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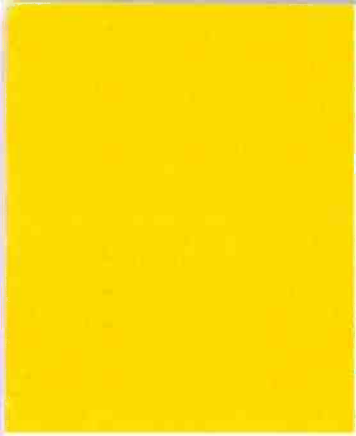
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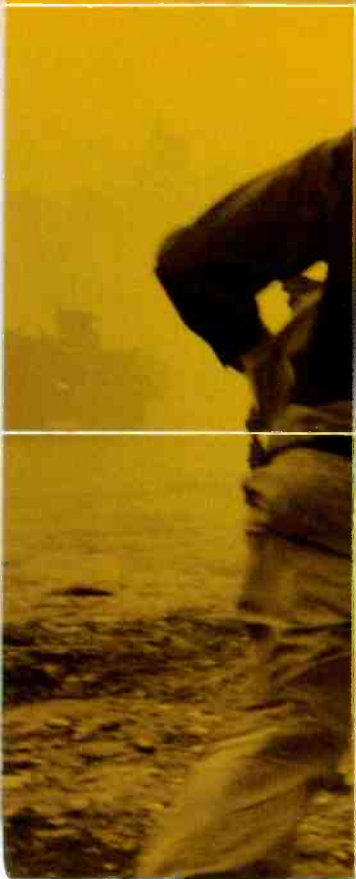
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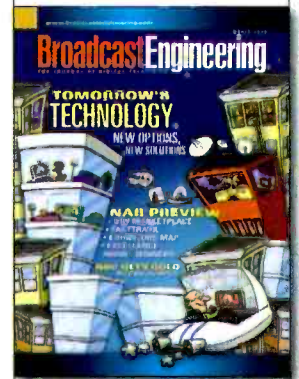
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"Tomorrow's Technology: New options, New solutions" cover and theme by Robin Metheny, Art Director.



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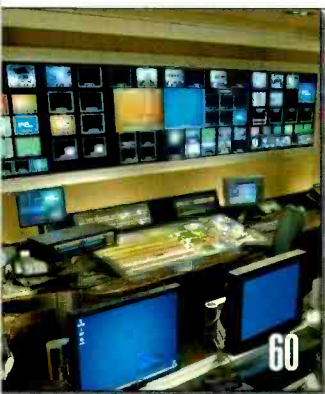
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FreezeFrame

What is another common name for a bidirectionally predictive-coded picture?

Readers submitting winning entries will be entered into a drawing for *Broadcast Engineering* T-shirts. Enter by e-mail. Title your entry "FreezeFrame-March" in the subject field and send it to: editor@prismb2b.com. Correct answers received by May 1, 2006, are eligible to win.

Question courtesy Tektronix 2005 Desktop calendar.





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The ultimate remote



I'm a guy who likes things big. I've got a big TV with huge 7.1 channel surround speakers. I like big. I'm going to get a matching sized — I mean colossal — remote for my big TV and big sound system.

Yep, the Consumer Electronics Association (CEA) decided its time to reassess remote controls. What used to be a little bitty, black five-button device is going to grow up, literally. And, to make sure it does, the CEA



has formed a subcommittee to oversee the design.

As a kid, I remember my grandfather having a really cool TV remote called the Zenith Space Commander. About the size of your hand, it used two small hammers to strike one of a pair of hollow tubes inside the device. When struck, the bars would emit an ultrasonic tone, which the TV set could hear.

Pressing the channel change button tripped the hammer above one tube and the channel knob rotated clockwise, stopping on the next preprogrammed station. Once the channel knob reached the zero position, the TV set would turn off. You'd have to click the channel button again to turn it on and wait while the channel knob slowly rotated to the next TV station.

The owner could hit the sound button, and the sound would go up a preset amount and stop. Hit the button a couple more times, and the sound would reach the maximum and decrease back to a low volume. As I

recall, there were about four or five preset volume levels.

Because the control signal was ultrasonic, other devices also could operate the TV set. My grandfather could jingle his car keys or his dog could rattle her dog tags, and the TV would either change channels or change volume — maybe both.

Ah, the good old days. Today, the CEA's subcommittee is charged with implementing new remote control standards. *Broadcast Engineering* has received a secret list of some of the new functions to be included:

- *All off.* Everything in your whole house will turn off.
- *All on.* Everything in your whole house will turn on.
- *Random.* Everything in your house will begin turning on and off randomly. Press "all off" to stop the process.
- *Neighbor on/off.* Turns your neighbor's TV on or off. A caveat: Your neighbor may have one too.
- *Dog off.* Note, there is no "dog on" button.
- *Google.* Google overtakes your TV, remembers everything you've watched for the past 10 years and sends a monthly report to the Chinese government.
- *Food.* Every restaurant within 50 miles pops up on your TV set with phone numbers. Trying to remain politically correct, the CEA committee can't decide whether users need separate Northern Italian and Southern Italian food buttons. After all, there's currently only one Mexican food button.
- *Cell phone.* Yep, your new TV remote is also a cell phone. A monthly report of all your phone calls is also sent to the Chinese government, along with a separate list of dirty words you said.

If these functions had been part of Space Command, my dog shaking her tags could have potentially triggered Google to connect my cell phone to a North Italian restaurant in Mexico for carryout. Or worse, the jingle jangle of my keys could send my neighbor a report of all the four-lettered words I used before pressing the "neighbor off" button.

Brad Dick

Editorial Director

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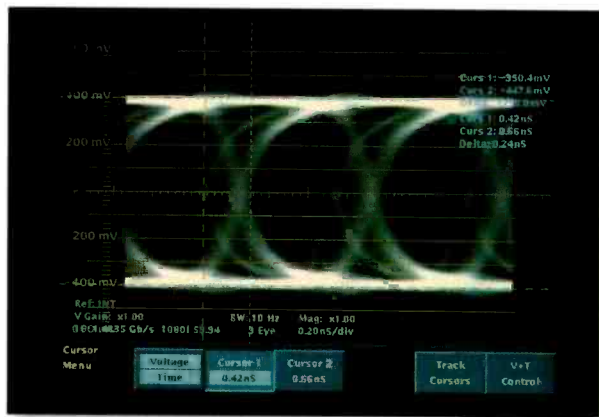


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HDTV: MAKING IT HAPPEN



Monitoring the SDI stream

John Luff:

I read your article, "Monitoring the SDI stream," in August 2005 and wanted to add something interesting. The actual analog signal for SDI 270Mb is 135MHz because of NRZI coding.

The Web site www.extron.com/technology/archive.asp?id=sd explains why this is true, under the heading "Why SDI?"

FRED TULLOCK
BRISTOL, CT

John Luff responds:

Your observation is important to comment on. SDI is a complex signal. Today, only the 270Mb version is in widespread use. The 143Mb/177Mb composite coding variants are effectively no longer used in new products, and older composite production and broadcast systems are rapidly disappearing.

The actual coded bit rate in SMPTE 259M is truly 270Mb. The reference to 135MHz is part of the specification for signal amplitude measurement in Annex A (found on page seven of the standard):

"The preferred method for measuring serial digital waveform amplitude, rise time and overshoot is using a 1GHz bandwidth oscilloscope. Input impedance of the oscilloscope should be 75Ω with a return loss greater than 20dB to 400MHz. Measurements should be made using a

2m length of coax between the transmitter and oscilloscope, with no more than 0.15dB/m loss at 135MHz."

The bit rate is separate from this reference, which refers to the practice of measuring the amplitude of the signal for the specification of cable loss at half

of the fundamental of the signal — hence, half of 270MHz. If you wonder what the apparent analog waveform frequency is, I think you would find 270MHz as the fundamental, but it is obviously dependent on the content of the data stream.

Due to the scrambling and relatively random nature of the video signal, one might find long periods without transitions. Video signals create plenty of problems for some hardware and can create DC on the cable, which upsets transmission.

The NRZI signal has a transition either positive or negative. This occurs every time there is a change of state (high to low or reverse). That means if the bit rate is 270Mb, there are potentially 270M transitions per second, with minor variations due to the random coding.

It is a bit misleading to look at this as an analog sine wave and assume that a combined positive and negative transition make one cycle, thus interpreted as half of the bit rate. A bandwidth capable of only 135MHz would not sufficiently pass the signal. It is also important to look at the rise time specifications in section 3.3:

"The rise and fall times, determined between the 20 percent and 80 percent amplitude points, shall be no less than 0.4ns, no greater than 1.50ns and shall not differ by more than 0.5ns."

SMPTE 259M does not in fact specify receiver characteristics. It specifies launch characteristics and states in Section 1, Scope:

"This standard has application in the television studio over lengths of coaxial cable where the signal loss does not exceed an amount specified by the receiver manufacturer. Typical loss amounts would be in the range of 20dB to 30dB at one half the clock frequency with appropriate receiver equalization. Receivers designed to work with lesser signal attenuation are acceptable."

Thus, SMPTE is mute on standards for receiver performance. The suggestion to measure at half the clock rate is about as close as they come to ever mentioning 135MHz in the standard itself. This section is what SMPTE refers to as informative, not normative. **BE**

November Freezeframe

Q. Fill in the blanks.

_____ is the entire time between the end of the active picture time of one line and the beginning of the active picture time of the next line. It extends from the start of the front porch to the end of the back porch.

A. Horizontal blanking

Winners:

Guy St.-Arnaud, Mark Augustine, Wes Bishop, Jim Borgioli, Chuck Condie, Al Conte, Mark Everett, Peter A. Gouweleeuw, John L. Harris, Scott Holisky, Slobodan Kozic, Murat Kurubas, Don Norwood, Jayen Patel, Bob Peticolas, Henry Rousseau, Karl Sargent, Roman Shkwarok, Slobodan Uzelac, Al Vandinteren, Chris Whittington, Bob Woodward, Pat Yates

Test Your Knowledge!

See the Freezeframe question of the month on page 8 and enter to win a Broadcast Engineering T-shirt.

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A lasting compression standard?

BY CRAIG BIRKMAIER

Given the incredible change in pace of all things digital, one might speculate about the half-life of any technology that can benefit from the ongoing geometric progression in processing power, memory and storage capacity, network bandwidth, and so on. For example, the following question came up recently in the OpenDTV Forum, an e-mail discussion forum on digital television issues:

“Is there a Moore’s Law regarding codec efficiency, or is there a theoretical limit to the improvements we can expect in digital compression algorithms? If so, then how far away from that theoretical limit is MPEG-4/AVC (aka H.264)? Is MPEG-4/AVC to the point that it really could be a standard that could last for 20 years?”

Lasting compression

Video compression has been a fact of life since television hit the airwaves about seven decades ago. One might

ask how this is possible, because digital television broadcasting has only been a practical reality for the last decade of those seven. The answer is simple: Video compression need not use digital signal processing techniques to reduce the amount of information that is transmitted.

The true measure of compression

come too objectionable to the human observer).

Given the high level of compression artifacts seen today on virtually all digital television distribution platforms, one could properly surmise that this limit is exceeded on a routine basis. Then again, for those of us who have been around for some or all of



Our analog broadcast standards place hard limits on the frequency response of the analog signals that are transmitted.

efficiency lies in the ability to reduce the amount of information delivered to a receiver in a manner that limits the distortions and artifacts perceived by the viewer. One measure of the theoretical limit faced by any compression technique is known as the rate/distortion boundary (in layman’s terms, how much we can squeeze before the distortions be-

the past seven decades, we know limits on image quality, artifacts and distortions have always been a problem for television broadcasters.

Over those decades, the analog television standards used throughout the world have relied on analog compression techniques to bring moving images into our homes. Interlace is a powerful compression technique, reducing the amount of information transmitted by half.

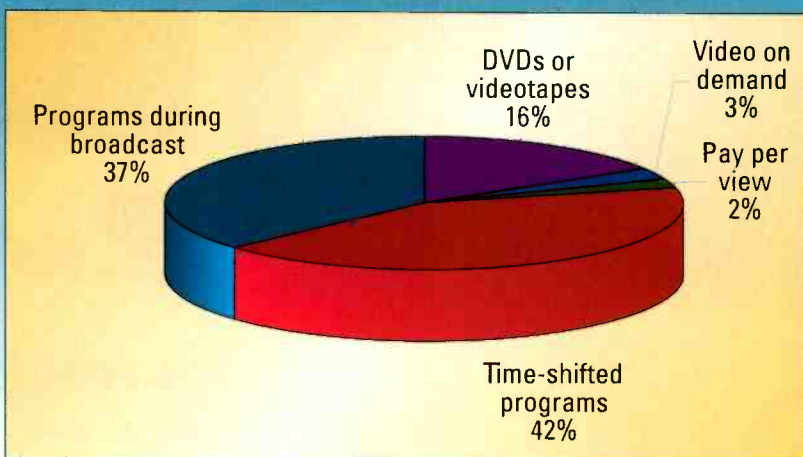
Our analog broadcast standards place hard limits on the frequency response of the analog signals that are transmitted. For several decades, it has been possible to capture significantly more detail in 525- and 625-line television systems than can be delivered via NTSC and PAL. This became obvious in the ’80s when analog component video processing gear became a practical alternative to composite signal processing. It happened again when analog component outputs from DVD players made it possible to deliver the full quality possible with 525/625-line component video to consumer television displays.

