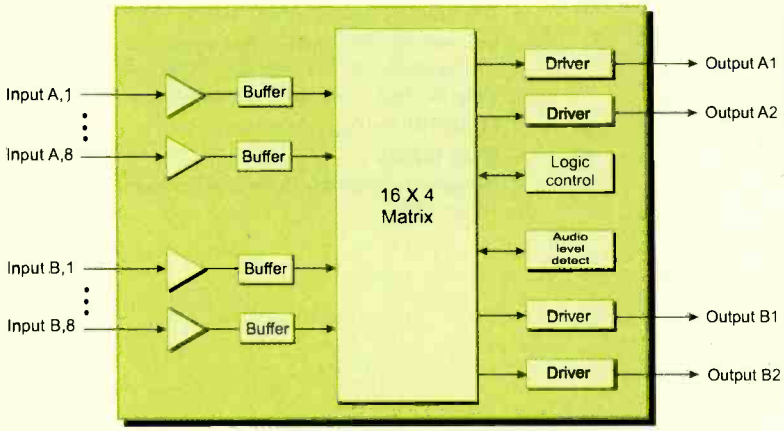


- High-quality AES audio routing switcher
- 8x1 switcher with auto-detect switchover configuration or 7x2 switcher configuration.
- Supports these signal types:
  - AES3 – 30kHz – 100kHz frame rates
  - Any 50% duty cycle digital signal within the voltage and frequency range
- Relay bypass

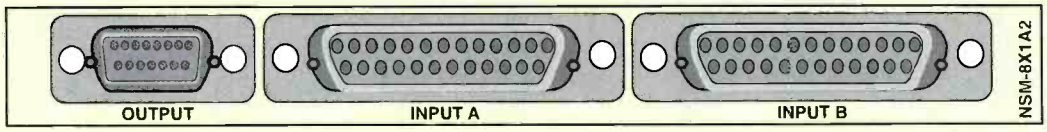


See page 29 for other back panels: NSM-7x2AES-C and NSM-8x1AES-C

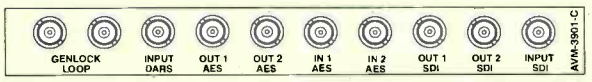
NSM-8X1-A2 — Analog Audio Switches



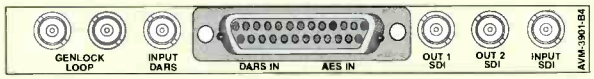
- High-quality analog audio routing switcher
- Can be user-configured for the following matrix sizes:
  - single stereo 8x2
  - single mono 16x4
  - stereo 8x1 with dual outputs
  - quad mono 4x1 (married)
  - quad mono 4x1 (breakaway)
- Relay bypass
- Swap / sum capability



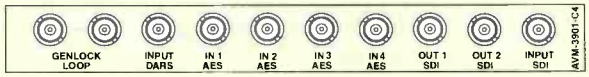
AVM-3901-C



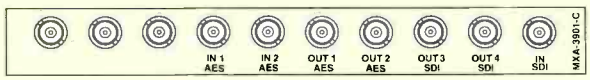
AVM-3901-B4



AVM-3901-C4

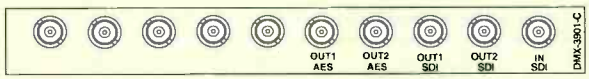


MXA-3901-C

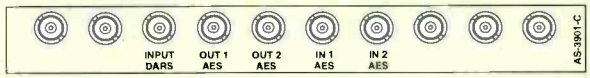


DMX-3901-B

DMX-3901-C

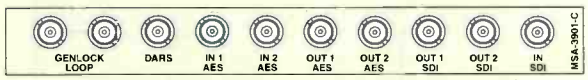


AS-3901-C



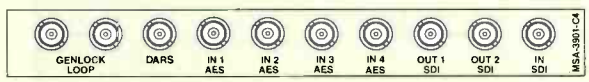
AS-3981-DA

MSA-3901-C

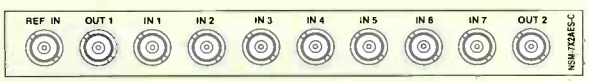


MSA-3901-B4

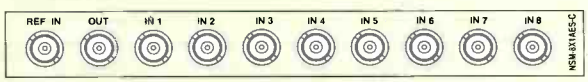
MSA-3901-C4



NSM-7X2AES-C



NSM-8X1AES-C



Additional back modules intended to complement product information provided on product pages.

[NEO FRAMES]

LEITCH

HDTV

NEO frames have been designed with the future in mind, offering flexibility for multiple applications of use, housing any combination of video/audio analog/digital conversion and distribution modules. The frames offer an easy upgrade path of video & audio from analog to SDI and HD for the Broadcast, Post-Production, Cable and Telco applications requiring monitoring and control capability of incoming and outgoing feeds. There are two frame sizes available for NEO products: A 1RU frame that holds four NEO products and a 3RU frame that holds twelve NEO products. Additionally, a local control panel can be provided at time of order or can be field retrofitted for the 1RU frame.

CCS-Resource Communications Module

When external communications and/or a local control panel are required, a resource communications module is required. External contact closures and Ethernet communications are supported.

The FR-3901-E, FR-3901-E-P and FR-3923-E frames contain this module. There is room for one resource module in the 1RU frame and room for two (redundant) resource modules in the 3RU frame.

3901PS Power Supply

The 3901PS provides power to the modules inside the 1RU frame. The 1RU frame can hold a single power supply. It is hot-swappable from the front of the frame.

3923PS Power Supply

The 3923PS provides power to the modules inside the 3RU frame. The 3RU frame can hold up to two power supplies. The 3923PS is hot-swappable from the front of the frame.

Features

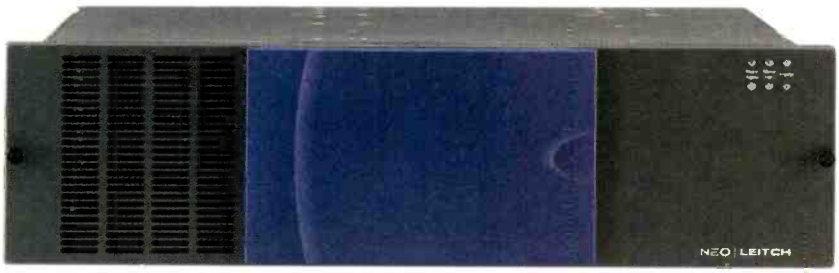
- Capacity of four modules in the FR-3901 and twelve modules in the FR-3923
- No power or thermal limits for any module combination within the NEO frame
- Front-loading, hot-swappable modules, fans, power supplies and resource modules
- DejaView: Intelligent, automatic parameter recovery in cases where spare modules replace failed ones

Remote Control Panel

The RCP-CCS-1U remote control panel provides simple control and monitoring of devices on a Leitch CCS network. This control panel supports all CCS enabled products.

RCP-CCS-1U

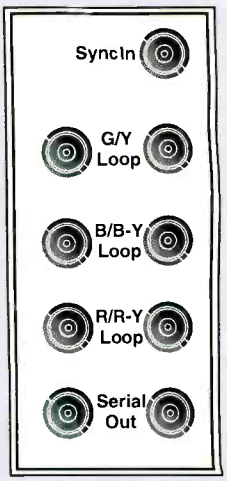
FR-3901



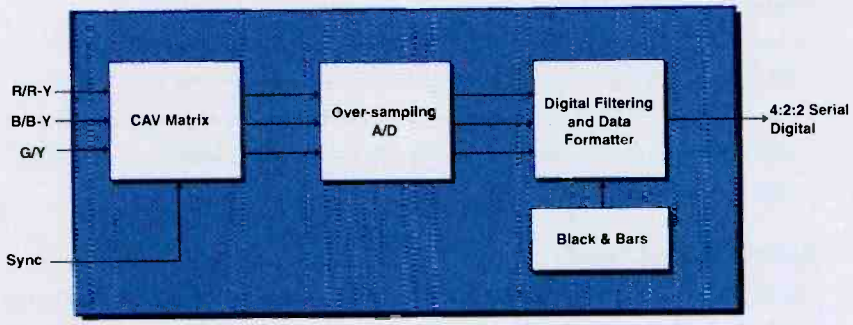
FR-3923

ADC-6801 — Analog Component to SDI Converter

- 525/625 line operation
- 2x over-sampling, 27MHz Y 13.5MHz Cr/Cb
- 10-bit conversion and signal path
- Auto calibration
- Built-in color bars as alignment aid
- Automatic line-standard switching
- Sync on G/Y or external sync
- RGB, SMPTE/EBU component, Betacam and MII
- Optional 8-bit rounding
- Note: This is a 6800 series module

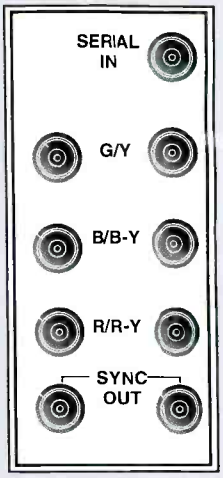


ADC-6801
Back Connector

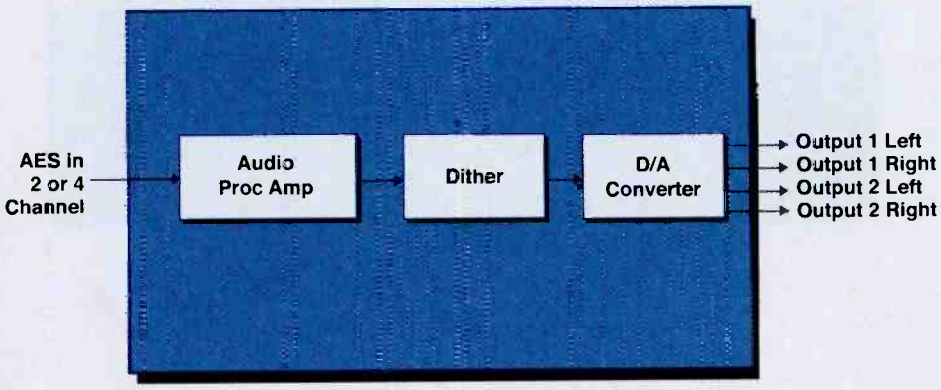


DAC-6801 — SDI to Analog Component Converter

- 525/625 line operation
- 4x over-sampling
- 10-bit conversion and signal path
- Auto calibration
- Built-in color bars as alignment aid
- Automatic line-standard switching
- Sync on G/Y or external sync
- RGB, SMPTE/EBU component, Betacam and MII
- Note: This is a 6800 series module



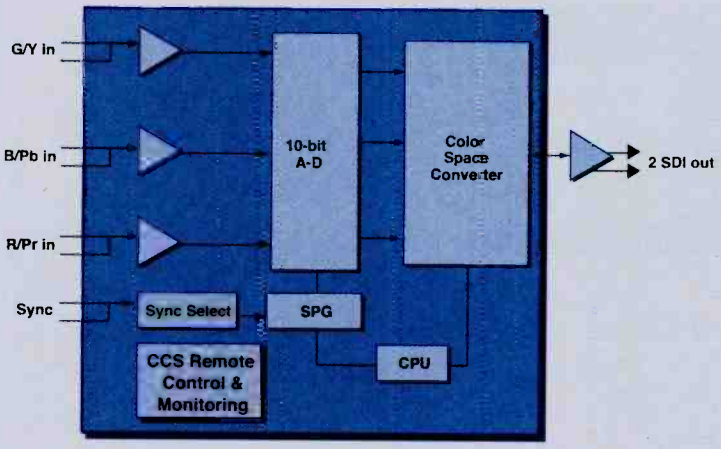
DAC-6801
Back Connector

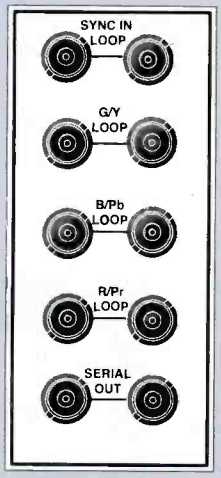


PRELIMINARY

ADV6800+ — Analog Component Video to SDI Converter

- 525/625 line operation
- 10-bit converter and 12-bit signal path
- Looping inputs supporting SMPTE/EBU component and RGB, Betacam and MII, and NTSC RGB
- SMPTE 259M outputs (2)
- Sync on G/Y or external Sync/Video (looping input)
- Built-in color bars as alignment aid
- EDH Insertion on output
- Card edge and remote communications





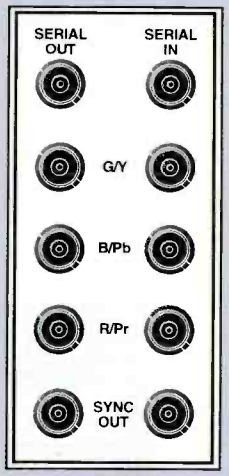
ADV6800+
Back Connector

PRELIMINARY

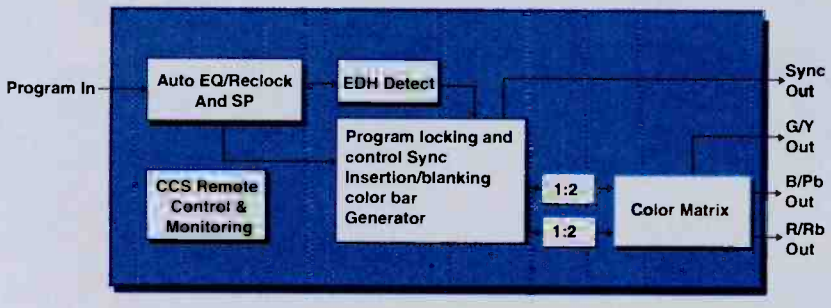
DAV6800+ — SDI to Analog Component Video Converter

The DAV6800+ is an SDI to analog component video converter.

- 4X over-sampling
- High-end 10-bit conversion and signal path
- Selective Vertical Blanking
- Built-in color bars as alignment aid
- Digital gain offset calibration



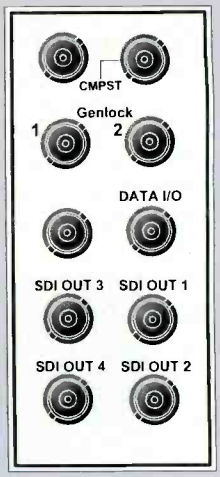
DAV6800+
Back Connector



DEC6800+ — Composite Video Decoder
DES6800+ — Composite Video Decoder/Synchronizer

The DEC6800+ and DES6800+ are compact, high-precision 12-bit decaders that convert NTSC or PAL composite video signals into superior quality component (4:2:2) digital video.

- 2-D Adaptive comb filtering using Leitch Phase Quatradure Modulation (PQM) algorithm
- Full line-by-line VBI handling and processing
- Black level adjustment
- DES6800+ additionally provides frame synchronization and TBC capabilities

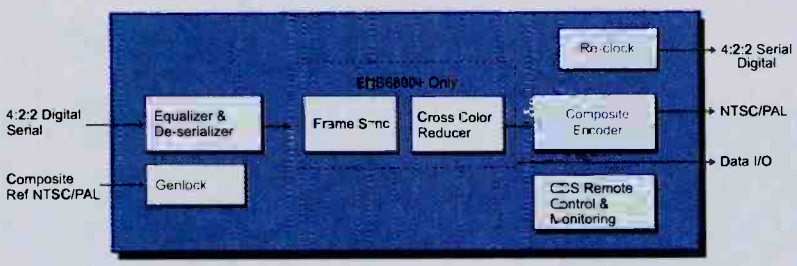


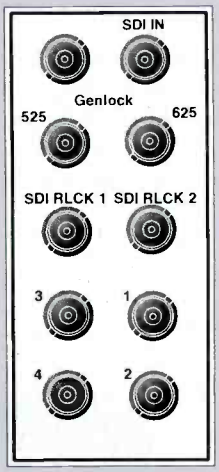
DEC6800+ and DES6800+ Back Connector

ENC6800+ — SDI Video Encoder
ENS6800+ — SDI Video Encoder/Synchronizer

The ENC6800+ and ENS6800+ are high-precision 12-bit digital encoders that convert component (4:2:2) digital video into NTSC or PAL composite video signals.

- 2X over-sampling
- Jitter removal
- Full line-by-line VBI handling and processing
- Delay mode or one line synchronizer mode (without synchronizer)
- Color black output signal when signal is lost



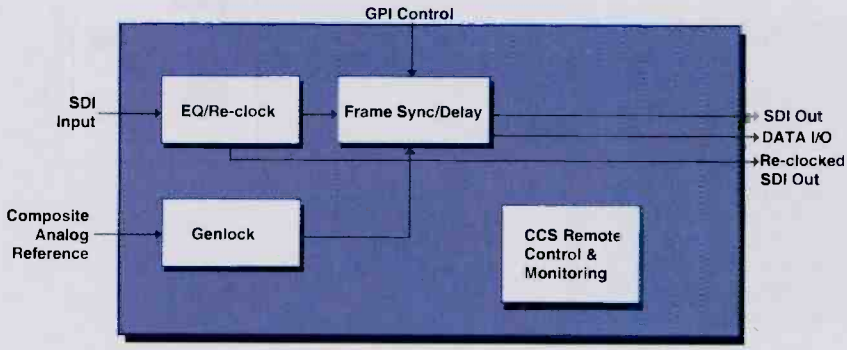


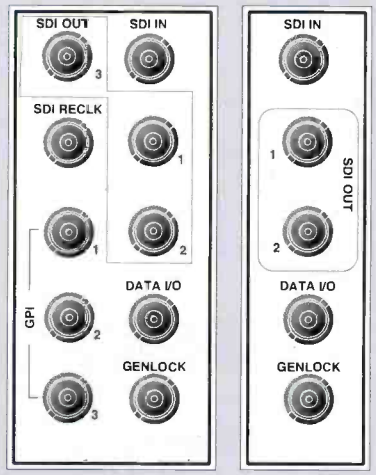
ENC6800+ and ENS6800+ Back Connector

VFS6800+ — SDI Frame Synchronizer/Processor

The VFS6800+ is a full-featured 10-bit serial 4:2:2 Video Frame Synchronizer.