When we added color to TV, we had

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

Breakdown of DVR users’ TV time

Forty-two percent of DVR use is for time-shifted programs



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to squeeze even harder. Where one black and white signal once filled an entire 6MHz to 8MHz channel, we now needed to deliver three components. Only a tiny fraction of the color information from a camera is delivered using NTSC and PAL compression.

While these analog compression techniques imposed hard limits on delivered image quality, we became accustomed to the inherent distortions, even as television images improved over the years. It took about

In contrast, it took less than a decade to fully exploit MPEG-2, the first digital compression standard used to deliver television pictures to the masses. Now the question is whether MPEG-4/AVC (aka H.264) can be expected to last as the standard for two decades.

The half-life of a standard

Analog television is still going strong. While President George W. Bush just signed legislation setting February 17, 2009, as the official shutoff date

will be any more real than others that have come and gone.

To be certain, devices that will support the signals flowing through that little RCA connector will not disappear for decades to come. Analog cable, analog television translators and huge libraries of analog programming will not disappear on any certain date.

The same is likely to be true for MPEG-2, MPEG-4/AVC and whatever comes next. Legacy standards will live for decades, even as they are replaced by the next generation. A useful threshold to consider when thinking about the half-life of a digital compression standard is that point in time when it becomes possible to realize a 2:1 improvement in compression efficiency, i.e., the ability to deliver the same picture quality with half the bits.

Gary Sullivan, a video architect

Now the question is whether MPEG-4/AVC can be expected to last as the standard for two decades.

five decades to fully exploit the capabilities inherent in these analog television standards.

for analog television broadcast in the United States, many industry observers question whether this deadline

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with Microsoft, has worked extensively in the ITU and MPEG on video compression standards. As chairman of the Joint Video Team, a collaboration of the ITU and ISO/MPEG, Sullivan played an important role in the development of MPEG-4 part 10 (AVC), which is also known as ITU standard H.264.

video (i.e., a 50 percent reduction in bit rate with similar video quality relative to a good use of H.264/MPEG-4 AVC syntax).

But Sullivan cautions that it may take a number of years before we figure out how. His guess: between five and 15 years. That puts the estimated time necessary to get the next solid

codecs such as On2's VP series that are popping up in places like Flash, AOL and Skype.

By the time broadcasters are expected to turn off those NTSC transmitters in 2009, it is likely that they will be a generation behind their competition. To make matters worse, the ATSC standard has poor support for the one aspect of over-the-air television where broadcasters have a competitive advantage over tethered services: the ability to deliver bits to portable and mobile receivers.

Attendees at next month's NAB2006 will have the opportunity to see how much the landscape of digital television has evolved in just one decade. And they will have the opportunity to see where we may be in another decade, as today's emerging technologies will have run their course and begin to yield to whatever comes next.

Broadcasters might question where the opportunity is for *them* in all of this. Here's a clue: It has nothing to do with government subsidies for set-top boxes that implement dated technologies.

Is the broadcast industry's glass half empty or half full? Have we reached the theoretical limit on squeezing more profits from broadcasting as we know it? What do you think?

BE

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

 Send questions and comments to: craig_birkmaier@prismb2b.com

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Broadcasters are being told that their new digital television standard, built on MPEG-2 video technology, is already dated.

When asked how far today's technology is from the theoretical limits on compression efficiency, Sullivan replied, "I think nobody knows the answer for sure." However, he is confident that we can achieve at least another factor of two in practical compression efficiency improvement for

factor of two in coding efficiency into the same 10-year ballpark as the last time around — with MPEG-1 and MPEG-2 standardized in 1993 and 1994 and H.264/MPEG-4 AVC standardized in 2003 with its fidelity range extensions in 2004.

Out of sync

So here we are, some three years from the date that analog television broadcasting is supposed to end in the United States, and broadcasters are being told that their new digital television standard, built on MPEG-2 video technology, is already dated. The direct broadcast satellite services are migrating their customer base to H.264/AVC, to take advantage of the bandwidth savings so that they can deliver (H)DTV broadcasts to most local markets across the country. Cable is certain to follow.

H.264/AVC is being deployed rapidly for Internet download applications. It is supported natively by Apple's QuickTime media architecture and is the format used by the company's video download service and iPods. Most videoconferencing systems and some key cellular and mobile TV services are using one of the low complexity profiles of H.264/AVC.

H.264/AVC is not the only new game in town. There is the new SMPTE 421M VC-1 standard based on Microsoft's Windows Media 9 codec design, as well as proprietary

Web links

Description of H.264/MPEG-4 Part 10 video compression algorithm
<http://en.wikipedia.org/wiki/H.264>

Description of SMPTE 421M/VC-1 video compression algorithm
<http://en.wikipedia.org/wiki/VC-1>

MPEG Industry Forum Tutorials on compression technology
www.mpegif.org/tutorials.php

Apple Computer H.264 in QuickTime 7
www.apple.com/quicktime/technologies/h264

Microsoft description of VC-1/Windows Media compression algorithms
www.microsoft.com/windows/windowsmedia/forpros/events/NAB2005/VC-1.aspx

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Networks agree to KidVid compromise

BY HARRY C. MARTIN

The four major broadcast networks, joined by some public interest groups, have proposed a compromise on the FCC's new KidVid rules in an effort to avoid a showdown in court. Specifically, the networks and public interest groups are suggesting revisions to the Web site rule, the host-selling rule, the promotions rule, the preemption rule and the multicasting rule. If the FCC adopts these recommendations, the networks and public interest groups will drop their court challenges to the new rules. Currently, the rules are subject to stay while petitions are being reconsidered.

Web site rule

In the current rules, the FCC bans the display of Web site addresses in a

Dateline

April 1 is the deadline for TV, LPTV and Class A stations and TV translators in Texas to file their 2006 renewal applications. Texas TV stations must file, along with their renewal applications, their biennial ownership reports and EEO program reports. Class A TV stations in Texas must file EEO program reports with their renewals, but not ownership reports.

April 1 is the deadline for TV stations in Delaware and Pennsylvania to file their 2006 biennial reports.

April 1 is the start date for pre-filing renewal announcements for TV, Class A and LPTV stations that originate programming in the states of Arizona, Idaho, New Mexico, Nevada, Utah and Wyoming in anticipation of a June 1 renewal filing date.

children's program when the site uses characters from that program to sell products or services. The networks suggest that the FCC rule should be replaced with a more specific rule prohibiting the display of a Web site

commercial time exclude promotions for children's programming on the same channel or educational and informational programming on any other channel. The FCC's new rules changed the long-standing definition

If the FCC adopts these recommendations, the networks and public interest groups will drop their court challenges to the new rules.

address only during or adjacent to a program where:

1. products are being sold that feature a character appearing in that program
2. a character appearing in that program is used to actively sell products.

Host-selling rule

The networks and public interest groups proposed that broadcasters certify compliance with these host-selling rules in the same manner as they currently certify compliance with the advertising limits.

Promotions rule

The networks propose clarifying the rule to provide that:

1. the rule apply when Internet addresses appear during program material or in promotional material not counted as commercial time
2. if an Internet address is displayed during a promotion for program material and the immediately available pages on the featured Web site contain commercial matter, then in addition to counting against the commercial time limits, the promotion must be clearly separated from programming material.

In relation, the networks urge that the FCC's definition of com-

mercial matter to include promotions of any television programs other than educational and informational programs.

Preemption rule

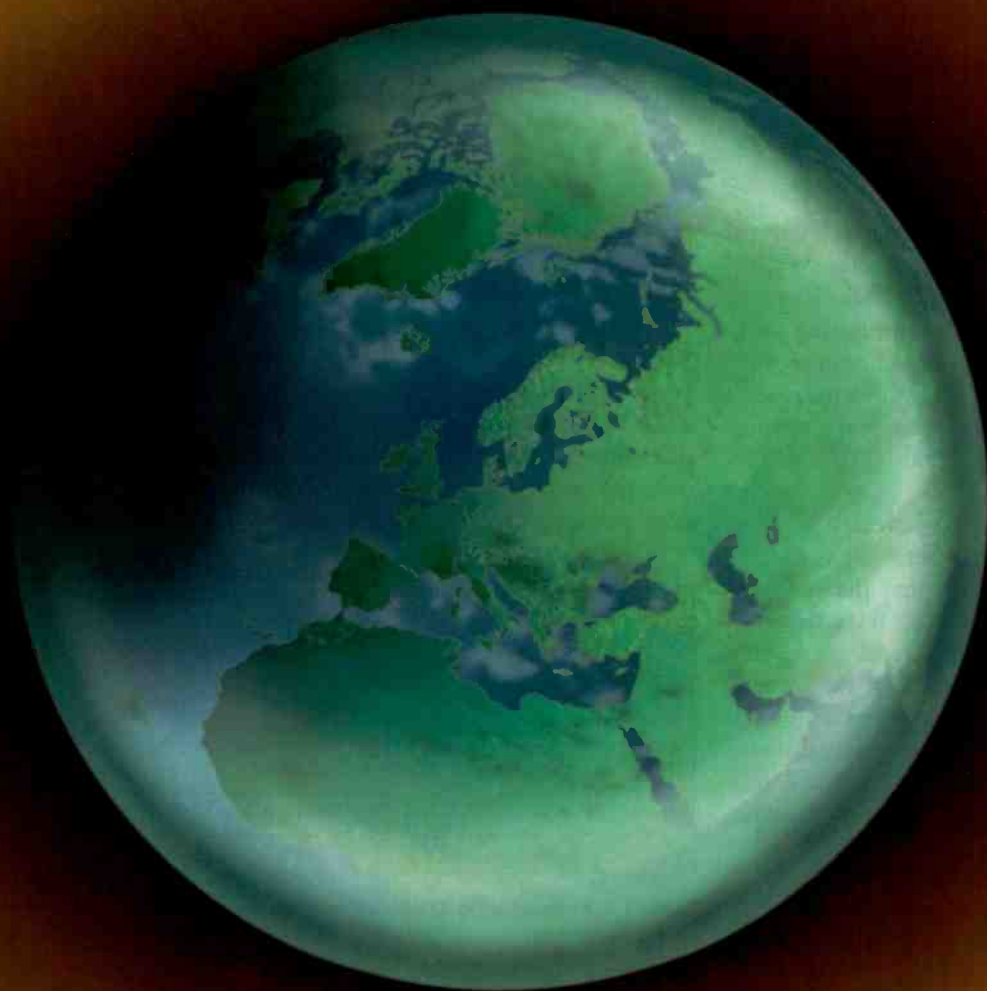
With respect to preemptions of core programming, the networks recommend eliminating all percentage and other numerical limitations on preemptions of core children's programming.

Multicasting rule

The networks recommend keeping the new multicasting rule with one minor clarification. The current rule states that if 50 percent or more of a station's core programming is repeated during the same week, the excess does not qualify as core programming. Under the clarification, repeating core programming on the main channel or on any multicast DTV channel will not count in meeting the additional hourly core programming requirements that accrue as a result of multicasting. **BE**

Harry C. Martin is the immediate-past president of the Federal Communications Bar Association and a member of Fletcher, Heald and Hildreth PLC.

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The ATSC standard

BY MICHAEL ROBIN

In the 1980s, many interested parties began developing concepts of advanced television, or HDTV, geared at reproducing superior-quality 16:9 aspect ratio pictures when seated at three times the picture height. The International Telecommunications Union (ITU) defines HDTV as:

"...[A] system designed to allow viewing at about three times the picture height, such that the system is virtually, or nearly, transparent to the quality of portrayal that would have been perceived in the original scene or performance by a discerning viewer with normal visual acuity. Such factors include improved motion portrayal and improved perception of depth."

A tall order indeed!

In the United States, the development of the advanced television concepts was entrusted to the Advanced Television Systems Committee (ATSC), a private sector organization of corporations, associations and educational institutions. It was

responsible for exploring the need for and developing the documentation of the advanced television system.

Video system characteristics

The ATSC standard supports a range of program materials originating in different picture formats. Two program format levels, SDTV (480 active

and several frame rates are specified. The formats are, respectively:

- a VGA format (640 pixels x 480 lines)
- a slightly modified CCIR 601 format (704 H samples x 480 lines).

The modification consists in reducing the number of active samples per line to 704 and active scanning lines per frame to 480. This is an MPEG-2

Active H-samples	Active lines	Scanning mode	Frame rate (Hz)*
640	480	Progressive	60(60/M), 30(30/M), 24(24/M)
		Interlaced	30(30/M)
704	480	Progressive	60(60/M), 30(30/M), 24(24/M)
		Interlaced	30(30/M)

* M=1.001 is a frame rate divisor for NTSC-friendly systems.

Table 1. 4:3 aspect ratio ATSC picture formats

lines) and HDTV (720 and 1080 active lines), are represented.

Table 1 summarizes the 4:3 aspect ratio SDTV ATSC formats. The scanning mode may be progressive or interlaced,

requirement to the effect that the number of active pixels per line and active lines per frame be a multiple of the pixels and lines in a DCT block (8 pixels x 8 lines).

Table 2 on page 24 summarizes the 16:9 aspect ratio formats. NTSC-friendly frame rates are obtained by dividing the nominal frame rate by M=1.001. The formats are:

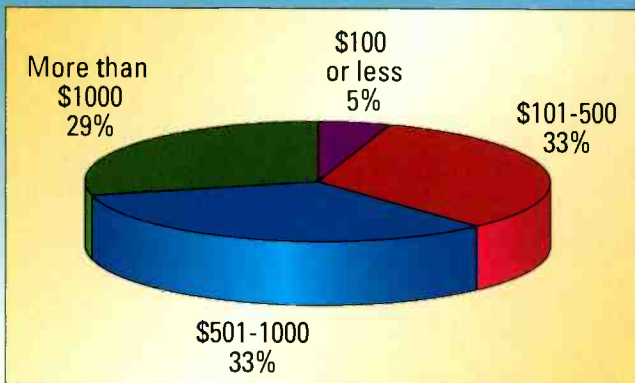
- SDTV format (704 H samples x 480 lines) modified to MPEG-2 requirements as explained above. This format may use the progressive or interlaced scanning mode at several frame rates. SMPTE standards 293M (progressive scanning) and 294M (bit-serial interface) define the production aspects of the format.
- HDTV format A (1280 H samples x 720 lines). This format uses exclusively progressive scanning at several frame rates and is described in the SMPTE 296M standard.

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SMPTE production standard	Active H-samples	Active lines	Scanning mode	Frame rate (Hz)*
293M (Progressive scanning)	704	480	Progressive	60(60/M), 30(30/M), 24(24/M)
294M (Serial interface)			Interlaced	30(30/M)
296M (Scanning and interface)	1280	720	Progressive	60(60/M), 30(30/M), 24(24/M)
274M (Scanning)	1920	1080	Progressive	30(30/M), 24(24/M)
292M (Serial interface)			Interlaced	30(30/M)

* M=1.001 is a frame rate divisor for NTSC-friendly systems.

Table 2. 16:9 aspect ratio ATSC picture formats

• *HDTV format B (1920 H samples x 1080 lines)*. This format uses exclusively progressive or interlaced scanning at frame rates not exceeding 30Hz. This restriction is due to the fact that a progressive 60Hz frame rate would result in a non-compressed bit-serial rate of 3Gb/s, which exceeded the bit-rate compression capabilities at the time the ATSC standard was developed. SMPTE Standards 274M (scanning) and 292M (bit-serial interface) define several formats, including progressive scanning, which, currently, is not an ATSC format.

Accounting for all picture scanning formats and frame rates, the ATSC

The latter frame rates will simplify interworking with NTSC material during the simulcast period.

The audio system characteristics

The ATSC standard document A-52 defines audio characteristics. The digital compression system is a constrained subset of the AC-3 system developed by Dolby Laboratories. It encodes five full-bandwidth audio channels (3Hz to 20kHz) including left, center, right, left and right surround and one reduced bandwidth, low-frequency enhancement (LFE) channel (3Hz to 120Hz) by com-

pressing the resulting 5.184Mb/s data stream into a 384Kb/s data stream. The LFE channel carries about one-tenth of the bandwidth of the other channels, so the AC-2 system is frequently mentioned as carrying 5.1

Transmission considerations

channels. Table 3 summarizes the audio service type contained in an AC-3 elementary stream.

Table 4 on page 26 shows essential (active) bit rates of ATSC-recommended production scanning formats, with 10 bits/sample resolution, before bit-rate reduction and compression are applied. The total bit rates, including the samples in the horizontal and vertical blanking areas, are shown in brackets.

The ATSC terrestrial transmission standard defines the bit-stream content and transport and its digital transmission in the specified 6MHz RF channel. The nominal transmission bit rate depends on the chosen digital RF modulation scheme. The ATSC chosen scheme, 8VSB, limits the transmission bit rate to 19.38Mb/s. This constraint offers no other alternative but bit-rate reduction and compression to accommodate all the ATSC formats.

The video compression scheme is based on the main profile syntax of the MPEG-2 video standard. It uses a motion-compensated discrete cosine transform (DCT) algorithm and B-frame prediction. The video encoder supports the wide motion estimation range needed for tracking fast-motion pictures. In addition, it uses source-adaptive coding, field and frame motion vectors and other techniques to improve compression efficiency. In all ATSC-suggested formats, it is

Designation	Type of service	Number of channels	Compressed bit rate (in Kb/s)
Complete main (CM)	Main audio	1 to 5.1	64 to 384
Music and effects (ME)	Main audio	1 to 5.1	64 to 384
Visually impaired (VI)	Associated	1	128
Hearing impaired (HI)	Associated	1	128
Dialogue (D)	Associated	1	128
Commentary (C)	Associated	1	128
Emergency (C)	Associated	1	128
Voice-over (VO)	Associated	1	128

Table 3. ATSC audio service types

standard supports 18 picture formats, based on the nominal frame rates of 60Hz, 30Hz and 24Hz. If we take into consideration the NTSC-friendly rates of 59.94Hz, 29.97Hz and 23.976Hz, we end up with 36 picture formats.

pressing the resulting 5.184Mb/s data stream into a 384Kb/s data stream. The LFE channel carries about one-tenth of the bandwidth of the other channels, so the AC-2 system is frequently mentioned as carrying 5.1

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possible to transmit film material in its native progressive 24fps format and eliminate the 3/2 pull-down concept used in NTSC countries. This reduces the transmitted bit rate and eases the task of the MPEG-2 encoder. The

correction, program stream multiplexing and switching, time synchronization, flexibility and extensibility, and compatibility with the ATM format. The 19.38Mb/s data stream feeds a channel encoder, which in

(1920 x 1080, 1280 x 720 or 720 x 480). In the end, the display device determines the picture detail. Triple CRT (green, blue and red) forward or reverse projection systems offer the best resolution as the picture quality depends on the beam focus that can be tightly controlled. The resolution of the relatively obsolete triple-gun direct-display CRT depends on the beam focus as well as the phosphor dot density.

LCD and Plasma devices feature progressive (non-interlaced) displays. Because their native format is typically 1280 x 720, they will work best with a 1280 x 720 HDTV format. They will, however, require deinterlacing and down-scaling from a 1920 x 1080 HDTV format to their native format. This, by necessity, will affect the displayed picture quality.

Reception problems

The ATSC chosen modulation scheme, 8VSB, provides adequate reception when outside, rooftop, reception antennas are used. Indoor antennas provide unreliable reception. However, rooftop antennas are rarely used except in isolated and remote reception sites and, in any event, are impractical — if not impossible — to use in large cities with many high-rise buildings.

For this reason, more than 80 percent of North American viewers receive analog cable TV. Because cable operators have chosen a different type of digital TV modulation, a separate set-top digital cable TV tuner is required, or a new generation of cable-compatible ATSC receivers will need to be made available. **BE**

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



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Active (total) video format H-samples x lines	Nominal frame rate (Hz)*	Active (total) nominal bit rate (in Mb/s)*
640 x 480 (840 x 525)	30 interlaced	184 (252)
	30 progressive	184 (252)
	60 progressive	368 (504)
720 x 480 (858 x 525)	30 interlaced	207 (270)
	30 progressive	207 (270)
	60 progressive	414 (540)
1280 x 720 (1650 x 750)	30 progressive	553 (742)
	60 progressive	1106 (1485)
1920 x 1080 (2200 x 1125)	30 interlaced	1244 (1485)
	30 progressive	1244 (1485)

* For NTSC-friendly systems, this figure is divided by M=1.001.

Table 4. Active and total bit rates for various formats

receiver reconstructs the interlaced or progressive display.

The ATSC system employs multiple picture formats, digital audio and video compression. The compressed video and associated audio data streams are packetized into a packetized elementary stream (PES). One (i.e., one HDTV program) or several (i.e., multiple SDTV programs) PES together with auxiliary and control data and program and system infor-

turn feeds the RF modulator of the terrestrial transmitter operating in an allocated 6MHz RF channel.

Receiver and display considerations

The receiver reverses the functions of the RF transmission and encoding and, after decompression, generates video and audio signals suitable for the display format and listening conditions chosen. For economic

For economic reasons and to simplify receiver design, TV receivers may not display different formats.

mation protocol (PSIP) are fed to a transport stream multiplexer, which combines them into a 19.38Mb/s data stream.

The packetization separates audio, video and auxiliary data into fixed-size units suitable for forward error

reasons and to simplify receiver design, TV receivers may not display different formats. Depending on its class, the receiver may be built to display all transmitted formats or in a native, receiver-specific display, in one of the three picture formats



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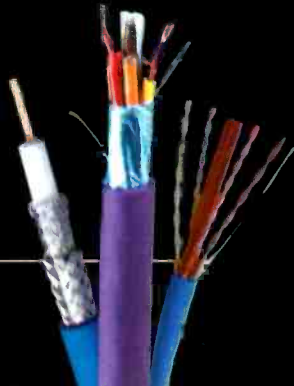


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Network cabling: A manufacturer's view



BY BRAD GILMER

Although I have worked with cable for many years, I had never had the opportunity to see it being made until a few months ago when I visited CommScope's cable manufacturing plant in Claremont, NC. CommScope designs and manufactures cable and makes more than 3000mi of enterprise, broadband and wireless cables per day. At the Claremont plant, the company manufactures many different products, including unshielded twisted pair (UTP), coax and fiber-optic cable. This plant is one of the company's 12 manufacturing facilities located around the world.

Manufacturing single-conductor and braid wire

The first thing that struck me when I entered the plant was its size. The manufacturing plant is held within two connected buildings that total 587,500sq ft.

The basic layout of the various manufacturing lines is similar. CommScope draws its own single-conductor and braid wire. Spools of single-conductor wire or fiber are loaded onto machines at the beginning of each line. The number of conductors or fibers needed for



Single-fiber reels are loaded onto a manufacturing line to create a multi-fiber cable. Photos courtesy CommScope.

The jacket starts out as plastic pellets that are loaded into a hopper above the extruder. The appropriate color is added as the pellets are melted. The molten plastic flows into the extruder head and onto the individual wires as the wires move through the head in a continuous motion. The number of variables that

statistical process control to identify short and long-term manufacturing problems. An example of a short-term problem is a pressure variation in the molten plastic as it flows into an extruder. An example of a long-term problem is a bearing going bad, causing periodic fluctuations in cable thickness.

In addition, operators test each roll of cable to ensure it meets specifications before the cable moves on to subsequent manufacturing steps. Operators also test and inspect the final product.

Once the jacket is extruded onto the wires, the completed cable passes through a number of water baths. The temperature of these water

The number of variables that have to be regulated to make this work is mind-boggling.

the finished product determines the number of spools. Filler material and strength members are also loaded, if required. The cable contents are threaded through an extruder, which creates a jacket, which then encloses the wires.

have to be regulated to make this work is mind-boggling. Wire feed rate, tension, plastic flow rate and plastic temperature are just some of the items that must be closely controlled.

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baths is tightly controlled so that the finished product's jacket bonds properly to the cable.

The cable is then wound onto spools or put into conveniently sized boxes. Custom-designed computers control the whole process, with proprietary software written and maintained by the company.

Manufacturing UTP cable

I had a couple questions about how UTP cable is made: How are the wires twisted together? Are the pairs in UTP manufactured separately and then woven together, or is the entire cable manufactured in one step? But before I got to these questions, I learned something else.

The raw material for the line is bare 14-gauge copper wire. As the line moves, this wire is swaged down to the appropriate gauge. This reduces the time between loading reels of raw materials.

Once the wire is swaged to proper size, it is insulated and fed into a twinning machine. Two conductors are fed through collars with holes in them. As the wire is fed through the machine, the collars twist the two wires into a single twisted pair. The wires feed into another set of collars, which twist with a similar motion, but at a faster rate.

This process continues until the fourth stage, when the collars are twisting so rapidly that you almost cannot see the individual strands. The output of this line is a reel of one twisted pair. The four individual pairs are then loaded into a similar machine, and they are bunched together to produce the final UTP wire. From here, the reels of UTP are loaded onto a final line that adds a jacket.

Manufacturing fiber-optic cable

To make fiber-optic cable, multicolored reels of single-coated glass fiber are loaded at the beginning of the line. What happens next depends on whether the cable is loose buffer or tight buffer.

Loose buffer cable, which is typically

used in outdoor applications, carries the fiber inside a loose-fitting buffer tube filled with a water-blocking gel that virtually eliminates water migration into the tube. Tight buffer cable, as the name implies, has a buffer that tightly encircles the fibers. Tight buffer cable, intended for indoor applications, does not contain any gel.

A loose buffer manufacturing line injects a water-blocking gel and then extrudes the buffer tube around the fiber. Multiple fibers in their buffer tubes are combined according to the cable type being manufactured. The fibers are



Braiders, mechanical knitting machines, have been around for more than 100 years and are an efficient way to create a woven shield outer conductor.

wrapped in Kevlar-strength members and then fed through another extruder. They can also be fed into a machine that covers the cable in an armored jacket.

Tight buffer cable follows a manufacturing process similar to standard wire described earlier in this article.

Manufacturing coaxial cable

Watching UTP being made was quite something. But it was also a real learning experience seeing coax cable being made.

The manufacturing process starts with the cable's center conductor, which is fed off of reels and around

a large capstan. Two capstans, one at the beginning of the line and the other at the end, carefully control tension and feed rate throughout the process. The center conductor is fed through an extruder, where the dielectric is applied. In this case, plastic pellets are heated to the melting point and compressed nitrogen gas is injected just before the plastic exits the extruder. The center conductor moves through the extruder as the dielectric flows onto it.

As the dielectric exits the extruder head, two things occur simultaneously. First, the plastic begins to contract as it cools. Second, the plastic begins to expand as the high-pressure gas mixed with the plastic is exposed to ambient air pressure (creating the foam dielectric).