- Video Proc Amp
- Jitter removal
- Passes all ancillary data including embedded audio, VBI (HANC and VANC)
- Infinite Phasing relative to reference (both V and H)
- 1 Frame Delay buffer
- Delay or Synchronize Modes



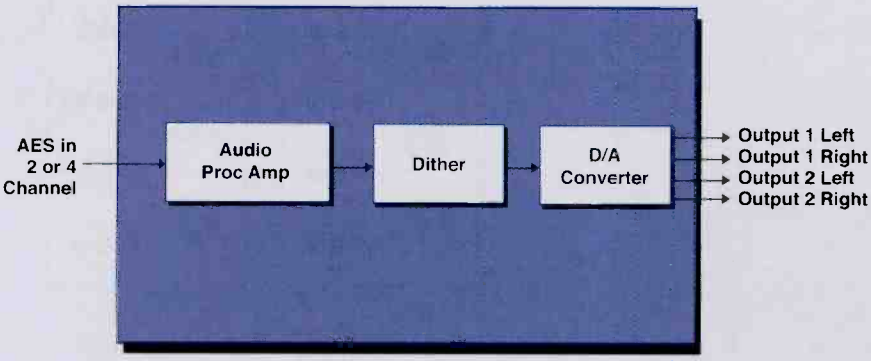


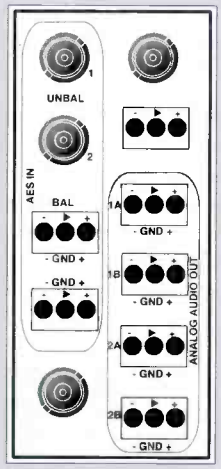
VFS6800+ Double-Slot Back Connector

VFS6800+ Single-Slot Back Connector

DAC6800+ BCA2, BCA4 — AES to Analog Audio Converters

- High-quality, 24-bit D to A conversion
- 2-channel and 4-channel versions
- Provides 110 Ohm balanced (AES3-1992) and 75 Ohm coaxial (SMPTE-276) AES inputs



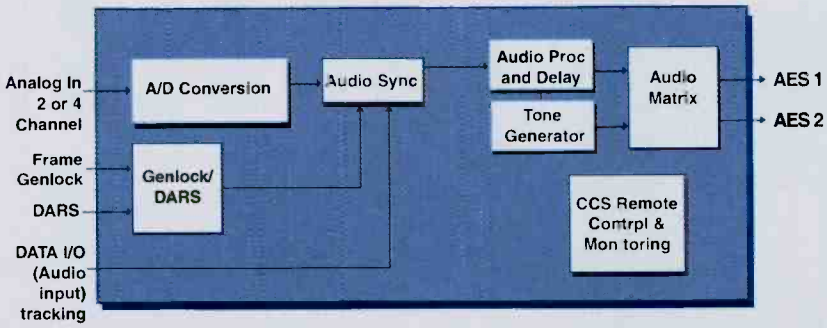


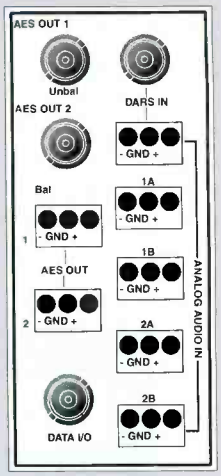
DAC6800+ BCA2 and BCA4 Back Connector

ADC6800+ A2BC, A4BC — Audio Analog to AES Converters

The ADC6800+ A2/A4BC are 2-channel or 4-channel analog audio to AES audio converters with delay.

- Internal audio processing amplifier
- Fixed delay operation of up to 1.3 seconds
- 32/48/96kHz sampling
- Selectable 16/20/24-bit analog-to-digital conversion
- Channel ID tone generators (750 Hz, 1.5 kHz, 3 kHz, and 6 kHz)
- Selectable delay adjustment for each channel





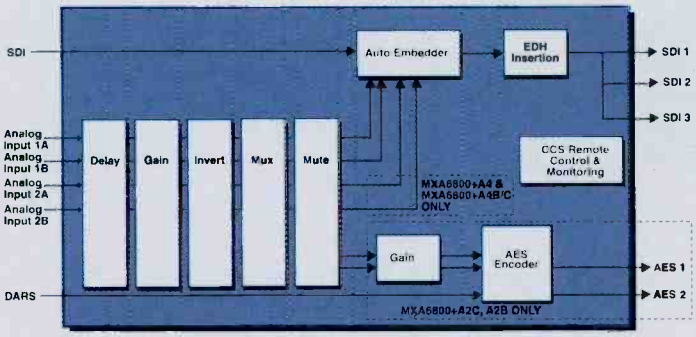
ADC6800+ A2BC and A4BC Back Connector

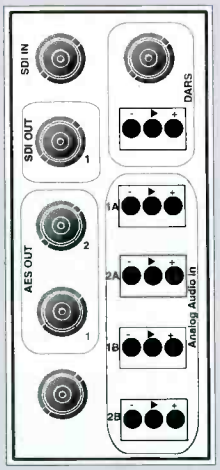
PRELIMINARY

MXA6800+ A4B2, A2B, A4C2, A2C — Analog/AES Audio Multiplexers

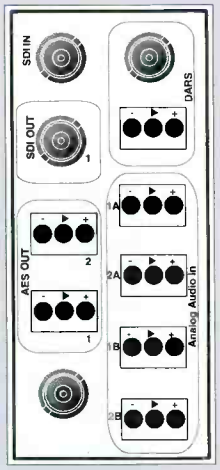
The MXA6800+ A4B2/A2B/A4C2/A2C audio multiplexers provide audio embedding up to 4-channel Analog to a serial digital interface (SDI) output, and up to 2-channel AES with outputs.

- Selectable 16, 20 or 24-bit resolution audio processing
- Accepts 32kHz & 48kHz audio
- Adjustable audio delay up to 1.3 seconds
- Customer-selectable on/off mute function with adjustable mute duration
- Adjustable gain, invert, channel swapping
- Audio group selection, insertion / pass-through / delete
- Audio and time code selectable delay





MXA6800+ A4C2 and A2C Back Connector

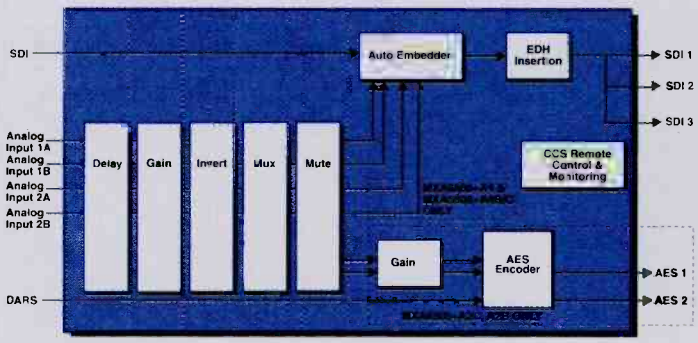


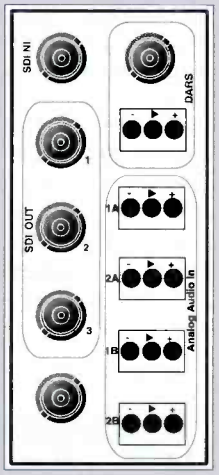
MXA6800+ A4B2 and A2B Back Connector

MXA6800+ A2, A4 — Analog Audio Multiplexers

The MXA6800+ A2/A4 Analog audio multiplexers embed up to two audio groups onto a serial digital video stream.

- MUX-enabling embedder input can be selected from any audio input
- 24-bit audio processing with adjustable fade rate, gain, invert and mute
- Black video generated on loss of video input
- Adjustable audio delay up to 1.3 seconds
- Adjustable embedding group and mode



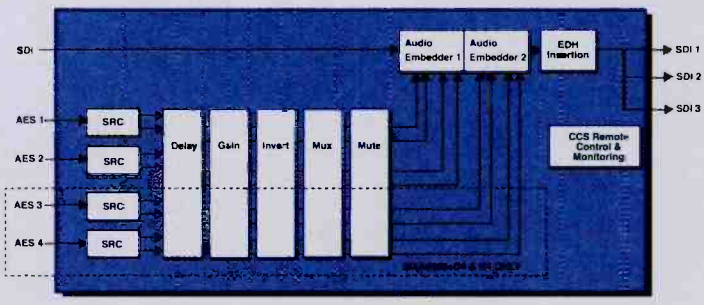


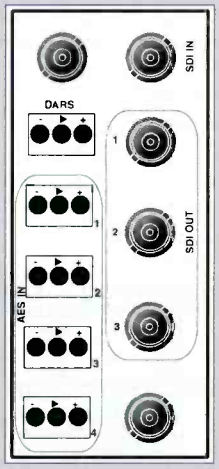
MXA6800+ A2 and A4 Back Connectors

MXA6800+ B2, B4, C2, C4 — AES Digital Audio Multiplexers

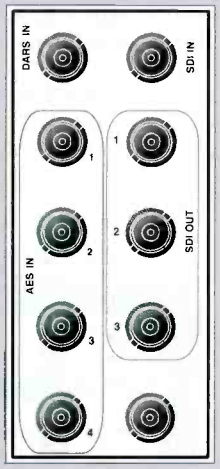
The MXA6800+ B2/B4/C2/C4 AES audio multiplexers embed up to two audio groups onto a serial digital video stream.

- Embedder input can be selected from any audio input
- Input audio sample rates from 32 kHz to 108 kHz
- 24-bit audio processing with adjustable fade rate, gain, invert and mute, independent per channel
- Adjustable audio delay up to 1.3 seconds
- Black video generated on loss of video input
- Adjustable embedding group and mode
- Choice of unbalanced or balanced AES inputs





MXA6800+ B2 and B4 Back Connectors



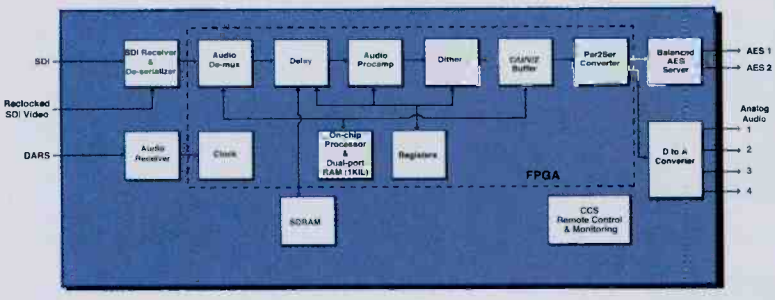
MXA6800+ C2 and C4 Back Connectors

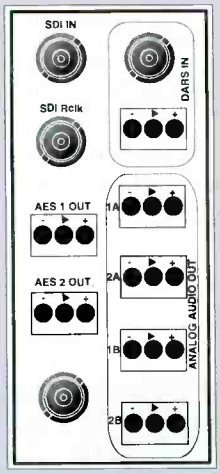
6800+ AUDIO

DMX6800+ A2B, A2C, A4B2, A4C2 — Analog/AES Audio Demultiplexers

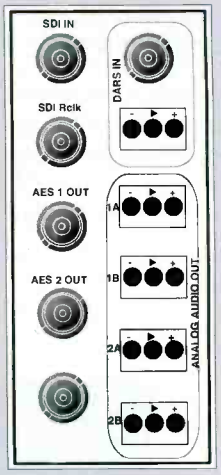
The DMX6800+ A2B/A2C/A4B2/A4C2 Analog and AES Audio Demultiplexers provide audio de-embedding from an SDI input with up to 2-channel AES and up to 4-channel analog output.

- Selectable 16, 20 or 24-bit resolution during audio processing
- Adjustable audio delay up to 1.3 seconds
- Selectable on/off mute function for audio errors
- Adjustable gain, invert, channel swapping
- Left/Right channel swapping
- Audio group selection
- Add "Z" at end of part number for 600ohm output impedance option





DMX6800+ A4B2, A2B Back Connector

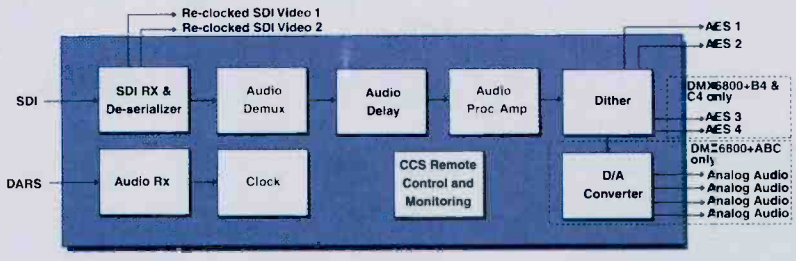


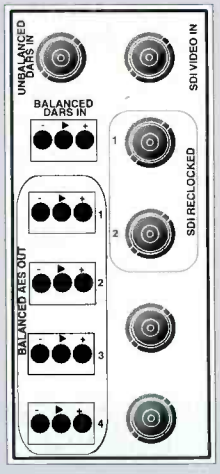
DMX6800+ A4C2, A2C Back Connector

DMX6800+ B2, B4, C2, C4 — AES Audio Demultiplexers

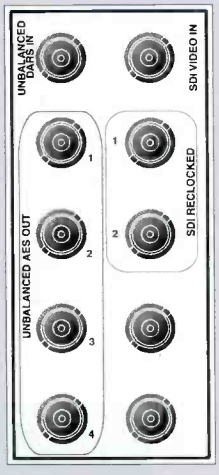
The DMX6800+ B2/B4/C2/C4 AES digital audio demultiplexers support up to four balanced or unbalanced AES audio outputs.

- Internal audio processing amplifier
- 16-bit, 20-bit, or 24-bit audio processing
- C-bit, U-bit, and V-bit transparency
- Adjustable audio delay of up to 1.3 seconds





DMX6800+ B2 and B4 Back Connector

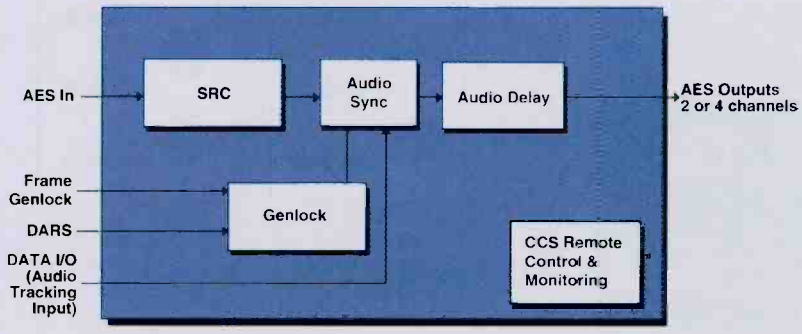


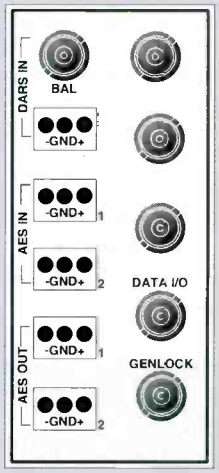
DMX6800+ C2 and C4 Back Connector

ADS6800+ B2, C2 — AES Audio Delay Synchronizer

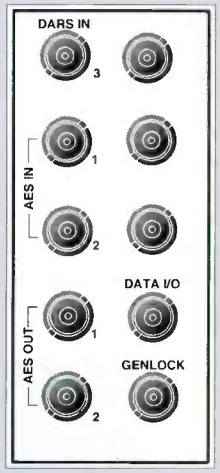
The ADS6800+ B2/C2 are the audio delay synchronizers used in conjunction with the 6800+ DES, ENS, and VFS modules.

- 2-channel 24-bit digital audio input
- Audio adjustment proc amp for levels and mute
- Framestore tracking and system delay operation
- Fixed delay of up to 1.3 seconds





ADS6800+ B2 Back Connector

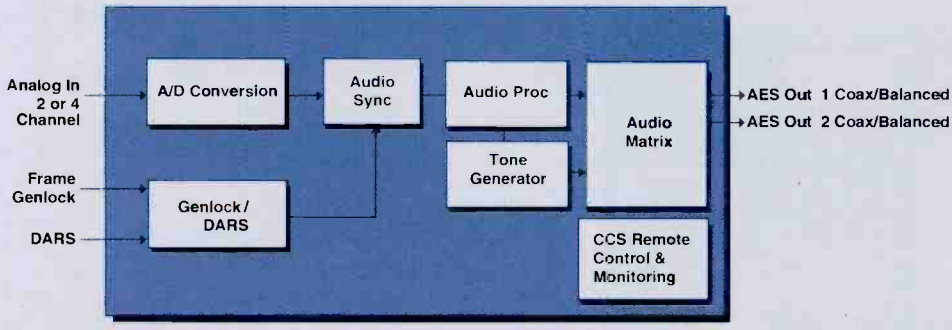


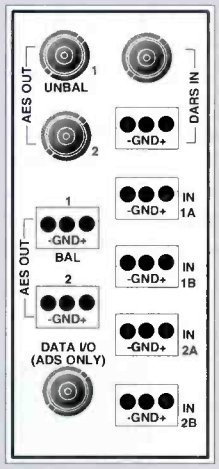
ADS6800+ C2 Back Connector

ADS6800+ A2BC, A4BC — Audio Delay Synchronizer with A to D Conversion

The ADS6800+ A4BC/A2BC are audio delay synchronizers with on-board analog-to-digital conversion capabilities. To be used in conjunction with the 6800+ DES, ENS, and VFS modules.

- Internal audio processing amplifier
- Fixed delay of up to 1.3 seconds
- 32/48/96Khz sampling
- Selectable 16/20/24-bit analog-to-digital conversion
- Channel ID tone generators (750 Hz, 1.5 kHz, 3 kHz, and 6 kHz)
- Selectable delay adjustment for each channel





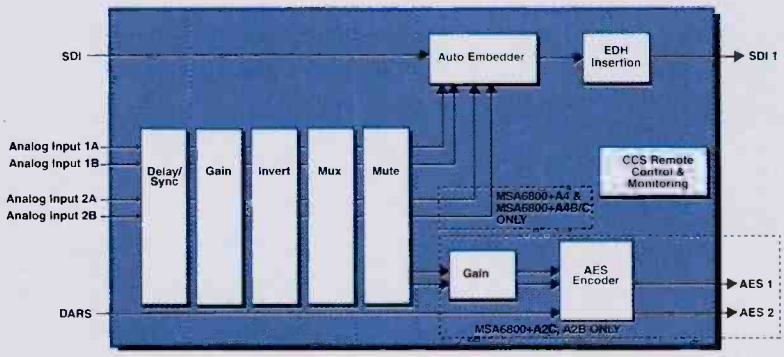
ADS6800+ A2BC and A4BC Back Connector

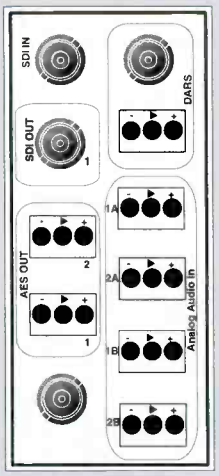
6800+ AUDIO

MSA6800+ A2B, A2C, A4B2, A4C2 — Analog Audio Multiplexer with Synchronizer & Delay

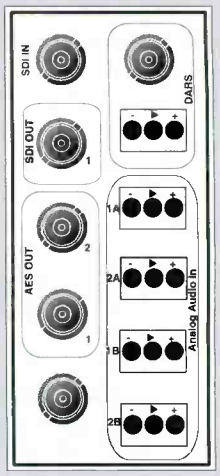
The MSA6800+ analog and AES audio multiplexers with Sync and Delay combine the function of embedding one audio group onto a serial digital video stream along with video synchronization and delay capabilities, all in one module.

- Selectable 16, 20 or 24-bit resolution during audio processing
- Accepts 32kHz & 48kHz audio
- Adjustable audio delay up to 1.3 seconds
- Customer-selectable on/off mute function with adjustable mute duration
- Adjustable gain, invert, channel swapping
- Audio group selection, insertion/pass-through/delete
- Audio and time code selectable delay





MSA6800+ A2B and A4B2 Back Connector

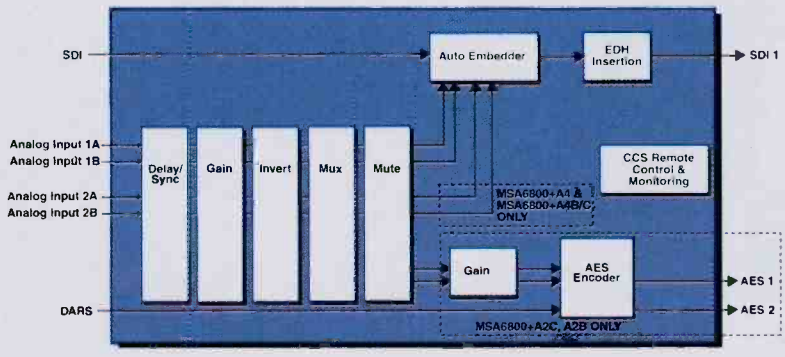


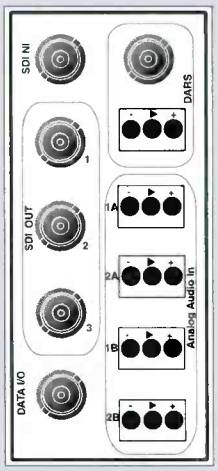
MSA6800+ A2C and A4C2 Back Connector

MSA6800+ A2, A4 — Analog Audio Multiplexer with Synchronizer & Delay

The MSA6800+A2/A4 analog audio multiplexers with Sync and Delay combine the function of embedding one audio group onto a serial digital video stream along with video synchronization and delay capabilities, all in one module.

- MUX-enabling embedder input can be selected from any audio input
- 24-bit audio processing with adjustable fade rate, gain, invert and mute
- Adjustable audio delay up to 1.3 seconds
- Black video generator at loss of video input
- Adjustable embedding group and mode



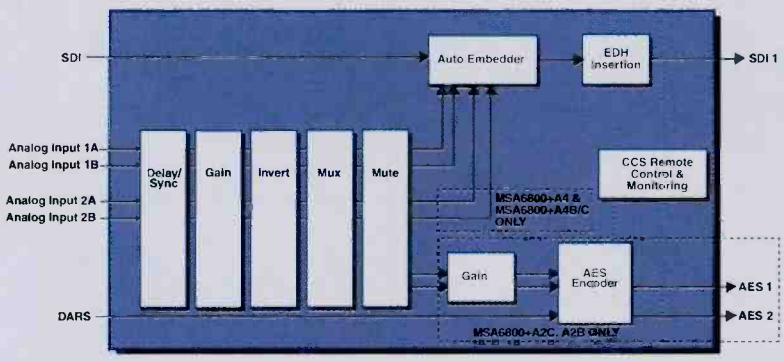


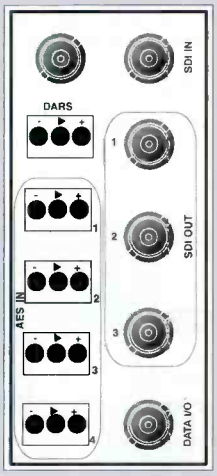
MSA6800+ A2 and A4 Double-Slot Back Connector

MSA6800+ B2, B4, C2, C4 — AES Multiplexers with Synchronizer & Delay

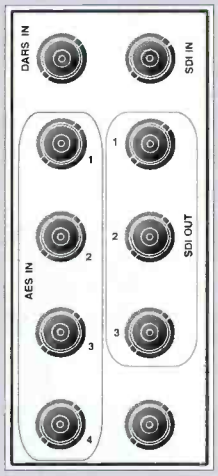
The MSA6800+ AES digital audio multiplexers with audio sync and delay combine the function of embedding up to two audio groups onto a serial digital video stream along with video synchronization and delay capabilities, all in one module.

- Embedder input can be selected from any audio input
- Input audio sample rates from 32 kHz to 108 kHz
- 24-bit audio processing with adjustable fade rate, gain, invert and mute, independent per channel
- Adjustable audio delay up to 1.3 seconds
- Black video generator at loss of video input
- Adjustable embedding group and mode





MSA6800+ B2 and B4 Back Connector

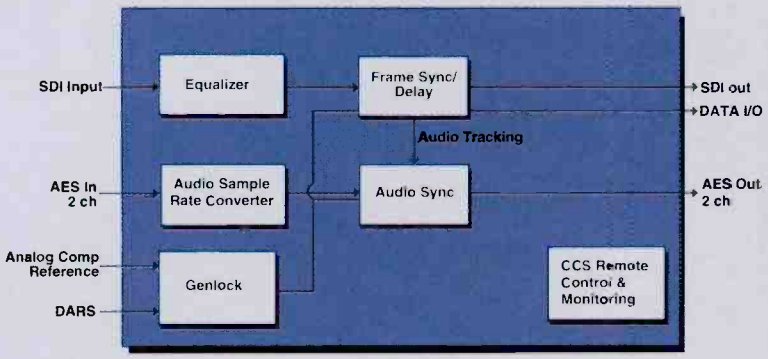


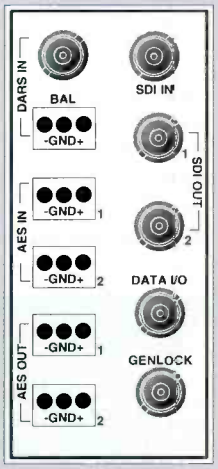
MSA6800+ C2 and C4 Back Connector

AVS6800+ B2, C2 — SDI/AES Synchronizer/Processor

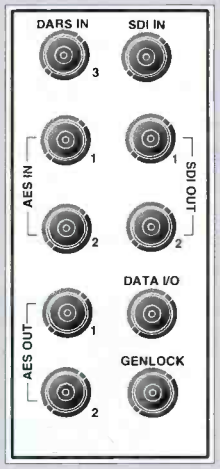
The AVS6800+ B2/C2 are single modules that combine SDI frame synchronizer and an audio delay synchronizer function in a single module.

- Video Proc Amp
- Frequency jitter removal
- Delay or Synchronize Modes
- Audio adjustment proc amp
- Audio Synchronizer tracks video frame sync
- Fixed delay of up to 1.3 seconds
- AES input and output ports provide full 24-bit capability, as well as compressed (Diamond, Dolby-E) pass-through capability





AVS6800+ B2 Back Connector

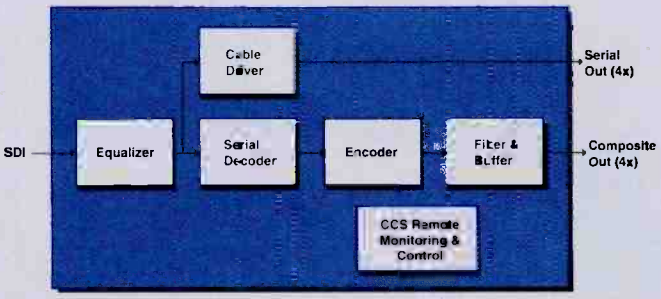


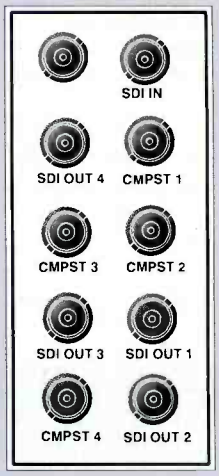
AVS6800+ C2 Back Connector

VSM6800+ — SDI Monitoring Distribution Amplifier

The VSM6800+ serial monitoring DA combines the functions of an equalizing, re-clocking serial DA and a composite video encoder on a single card.

- Vertical blanking (pass/blank) – Line 10 to 22 (NTSC); Line 10 to 23 (PAL)
- V-Blanking Chroma, plus Chroma on/off
- Mono burst on/off





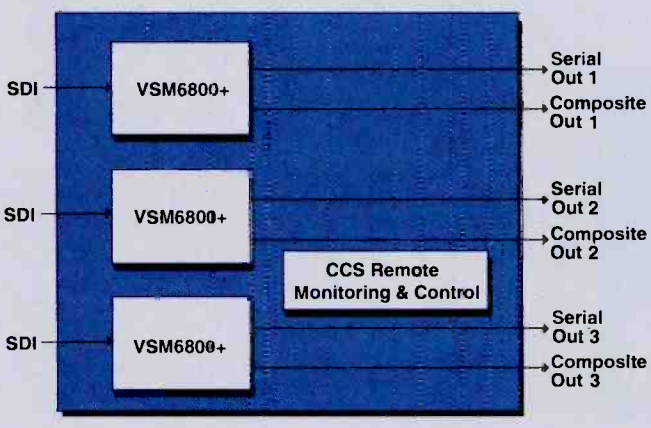
VSM6800+ Double-Slot Back Connector

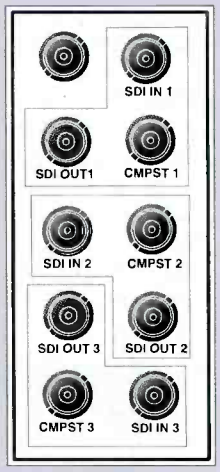
VSM6800+ Single-Slot Back Connector

VTM6800+ — SDI Triple Monitoring Distribution Amplifier

The VTM6800+ triple serial monitoring DA combines the functions of three equalizing, re-clocking serial DAs and three composite video encoders on a single module.

- **SAVE SPACE AND MONEY!**
- Vertical blanking (pass/delete)
- Set-up on/off option (per channel) NTSC only
- Local Gain control for each channel
- Zero SCH and proper picture position
- Burst and chroma on/off (jumper per channel)

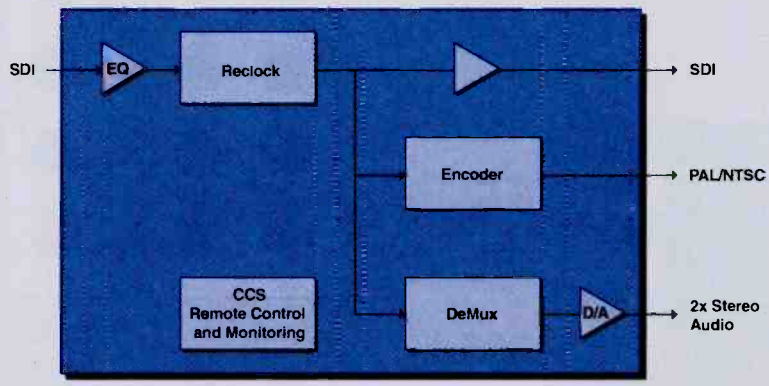




VTM6800+ Double-Slot Back Connector

VAM6800+ — SDI Video & Analog Audio Monitoring Distribution Amplifier

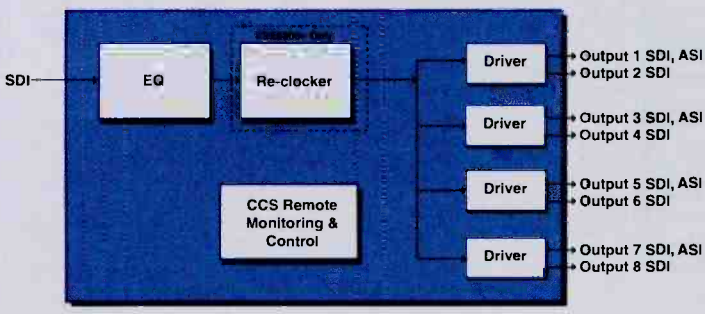
- 525/625 operation
- SDI input with serial and composite analog outputs
- Analog audio outputs
- Command Control System (CCS)-enabled

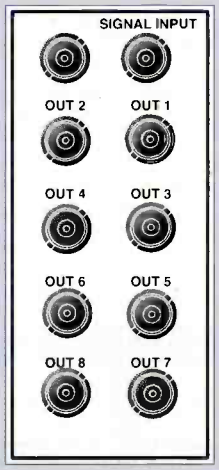


VSE6800+ — SDI Video Equalizing Distribution Amplifier

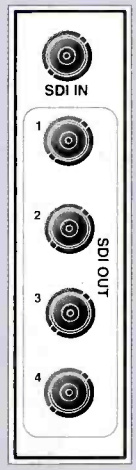
The VSE6800+ is a serial digital video DA with cable equalizing and reclocking.

- High video performance and low cost
- Handles 143, 177, 270, 360, and 540Mb Mb/s SDI signals; and ASI signal (4 outputs only)
- Other features include:
  - Input signal presence detect
  - Automatic cable equalization
  - Alarm output
  - Automatic/manual reclock rate select at 143/177/270/360/540 Mb/s
  - Reclocking status report
  - Automatic/manual bypass





VSE6800+ Double-Slot Back Connector

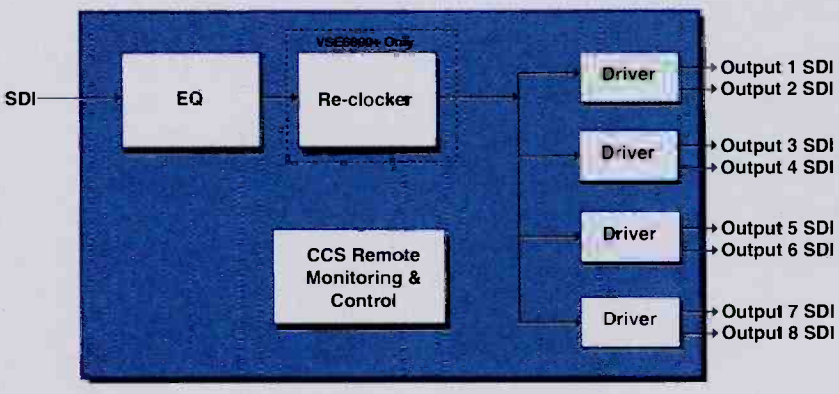


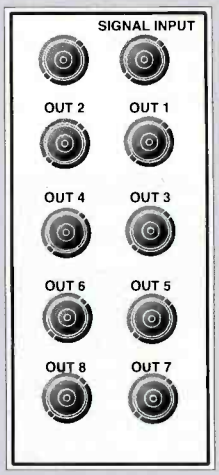
VSE6800+ Single-Slot Back Connector

VSD6800+ — SDI Video Distribution Amplifier

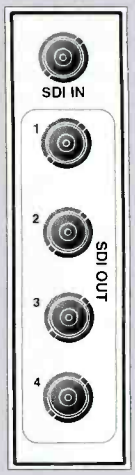
The VSD6800+ is a serial digital video distribution amplifier with cable equalizing.

- High video performance and low cost
- Distributes any 10-540Mb/s data within the amplitude limitation
- Other VSD6800+ features include the following:
  - Input signal presence detect
  - Automatic cable equalization
  - Alarm output





VSD6800+ Double-Slot Back Connector

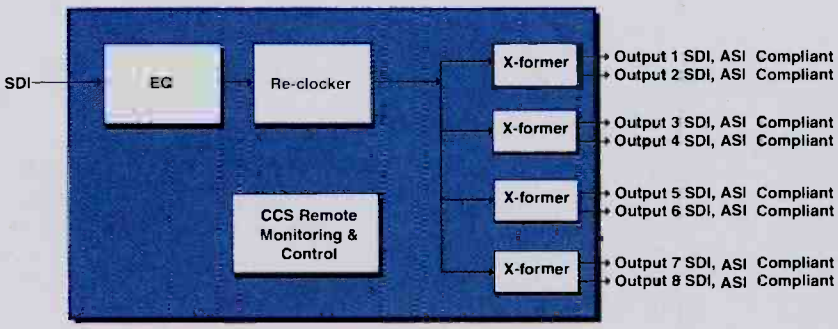


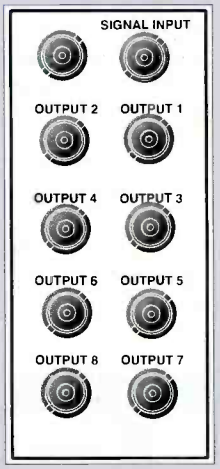
VSD6800+ Single-Slot Back Connector

VSI6800+ — SDI/ASI Equalizing Reclocking Distribution Amplifier

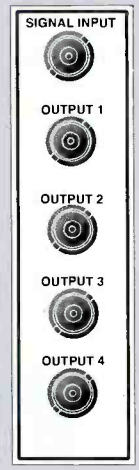
The VSI6800+ is a serial video distribution amplifier that meets the requirements of SMPTE259ABC and DVB-ASI.