The two processes are carefully controlled to maintain the cable diameter within tight tolerances. As part of the continuous quality control process, the center conductor is connected to ground. The cable, with its dielectric bonded to it, passes through a spark-er box, where bead chains energized with a high-frequency HV signal are used to create a corona. If there is a fault in the dielectric, the corona field is disrupted and sets off a detector.

The cable is wound onto spools and is then fed through another machine called a braider. The center conductor and dielectric are fed through the center of the braider, which weaves the wire braid onto the cable. The braiders have been around for more than 100 years and were originally designed to make rope. The shielded cable is then fed through an extruder head, where the appropriate jacket is added. **BE**

ACKNOWLEDGEMENTS: Thanks to Randall Stevens, Betsy Lambert and CommScope for their hospitality and contributions to this article.

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HD routing preparation

BY MITCH HAYDEN

When considering an HD routing infrastructure build-out, you'll need to answer these four questions:

1. What specifications do I need to consider?
2. What are my options and considerations to weigh against my financial budget?
3. Does the actual picture format (1080i or 720p) matter?
4. Are there any special timing considerations for HD?

Before we find the answers to these questions, let's review the background concepts of SDI.

SDI background

There is a serial signal transport standard for routing SD digital video signals (SMPTE 259M) and a different, but similar, transport standard for HD signals (SMPTE 292M). These

SD rates are from 143Mb/s to 360Mb/s, and the SMPTE 292M HD rate is 1.485Gb/s. Both of these standards are designed as funnels in which there are multiple source formatting standards that can be turned into a compliant SDI signal. Examples of these standards are the NTSC 4fsc composite sampling for SD (SMPTE 244M) or 1080-line video (SMPTE 274M) for HD rates.

Specifications

Because the basic characteristics of SD and HD transport are similar, what aspects of the specifications are noteworthy for consideration in planning for HD? The first issue is cable length.

Today, 100m of coax cable is typically specified by HD transmission gear as the equalization length for HD. Equalization is the process of inserting specific high frequencies back into the signal to recreate a good signal.

Because HD and SD share this same basic electrical interface, circuit chips and finished products can be designed to handle both.

standards' similarities allow HD infrastructure to transport SD signals. The similarities include:

- Electrical interface — 75Ω BNC, unbalanced signal over coaxial cable.
- Signal level — 800mV PP signal (+/-10 percent) and 0.0VDC offset (+/- 0.5V).
- Channel coding — scrambled NRZI.

Because HD and SD share this same basic electrical interface, circuit chips and finished products can be designed to handle both SD and HD. Any remaining differences in the specifications can be handled by equipment designers.

The key difference between the SD and the HD serial transport standards is the data rate of the serial bit stream. The

Equalization is possible because the transport situation is well-defined and consistent. The signal transport medium is known (a coaxial cable with specified characteristics), and the signal being transported is a fixed style. Therefore, the filtering action on the signal can be reversed or equalized.

If you have an infrastructure that requires cable runs for HD equipment longer than 100m, what options do you have? By choosing the correct cable types, you can increase the cable runs about 20 percent to 30 percent.

The 100m equalization specification typically calls for Belden 1694A or equivalent cable. Belden 7731A or equivalent can increase your reach,



Grass Valley's Trinix digital video routing switcher is designed for density and comes in three sizes: 8RU for 128 X 128 frames, 15RU for 256 X 256 frames and 32RU for 512 X 512 frames.

but if significantly longer cable runs are needed, the best option is to turn to fiber.

Fiber signal transport options for HD signals are readily available. With fiber, the distance of the signal runs can be anywhere from 1km to 60km, depending on the device used. Fiber transport capabilities center on two criteria: signaling type and carrier frequency of the laser. There are two signaling types: single- and multi-mode fiber.

Multi-mode fiber has a larger pipe diameter (50 micrometers) and thus allows for multiple paths for the light to travel (hence the term *multi*). Single-mode fiber has a much narrower pipe diameter (9 micrometers) and essentially has only one path for the light to travel. Because of the many paths and resulting modal dispersion, multi-mode fiber has more signal attenuation and thus travels shorter distances than single-mode fiber.

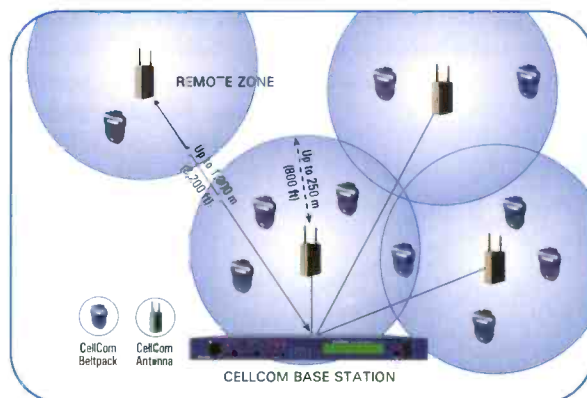
The second aspect that has a major impact on the distance traveled is the carrier frequency. Fiber transmission on glass fibers has three main frequencies that are used. These frequencies are used because they fit into the locations where the least amount of



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light is absorbed. The three windows are 830nm, 1310nm and 1550nm.

The 830nm window is old technology and not found in new equipment. The 1310 window is used with multi-mode transmission to create cost-effective gear, sufficient for use in distances up to 10km. The single-mode fibers and the 1550nm wavelength are used in combination to push the distances up to the 30km range. There is gear on the market that can reach 60km distances while transporting HD-SDI signals.

Costs

It is also important to evaluate the total cost of ownership of an HD-SDI routing infrastructure. The total cost of ownership includes the original price of the equipment, the day-to-day costs, and the maintenance and repair costs.

Because of the similarity in the SD and HD transport standards, there is plenty of transport gear that ranges from SD-only to SD/HD-capable. The original purchase cost of HD today is typically about 25 percent to 35 percent more than SD-only gear.

This cost can be mitigated for those who need SD-only today but want to be HD-ready. The minimum required plan to prepare for HD is to have your cabling and your frames HD-ready.

The next step is to evaluate how much of your circuitry should be HD-capable today. For example, most of today's routers use a three-board architecture. This includes

an input board,
a matrix or

crosspoint board, and an output board. To save money, you could pay for the crosspoints to be HD/SD capable and select SD-only I/O boards.

One key consideration in choosing SD/HD gear in routing equipment is that the equalization distances are 300m for SD and 100m for HD. In some HD/SD gear, the equalization specification drops to 100m for SD and HD. Evaluate your signal transport layout to determine if you require the full 300m specification for your SD runs. If that is the case, seek out gear that allows for the dual-rate equalization and meets both the SD and HD specifications.

The operating costs for HD signal transport equipment is essentially the power consumption costs. Today, in many cases, you can expect not to pay a power premium for HD gear. However, a quick analysis can show that it is worth looking at the power consumption costs.

For example, if you are evaluating products where the total power delta is 1000W, you can expect to save about \$1200 to \$1500 per year in power and cooling costs. For 10 years worth of service, you can save as much as \$15,000.

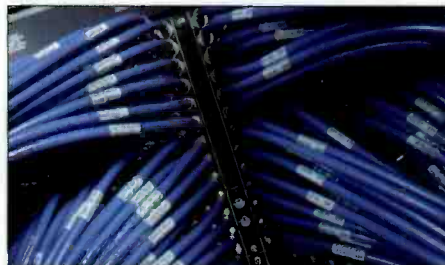
Picture format

The SMPTE 292M serial digital interface standard accepts all the common picture format scanning and sampling standards. There are 13 formats outlined in the standard.

The transport was designed to handle 1.485Gb/s, and all picture formats were designed to create 1.485Gb/s or 1.483Gb/s. The second rate is a result of accommodating the frame rates of both 30Hz and 30/1.001Hz, or 29.97Hz. To have all these picture formats achieve an equal number of bits, the horizontal ancillary data spaces are adjusted.

Thus, for signal transport

reasons, products that conform to SMPTE 292M will handle any of the SMPTE standard picture formats. The



Choosing the correct cable type allows you to increase the cable runs by about 20 percent to 30 percent.

real consideration in this case is to evaluate the gear for its synchronization and timing capabilities.

Synchronizing and timing

The frame rates available in HD picture formats are 24fps, 25fps, 29.97fps, 30fps, 50fps, 59.94fps and 60fps. The signal routing infrastructure needs to be able to create switch points at all these frame-timing rates. This is a vendor-to-vendor implementation decision — not something mandated by a standard. For this reason, you will need to be sure the routing gear you purchase has sufficient support to switch on a frame-rate basis.

If your situation will have multiple picture formats, you must also evaluate whether the routing gear will be able to support multiple switch points. The two most common situations are when 29.97fps and 25fps content are both included in the signal infrastructure and when SD and HD are in place.

Bring the system together

A little bit of planning and early system design work will go a long way toward successful and cost-effective implementation of a reliable, multifunction HD routing infrastructure. Knowing your business and how your company wants to implement new digital signal distribution paths is critical to avoid wasted time and money on equipment you may not need.

BE

The Grass Valley Encore offers a scalable approach to LAN/WAN facility control with configuration, control, monitoring and diagnostics.

Mitch Hayden is the director of product management for routers at Grass Valley.

NAB
 Booth # **SU4355**

MegaPixel Resolution

Expanding Our New Line of
TFT-MegaPixel™
 High Definition Monitors



V-R72P-2HDSOI
 Price: \$2999.00



Marshall's 1.2 TFT-MegaPixel



Competitor's best resolution

Many of our new products feature TFT-MegaPixel™ displays that provide greatly improved images compared to similar CRT and LCD products. This new product line features the highest pixel density available for 10.4-inch to 3.5-inch displays in one, two, three, and four screen configurations. Unlike many other LCD monitor manufacturers who simply package OEM open frame monitor sets, Marshall Electronics has developed these products with newly developed proprietary technology that delivers a totally digital image process onto each screen with greater than twice the resolution of our competition. Significant improvements have also been achieved in brightness, contrast ratio, and viewing angles. Configurations are available with HDSOI, SDI, DVI, Component HD/SD, and composite video inputs. All models feature screens calibrated to SMPTE/IBU standards for color gamut and color temperature.

1.44
 TFT-MegaPixel™

NEW LINE

Inputs	8.4"		10.4"	
	800 x RGB x 600		800 x RGB x 600	
	Dual 8.4"	Stand Alone 8.4"	Dual 10.4"	Stand Alone 10.4"
VGA	V-R82DP-VGA \$1799.00	V-R84DP-VGA \$999.00	V-R102DP-VGA \$1999.00	V-R104DP-VGA \$1199.00
Composite 1, Composite 2	V-R82DP-2C \$1999.00	V-R84DP-2C \$1399.00	V-R102DP-2C \$2499.00	V-R104DP-2C \$1599.00
SDI 1, SDI 2	V-R82DP-2SDI \$2999.00	V-R84DP-2SDI \$1799.00	V-R102DP-2SDI \$3399.00	V-R104DP-2SDI \$1999.00
HDSOI/SDI	V-R82DP-HDSOI \$3399.00	V-R84DP-HDSOI \$2099.00	V-R102DP-HDSOI \$3699.00	V-R104DP-HDSOI \$2299.00
YPbPb, DVI, XGA, S-Video, Composite	V-R82DP-HDA \$3099.00	V-R84DP-HDA \$1999.00	V-R102DP-HDA \$3399.00	V-R104DP-HDA \$2199.00
SDI, YPrPb, DVI, XGA, S-Video, Composite	V-R82DP-SD \$3699.00	V-R84DP-SD \$2199.00	V-R102DP-SD \$3999.00	V-R104DP-SD \$2399.00
HDSOI/SDI, YPrPb, DVI, XGA, S-Video, Composite	V-R82DP-HD \$4299.00	V-R84DP-HD \$2499.00	V-R102DP-HD \$4599.00	V-R104DP-HD \$2699.00