- Transformer coupling at the input and output
- Identical polarity between the input and outputs
- Automatic cable equalization
- Automatic reclocking at 143, 177, 270 (SDI and ASI), and 360 Mb/s
- Automatic bypass if the signal is not able to be reclocked
- Enforce bypass





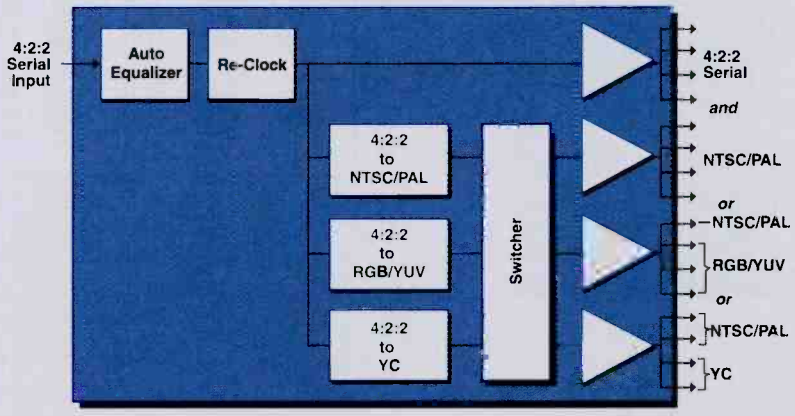
VSI6800+ Double-Slot Back Connector

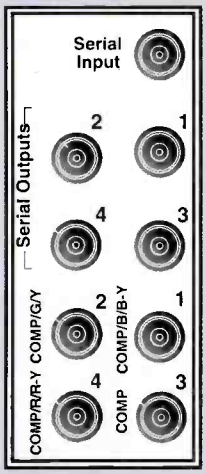


VSI6800+ Single-Slot Back Connector

USM-6800 — Universal SDI Encoder/Distribution Amplifier

- PAL/NTSC Monitoring Encoder
- Selectable outputs, all with 4 serial outputs
  - 4 NTSC/PAL composite analog
  - 1 RGB or YUV and 1 composite analog
  - 1 YC and 2 composite analog
- Automatic data re-clocking of 143, 177, 270 & 360 Mb/s
- 525/625 line auto switching/4 equalized, re-clocked serial outputs
- Note: This is a 6800 series module



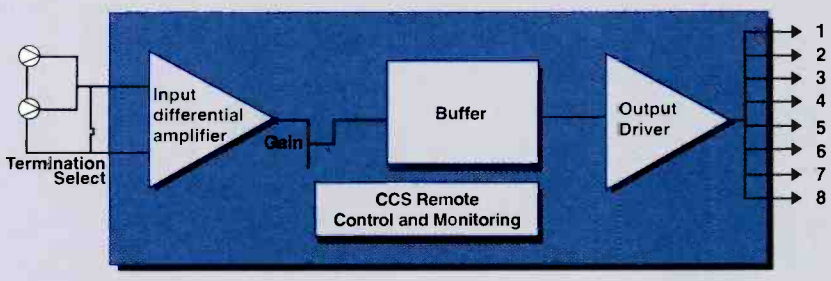


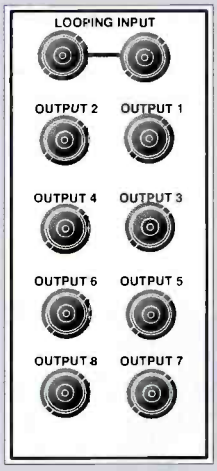
USM-6800
Double-Slot
Back Connector

VDA6800+ — Composite Video Distribution Amplifier

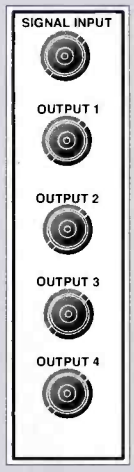
The VDA6800+ is a high-performance, high-reliability, cost-efficient general purpose analog video distribution amplifier.

- DC input coupling
- Looping and internal terminating selectable with double-slot back module, internal terminating with single-slot back module
- ± 3dB gain adjustable range, > 50 MHz bandwidth





VDA6800+
Double-Slot
Back Connector



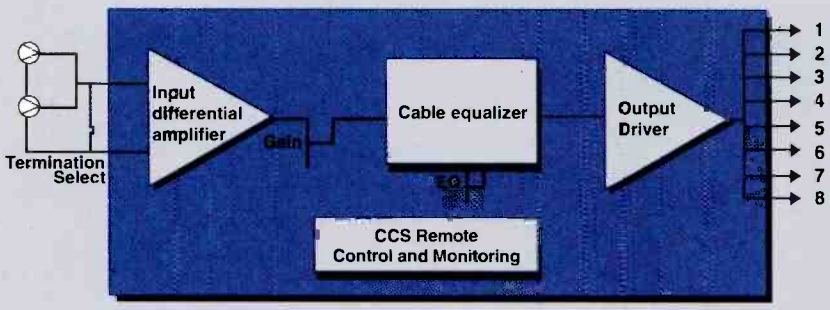
VDA6800+
Single-Slot
Back Connector

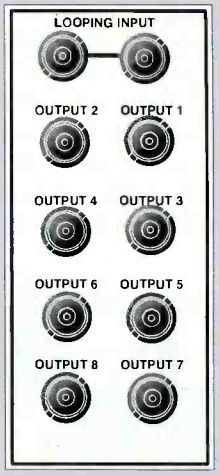
6800+ DISTRIBUTION

VEA6800+ — Composite Video Equalizing Distribution Amplifier

The VEA6800+ is a high-performance, high-reliability, analog video equalizing distribution amplifier.

- DC input coupling
- Looping and internal terminating selectable with double-slot back module, internal terminating with single-slot back module
- ± 3 dB gain adjustable range, 50 MHz bandwidth
- Continuous cable equalizing up to 984 ft (300 m) Belden 8281 cable, or equivalent





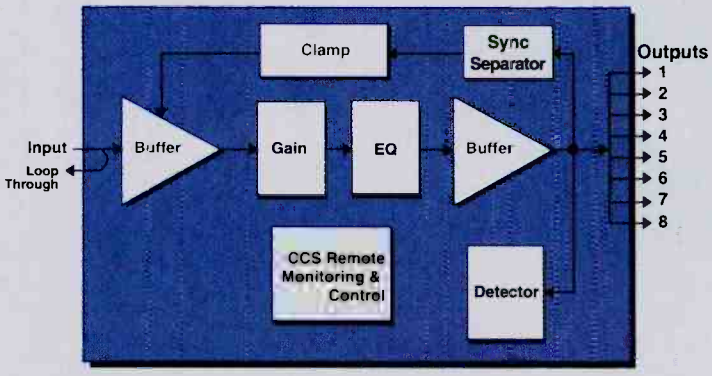
VEA6800+ Double-Slot Back Connector

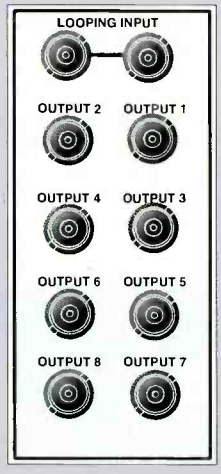
VEA6800+ Single-Slot Back Connector

VRG6800+ — Composite Video Remote Gain Distribution Amplifier

The VRG6800+ is an analog video remote gain and EQ distribution amplifier.

- Remote gain, EQ and clamping timing adjustability
- Looping and internal terminating selectable with double-slot back module, internal terminating with single-slot back module
- Back porch clamp with selectable soft, hard and non-clamp modes



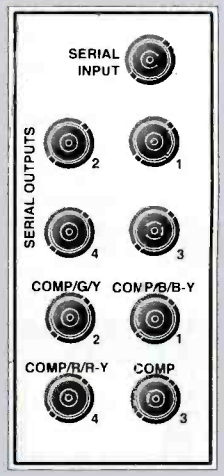


VRG6800+ Double-Slot Back Connector

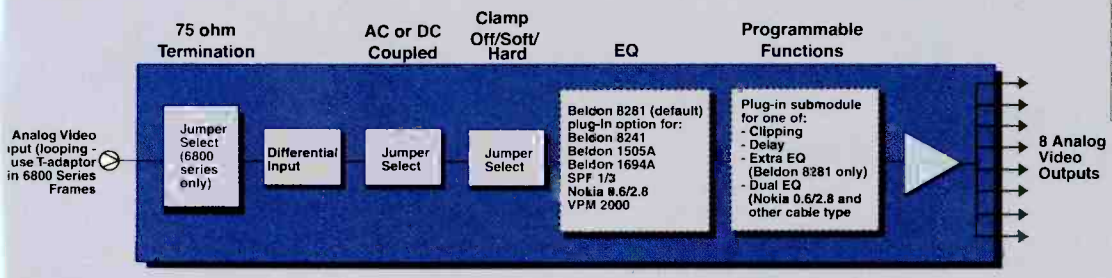
VRG6800+ Single-Slot Back Connector

VPD-6830 — Composite Video Programmable Distibution Amplifier

- Differential input, eight outputs
- 30 MHz bandwidth (-3dB)
- Jumper-selectable soft back porch clamp
- Jumper-selectable AC or DC coupling
- Note: This is a 6800 series module



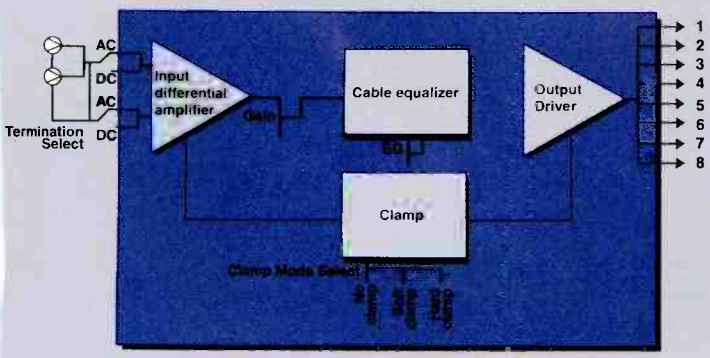
VPD-6830 Back Connector

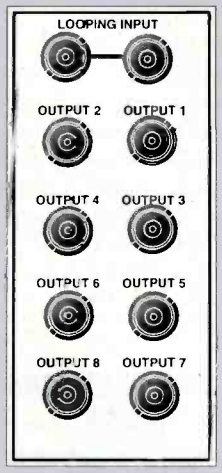


VCA6800+ — Composite Video Equalizing & Clamping Distribution Amplifier

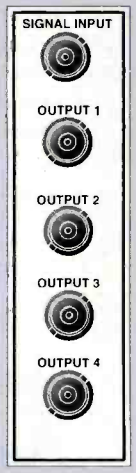
The VCA6800+ is an analog video clamping and equalizing distribution amplifier. This distribution amplifier is capable of hard and soft clamping to the composite NTSC and PAL video signal.

- AC and DC input coupling selectable
- Looping and internal terminating selectable with double-slot back module, internal terminating with single-slot back module
- ± 3 dB gain adjustable range, >50 MHz bandwidth
- Continuous cable equalizing up to 984 ft (300 m) Belden 8281 cable, or equivalent
- Back porch clamp with selectable soft, hard and non-clamp modes
- Optional gain/EQ control





VCA6800+ Double-Slot Back Connector

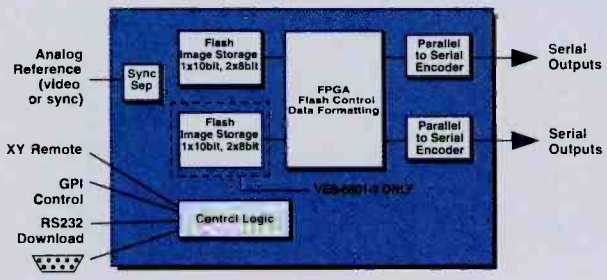


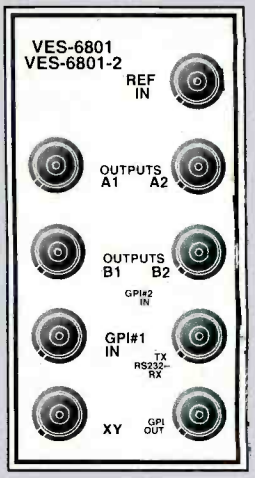
VCA6800+ Single-Slot Back Connector

6800+ DISTRIBUTION

VES-6801, VES-6801-2 — SDI Video Slide Generators

- Single-channel and dual-channel models
- Storage for two 8-bit or single 10-bit images per channel
- Four serial digital 270Mb/s outputs with embedded EDH
- Analog reference input (black or sync) provides genlock capability
- Infinite phasing relative to reference, s/w controlled V and H adjust
- Supports both 525- and 625-line standards, and can accommodate slides of both standards on a single module
- Card edge controls for timing and slide selection
- GPI input for slide selection
- Fully compatible with complete set of Logo Graphics Utilities (LogoWIN and LogoDOS)
- Front PCB-mounted DB-9 serial port for image downloading, RS232 also available on two BNCs
- Note: This is a 6800 series module

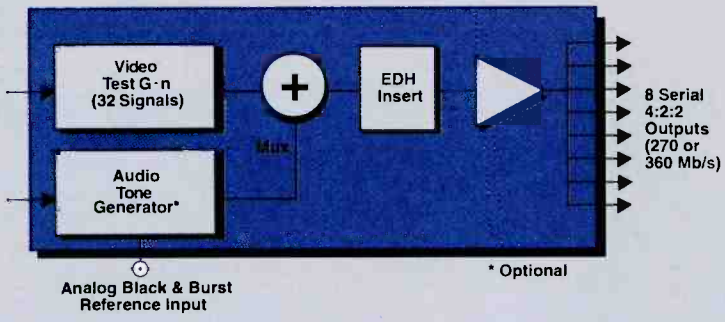


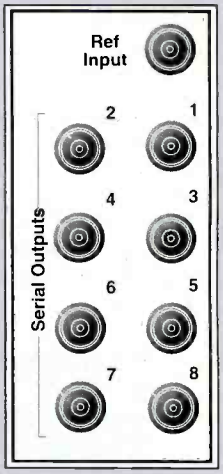


VES-6801 and VES-6801-2 Back Connector

VTG-6801-1 — SDI Test Signal Generator

- Up to 32 selectable 4:2:2 digital test signals (10-bit)
- 8 serial outputs
- Optional embedded digital audio (AES/EBU) test signals
- Optional embedded EDH check words in test signal
- 4:3, 270Mb/s interlaced
- Free run or genlock operation
- Infinite timing range
- Note: This is a 6800 series module

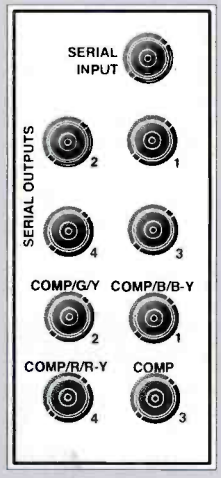




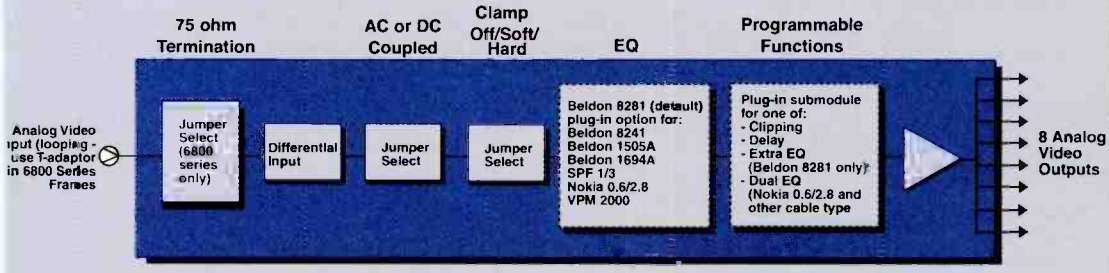
VTG-6801-1 Back Connector

VPD-6830 — Composite Video Programmable Distibution Amplifier

- Differential input, eight outputs
- 30 MHz bandwidth (-3dB)
- Jumper-selectable soft back porch clamp
- Jumper-selectable AC or DC coupling
- Note: This is a 6800 series module



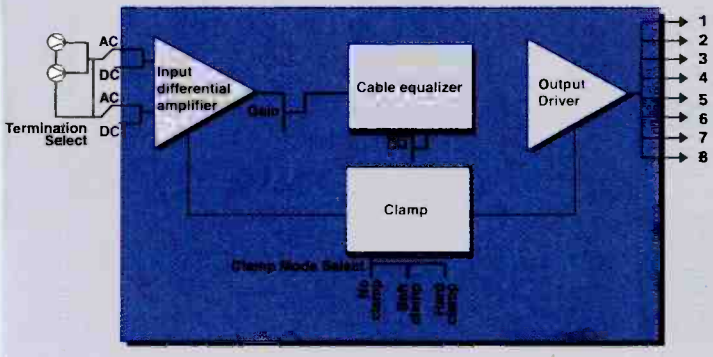
VPD-6830 Back Connector

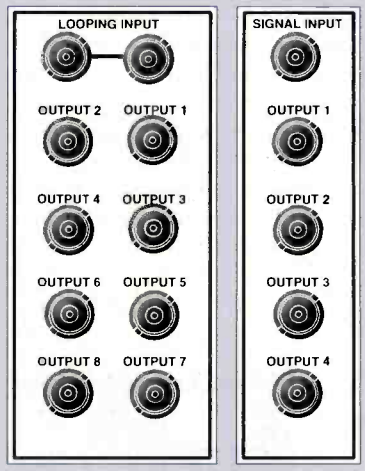


VCA6800+ — Composite Video Equalizing & Clamping Distribution Amplifier

The VCA6800+ is an analog video clamping and equalizing distribution amplifier. This distribution amplifier is capable of hard and soft clamping to the composite NTSC and PAL video signal.