LCD Racks

Composite

V-R18P



V-R25P



V-R43P



V-R44P



V-R53P



V-R563P

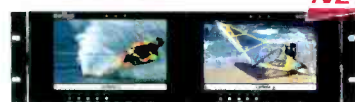


V-R63P



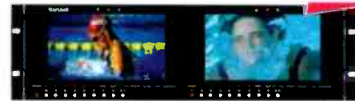
V-R72DP-2C

NEW



V-R72DP

NEW



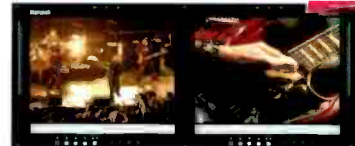
V-R82DP-2C

NEW



V-R102DP-2C

NEW



V-R151P



Display	# of Displays	Rack Spaces (Rack Depth)	Resolution (Backlight in cd/m ² luminance)	Inputs-Video per Display (Total)				Inputs-Audio			Tally	Features	Price	
				S-Video Composite	Component HD/SD	SDI	HDSDI/SDI	VGA	DVI	SDI Embedded				AES/EBU
	8	1	480 x 234 D(11") (250)	1 (8)									<ul style="list-style-type: none"> ONLY tiltable rack mount on the market with 8 monitors in 1U space! High resolution LCD panels Active loop through NTSC/PAL auto recognition 	\$2299.00
	10	3	480 x 234 D(2.65") (250)	1 (10)									<ul style="list-style-type: none"> ONLY rack mount on the market with 10 monitors in 3U space! High resolution LCD panels Active loop through NTSC/PAL auto recognition Blue screen when signal not present 	\$3299.00
	3	2	480 x 234 D(1.9") (300)	2 (6)									<ul style="list-style-type: none"> Ultra compact - Only 2U high Active loop through NTSC/PAL auto recognition Low price 	\$1299.00
	4	2	480 x 234 D(1.9") (300)	1 (4)									<ul style="list-style-type: none"> Ultra compact - Only 2U high Active loop through NTSC/PAL auto recognition Low price 	\$1699.00
	3	3	960 x 234 D(2.5") (350)	2 (6)			1 (3)						<ul style="list-style-type: none"> High resolution LCD panels Each display has extra VGA input Built-in Color Bar Generator Active loop through NTSC/PAL auto recognition 	\$2249.00
	3	3	960 x 234 D(2.5") (350)	2 (6)									<ul style="list-style-type: none"> High resolution LCD panels Built-in Color Bar Generator Blue screen when signal not present 	\$1799.00
	3	3	1200 x 234 D(2.5") (350)	2 (6)									<ul style="list-style-type: none"> Wide Screen Hi Res panels with 16:9 to 4:3 ratio switch Blue screen when signal not present Input config stored in memory, when unit is off NTSC/PAL configuration switch Active loop through; Bar Generator 	\$3099.00
	2	3	800 x 480 x RGB (380)	2 (4)									<ul style="list-style-type: none"> 1.2 TFT-Megapixel 7-inch wide screen 800 x RGB x 480 Dots with 1.2 million pixels 100% digital processing Bright 380 cd/m² luminance 400:1 ratio of contrast between black and white 4:3 and 16:9 screen aspect ratios Built in Color Bars 	\$1999.00
	2	3	800 x 480 x RGB (380)	2 (6)									<ul style="list-style-type: none"> 1.2 TFT-Megapixel 7-inch wide screen 800 x RGB x 480 Dots with 1.2 million pixels 100% digital processing Bright 380 cd/m² luminance 400:1 ratio of contrast between black and white Any of the 6 inputs can be routed to each screen Each screen can sequence through all active inputs 	\$2995.00
	2	4	800 x 600 x RGB (500)	2 (4)									<ul style="list-style-type: none"> 1.44 million TFT-MegaPixel / 8.4 inch screens Hyper Process plus Match Color Conversion 50,000 hour backlight half life 500 (cd/m²) brightness modification Composite displayed as 10-bit digital On Screen Display (OSD) and Blue "Gun" 	\$1999.00
	2	5	800 x 600 x RGB (600)	2 (4)									<ul style="list-style-type: none"> Large 10.4- inch screens /1.44 TFT-MegaPixel More screen in less space than 9-inch CRT Hyper Process plus Match Color Conversion 50,000 hour backlight half life Composite displayed as 10-bit digital On Screen Display (OSD) and Blue "Gun" 	\$2499.00
	1	6	1024 x 768 x RGB (250)	1 (1)			1 (1)				2		<ul style="list-style-type: none"> Compact - only 6U for 15" LCD Hi Res LCD panel Built-in 125 channel cable ready TV tuner (NTSC only) Built-in speakers NTSC/PAL configuration switch 	\$2199.00

LCD Racks

SDI

V-R18P-SDI



V-R25P-SDI



V-R44P-SDI



V-R44DP-SDI **NEW**



V-R53P-SDI



V-R563P-SDI



V-R63P-SDI



V-R72P-2SD **NEW**



V-R82DP-2SDI **NEW**



V-R82DP-SD **NEW**



V-R102DP-2SDI **NEW**



V-R102DP-SD **NEW**



Display	# of Displays	Rack Spaces (Rack Depth)	Resolution (Backlight in cd/m ² luminance)	Inputs-Video per Display (Total)						Inputs-Audio			Tally	Features	Price	
				S-Video	Composite	Component HD/SD	SDI	HDSDI/SDI	VGA	DVI	SDI Embedded	AES/EBU				Balanced XLR
	8	1 D(11")	480 x 234 (250)				1 (8)								<ul style="list-style-type: none"> ONLY tiltable rack mount on the market with 8 SDI monitors in 1U space! High resolution LCD panels Active reclocked loop through NTSC/PAL auto recognition 	\$3599.00
	10	3 D(2.65")	480 x 234 (250)				1 (10)								<ul style="list-style-type: none"> ONLY rack mount on the market with 10 SDI monitors in 3U space! High resolution LCD panels Active reclocked loop through NTSC/PAL auto recognition 	\$4599.00
	4	2 D(1.9")	480 x 234 (300)				1 (4)							Y	<ul style="list-style-type: none"> High resolution LCD panels 4 SDI inputs, each with loop through Blue screen when signal not present Each channel has Hi-Res SDI to Composite Video converter NTSC/PAL configuration switch 	\$2299.00
	4	2 D(1.9")	640 x 480 x RGB (250)				1 (4)							Y	<ul style="list-style-type: none"> Four 3.5-inch Advanced Definition 4:3 screens 100% digital processing Widest quad screen viewing radius available - 130° Brightest quad screen available - 380(cd/m²) 4:3, 16:9, and 4:3 of 16:9 DTV aspect ratios On Screen Display (OSD) and Blue "Gun" 	\$2999.00
	3	3 D(2.5")	960 x 234 (350)	1 (3)	1 (3)	1 (3)								Y	<ul style="list-style-type: none"> High resolution LCD panels Active loop through for composite and SDI inputs Built-in Color bar generator Blue screen when signal not present Each SDI channel has Hi-Res 10-bit SDI to Composite Video converter NTSC/PAL auto recognition 	\$3399.00
	3	3 D(2.5")	960 x 234 (350)	1 (3)	1 (3)									Y	<ul style="list-style-type: none"> High resolution LCD panels Built-in Color Bar Generator Each channel has Hi-Res 10-bit SDI to Composite Video converter 	\$2799.00
	3	3 D(2.5") wide	1200 x 234 (300)	1 (3)	1 (3)									Y	<ul style="list-style-type: none"> Wide Screen Hi Res panels with 16:9 to 4:3 ratio switch Each ch. has 10-bit D/A converter Blue screen when signal not present Input config. stored in memory, when unit is off NTSC/PAL configuration switch Active loop through; Bar Generator 	\$3699.00
	2	3 D(2.5") wide	800 x 480 x RGB (380)	1 (2)	1 (2)	1 (2)	1 (2)							Y	<ul style="list-style-type: none"> 1.2 TFT-Megapixel 7-inch wide screen with 800 x 480 x RGB Dots 100% digital processing Bright 380 cd/m² luminance 400:1 ratio of contrast between black and white 4:3 and 16:9 screen aspect ratios Standard multiformat Inputs Built in Color Bars 	\$2899.00
	2	4 D(1.5")	800 x 600 x RGB (500)				2 (4)							Y	<ul style="list-style-type: none"> 1.44 million TFT-MegaPixel / 8.4 inch screens 100% digital processing Hyper Process plus Match Color Conversion 50,000 hour backlight half life 500 (cd/m²) brightness modification On Screen Display (OSD) and Blue "Gun" 	\$2999.00
	2	4 D(1.5")	800 x 600 x RGB (500)	1 (2)	1 (2)	1 (2)	1 (2)	1 (2)	1 (2)					Y	<ul style="list-style-type: none"> 1.44 million TFT-MegaPixel / 8.4 inch screens SDI plus all HD/SD analog signals Hyper Process plus Match Color Conversion 50,000 hour backlight half life 500 (cd/m²) brightness modification On Screen Display (OSD) and Blue "Gun" 	\$3699.00
	2	5 D(1.5")	800 x 600 x RGB (500)				2 (4)							Y	<ul style="list-style-type: none"> Large 10.4- inch screens /1.44 TFT-MegaPixel 100% digital processing Hyper Process plus Match Color Conversion 50,000 hour backlight half life 500 (cd/m²) brightness modification On Screen Display (OSD) and Blue "Gun" 	\$3399.00
	2	5 D(1.5")	800 x 600 x RGB (500)	1 (2)	1 (2)	1 (2)	1 (2)	1 (2)	1 (2)					Y	<ul style="list-style-type: none"> Large 10.4- inch screens /1.44 TFT-MegaPixel SDI plus all HD/SD analog formats/frame rates Hyper Process plus Match Color Conversion 50,000 hour backlight half life 500 (cd/m²) brightness modification On Screen Display (OSD) and Blue "Gun" 	\$3999.00

LCD Racks

SDI

V-R171P-SDI



V-R191P-SDI



Display	# of Displays	Rack Spaces (Rack Depth)	Resolution (Backlight in cd/m ² luminance)	Inputs-Video per Display (Total)					Inputs-Audio			Tally	Features	Price	
				S-Video	Composite	Component HD/SD	SDI	HDS/SDI	VGA	DVI	SDI Embedded				AES/EBU
17" wide	1	6 D(2.5")	1280 x 768 x RGB (450)	1	1	1	1							<ul style="list-style-type: none"> High Resolution wide screen 1280 x 768 Dots with 2.95 million pixels CRT style viewing radius - 170° in any direction provides superior visibility Bright 450 cd/m² luminance produces enhanced image quality 500:1 contrast ratio 4:3 and 16:9 screen aspect ratios Built-in Color Bars Easy to see three color tally indicators 	\$3499.00
19"	1	8 D(2.5")	1280 x 1024 x RGB (300)	1	1	1	1						<ul style="list-style-type: none"> High Resolution LCD panel, 1280 x 1024 pixels, 1,310,720 total CRT style viewing radius - 170° in any direction provides superior visibility 500:1 contrast ratio, 4:3 and 16:9 screen aspect ratios for DTV operations Standard multiformat inputs: composite, Y/C and SDI with active loop through. plus VGA/XVGA input with automatic scaling SDI input with standard 10-bit composite output is provided using 12-bit Digital to Analog processing Three color tally indicators 	\$3995.00	

LCD Racks

High Definition

V-R44P-HDS/SDI

NEW



V-R653P-HDS/SDI

NEW



V-R72P-2HDA

NEW



V-R72P-2HDS/SDI

NEW



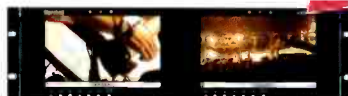
V-R72P-2HD

NEW



V-R72P-AFHD

NEW



V-R82DP-HDA

NEW



V-R82DP-HDS/SDI

NEW



3.5" wide	4	2 D(1.5")	640 x 480 x RGB (250)					1 (4)					Y	<ul style="list-style-type: none"> Four 3.5-inch Advanced Definition 4:3 screens Bright 300 cd/m² luminance 350:1 ratio of contrast between black and white 4:3 and 16:9 screen aspect ratios for DTV applications Works with all SMPTE/ITU SDI/HDS/SDI production formats and frame rates 	\$3999.00
6.5" wide	3	3 D(2.5")	800 x 480 x RGB (500)					1 (3)					Y	<ul style="list-style-type: none"> 3 High Resolution 6.5-inch 1.2 TFT-MegaPixel wide screens 100% digital processing Bright 300 cd/m² luminance 500:1 ratio of contrast between black and white 4:3 and 16:9 screen aspect ratios Works with all SMPTE/ITU SDI/HDS/SDI production formats and frame rates 	\$3999.00
7" wide	2	3 D(2.5")	800 x 480 x RGB (380)	1 (2)	1 (2)	1 (2)			1 (2)				Y	<ul style="list-style-type: none"> 2 High Resolution 7-inch 1.2 TFT-MegaPixel wide screens Analog Signals converted to 10 bit digital Bright 380 cd/m² luminance 400:1 ratio of contrast between black and white 4:3 and 16:9 screen aspect ratios Works with all SMPTE/ITU SDI/HDS/SDI production formats and frame rates 	\$2899.00
7" wide	2	3 D(1.5")	800 x 480 x RGB (380)					1 (2)					Y	<ul style="list-style-type: none"> 2 High Resolution 7-inch 1.2 TFT-MegaPixel wide screens 100% digital processing Bright 380 cd/m² luminance 400:1 ratio of contrast between black and white 4:3 and 16:9 screen aspect ratios Works with all SMPTE/ITU SDI/HDS/SDI production formats and frame rates 	\$2999.00
7" wide	2	3 D(2.5")	800 x 480 x RGB (380)	1 (2)	1 (2)	1 (2)		1 (2)					Y	<ul style="list-style-type: none"> 2 High Resolution 7-inch 1.2 TFT-MegaPixel wide screens 100% digital processing Bright 380 cd/m² luminance 400:1 ratio of contrast between black and white 4:3 and 16:9 screen aspect ratios Works with all production formats and frame rates 	\$3999.00
7" wide	2	3 D(2.5")	800 x 480 x RGB (380)	1 (2)	1 (2)			1 (2)					Y	<ul style="list-style-type: none"> 2 High Resolution 7-inch 1.2 TFT-MegaPixel wide screens 100% digital processing Bright 380 cd/m² luminance 400:1 ratio of contrast between black and white 4:3 and 16:9 screen aspect ratios Blue Gun for color adjustment 6 Frame Marker Overlays with Center Mark 	\$4499.00
8.4" wide	2	4 D(1.65")	800 x 600 x RGB (500)	1 (2)	1 (2)	1 (2)			1 (2)	1 (2)			Y	<ul style="list-style-type: none"> 1.44 million TFT-MegaPixel / 8.4 inch screens Accepts all analog HD/SD formats/frame rates Hyper Process plus Match Color Conversion 50,000 hour backlight half life 500 (cd/m²) brightness modification On Screen Display (OSD) and Blue "Gun" 	\$3099.00
8.4" wide	2	4 D(1.65")	800 x 600 x RGB (500)						1 (2)				Y	<ul style="list-style-type: none"> 1.44 million TFT-MegaPixel / 8.4 inch screens 100% digital processing of HDS/SDI Hyper Process plus Match Color Conversion 50,000 hour backlight half life 500 (cd/m²) brightness modification On Screen Display (OSD) and Blue "Gun" 	\$3399.00