- AC and DC input coupling selectable
- Looping and internal terminating selectable with double-slot back module, internal terminating with single-slot back module
- ± 3 dB gain adjustable range, >50 MHz bandwidth
- Continuous cable equalizing up to 984 ft (300 m) Belden 8281 cable, or equivalent
- Back porch clamp with selectable soft, hard and non-clamp modes
- Optional gain/EQ control





VCA6800+ Double-Slot Back Connector

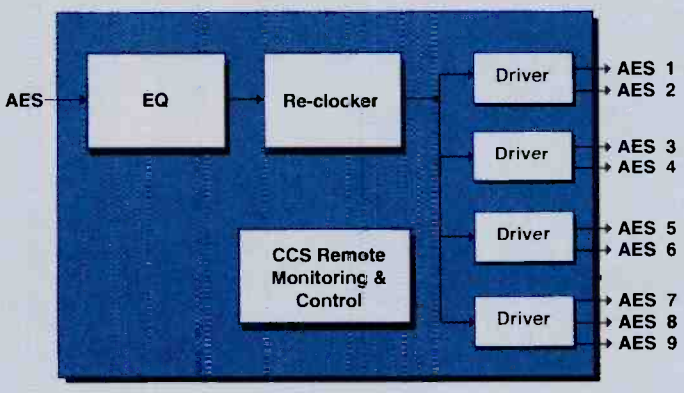
VCA6800+ Single-Slot Back Connector

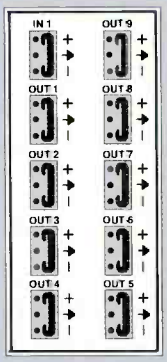
6800+ DISTRIBUTION

AES6800+ B, C — AES Audio Distribution Amplifier

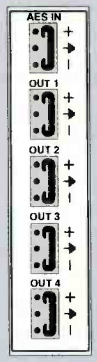
The AES6800+ B/C is a differential input, nine outputs AES/EBU digital audio distibution amplifier for use in balanced or unbalanced installations.

- Manual or automatic equalization modes
- Bypass mode for non-AES (non bi-phase encoded) signals up to 30MHz 50% duty cycle
- Data re-clocking provides jitter reduction
- LED indication of input lock and other important errors

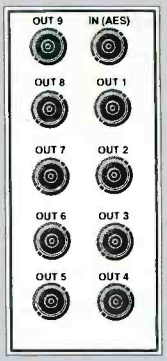




AES6800+B Double-Slot Rear Connector



AES6800+B Single-Slot Rear Connector

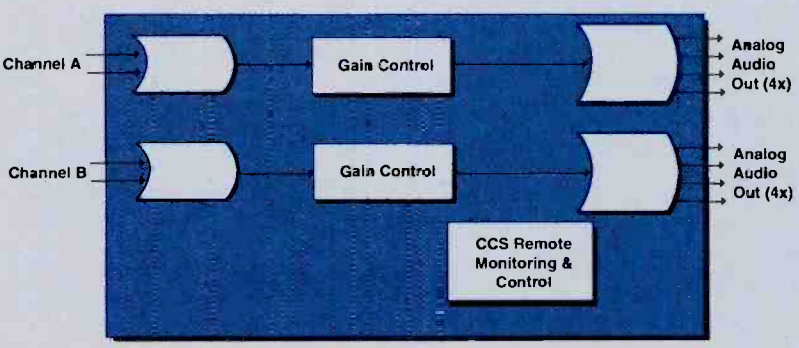


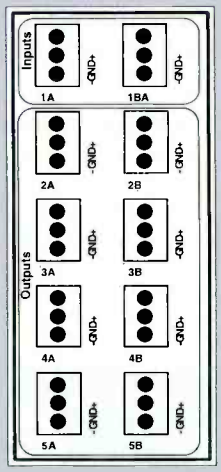
AES6800+C Double-Slot Rear Connector

AES6800+C Single-Slot Rear Connector

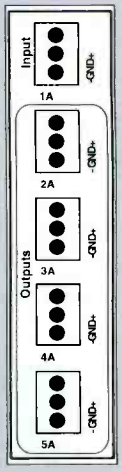
ARG6800+ — Analog Audio Remote Gain Distribution Amplifier

- Balanced inputs and outputs
- Remote control for mute settings
- Remote indication for channel state and overload
- Remote and local control for independent channel gain adjustment
- Local control for selecting output configuration
- Configurable outputs to one of the following options:
  - Eight outputs designated to one channel (1x8)
  - Four outputs designated to channel A, four outputs designated to channel B (dual 1x4)
  - Eight outputs designated to the combined stream of both channels (2x8 sum)





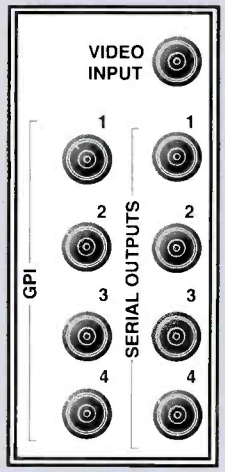
ARG6800+ Double-Slot Back Connector



ARG6800+ Single-Slot Back Connector

LGI-6801 — SDI Logo Generator/Inserter

- 525 / 625 line formats supported (auto detect)
- TARGA, TIFF, JPEG, PICT file formats supported
- GPI control interface
- Note: These are 6800 series modules



LGI-6800 Double-Slot Back Connector

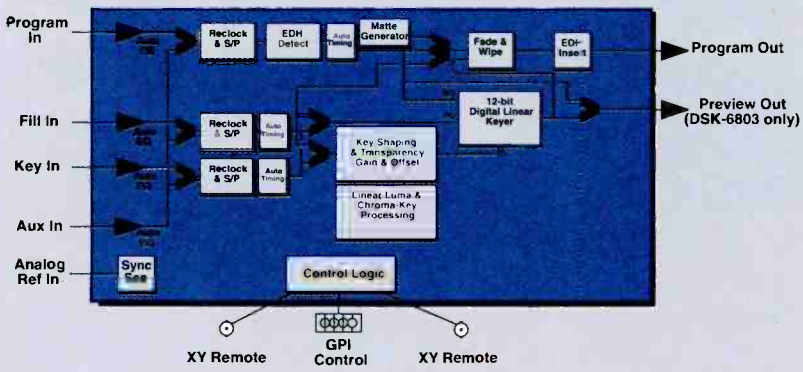
DSK-6801, DSK-6803 — SDI Downstream Keyers

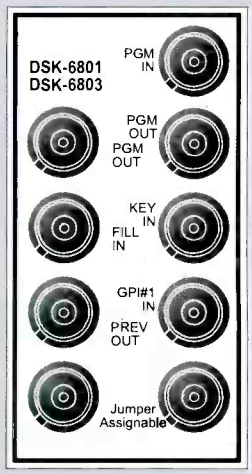
Both DSKs feature:

- Full 10-bit program path with 12-bit keyer for optimum quality
- MIX keying mode
- Control via card edge controls or GPI contact closures
- RS232/422 serial port for automation and editor control
- Luminance or linear keying
- Adjustable transparency, gain, offset, fade rates
- Fade-to-black

DSK-6803 adds:

- Preview path
- Additive keying mode
- Simple chroma keyer
- Simple wipe transitions
- Note: These are 6800 series modules

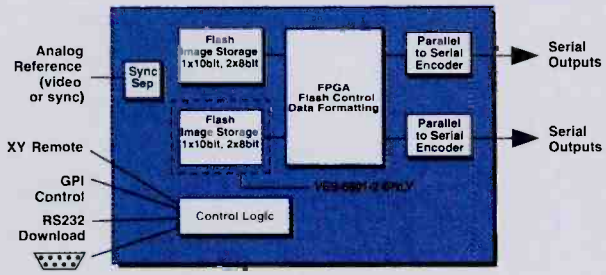


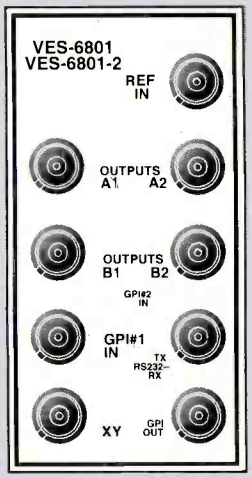


DSK-6800 and DSK-6803 Back Connector

VES-6801, VES-6801-2 — SDI Video Slide Generators

- Single-channel and dual-channel models
- Storage for two 8-bit or single 10-bit images per channel
- Four serial digital 270Mb/s outputs with embedded EDH
- Analog reference input (black or sync) provides genlock capability
- Infinite phasing relative to reference, s/w controlled V and H adjust
- Supports both 525- and 625-line standards, and can accommodate slides of both standards on a single module
- Card edge controls for timing and slide selection
- GPI input for slide selection
- Fully compatible with complete set of Logo Graphics Utilities (LogoWIN and LogoDOS)
- Front PCB-mounted DB-9 serial port for image downloading, RS232 also available on two BNCs
- Note: This is a 6800 series module

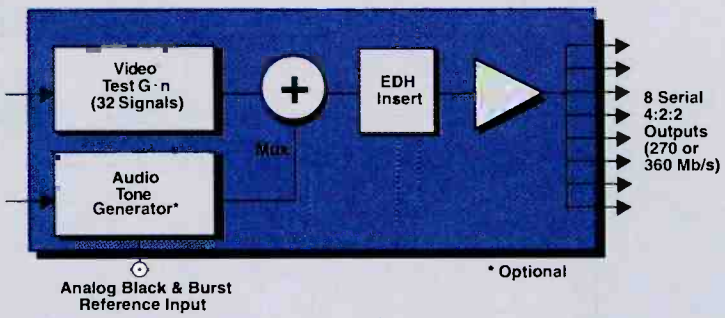


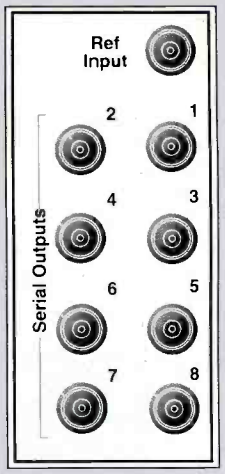


VES-6801 and VES-6801-2
Back Connector

VTG-6801-1 — SDI Test Signal Generator

- Up to 32 selectable 4:2:2 digital test signals (10-bit)
- 8 serial outputs
- Optional embedded digital audio (AES/EBU) test signals
- Optional embedded EDH check words in test signal
- 4:3, 270Mb/s interlaced
- Free run or genlock operation
- Infinite timing range
- Note: This is a 6800 series module

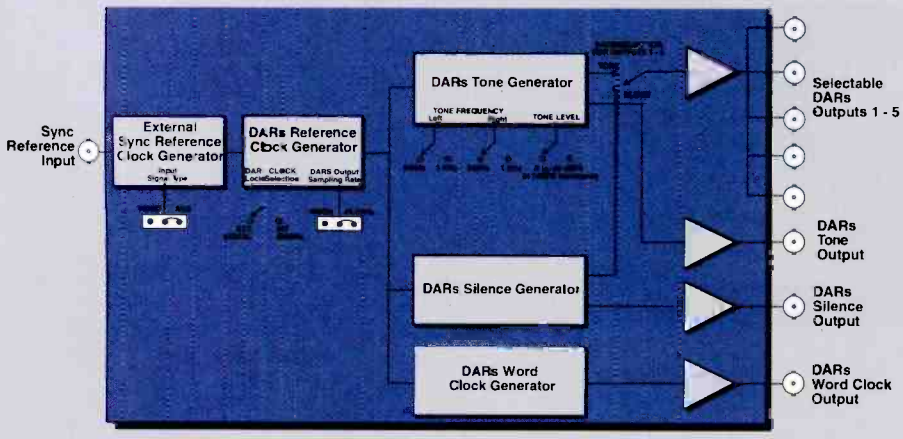


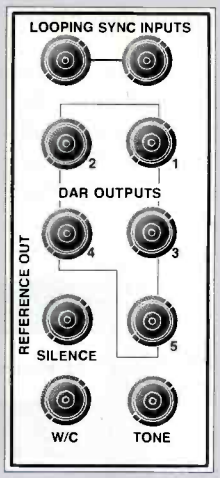


VTG-6801-1
Back Connector

DAR-6880 — AES Audio Reference and Test Generator

- Locks to video or AES audio
- Auto-detects PAL/NTSC
- Provides 8 Digital Audio Reference Signal (DARS) outputs:
  - 5 DARS outputs with card edge selection of tone or silence
  - 3 dedicated DARS outputs (1-tone, 1-silence, 1-word clock)
- Generates self-clocking AES grade-2 reference at loss of sync or in free-run mode
- Versatile DARS tone signal – Output level adjustable from 0 to 31 dBFS in 1dB increments
- Note: This is a 6800 series module



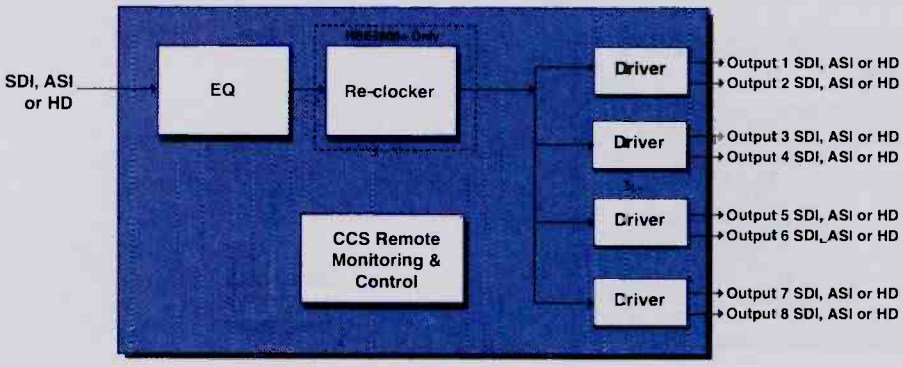


DAR-6880
Back Connector

HSD6800+ — HDTV, ASI, SDI Distribution Amplifier
HSE6800+ — HDTV, ASI, SDI Reclocking Distribution Amplifier

HSD6800+ and HSE6800+ are SD/HD/ASI serial digital video distribution amplifiers with cable equalization.

- Input signal presence detection
- Automatic cable equalization
- Automatic/manual reclock rate setting at 143, 177, 270, 360, and 540 Mb/s; and 1.485 Gb/s (HSE6800+ only)
- Reclocking status report and Automatic/enforced bypass (HSE6800+ only)



HSD6800+ and HSE6800+ Double-Slot Back Connector

HSD6800+ and HSE6800+ Single-Slot Back Connector

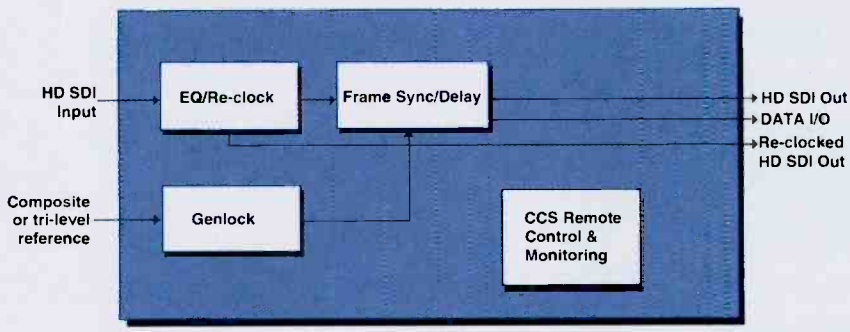
HDTV

PRELIMINARY

HFS6800+ — HDTV Frame Synchronizer/Processor

The HFS6800+ is an HDTV frame synchronizer.

- Automatic detection of all video standards
- Synchronizes 1080i/50, 1080i/59.94, or 720p/59.94
- Provides reclocked serial outputs
- Up to 7 additional delay frames can be added
- Output phase is programmable with respect to the reference input
- Provides hot switch and I/O delay signals for tracking audio processing



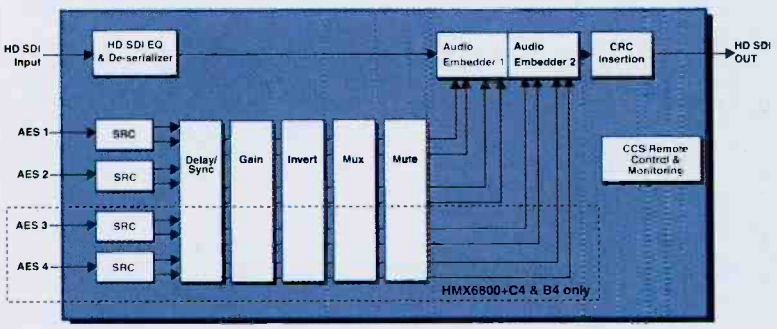
HDTV

PRELIMINARY

HMX6800+ B2, C2, B4, C4 — HDTV AES Audio Multiplexers

The HMX6800+ AES multiplexers embed 2 to 4 AES audio signals into a single 1.485Gb/s HD video signal.