LCD Racks

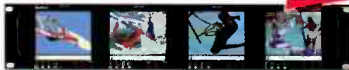
High Definition

Display	# of Displays	Rack Spaces (Rack Depth)	Resolution (Backlight in cd/m ² luminance)	Inputs-Video per Display (Total)						Inputs-Audio			Tally	Features	Price
				S-Video	Composite	Component HD/SD	SDI	HDSDI/SDI	VGA	DVI	SDI Embedded	AES/EBU			
V-R82DP-HD NEW	8.4"	2	4	800 x 600 D(1.5") x RGB (500)	1 (2)	1 (2)	1 (2)	1 (2)	1 (2)	1 (2)				<ul style="list-style-type: none"> • 1.44 million TFT-MegaPixel / 8.4 inch screens • Accepts all HD/SD formats/frame rates • Hyper Process plus Match Color Conversion • 50,000 hour backlight half life • 500 (cd/m²) brightness modification • On Screen Display (OSD) and Blue "Gun" 	\$4299.00
V-R842P-AFHD NEW	8.4"	2	4	1024 x 768 D(2.16") x RGB (400)	1 (2)	1 (2)	1 (2)	1 (2)	1 (2)	1 (2)			<ul style="list-style-type: none"> • High Definition Resolution 8.4-Inch 2.4 TFT-MegaPixel screen • Analog Signals converted to 10 bit digital • Bright 400 cd/m² luminance • 400:1 ratio of contrast between black and white • Built-in Color Bar Generator • Standard Multiformat Inputs • Blue Gun for color adjustment • Zoom function • Built-in Color Bars • 6 Frame Marker Overlays with Center Mark 	\$5999.00	
V-R102DP-HDA NEW	10.4"	2	5	800 x 600 D(1.5") x RGB (600)	1 (2)	1 (2)	1 (2)		1 (2)	1 (2)			<ul style="list-style-type: none"> • Large 10.4- inch screens /1.44 TFT-MegaPixel • Accepts all analog HD/SD formats/frame rates • Hyper Process plus Match Color Conversion • 50,000 hour backlight half life • 500 (cd/m²) brightness modification • On Screen Display (OSD) and Blue "Gun" 	\$3399.00	
V-R102DP-HSDI NEW	10.4"	2	5	800 x 600 D(1.5") x RGB (600)					1 (2)				<ul style="list-style-type: none"> • Large 10.4- inch screens /1.44 TFT-MegaPixel • 100% digital processing of HDSDI/SDI • Hyper Process plus Match Color Conversion • 50,000 hour backlight half life • 500 (cd/m²) brightness modification • On Screen Display (OSD) and Blue "Gun" 	\$3699.00	
V-R102DP-HD NEW	10.4"	2	5	800 x 600 D(1.5") x RGB (600)	1 (2)	1 (2)	1 (2)		1 (2)	1 (2)			<ul style="list-style-type: none"> • Large 10.4- inch screens /1.44 TFT-MegaPixel • Accepts all HD/SD formats/frame rates • Hyper Process plus Match Color Conversion • 50,000 hour backlight half life • 500 (cd/m²) brightness modification • On Screen Display (OSD) and Blue "Gun" 	\$4599.00	
V-R171P-HDA NEW	17"	1	7	1280 x 1024 D(3") x RGB (300)	1 (2)	1 (2)	1 (2)		1 (2)	1 (2)			<ul style="list-style-type: none"> • SXGA 1280 x 1024 pixels, 16.7 million colors • Compact - fits in EIA standard rack 8U high • VESA 75 mount for wall, Ceiling or desk top • 170° CRT style viewing angles • V-Mount battery adapter • Composite/Component/DVI/VGA inputs 	\$2995.00	
V-R171P-HD	17" wide	1	6	1280 x 768 D(2.5") x RGB (450)	1	1	1		1	1			<ul style="list-style-type: none"> • Rack mount and Desktop configurations • High Resolution wide screen 1280 x 768 Dots • Bright 450 cd/m² luminance • CRT style viewing radius - 170° in any direction • 500:1 contrast ratio • Pixel response less than 23 ms • 16:9 and 4:3 screen aspect ratios • Built-in Color Bar Generator • 6 Frame Marker Overlays with Center Mark 	\$4399.00	
V-R231P-AFHD NEW	23" wide	1	6	1920 x 1200 D(2.5") x RGB (250)	1	1	1		1	1			<ul style="list-style-type: none"> • Totally Digital WUGA 6.9 Megapixel 1920 x 1200 display • Native HD/SD screen for formats (640, 720, 1080 vertical lines) in TFT Pixel-to-Pixel™ mode • CRT style viewing radius - 176° in any direction • Bright 250 cd/m² luminance • CRT style viewing radius - 170° in any direction • 500:1 contrast ratio • 16:9 and 4:3 screen aspect ratios • All analog signals internally converted to 24 bit component digital with 5 line adaptive filter • 6 Frame Marker Overlays with Center Mark 	\$5999.00	

LCD Racks

DVI/VGA

V-R44P-DVI **NEW**



V-R82DP-VGA **NEW**



V-R102DP-VGA **NEW**



Display	# of Displays	Rack Spaces (Rack Depth)	Resolution (Backlight in cd/m ² luminance)	Inputs-Video per Display (Total)					Inputs-Audio			Tally	Features	Price		
				S-Video	Composite	Component HD/SD	SDI	SDI/SDI	VGA	DVI	SDI Embedded				AES/EBU	Balanced XLR
4"	4	2	840 x 480 D(1.9") x RGB (300)											Y	<ul style="list-style-type: none"> Four 3.5-inch Advanced Definition 4:3 screens 100% digital processing of DVI/VGA signals Widest quad screen viewing radius available - 130° Brightest quad screen available - 380(cd/m²) 4:3, 16:9, and 4:3 of 16:9 DTV aspect ratios On Screen Display (OSD) and Blue "Gun" 	\$3599.00
8.4"	2	5	800 x 600 D(1.5") x RGB (500)											Y	<ul style="list-style-type: none"> For PC signals up to SXGA resolution (1280x1024) 1.44 million TFT-MegaPixel / 8.4 inch screens Hyper Process plus Match Color Conversion 50,000 hour backlight half life 500 (cd/m²) brightness modification On Screen Display (OSD) and Blue "Gun" 	\$1799.00
10.4"	2	5	800 x 600 D(1.5") x RGB (600)											Y	<ul style="list-style-type: none"> For PC signals up to SXGA resolution (1280x1024) Large 10.4 inch High Res screens Hyper Process plus Match Color Conversion 50,000 hour backlight half life 600 (cd/m²) brightness modification On Screen Display (OSD) and Blue "Gun" 	\$1999.00

LCD Racks

Quads

V-R151P-4



V-R154P



V-RD151-4



V-R171P-4



15.1"	1	6	1024 x 768 D(2.25") (250)	1	4			1						N	<ul style="list-style-type: none"> Compact - only 6U for 15" LCD Hi Res LCD panel Built-in Quad Splitter with on screen display Freeze-zoom function and PIP capability Available in NTSC or PAL config. (V-R151P-4-PAL) 	\$2699.00
15.1"	1	8	1024 x 768 D(3.33") x RGB (250)	1	4			1			8			Y	<ul style="list-style-type: none"> Hi Resolution LCD panel Built-in 125 channel cable ready TV tuner (NTSC only) Built-in speakers Built-in Quad Splitter with on screen display Freeze-zoom function and PIP capability Built-in audio bar graph display Headphone output Available in NTSC or PAL config. (V-R154P-PAL) 	\$4995.00
15.1"	1	1	1024 x 768 D(22") x RGB (250)	1	4			1				2		N	<ul style="list-style-type: none"> High Resolution 1024 x 768 pixels, 786,432 total Bright 250 cd/m² luminance 4 Video inputs with 75Ω termination and active loop through feature Ultra-compact design fits in EIA standard rack 1U high Built-in Quad Splitter/Sequential Switcher Available in NTSC or PAL format Key lock for secure transportation 	\$2699.00
17"	1	8	1280 x 1024 D(2.5") x RGB (250)	1	4			1						N	<ul style="list-style-type: none"> High Resolution 17" LCD monitor Best viewing angle in the industry - 170° in <u>any</u> direction Menu driven 4:3 or 16:9 ratio switch Built-in Quad Splitter with on-screen display Freeze-zoom function and PIP capability With optional HDSDI to VGA converter can accept 1080i or 720p Only 2.5" deep Available in NTSC or PAL config. (V-R171P-4-PAL) 	\$3699.00

LCD Racks

Audio + Video

V-R81PA



V-R71PA-SDI



Display	# of Displays	Rack Spaces (Rack Depth)	Resolution (Backlight in cd/m ² luminance)	Inputs-Video per Display (Total)						Inputs-Audio				Tally	Features	Price		
				S-Video	Composite	Component HD/SD	SDI	HDSDI/SDI	VGA	DVI	SDI Embedded	AES/EBU	Balanced XLR				Unbalanced RCA	
7.9"	1	4	1400 x 234 D(2.65") (350)	1	2								4	Y	<ul style="list-style-type: none"> Built-in speakers / Headphone output Ability to choose any audio input to any speaker independently NTSC/PAL auto recognition 4 channel bar graph display Low cost 	\$1999.00		
7" wide	1	3	1440 x 234 D(2.65") (400)	1	1	1							4	2	4	N	<ul style="list-style-type: none"> Wide Screen Hi Res panel with 16:9 to 4:3 ratio switch Accepts all types of audio/video inputs 4 channel high res bar graph display NTSC/PAL auto detection Active loop through; Bar Generator Revolutionary Class D digital audio amplifier offers 5W per channel 	\$3299.00

LCD Racks

Pull-Out Drawers

V-RD151-4



V-RD151P



15.1"	1	1	1024 x 768 D(22") x RGB (250)	1	4				1				2	N	<ul style="list-style-type: none"> High Resolution 1024 x 768 pixels, 786,432 total Bright 250 cd/m² luminance 4 Video inputs with 75Ω termination and active loop through feature Ultra-compact design fits in EIA standard rack 1U high Built-in Quad Splitter/Sequential Switcher Available in NTSC or PAL format Key lock for secure transportation 	\$2699.00
15.1"	1	1	1024 x 768 D(22") x RGB (250)	1	1				1				2	N	<ul style="list-style-type: none"> High Resolution 1024 x 768 pixels, 786,432 total Bright 250 cd/m² luminance Video and S-Video inputs with 75Ω termination and active loop through feature Ultra-compact design fits in EIA standard rack 1U high Built-in Speakers NTSC/PAL recognition Key lock for secure transportation 	\$2199.00

Monitors

VGA

V-R84DP-VGA **NEW**



V-R104DP-VGA **NEW**



Display	Resolution (Backlight in cd/m ² luminance)	Inputs						Dimensions	Tally	Features	Price	
		S-Video	Composite	Component HD/SD	SDI	HDSDI/SDI	VGA					DVI
8.4"	800 x 600 x RGB (500)						1	1	3.62" x 3.32" x 0.95"	N	<ul style="list-style-type: none"> Easy to View 8.4-inch screen 800x600 Dots (1.44 million RGB pixels) 100% digital processing 5 Year /50,000 backlight life 10 bit Analog to Digital conversion Wide viewing angle - 130° 500 (cd/m²) luminance 500:1 contrast ratio Response rates less than 25 ms 4:3 and 16:9 screen aspect ratios Direct access for all adjustments Durable metal enclosure Configurable ¼ 20 Mounting Operates on 12 VDC 	\$999.00
10.4"	800 x 600 x RGB (600)						1	1	3.62" x 3.32" x 0.95"	N	<ul style="list-style-type: none"> Large 10.4-inch screen 800x600 Dots (1.44 million RGB pixels) 100% digital processing 5 Year /50,000 backlight life 10 bit Analog to Digital conversion Wide viewing angle - 130° 600 (cd/m²) luminance 500:1 contrast ratio Response rates less than 25 ms Direct access for all adjustments Durable metal enclosure Configurable ¼ 20 Mounting Operates on 12 VDC 	\$1199.00