- Automatic detection of all video standards
- Bypass relay protection on one SDI output for power failures
- 24-bit AES input audio embedding
- Audio processing amplifier with various controls
- Individual audio group assignment for each group
- Group lock mode for 5.1 audio applications and sample rate conversion disable for Dolby embedding
- Programmable audio delays
- Ancillary packet cleaning mode to remove audio before embedding
- Ancillary packet reformatting mode to remove unused packets before embedding

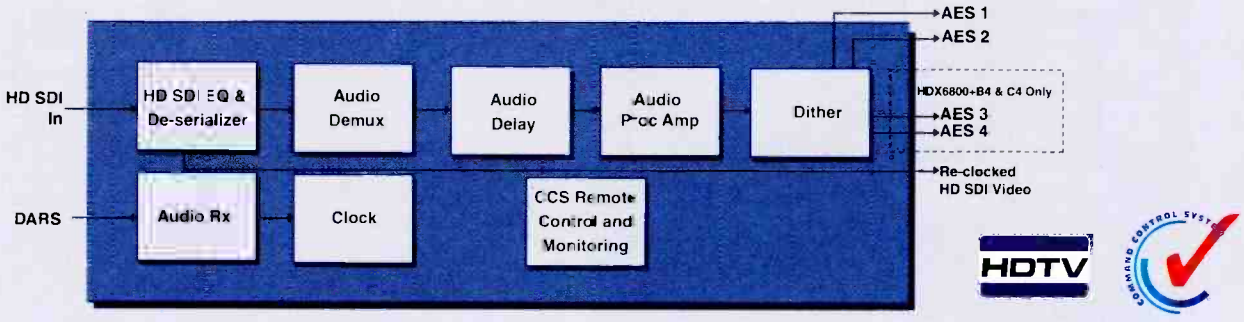


HDTV

HDX6800+ B2, C2, B4, C4 — HDTV AES Audio Demultiplexers

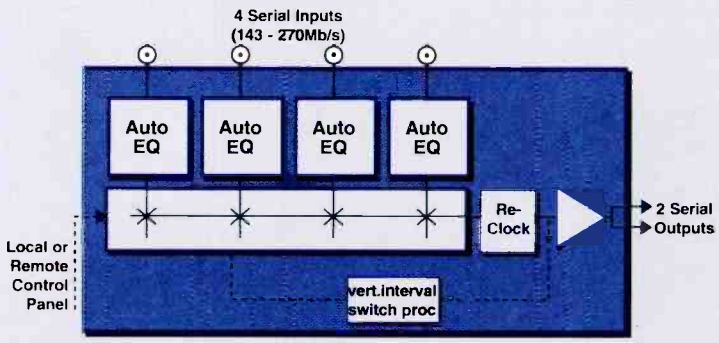
The HDX6800+ audio demultiplexers de-embed 2 to 4 AES audio signals from a single 1.485Gb/s HD video signal.

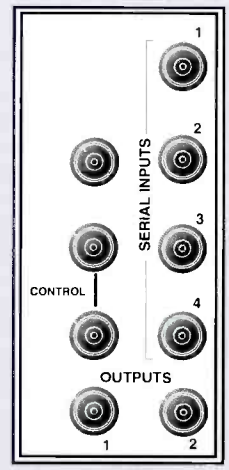
- Automatic detection of all video standards
- 24-bit AES audio de-embedding
- Audio processing amplifier with controls for delay, gain, invert, channel multiplexing and averaging
- Individual audio group assignment for each group
- Group lock mode for 5.1 audio applications and sample rate conversion disable for Dolby embedding
- Programmable audio delays



VSR-4041 — SDI 4x1 Switch

- 4x1 serial digital switcher
- Digital component or composite video
- Two serial outputs
- Local and/or remote operation
- All inputs equalized for up to 200m (675ft)
- Reclocked outputs
- Note: This is a 6800 series module

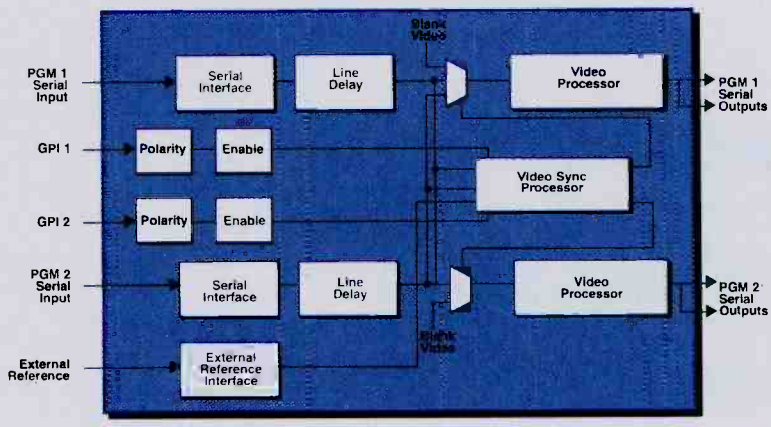


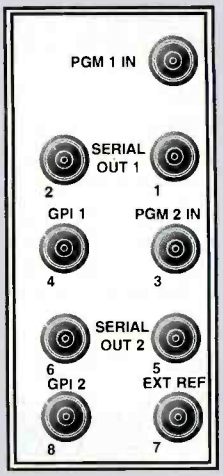


VSR-4041
Double-Slot
Back Connector

VTS-6801 — Video Timing Switch

- Fixes SAV/AEV errors
- Fixes illegal codes in active picture
- Recalculates EDH (Error, Detection and Handling)
- 2 x 1 clean-switch router
- Used to time input signals for devices with no time buffers on inputs
- Can be used as two independent delay lines (no reference input)
- GPI control for video switching
- Horizontal phase adjustment
- Note: This is a 6800 series module



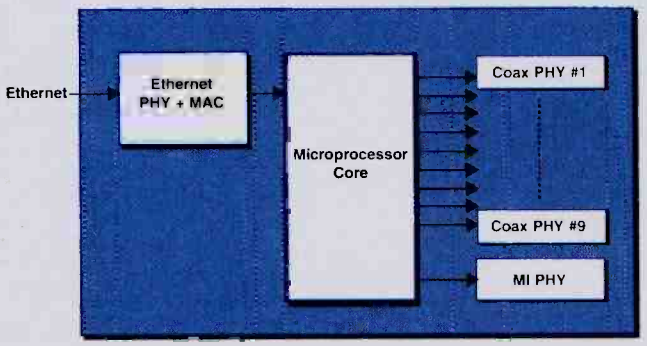


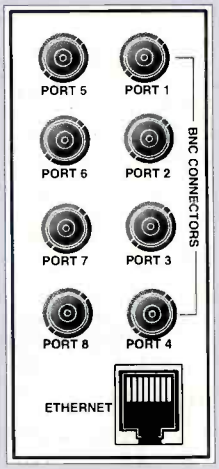
VTS-6801
Double-Slot
Back Connector

ICE6800+ — CCS Ethernet Communications Card

The CCS Ethernet card provides connectivity of up to nine 6800+ frames to Leitch CCS Networks.

- Full CCS client support including Pilot, Navigator, CCS Control Panel, etc.
- Supports remote control access via Ethernet to PC for get/set/adjust, automatic status monitoring and alarming
- Status and change monitoring is achieved off of the network, minimizing traffic for optimal use
- Device and Interface Dynamic Discovery
- Supports full Leitch External Protocol (EP) with 3rd Party Automation capability



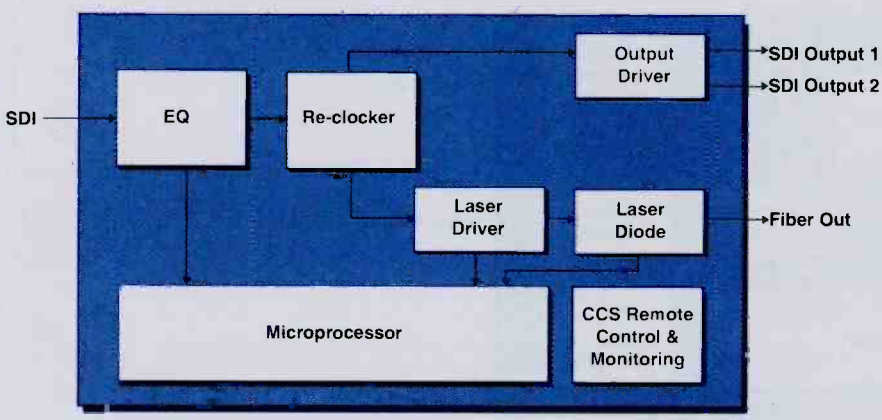


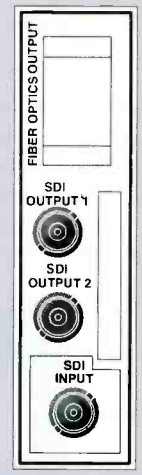
ICE6800+
Back Connector

SOM6800+ — SDI to Multi-mode Optical Transmitter

The SOM6800+ is an SDI to fiber optics multimode transmitter.

- Handles SDI pathological and DVB/ASI signals
- Auto rate selection with reclocking for all SDI
- Supports non-reclocked, selectable modes for all other data rates
- Detection (and alarming) of equalization and video format
- Auto coaxial input equalization to 275M at SD 270Mb/s rates (Belden 1694A) on electrical to fiber conversion modules
- Support for a single slot operation, with up to 20 modules within one 6800+ frame



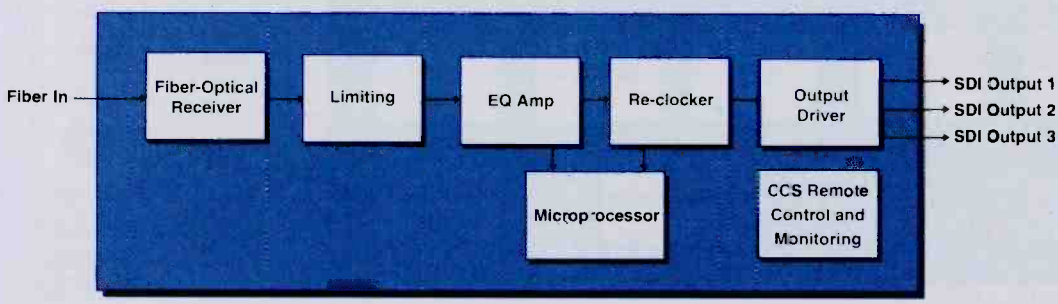


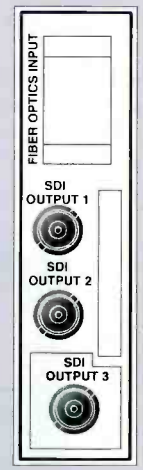
SOM6800+ Back Connector

OSM6800+ — Multi-mode Optical to SDI Receiver

The OSM6800+ is a fiber optics to SDI multimode receiver.

- Handles SDI pathological and DVB/ASI signals
- Auto rate selection with reclocking for all SDI and HD-SDI rates, from 143Mb/s to 360Mb/s. Supports non-reclocked, selectable modes for all other data rates
- Detection (and alarming) of equalization and video format
- Support for a single slot operation, with up to 20 modules within one 6800+ frame





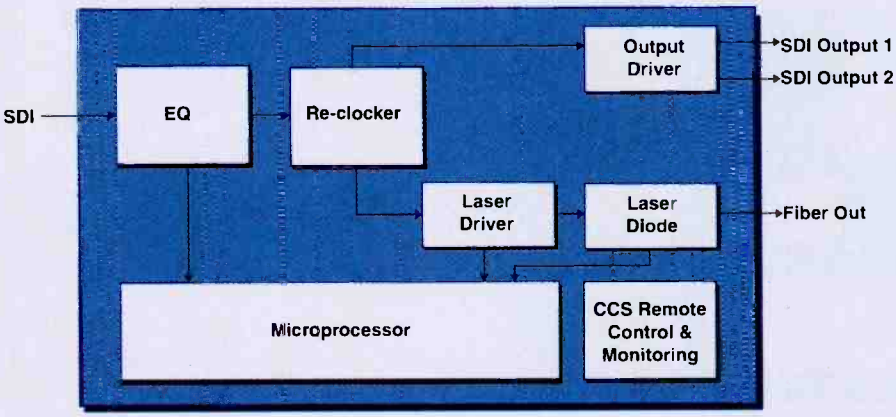
OSM6800+ Back Connector

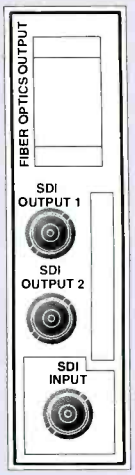
6800+ FIBER OPTICS

SOS6800+ — SDI to Single-mode Optical Transmitter

The SOS6800+ is an SDI to fiber optics single mode transmitter.

- Handles SDI pathological and DVB/ASI signals
- Auto rate selection with reclocking for all SDI
- Supports non-reclocked, selectable modes for all other data rates
- Detection (and alarming) of equalization and video format
- Auto coaxial input equalization to 275M at SD 270Mb/s rates (Belden 1694A) on electrical to fiber conversion modules
- Support for a single slot operation, with up to 20 modules within one 6800+ frame



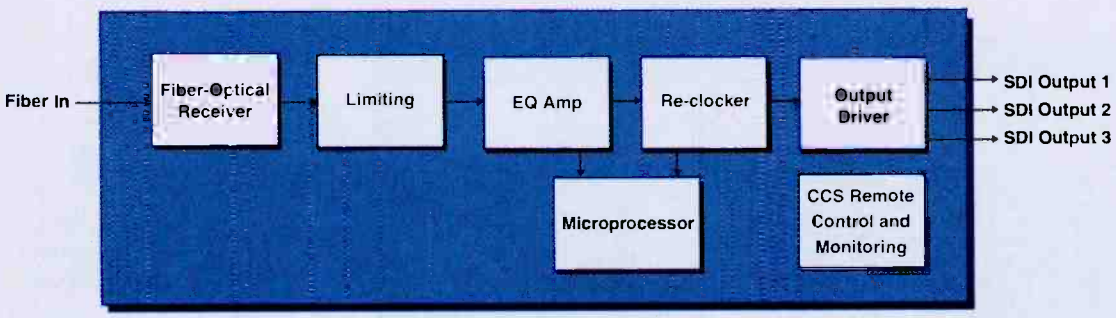


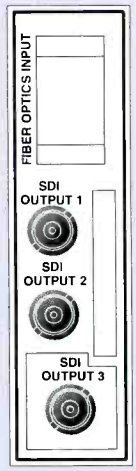
SOS6800+ Single-Slot Back Connector

OSS6800+ — Single-mode Optical to SDI Receiver

The OSS6800+ is a fiber optics to SDI single mode receiver.

- Handles SDI pathological and DVB/ASI signals
- Auto rate selection with reclocking for all SDI and HD-SDI rates, from 143Mb/s to 360Mb/s. Supports non-reclocked, selectable modes for all other data rates
- Detection (and alarming) of equalization and video format
- Support for a single slot operation, with up to 20 modules within one 6800+ frame



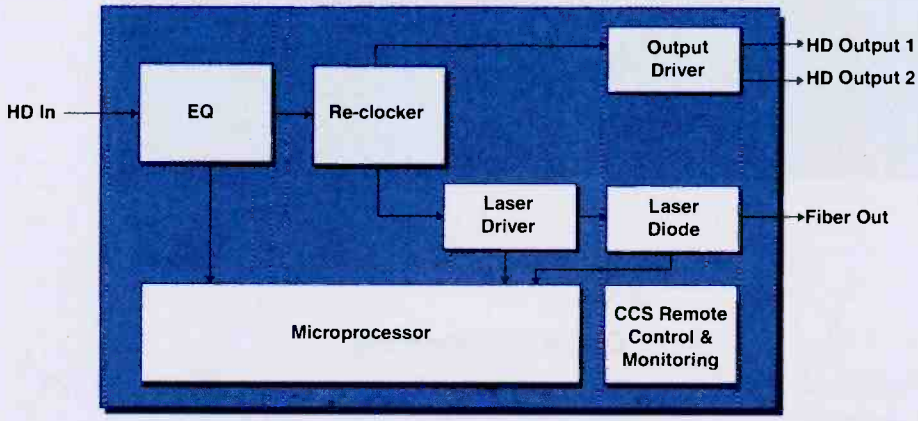


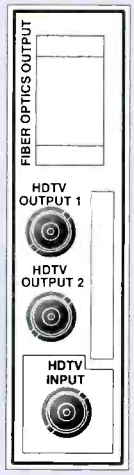
OSS6800+ Single-Slot Back Connector

HOS6800+ — HDTV to Single-mode Optical Transmitter

The HOS6800+ is an HDTV to Fiber Optics Single Mode Transmitter.

- Handles HDTV and SDI pathological and DVB/ASI signals
- Auto rate selection with reclocking for all HD-SDI rates, from 143Mb/s to 1.485Gb/s
- Supports non-reclocked, selectable modes for all other data rates
- Detection (and alarming) of equalization and video format
- Auto coaxial input equalization to 150M at HD (1.485Gb/s)
- Support for a single slot operation, with up to 20 modules within one 6800+ frame





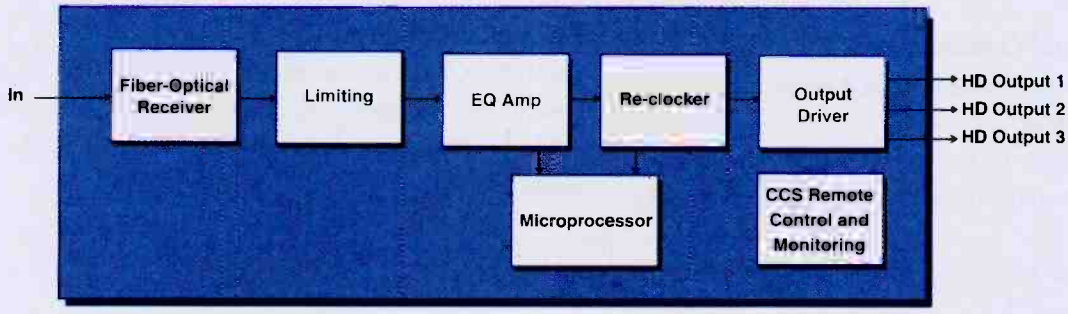
HOS6800+ Single-Slot Back Connector

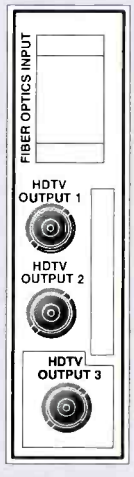
HDTV

OHS6800+ — Single-mode Optical to HDTV Receiver

The OHS6800+ is a Fiber Optics to HDTV Single Mode Receiver.

- Handles SDI pathological and DVB/ASI signals
- Auto rate selection with reclocking for all HD-SDI rates, from 143Mb/s to 1.485Gb/s.
- Supports non-reclocked, selectable modes for all other data rates.
- Detection (and alarming) of equalization and video format
- Support for a single slot operation, with up to 20 modules within one 6800+ frame



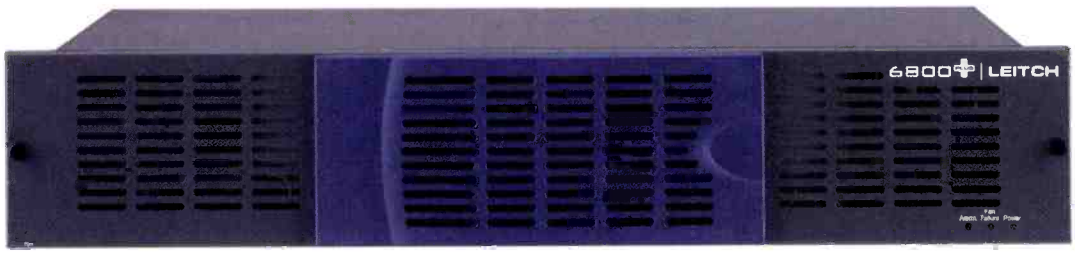


OHS6800+ Single-Slot Back Connector

HDTV

6800+ FIBER OPTICS

The 6800+ frames house and power 6800 family modules and enable a new generation of 6800+ style products. These frames allow genlocking, remote control, higher product and power capacity and modular interfaces.



HDTV

Main Features

General

- Capable of handling HDTV, SDI, Analog & AES Audio, Fiber Optics and other (non-BNC) interfaces (in the FR6802+X(F) frame only)
- Holds up to 20 single slot cards (in the FR6802+X(F) frame only) or 10 double slot cards or any combination of the two totaling 20 single slots
- Provides continuity to legacy products, housing 6800 modules
- All modules are hot-swappable
- Frame-based looping video reference distribution across frame midplane
- Lightweight for mobile production applications
- Rear support extension rail and cable strain relief/tie-down options available

Power & Thermal Considerations

- The frame can house two (redundant) power supplies
- Power cord is locked in place
- Single Power Supply Unit can support entire frame load
- Able to support any combination of modules in every slot of the frame
- Optional integral fan cooling; front to back primary airflow
- Frames equipped with integral fan cooling; may be rack-mounted on top of one another without restrictions
- Processing products must be housed in frames with fans

Control and Monitoring

- Frame status monitoring by means of GPI contact closure
- Every frame supports serial control and monitoring, with free +Pilot Lite application
- Option to connect to Leitch CCS control through an interface card (ICE6800+)
- One ICE6800+ module enables control and monitoring for up to 9 frames

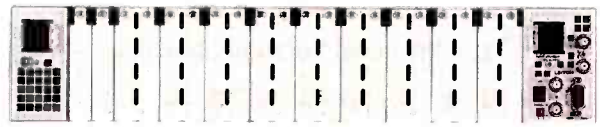
RCP CCS-1U

Remote Control Panel

The RCP-CCS-1U remote control panel provides simple control and monitoring of devices on a Leitch CCS network. This control panel supports all modular platforms.

FR6802+X(F)

The FR6802+X(F) is the core 6800+ frame. Specifically designed for maximum flexibility, the back of the frame accommodates removable back-connectors that are module-function specific.



FR6802+X(F) back view with blank plates

FR6802+X(F) back view with blank plates removed to insert back connectors

HDTV

- ALL 6800+ and ALL 6800 modules can be housed in this frame
- Houses up to 20 modules, in any combination (both single & dual slot modules at the same time)
- Requires back-connectors to be ordered for both 6800 and 6800+ modules to be housed in this frame

FR6802+DM(F)

The FR6802+DM(F) incorporates the benefits of the 6800+ platform, with further considerations for ultimate cost-effectiveness. For applications requiring housing for coaxial products only, this frame is ideal. The rear of the frame is a fixed BNC panel, eliminating the need to order separate back-connectors (as in the FR6802+X(F) frame).

FR6802+DM(F) back view

- ONLY coaxial 6800+ modules and ONLY some of the 6800 modules can be housed in this frame
- Holds ONLY double-slot modules
- Does not accommodate HDTV, Fiber Optics, analog audio, balanced AES or ICE card
- Module back-connectors are not required for operation
- Field upgradable to an FR6802+X(F) frame

FR-6801-1

- 1 rack unit frame is also available for only coaxial 6800+ modules and most 6800 modules
- No access to Leitch CCS control with this frame

PRODUCT NUMBER ORDERING DETAILS

xxx6800+D — D implies that the product is delivered with a "2 slot" back connector for an FR6802+X(F) frame

xxx6800+S — S implies that the product is delivered with a "1 slot" back connector for an FR6802+X(F) frame

xxx6800+DR — DR implies that only the back connector is delivered for an FR6802+X(F) frame

xxx6800+SR — SR implies that only the back connector is delivered for an FR6802+X(F) frame

xxx6800+ — implies that only the module is delivered for an FR6802+DM(F) frame

LEITCH

Digital Processing Synchronizer

DPS-575 is the most versatile processor available for digital and analog interfacing requirements that include networked control all in a single rack unit.

More Than Just a Synchronizer

- AV Synchronizer
- Audio Embedder/De-Embedder
- Uni-directional (Normal Mode)
- Bi-Directional Analog/Digital Conversion (Digi-Duplex™ mode)
- Auto-Switch Time Base Corrector
- Graphics Framestore
- Linear Keyer
- Video AGC
- VITS Inserter
- Video Test Signal Generator
- Audio Test Signal Generator
- Animated Logo Inserter Option
- Digital Noise Reduction with Digital Bandwidth Filtering Option
- Audio Limiter Option
- DV (IEEE 1394) Transcoder Option

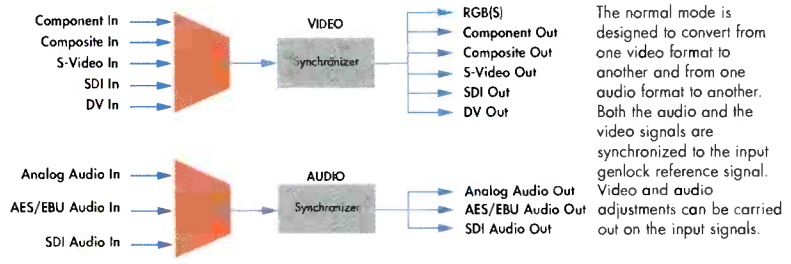
Applications Facility-Wide

Offering maximum functionality and flexibility in a single unit of rack space, the DPS-575 Digital Processing Synchronizer is equally suited for use in analog, digital or hybrid facilities. Fully capable of bridging analog video signals (such as satellite and microwave feeds) to digital production facilities, these dexterous devices are the ideal choice for broadcasters beginning the transition to digital.

Applications Worldwide

The DPS-575 is available in either video only or audio/video configurations and is an auto-sensing, dual-standard (PAL/NTSC) device.

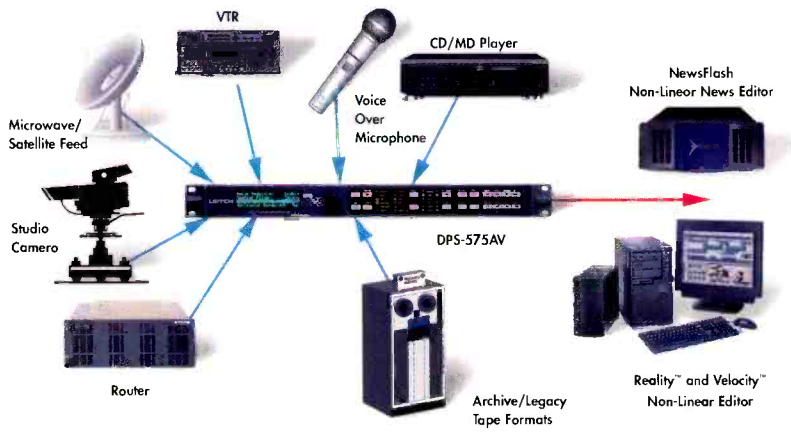
Normal Mode*



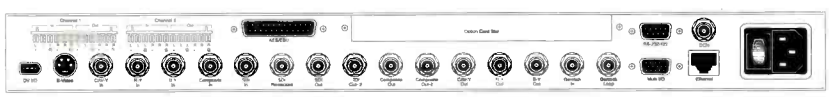
The normal mode is designed to convert from one video format to another and from one audio format to another. Both the audio and the video signals are synchronized to the input genlock reference signal. Video and audio adjustments can be carried out on the input signals.

*Digi-Duplex allows for simultaneous A to D and D to A conversions

Edit Suites/Ingest/Mobiles/Satellite/Microwave



Leitch's DPS-575 adds flexibility and agility to any edit suite. Format translation, level adjustment, TBC control, audio/video sync, noise reduction and automatic voice over insertion allow you to use any video the outside world can throw at you.



Four video input and output formats are standard: Composite Video, Serial Digital Video (SDI), Component Analog Video (Betacam) and Y/C (S-VHS/Hi-8). A separate RGB output supports sync on green or RGBS modes and is ideal for driving video projectors. The RGB output can also be configured to provide an additional composite video output.

UDA-683 Utility Video Distribution Amplifier

The UDA-683 is a one in, eight out analog video utility distribution amplifier, ideal for analog composite/component, color black, subcarrier and analog HDTV video installations.

VDA-683 Video Distribution Amplifier

The VDA-683 is a one in, eight out analog video distribution amplifier with a differential input ideal for analog composite/component, color black, subcarrier and analog HDTV video installations.

VEA-683 Video Equalizing Amplifier

The VEA-683 is a one in, eight out analog video equalization distribution amplifier with a differential input for long cable runs using analog composite/component, color black, subcarrier and analog HDTV video signals.

VEA-684 Video Equalizing Amplifier

The VEA-684 is a one in, eight out analog video equalizing and clamping distribution amplifier with a differential input and AC or DC coupling for long cable runs using analog composite/component, color black, subcarrier and analog HDTV video signals.

VPD-683 Video Programmable Amplifier

The VPD-684 is a one in, eight out analog video equalization and clamping distribution amplifier with a differential input and AC or DC coupling for long cable runs using analog composite/component, color black, subcarrier and analog HDTV video signals. Optional, removable submodule with different gain and EQ settings are available.

VEH-683 Video Wide Band Equalizing Amplifier

The VEH-683 is a wide bandwidth one input, eight output video equalizing and clamping distribution amplifier with differential input and equalization for up to 100 meters (325 ft.) of coaxial cable. Ideal for analog composite/component and computer-generated video installations.

VEH-6810 200Mhz Video Distribution Amplifier

The VEH-6810 is a wide bandwidth one input, eight output video equalizing and clamping distribution amplifier with differential input and equalization for up to 100 meters (325 ft.) of coaxial cable. Ideal for analog composite/component and computer-generated video installations.

INT-EX1x2 and INT-EX1x4 Analog Video, Digital Video, Digital Audio Distribution Amplifier Packages

The INT-EX1x2 is a 1RU package containing 16 one input, two output distribution amplifiers for analog composite/component, 75 ohm AES digital audio and SDI digital video signals.

The INT-EX1x4 is a 2RU package containing 16 one input, four output distribution amplifiers for analog composite/component, 75 ohm AES digital audio and SDI digital video signals.

[AUDIO DISTRIBUTION AMPLIFIERS]

AMD-880 Mono Audio Distribution Amplifier

The AMD-880 is a one in, eight out monaural analog audio distribution amplifier for balanced 66 or 600 ohm signals.

ASD-880 Stereo Audio Distribution Amplifier

The ASD-880 is a one in, four out stereo (2 channels) analog audio distribution amplifier for balanced 66 or 600 ohm signals.

APD-880 Mono/Stereo/Summing Programmable Audio Distribution Amplifier

The APD-880 can be programmed using plug-in submodules to provide monaural, stereo or summed, or a combination of outputs.

ARG-880 Audio Remote Gain Amplifier

The ARG-880 is a one in, eight out monaural analog audio distribution amplifier for balanced 66 or 600 ohm signals with remote gain control.

AES-880 AES/EBU Digital Audio Distribution Amplifier

The AES-880 is a one input, eight out AES/EBU digital audio distribution amplifier for use in 110 ohm balanced installations.

ATG-880 Audio Tone Generator

The ATG-880 provides audio tones of 400 and 1000 Hz on four dual outputs at levels of +8, +4, 0 and –10 dBm. 440 Hz tone may be requested in place of 400 Hz.

ADC-880 Analog to Digital Audio Converter

The ADC-880 is a two-channel analog audio to 110 ohm balanced AES digital audio converter with 20-bit precision.

DAC-880 Digital to Analog Audio Converter

The DAC-880 is a 110 ohm balanced AES digital audio to two-channel analog audio converter with 20-bit precision.

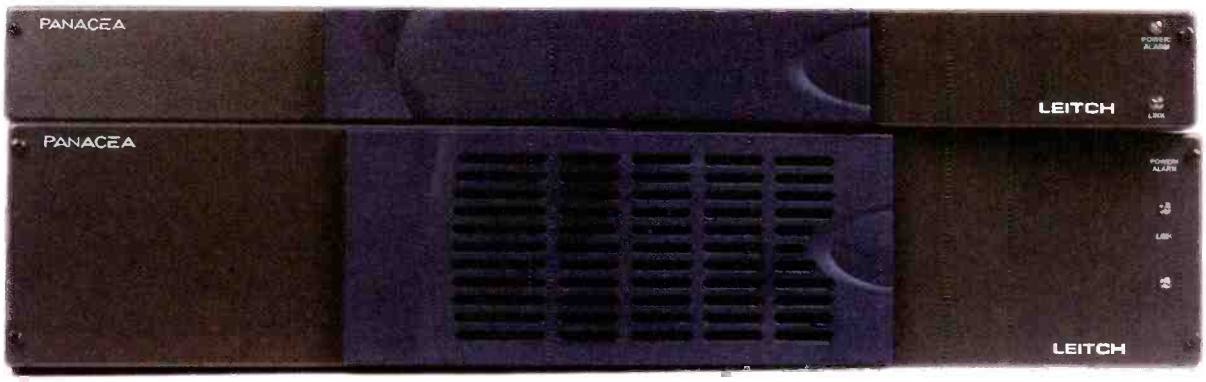
INT-EX1x4A2 Analog Audio Distribution Amplifier Package

The INT-EX1x4A2 is a 2RU package containing 32 one input, four output stereo (two channels) distribution amplifiers.

Additional Distribution Amplifiers

HDC-3901	HDTV Downconverter and Distribution Amplifier
HDC-3901-AD	HDTV Downconverter and Distribution Amplifier with audio outputs
VSM-3901	SDI Monitoring Distribution Amplifier
HSE-3901	HDTV / SDI Reclocking Distribution Amplifier
VSE-3901	SDI Reclocking Distribution Amplifier
AES-3981	AES Audio Distribution Amplifier
VEA-3901	Video Equalizing Distribution Amplifier
ADA-3981	Analog Audio Distribution Amplifier
ARG6800+	Analog Audio Remote Gain Distribution Amplifier
VSM6800+	SDI Monitoring Distribution Amplifier
VTM6800+	Triple Monitoring Distribution Amplifier
VCA6800+	Composite Video Equalizing & Clamping Distribution Amplifier
VDA6800+	Composite Video Distribution Amplifier
VEA6800+	Composite Video Equalizing Distribution Amplifier
VRG6800+	Composite Video Remote Gain Distribution Amplifier
VPD-6830	Composite Video Programmable Distribution Amplifier
AES6800+	AES Audio Distribution Amplifier
VSE6800+	SDI Video Equalizing Distribution Amplifier
VSD6800+	SDI Video Distribution Amplifier
HSD6800+	HDTV, ASI, SDI Distribution Amplifier
HSE6800+	HDTV, ASI, SDI Reclocking Distribution Amplifier
VSI6800+	SDI/ASI Equalizing Reclocking Distribution Amplifier
USM-6800	SDI Component Video Monitoring Distribution Amplifier
VAM6800+	SDI SDI Video and Analog Monitoring Distribution Amplifier

Panacea is an affordable, compact router that offers on-air quality in every professional format from analog to HD.



Comprehensive Format Coverage

Panacea offers comprehensive format coverage, with HD, SD/ASI, AES, and analog video and audio available in the most complete and flexible array of matrix sizes.

Advanced Control Options

Panacea's advanced control options — including remote, local, RS232/422, X/Y and Ethernet control direct to the frame — raise the standard for small routing. Because Panacea shares a common control base with all other Leitch routers, integration into existing and new router installations is effortless.

Superior Performance

Leitch is an industry leader in incorporating the most advanced technology to meet the latest broadcast and professional media applications. With Panacea, performance was not sacrificed to provide a compact, cost-effective solution.

Excellent Value

Panacea provides the same flexibility, performance and reliability customers have come to expect from Leitch routers — all at an exceptionally cost-effective price.

Panacea is for Everyone

Television production facilities, cable operators, outside broadcast vans/trucks, DBS satellite operations, post production facilities, Webcasters, Telcos, corporate boardrooms, schools, military, government, videographers, or anyone else who wants a compact, on-air quality routing switcher with the ability to mix and match signal formats within the same frame.