Composite

V-LCD3.5-PRO



NEW

V-LCD4-PA



V-LCD4-PRO-L



V-LCD4-PRO-L-KIT



V-LCD5.6-PRO



V-LCD5.6-PRO-KIT



V-ASL7070 **NEW**



V-ASL8080 **NEW**



Display	Resolution (Backlight in cd/m ² luminance)	Inputs						Dimensions	Tally	Features	Price
		S-Video	Composite	Component HD/SD	SDI	VGA	DVI				
V-LCD3.5-PRO	480 x 234 (250)		1					3.62" x 3.32" x 0.95"	N	<ul style="list-style-type: none"> • High resolution LCD Panel • Bright 250 cd/m² luminance • NTSC only • Miniature and lightweight package • Optional stand • Optional Power Supply (V-PS12-500) • Weighs only 0.32 lbs 	\$399.00
V-LCD4-PA	480 x 234 (210)		1					6" x 4.5" x 2.5"	N	<ul style="list-style-type: none"> • Plastic cabinet with 1/4" mount • Sound and brightness control • Built-in speaker and removable stand • Power supply and RCA to BNC adapter are included • Available in NTSC or PAL format • Weighs only 1.12 lbs 	\$299.00
V-LCD4-PRO-L	480 x 234 (250)		2					5.51" x 3.62" x 1.81"	N	<ul style="list-style-type: none"> • Heavy Duty compact metal cabinet with brushed aluminum finish has 1/4" mount for ease of installation • Switchable dual video BNC inputs • Color, tint, contrast and brightness control • Wide viewing angle • Active loop through feature • Weighs only 0.92 lbs 	\$399.00
V-LCD4-PRO-L-KIT	480 x 234 (250)		2					5.51" x 3.62" x 1.81"	N	<p>Kit includes:</p> <ul style="list-style-type: none"> • V-LCD4-PRO-L • Weather Proof Carrying Case • High Capacity Battery • Charger • Can run up to 1 hour and 20 min on the battery 	\$474.00
V-LCD5.6-PRO	960 x 234 (250)		1				1	6.4" x 5.3" x 2.0"	N	<ul style="list-style-type: none"> • Plastic cabinet with 1/4" mount • Side mounted volume, color, contrast and brightness controls • Power supply and adapter cables included • Built-in speaker • Measures 6.4"W x 5.3"H x 2.0"D • Weighs only 1.14 lbs 	\$399.00
V-LCD5.6-PRO-KIT	960 x 234 (250)		1				1	6.4" x 5.3" x 2.0"	N	<p>Kit includes:</p> <ul style="list-style-type: none"> • LCD5.6-PRO • Padded Carrying Case • High Capacity Battery • Charger • Cables • Can run up to 1 hour and 45 min on the battery 	\$429.00
V-ASL7070	1440 x 234 (200)		1				2	7" x 4.75" x 1.0"	N	<ul style="list-style-type: none"> • Low Cost Wide Screen Field Monitor • NTSC/PAL System Selectable • Mirror Mode • Headphone Jack with volume control • IR Audio for wireless headphone • On Screen Display (OSD) for adjustment functions 	\$499.00
V-ASL8080	640 x 480 x RGB (380)		2				2	7.8" x 5.8" x 1.3"	N	<ul style="list-style-type: none"> • Low Cost Screen Field Monitor • NTSC/PAL System Selectable • Mirror Mode • Headphone Jack with volume control • On Screen Display (OSD) for adjustment functions 	\$529.00

Monitors Composite

V-R70DP **NEW**



Display	Resolution (Backlight in cd/m ² luminance)	Inputs					Dimensions	Tally	Features	Price	
		S-Video	Composite	Component HD/SD	SDI	HDSDI/SDI					VGA
7" wide	800 x 480 x RGB (380) 1.2 TFT MEGAPIXEL	1	2					7.60" x 5.16" x 2.16"	Y	<ul style="list-style-type: none"> High Resolution 7-inch wide screen 800xRGBx480 Dots with 1.2 million pixels Optical grade polycarbonate screen cover Analog signals converted to 10 bit digital Bright 380 cd/m² luminance 400:1 ratio of contrast between black and white luminance 4:3 and 16:9 screen aspect ratios "V" Mount battery adapter included Built in Color Bars Blue Screen for color adjustment 	\$999.95

V-LCD8-PRO



7.9"	1440 x 234 (350)	1	1					9.41" x 6.25" x 1.50"	N	<ul style="list-style-type: none"> Plastic cabinet with 1/4" mount Bright and vivid color picture Slim, portable design Low power consumption Accepts composite and S-Video, each with active loop through NTSC/PAL auto recognition Power supply included Weights only 1.7 lbs 	\$949.00
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V-R84DP-2C **NEW**



8.4"	800 x 600 x RGB (500) 1.44 TFT MEGAPIXEL		2					9" x 6.875" x 2.50"	Y	<ul style="list-style-type: none"> 1.44 million TFT-MegaPixel / 8.4 inch screens Hyper Process plus Match Color Conversion Optical grade polycarbonate screen cover Rugged Enclosure with AR/Scratch Resistant screen 50D (cd/m²) brightness modification Includes V-Mount Battery Adapter / 4 Pin XLR Pwr On Screen Display (OSD) and Blue "Gun" 	\$1399.00
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V-R104DP-2C **NEW**



10.4"	800 x 600 x RGB (600) 1.44 TFT MEGAPIXEL		2					10.25" x 8.5" x 2.50"	Y	<ul style="list-style-type: none"> 1.44 million TFT-MegaPixel / 10.4 inch screens Large 10.4 Screen Field Monitor Optical grade polycarbonate screen cover Hyper Process plus Match Color Conversion Rugged Enclosure w AR/Scratch Resistant screen Includes V-Mount Battery Adapter / 4 Pin XLR Pwr On Screen Display (OSD) and Blue "Gun" 	\$1599.00
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Monitors Composite + VGA

V-LCD12.1-SVGA



12.1"	800 x 600 x RGB (210)	1	1			1	1	11.50" x 8.75" x 1.25"	N	<ul style="list-style-type: none"> Lightweight and portable Remote control included Built-in speakers Optional VESA adapter available (VESA 75mm Adapter V-LCD-VA) NTSC/PAL switchable Optional Ceiling Mount (\$75.00) Optional Wall Mount (\$75.00) Low cost Weights only 3.25 lbs 	\$1199.00
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V-LCD15



15.1"	1024 x 768 x RGB (250)	1	1			1	1	15.37" x 12.19" x 2.10"	N	<ul style="list-style-type: none"> High resolution LCD panel Remote control included Built-in speakers Optional VESA adapter available (VESA 75mm Adapter V-LCD-VA) NTSC/PAL switchable Optional Ceiling Mount (\$75.00) Optional Wall Mount (\$75.00) Weights only 9 lbs 	\$1499.00
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Monitors

Composite + VGA

V-LCD17



V-LCD20



Display	Resolution (backlight in cd/m ² luminance)	Inputs						Dimensions	Tally	Features	Price
		S-Video	Composite	Component HD/SD	SDI	HDSDI/SDI	VGA				
17.0"	1280 x 1024 x RGB (250)	1	1			1	1	16.96" x 14.29" x 2.16"	N	<ul style="list-style-type: none"> • Best viewing angle in the Industry - 170° in any direction • Software driven 16:9 to 4:3 switch • HD Ready: will accept 1080i or 720p with optional HD/SVGA converter • VESA 75mm mount compliant • NTSC/PAL switchable • Weighs only 12.95 lbs 	\$2569.00
20.1"	640 x 480 x RGB (450)	1	1			1	1	20.08" x 18.90" x 2.36"	N	<ul style="list-style-type: none"> • Ultra bright 450 cd/m² luminance • Highest contrast ratio 400:1 • Full function remote control • NTSC/PAL switchable • VESA 75mm mount compliant • Weighs only 17.95 lbs 	\$2799.00

Monitors

SDI

V-R70P-SD **NEW**



V-R84DP-2SDI **NEW**



V-R84DP-SD **NEW**



V-R104DP-2SDI **NEW**



V-R104DP-SD **NEW**



7" wide	800 x 480 x RGB (380) 1.2 TFT MEGAPIXEL	1	2					7.60" x 5.16" x 2.16"	Y	<ul style="list-style-type: none"> • High Resolution 7-inch wide screen 800xRGBx480 Dots with 1.2 million pixels • Optical grade polycarbonate screen cover • 100% digital processing • Analog signals converted to 10 bit digital • Bright 380 cd/m² luminance • 400:1 ratio of contrast between black and white luminance • 4:3 and 16:9 screen aspect ratios • Includes V-Mount Battery Adapter / 4 Pin XLR Pwr • Built in Color Bars • Blue Screen for color adjustment 	\$1499.00
8.4"	800 x 600 x RGB (500) 1.44 TFT MEGAPIXEL		2					5" x 6.875" x 2.5"	Y	<ul style="list-style-type: none"> • 1.44 million TFT-MegaPixel / 8.4 inch screens • Optical grade polycarbonate screen cover • 100% digital processing • Hyper Process plus Match Color Conversion • 50,000 hour backlight half life • 500 (cd/m²) brightness modification • Includes V-Mount Battery Adapter / 4 Pin XLR Pwr • On Screen Display (OSD) and Blue "Gun" 	\$1799.00
8.4"	800 x 600 x RGB (500) 1.44 TFT MEGAPIXEL	1	1	1	1	1	1	9" x 6.875" x 2.5"	Y	<ul style="list-style-type: none"> • 1.44 million TFT-MegaPixel / 8.4 inch screens • Optical grade polycarbonate screen cover • SDI plus all HD/SD analog signals • Hyper Process plus Match Color Conversion • 50,000 hour backlight half life • 500 (cd/m²) brightness modification • Includes V-Mount Battery Adapter / 4 Pin XLR Pwr • On Screen Display (OSD) and Blue "Gun" 	\$2199.00
10.4"	800 x 600 x RGB (600) 1.44 TFT MEGAPIXEL		2					10.25" x 8.5" x 2.5"	Y	<ul style="list-style-type: none"> • Large 10.4- inch screens / 1.44 TFT-MegaPixel • Optical grade polycarbonate screen cover • 100% digital processing • Hyper Process plus Match Color Conversion • 50,000 hour backlight half life • 500 (cd/m²) brightness modification • Includes V-Mount Battery Adapter / 4 Pin XLR Pwr • On Screen Display (OSD) and Blue "Gun" 	\$1999.00
10.4"	800 x 600 x RGB (600) 1.44 TFT MEGAPIXEL	1	1	1	1	1	1	10.25" x 8.5" x 2.5"	Y	<ul style="list-style-type: none"> • Large 10.4- inch screens/1.44 TFT-MegaPixel • Optical grade polycarbonate screen cover • SDI plus all HD/SD analog formats/frame rates • Hyper Process plus Match Color Conversion • 50,000 hour backlight half life • 500 (cd/m²) brightness modification • Includes V-Mount Battery Adapter / 4 Pin XLR Pwr • On Screen Display (OSD) and Blue "Gun" 	\$2399.00

Monitors TV Tuner

V-ASL7000 **NEW**



V-ASL8000 **NEW**



V-LCD-12-TV



V-LCD15-TV



V-LCD17-TV



V-LCD20



Display	Resolution (Backlight in cd/m ² luminance)	Inputs						Dimensions	Tally	Features	Price	
		S-Video Composite	Component HD/SD	SDI	HDSDI/SDI	VGA	DVI Audio					
7" wide	1440 x 234 (200)	2						2	7.375" x 4.625" x 1.0"	N	<ul style="list-style-type: none"> • NTSC VHF/UHF/CATV (cable ready) • 125 channel tuner built-in • 2 Composite NTSC plus • 2 Mono Audio inputs • Composite NTSC output • Built-in FM Transmitter 87.5 to 89.5 MHz • Will work from 10V to 16V DC • Weight only 1.0 lb 	\$549.00
8"	640 x 480 x RGB (380)	2						2	7.8" x 5.8" x 1.3"	N	<ul style="list-style-type: none"> • NTSC VHF/UHF/CATV (cable ready) • 125 channel tuner built-in • 2 Composite NTSC plus • 2 Mono Audio inputs • Composite NTSC output • Built-in FM Transmitter 87.5 to 89.5 MHz • Will work from 10V to 16V DC • Weight only 1.5 lbs 	\$599.00
12.1"	800 x 600 x RGB (210)	1	1				1	1	11.50" x 8.75" x 1.25"	N	<ul style="list-style-type: none"> • Lightweight and portable • Remote control included • Built-in speakers • Optional VESA adapter available (VESA 75mm Adapter V-LCD-VA) • NTSC/PAL switchable • Optional Ceiling Mount (\$75.00) • Optional Wall Mount (\$75.00) • Low cost • Weighs only 3.25 lbs 	\$959.00
15.1"	1024 x 768 x RGB (250)	1	1				1	1	15.37" x 12.19" x 2.10"	N	<ul style="list-style-type: none"> • High resolution LCD panel • Remote control included • Built-in speakers • Optional VESA adapter available (VESA 75mm Adapter V-LCD-VA) • NTSC/PAL switchable • Optional Ceiling Mount (\$75.00) • Optional Wall Mount (\$75.00) • Weighs only 9 lbs 	\$1059.00
17.0"	1280 x 1024 x RGB (250)	1	1				1	1	16.96" x 14.29" x 2.16"	N	<ul style="list-style-type: none"> • Best viewing angle in the Industry - 170° in any direction • Software driven 16:9 to 4:3 switch • HD Ready: will accept 1080i or 720p with optional HD/SVGA converter • VESA 75mm mount compliant • NTSC/PAL switchable • Optional Ceiling Mount (\$75.00) • Optional Wall Mount (\$75.00) • Weighs only 12.95 lbs 	\$2059.00
20.1"	640 x 480 x RGB (450)	1	1				1	1	20.08" x 18.90" x 2.36"	N	<ul style="list-style-type: none"> • Ultra bright 450 cd/m² luminance • Highest contrast ratio 400:1 • Full function remote control • NTSC/PAL switchable • VESA 75mm mount compliant • Weighs only 17.95 lbs 	\$2799.00