Key Benefits

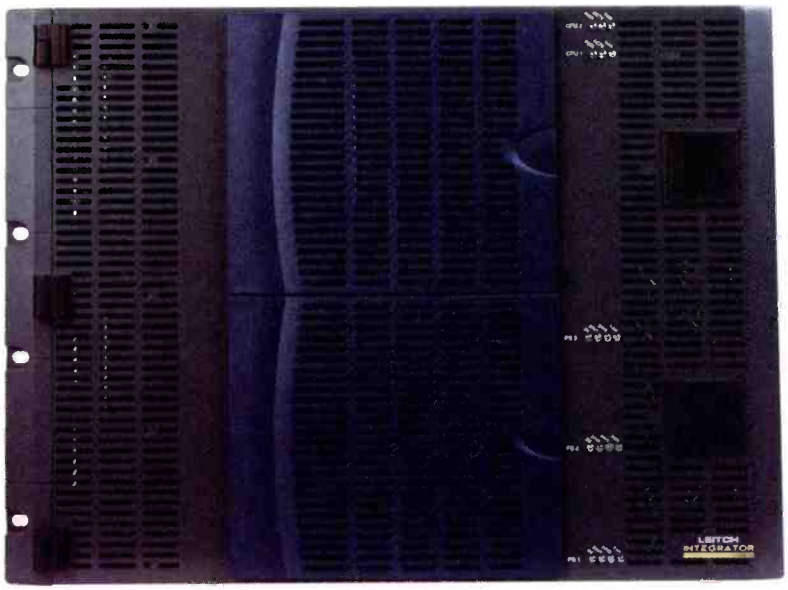
- Clean switching of SDI and HD Video option
- Quiet switching of AES/EBU digital audio signals option
- CCS/Pilot integrated control capabilities
- Control via local panel, RS232/422, X/Y, or IP/Ethernet option
- Signal diagnosis capabilities (i.e. signal presence, error detection)
- Numerous local control panel options
- Frame architecture provides both front and rear rack attachment capabilities
- External (Brick) universal power supplies or built-in universal power supplies
- Redundant power supplies option
- Blue3 Dynamic Routing Fabric-enabled – taking advantage of building larger systems through a distributed routing architecture

[INTEGRATOR]

LEITCH

HDTV

Flexible, multi-format routing switchers that provide unrivaled performance and control options for all mid to large routing applications.



Expandable Architecture

Integrator is a series of economical, scalable, multi-format routers packed with advanced features and redundancy that provide unrivaled performance and control options for all mid-to-large sized routing applications.

The Integrator™ allows you to mix different types of signals and I/O connections within the same frame by offering modular I/O back panels.

Our Integrator prepares your facility to switch today's and tomorrow's formats. The Integrator solutions include routing systems in 4, 6 and 8RU frames that provide expandability from 32x32 to 512x512, and our 8RU Integrator GOLD™ wideband digital multi-rate router will easily expand from 8x8 to 512x512. Other features include optional redundant hot-swappable logic cards and power supplies and incorporated alarms for control, fans and power supplies. Other options available include dual outputs, output monitoring, and left/right swapping and summing.

Reliable Dynamic Routing

Blue³ Dynamic Routing Fabric is Leitch's field-proven method for routing and controlling signals between multiple, networked frames easily, reliably and efficiently. Our distributed architecture removes single points of failure and supports installations across multiple locations.

Comprehensive Control

Leitch provides a powerful and complete control system through programmable control panels and our RouterMapper, RouterWorks, CCS Pilot2™ and CCS Navigator™ control software. Our control options free you from hardware constraints with virtual crosspoint mapping and soft-matrix partitioning; crosspoint restrictions such as locks and protects; up-loadable drivers for diagnostics and control of other vendors equipment; system polling for new or added component configuration without interrupting operations; and traceable system signal paths. Integrator is fully compatible with existing Leitch control software and hardware, allowing you to easily integrate into or upgrade existing or new router installations.

Integrator GOLD

Integrator GOLD is the standard when it comes to wideband digital multi-rate routing. With the capability of routing signals from 3 Mb/s to 1.5 Gb/s, Integrator GOLD offers a clear growth path from lower bit rate AES, SDI and ASI to high-bandwidth, high-definition format signals.

The 8RU Integrator GOLD can easily scale from 8x8 to 128x128 in multiples of 8 I/O. Features include redundant power supplies, redundant logic cards and easy-to-use, front-loading, hot-swap capability. Integrator GOLD provides complete digital format support: HD, SDI, AES, ASI and common Telco rates and an option for SDI-only.

Control Topologies	
TCP/IP (Ethernet)	Standard ☑
RS-232/422	Standard ☑
X/Y Coaxial	Standard ☑

Feature-rich digital master control switcher acclaimed for exceptional operational ease.

Comprehensive Value

Optimized for demanding environments, Opus performs effortlessly in live, on-air environments, managing one or more channels from a single control panel, from multiple panels, or under full automation. Opus provides eye-catching dual-channel squeeze effects, unrivaled audio processing capabilities, keys, audio overs, quick selects and much more. Most features are provided standard, yielding a cost-effective and integrated system from day one that is superior to others that must add many expensive options trying to match Opus.

Attention to Detail

Opus addresses SD and HD environments with a completeness that is refreshing and reassuring. Audio can be discrete AES and/or embedded with four AES pairs per input/output, or stereo analog audio, with total control over audio channel assignments. Multi-channel control, audio metering, machine control and upstream router panel come standard in the Opus control panel — streamlining your work surface.

Unique features include automatic key removal when switching to specified commercial sources; eliminating make-goods; and Program Special mode which frees the panel for training or other off-line use without affecting the program stream. Smooth integration within your facility is further enhanced with the flexibility of five aux outputs, 36 each GPIs/GPOs, and more.

The Best Image

The 1-channel and 2-channel Squeeze Effects options deliver intriguing motion with multi-stage setups that alter size, position and video content — so much more than a one-step squeeze and reveal. Combined with exceptional video/audio quality and functionality, you can count on Opus for a most impressive on-air image.

General Features

- Panels and frames assignable in "n" x "m" network configuration
- OPUS NAV user-configurable software control panel
- Industry-standard automation interface
- CCS Pilot option provides configurable alarm notifications on-screen, to a database, or by e-mail

Video Features

- 10-bit quality video processing throughout
- Two independent linear keyers, downstream of effects
- Sixteen primary inputs and four key (key & fill) inputs
- Five aux outputs
- Extended input range using external routers
- Full program/preset transitions
- Full monitoring output
- Clean outputs available prior to each keyer
- One line buffer on all inputs
- Program Special for off-line use
- Optional 2D squeeze effects
- Optional key border/shadow

Audio Features

- Sixteen primary and eight audio over inputs
- Four AES pairs, or two-channel analog audio, with selectable 20-bit or 24-bit resolution
- Embedded configuration supports both discrete and embedded I/O
- Complete channel control, including sum, swap, left/right to both, phase reversal, etc.
- Full control panel metering (VU & PPM ganged)
- Full audio breakaway capability
- Two separate over/under stages
- Program Special for off-line use
- Clean outputs available prior to each A/O stage

Applications:

- Master Control / Studio / Production Control Rooms
- OB Vans (trucks)
- Traffic / Security monitoring
- Corporate board rooms/schools/video conferencing
- Trade shows / Kiosks
- Edit Suites / Quality Control stations

Features Common to all SuiteView Offerings:

- Audio metering and alarm support for embedded, analog stereo & AES/EBU audio
- Dynamic UMD captions & multiple tally support
- Store/recall preset configurations (non-volatile)
- Fully integrated with CCS (i.e., CCS Navigator)
- Customized, facility-wide monitoring system for 24/7 operation

SuiteView Multi-source Display Processor

The SuiteView line of multi-source display processors is designed to support rendering of multiple video and computer graphic signals in real time to either video or high-resolution plasma, LCD, computer monitors and projection displays.

SuiteView

Compact, cost-effective, versatile multi-source display processor capable of rendering multiple video signals in real time to one or more video monitors or for distribution across video networks.

- From 4 to 16 inputs in compact 1RU frame
- Unique auto-format detecting inputs support SDI and composite video inputs
- Flexible output support for SDI (x2), analog component, composite and line-doubled VGA

NEO SuiteView Solo

Compact multi-source display processor capable of rendering multiple video and computer graphic signals in real time to plasma, LCD, high-resolution computer monitors or projection displays.

- Up to 12 inputs in compact 1RU frame
- Unique auto-format detecting inputs support HD-SDI, SDI and composite video inputs
- Analog video module supports NTSC, PAL, PAL-M and RGB, YUV and Y/C inputs
- Graphics module supports VGA and DVI inputs
- Outputs up to UXGA support plasma, LCD, computer monitor or projection display systems
- Separate external graphics input

NEO SuiteView

Highly scalable, modular, multi-source display processor capable of rendering multiple video and computer graphic signals in real time to plasma, LCD, high-resolution computer monitors or projection displays.

- Up to 44 inputs in 3RU NEO frame/ 12 inputs in 1RU NEO frame
- Unique auto-format detecting inputs support HD-SDI, SDI and composite video inputs
- Analog video module supports NTSC, PAL, PAL-M and RGB, YUV and Y/C inputs
- Graphics module supports VGA and DVI inputs
- Outputs up to UXGA support plasma, LCD, computer monitor or projection display systems
- Separate external graphics input
- Reliable flexibility with NEO platform (ideal for mission-critical applications)
  - Redundant power supplies & controllers
  - Front-loading, hot-swappable modules
  - Mix-n-match with other NEO modules in the same frame
- Extensive alarming capabilities

LEITCH

HDTV

NX4000TXS
Transmission Server

The NX4000TXS is a modular, multi-channel transmission server platform that connects to the NEXIO™ shared SAN, providing up to four independent I/O channels per chassis. Ingest and playout control is delivered by Leitch native or third-party applications. Optimized for scalability, the NX4000TXS enables you to easily grow from two channels to over 100 channels, thousands of hours of shared storage and hundreds of megabytes per second of IP network bandwidth — all within a single NEXIO SAN (domain). Up to eight NEXIO™ platforms (including NX4000TXS™, NX4000MTS™ MPEG Transport Stream Server, NewsFlash™ and NewsFlash FX™ non-linear editors, and InstantOnline™, NEXIO™ Gateway Server and NEXIO™ Mirror Server) may be connected directly to shared storage, eliminating the need for external Fibre Channel switches. Larger systems are constructed using Fibre Channel switches. All server and editing platforms in the NEXIO family run the patented and Emmy® award-winning RAIDSoft™ system that allows all channels and network ports to simultaneously access content without restriction. RAIDSoft also provides two methods of protection for stored media: either RAID 3, providing protection from single drive failures, or Leitch's unique ECC (Error Correction Coding) protection, which protects even in the event of two drive failures. The unique file system keeps cached copies of the FAT tables on each server platform and on disk, providing protection from multiple failures.

NX4000MTS
MPEG Transport Stream Server

The NX 4000MTS MPEG Transport Stream server adds significant functionality to the NEXIO shared storage server system. It provides ASI interface with the ability to de-multiplex a multi-program transport stream (MPTS) for both HD and SD content, store individual programs as elementary streams, multiplex a new transport stream from stored content and output via the ASI interface. When used in combination with the optional NXA1000VTS view and trim application, both HD and SD content can be trimmed to allow seamless splicing in the output transport stream. Like all server platforms in the NEXIO family, the NX 4000MTS runs the patented and Emmy® award-winning RAIDSoft™ system that allows all channels and network ports to simultaneously access content without restriction.

X4000ITS
Integrated Transmission Server

The NX4000ITS is a standalone transmission server with integrated storage, supporting up to four independent I/O channels per chassis and easy integration with IP networks using gigabit Ethernet. The NX4000ITS supports the same formats and interfaces as the NX4000TXS and offers multi-use flexibility — for example, as an independent storage domain for redundancy, as an edge server, or for small ingest and playout applications.

The NX4000ITS is fully upgradeable to the NX4000TXS — thus protecting your investment as needs increase.

NEXIO Applications

As part of the NEXIO family, Leitch offers a complete range of native applications for your exacting broadcast needs — including NEXIO™, Pilot™, MediaBase™, CLIPSync™, PlayList™, Delay™, Digitizer™, TapeBase™, Ingest Control Manager™ (ICM), MediaNet™ and Rundown Manager™. Refer to the NEXIO Server System Brochure for full details, or contact your Leitch sales representative.

[Digital Turnaround Processor]

LEITCH

HDTV

DTP

All-MPEG-2 Processor for your Broadcast Localization Needs, with Dynamic Control.

The all-MPEG-2 stream manipulation of the Digital Turnaround Processor (DTP) allows broadcasters to overlay graphics/logos on pre-compressed high-definition and standard-definition streams inexpensively and with superior video quality. This allows a remotely encoded DTV signal to be localized with such applications as logo overlays; character generator text crawls; time/temperature overlays; stock index overlays; and local weather/news overlays. Such enhancements allow content owners to derive additional value from their national content by localizing it and making it more relevant to local audiences. And by avoiding decoding/re-encoding, the original MPEG encoding picture quality is preserved to the greatest extent possible.

The DTP is a broadcast-quality, real-time operating system and general-purpose computing platform with patented software for real-time compressed video processing. This flexible software architecture allows the unique Leitch algorithms to be continuously enhanced to improve performance and to roll out new features quickly and efficiently — in most cases by doing software-only updates to units in the field.

The DTP also allows for "lights out" operation and a drastic reduction in operational expenses through implementing the latest standards for "remote" automation and control, even in stations that do not have two-way control network connectivity.

Leitch's DTP complements the NEXIO MTS MPEG-2 transport stream server, offering complete store-and-forward compressed stream processing applications such as time-zone delay and archiving. Leitch routing and modular products can also be used for redundant and high-confidence operations.

Key features to demonstrate (via the live system) at NAB:

- All-MPEG-2 solution with a DTP-200 and a NEXIO MPEG-2 Transport Stream server, running under an automation system
- Motion logos, as well as static logos, with dissolve "on and off" effects
- "Burned-in" localized tag ad overlays
- Seamless switching (MPEG-2 splicing) for local content and ad insertion
- Second-generation DTP product running on a general-purpose computing platform and a real-time operating system

We Have You Covered

Whether you are designing and implementing a complete, new master control facility or starting out with a small HDTV island within your existing SDI facility, Leitch has the products to meet your HDTV applications needs.

EDITING	VelocityHD	NEWSFLASH.
SMALL AND LARGE ROUTING	PANACEA.	INTEGRATOR GOLD.
SIGNAL PROCESSING (interface and conversion)	NEO.	6800 PLUS / DPS-575
MASTER CONTROL	DTP	OPUS HD
BRANDING	DTP	LOGOMOTION II. 6800 PLUS
STORAGE AND TRANSMISSION	DTP	NEXIO

Integrated Content Environments offer the greatest opportunity for productivity and performance gains when employing content management and control and monitoring operations under a common control system with a consistent, but flexible user-configurable interface.

Any product identified with the CCS check mark will bring you all the value of Leitch's award-winning Command Control System.

CCS is a distributed, soft real-time Command and Control System providing configuration, control, monitoring and secure access to Leitch and third-party party equipment on a network, regardless of network topology. Based upon Leitch's extensible architecture, CCS provides open and scalable access via standard protocols (TCP/IP, SNMP, HTML, and Serial) to almost any component on a networked system.

The framework architecture for CCS provides an extensible design based on a layered approach. Through this, both the applications and product interfaces provide access to a host of services. By developing an application and/or product interface on the CCS framework architecture, all of the services and communications methods provided by CCS are available to that application or product. Therefore, as new methods of communicating and/or services are developed, they immediately become available to every CCS-enabled product line.

In addition to the extensibility of the design, the communication capabilities provided by CCS are also designed to be highly scalable. From simple control of one or two devices to control of large distributed systems with many devices distributed over multiple remote sites, CCS is designed to offer soft real-time response.

Adds to CCS Pilot a customizable GUI that empowers our customers to mastermind their operations. The Navigator application enables the user to create screen views that replicate their environment. This customizing feature provides tremendous flexibility in terms of how this software can be used.

The CCS Navigator software provides the graphical tools that will enable you to create easy-to-use graphical pages that visually represent your network's many devices, systems and environments. These graphical pages, called Navigator pages, will then allow you to consolidate network-wide status monitoring, leading to more efficient deployment of human resources for monitoring and troubleshooting tasks.

Included with the CCS Navigator software is a collection of buttons, symbols and images for use in creating the customized Navigator pages. Each page represents an interface to your network environment. You can import other image files to supplement that gallery, such as your corporate logo, your own network diagram, etc.

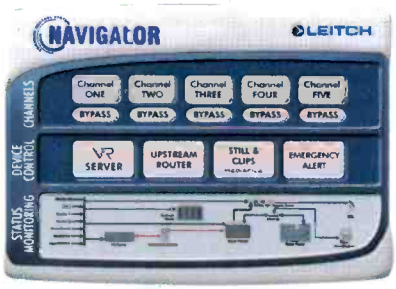
The Navigator tools also allow you to associate actions, such as loading a page, configuration or preset, with the graphical objects you place on a Navigator page. This enables you to interact with your network environments.

The software is highly customizable, so you can mold each Navigator page to suit your exact situation and particular needs.

All of CCS Pilot features plus the following:

GUI Page Creation

- Rendering of events across multiple pages
- Status Monitoring (alarm rendering)
- Allows browsing (backward & forward) across Navigator pages
- Buttons, images, text and Leitch device's symbol gallery
- Enable a single button to launch simple or multiple presets
- Enable a single click to launch HTTP applications
- Support for multiple image formats (JPG, BMP)
- Customizable monitoring with soft real-time control
- Configurable alarm notifications for CCS-enabled products



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Specifications and designs subject to change without notice.

TAKE CONTROL OF SIGNAL PROCESSING IN EVEN THE HARSHEST CONTENT ENVIRONMENT.

NEO™/6800+ Processing With NAVIGATOR Control

A Winning Video Processing Team for Your Integrated Content Environment (ICE)

NEO and 6800+ Give you an Integrated, Cost-effective System With Unprecedented Control:

- Reduce operational costs: Navigator's extensive control and monitoring capabilities allow unsurpassed views of your processing systems—from a single module to racks of equipment in multiple locations—saving you time and resources.
- Flex your processing options: A wide range of products in both NEO and 6800+ allows processing of analog and digital signals and provides compatibility with SD, HD, fibre optics and more.
- Design your system to fit your needs: The 6800+ and NEO platforms allow you to design a cost-effective, high-quality solution that is easy to configure and operate.

Put this team to work in your Integrated Content Environment (ICE): www.leitch.com/6800+ice and www.leitch.com/neo+ice

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