Monitors

High Definition

V-R65P-HD



V-R70P-HDA **NEW**



V-R70P-HDSOI **NEW**



V-R84DP-HDA **NEW**



V-R84DP-HDSOI **NEW**



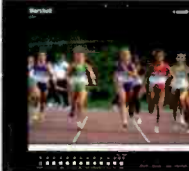
V-R84DP-HD **NEW**



V-R841P-AFHD **NEW**



V-R104DP-HDA **NEW**



V-R104DP-HDSOI **NEW**



V-R104DP-HD **NEW**



Display	Resolution (Backlight in cd/m ² luminance)	S-Video	Composite	Component HD/SD	Inputs	Dimensions	Tally	Features	Price
					SDI HDSOI/SDI VGA DVI Audio				
6.5"	800 x 480 x RGB (380) 1.2 TFT MEGAPIXEL		1	1	1	1	7.25" x 4.6" x 2.4"	Y • High resolution 6.5" wide screen LCD Panel with 1.2 million pixels • Bright 380 cd/m ² luminance • Optical grade polycarbonate screen cover • 16:9 and 4:3 screen aspect ratios for DTV app. • Standard multi-format inputs	\$3799.00
7"	800 x 480 x RGB (380) 1.2 TFT MEGAPIXEL		1	1			7.60" x 5.16" x 2.16"	Y • High Resolution 7-inch wide screen 800xRGBx480 Dots with 1.2 million pixels • 100% digital processing • Analog signals converted to 10 bit digital • "V" Mount battery adapter included • Bright 380 cd/m ² luminance • 4:3 and 16:9 screen aspect ratios	\$1599.00
7"	800 x 480 x RGB (380) 1.2 TFT MEGAPIXEL				1		7.60" x 5.16" x 2.16"	Y • "V" Mount battery adapter included • High Resolution 7-inch wide screen 800xRGBx480 Dots with 1.2 million pixels • Optical grade polycarbonate screen cover • 100% digital processing • Analog signals converted to 10 bit digital • Bright 380 cd/m ² luminance	\$1999.00
8.4"	800 x 600 x RGB (500) 1.44 TFT MEGAPIXEL		1	1	1	1	9" x 6.875" x 2.5"	Y • 1.44 million TFT-MegaPixel/8.4 inch screens • Optical grade polycarbonate screen cover • Accepts all analog HD/SD formats/frame rates • Hyper Process plus Match Color Conversion • 50,000 hour backlight half life • 500 (cd/m ²) brightness modification • Includes V-Mount Battery Adapter / 4 Pin XLR Pwr • On Screen Display (OSD) and Blue "Gun"	\$1999.00
8.4"	800 x 600 x RGB (500) 1.44 TFT MEGAPIXEL				1		9" x 6.875" x 2.5"	Y • 1.44 million TFT-MegaPixel/8.4 inch screens • Optical grade polycarbonate screen cover • 100% digital processing of HDSOI/SDI • Hyper Process plus Match Color Conversion • 50,000 hour backlight half life • 500 (cd/m ²) brightness modification • Includes V-Mount Battery Adapter / 4 Pin XLR Pwr • On Screen Display (OSD) and Blue "Gun"	\$2099.00
8.4"	800 x 600 x RGB (500) 1.44 TFT MEGAPIXEL		1	1	1	1	9" x 6.875" x 2.5"	Y • 1.44 million TFT-MegaPixel/8.4 inch screens • Optical grade polycarbonate screen cover • Accepts all HD/SD formats/frame rates • Hyper Process plus Match Color Conversion • 50,000 hour backlight half life • 500 (cd/m ²) brightness modification • Includes V-Mount Battery Adapter / 4 Pin XLR Pwr • On Screen Display (OSD) and Blue "Gun"	\$2499.00
8.4"	1024 x 768 x RGB (380) 2.4 TFT MEGAPIXEL		1	1	1	1	9" x 6.9" x 2.8"	Y • High Definition 8.4-inch 2.4 MegaPixel screen • "V" Mount battery adapter included • Optical grade polycarbonate screen cover • Bright 400 cd/m ² luminance • 400:1 ratio of contrast between black and white luminance • Blue Gun for color adjustment • Zoom function • 4:3 and 16:9 screen aspect ratios • 6 Frame Marker Overlays with Center Mark • Built-in Color Bars	\$3899.00
10.4"	800 x 600 x RGB (600) 1.44 TFT MEGAPIXEL		1	1	1	1	10.25" x 8.5" x 2.5"	Y • 1.44 million TFT-MegaPixel/10.4 inch screens • Optical grade polycarbonate screen cover • Accepts all analog HD/SD formats/frame rates • Hyper Process plus Match Color Conversion • 50,000 hour backlight half life • 500 (cd/m ²) brightness modification • Includes V-Mount Battery Adapter / 4 Pin XLR Pwr • On Screen Display (OSD) and Blue "Gun"	\$2199.00
10.4"	800 x 600 x RGB (600) 1.44 TFT MEGAPIXEL				1		10.25" x 8.5" x 2.5"	Y • 1.44 million TFT-MegaPixel/10.4 inch screens • Optical grade polycarbonate screen cover • 100% digital processing of HDSOI/SDI • Hyper Process plus Match Color Conversion • 50,000 hour backlight half life • 500 (cd/m ²) brightness modification • Includes V-Mount Battery Adapter / 4 Pin XLR Pwr • On Screen Display (OSD) and Blue "Gun"	\$2299.00
10.4"	800 x 600 x RGB (600) 1.44 TFT MEGAPIXEL		1	1	1	1	10.25" x 8.5" x 2.5"	Y • 1.44 million TFT-MegaPixel/10.4 inch screens • Optical grade polycarbonate screen cover • Accepts all HD/SD formats/frame rates • Hyper Process plus Match Color Conversion • 50,000 hour backlight half life • 500 (cd/m ²) brightness modification • Includes V-Mount Battery Adapter / 4 Pin XLR Pwr • On Screen Display (OSD) and Blue "Gun"	\$2699.00

6.5" and 7" Stand Alone Monitor Kits



A range of pre-packaged kits for 6.5" and 7.0" stand alone monitors are available. Each kit includes options that make these monitors even more portable. Every kit is provided at a discounted package price and no substitution of components is allowed. All of the kits include components required for portable operation and include

a durable carry case, analog component breakout cable, A.C. stand alone power supply and cleaning wipes. A variety of kits are available with batteries, charger, sun hood, plus Anton Bauer Gold and four pin D.C. power adapter cables. Tough, rugged and lightweight, the carry case provides the safest transportable environment for your monitor. Each case is manufactured with a proprietary HPX™ high performance resin, and features secure Press & Pull latches, automatic pressure relief valve and a durable soft-grip handle. This is the most comfortable, toughest case available. Airtight, watertight, dent & shatter-resistant, our carry case is made to defy the elements.

Part Number	Including	Description	Q-ty	Price
V-R65P-HD-K1	V-R65P-HD	6.5" HD monitor	1	3899.00
	RGB-5HD15-6	Analog Video Break-Out Cable	1	
	V-CC1	Carrying Case	1	
	V-PS12-3.3	A.C. Power Supply	1	
	V-HWP-K	Cleaning Wipe	10	
V-R65P-HD-K2	V-R65P-HD-K1	Anton Bauer Gold Power Adapter	1	3999.00
	V-PAC-D	4 pin XLR Power Adapter	1	
	V-PAC-XLR	Viewing Hood	1	
	V-H700P		1	
V-R65P-HD-K3	V-R65P-HD-K2	see above	1	4399.00
	V-R65-BA IDX-E50S	V Mount Battery Adapter Battery	1	
V-R65P-HD-K4	V-R65P-HD-K2	see above	1	4999.00
	IDX-VL-2Plus	2 Channel Sequential Charger	1	
V-R70-K1	V-CC7	Carrying Case	1	249.95*
	V-PS12-3.3	A.C. Power Supply	1	
	V-HWP-K	Cleaning Wipe	10	
V-R70-K2	V-R70-K1	see above	1	449.95*
	V-PAC-D	Anton Bauer Gold Power Adapter	1	
	V-PAC-XLR	4 pin XLR Power Adapter	1	
	V-H700P	Viewing Hood	1	
V-R70-K3	V-R70-K2	see above	1	649.95*
	IDX-E50S	Battery	1	
V-R70-K4	V-R70-K3	see above	1	1185.00*
	IDX-VL-2Plus	2 Channel Sequential Charger	1	

* Only when purchase with 7" LCD monitor

Accessories for Stand Alone / Video Assist Monitors



V-H7M

Sun Hood for 7" monitors. Use for viewing in bright lighting or outdoors. Price: \$99.95



V-H900

Sun Hood for 8.4" monitors. Use for viewing in bright lighting or outdoors. Price: \$129.00



V-H10M

Sun Hood for 10.4" monitors. Use for viewing in bright lighting or outdoors. Price: TBD



V-ABA-01

V-Mount to Anton Bauer Adapter. Use to power Marshall Electronics monitors that have V-Mount plate with Anton Bauer Gold Mount battery. Price: \$199.00



V-DV-PWR1

Use the DV-Power pack with Marshall Electronics line of Stand Alone monitors. This product is the perfect solution for users of DV and HDV Camcorders. Price: \$299.00



V-R65-BA

Mount for IDX Batteries. Attaches to V-R65P-HD monitor. Price: \$150.00



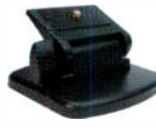
V-CC1, V-CC7

Airtight, watertight, dent & shatter-resistant, carry case for V-R65P-HD. Price: \$199.00



V-LCD-MT-01

Camera Hot Shoe Mount. Attaches monitor to camera. Price: \$24.95



V-LCD4-ST

Stand. Use for table top mount. Price: \$39.95



V-PAC-D

Power Adapter Cable. Use with Anton Bauer D-type connection. Price: \$60.00



V-PAC-XLR

Power Adapter Cable. Use with 4 Pin XLR connections. Price: \$60.00



RGB-5HD15-X

Component input cable. HD-15 to BNC breakout cable (X = Length in feet: 6, 10, 15, 20) Price: \$34.95 to \$68.50 (See Page 16 for pricing details)



V-HWP-K

Package of 10 non-toxic, anti-static, alcohol and ammonia free cleaning wipes for LCD displays. Price: \$9.95

Distribution Amplifiers

MD-0114



MD-0114-EQ



BD-0114



MD-0512



MD-0514



BD-0314



BD-0914-D



In	Out	Features	Price
1 Composite	4 Composite	<ul style="list-style-type: none"> Use in short cable run and desktop/multimedia applications Self terminating 75Ω BNC input 75Ω BNC outputs (4) Power indicator on front panel All connections in rear of module Install in rack or use on the desktop 	\$89.95
1 Composite	4 Composite	<ul style="list-style-type: none"> Convenient front panel adjustments of gain and high frequency equalization Adjustments to compensate for cable runs up to 1000' Self terminating 75Ω BNC input 75Ω BNC outputs (4) All connections in rear of module Install in rack or use on the desktop 	\$159.95
1 Composite	4 Composite	<ul style="list-style-type: none"> Signal Bandwidth up to 300Mhz Use 3 modules for Y-Pr-Pb applications Self terminating 75Ω BNC input 75Ω BNC outputs (4) All connections in rear of module Install in rack or use on the desktop 	\$179.95
1 Component 1 RGBHV	2 Component	<ul style="list-style-type: none"> Signal Bandwidth up to 350Mhz Multiple applications HD-15 Input Connection self terminating 75Ω 2 HD-15 Output Connections All connections in rear of module Install in wall or use on the desktop 	\$159.95
1 Component 1 RGBHV	4 Component	<ul style="list-style-type: none"> Signal Bandwidth up to 350Mhz Multiple applications HD-15 Input Connection self terminating 75Ω 4 HD-15 Output Connections All connections in rear of module Install in rack or use on the desktop 	\$179.95
1 SDI	4 SDI	<ul style="list-style-type: none"> Use for distribution of SDI signals 143Mbs to 540Mbs Self terminating 75Ω BNC SDI input 4 relocked and equalized BNC SDI Outputs Power indicator on front panel All connections in rear of module Install in rack or use on the desktop Can also be used as a signal repeater Includes power supply 	\$299.00
1 HDSDI/SDI	4 HDSDI/SDI	<ul style="list-style-type: none"> Use for distribution of HDSDI or SDI signals 143Mb/s to 1.5Gb/s Self terminating 75Ω BNC SDI input with adaptive equalization 4 buffered and relocked BNC HDSDI or SDI Outputs Power indicator on front panel All connections in rear of module 	\$699.00



Price: \$95.00

V-CRM2

Single RU Conversion and D/A Module Bracket

Single RU (1.75" tall) Conversion and Distribution 2 Module Bracket. Two Marshall Electronics 7.75" wide or one 7.75" plus one 4.75" wide conversion or distribution modules can be securely installed into a standard EIA 19" rack with the V-CRM2 mounting bracket. Every V-CRM2 includes one blank panel and one 4.75" adapter for a clean cosmetic appearance.



Price: \$95.00

V-CRM3

Single RU Conversion and D/A Module Bracket

Single RU (1.75" tall) Conversion and Distribution 3 Module Bracket. Up to three Marshall Electronics 4.75" wide conversion or distribution modules can be securely installed into a standard EIA 19" rack with the V-CRM3 mounting bracket. Every V-CRM3 includes two blank panels for a clean cosmetic appearance.

Converters

	In	Out	Features	Price
MC-0201-4 NEW 	4 S-Video	4 Composite	<ul style="list-style-type: none"> Compact design can be installed on the tabletop, wall mounted or placed into a standard 19" EIA-rack using the optional V-CRM2 rack kit Full bandwidth conversion of S-Video (Y/C) chrominance and luminance components to composite video Four channels of conversion in each MC-0201-4. This is a perfect fit for use of S-Video signals with the Marshall Electronics 17" screen monitor series model V-144P Low Power consumption less than 10 watt Operates from 6 Volt DC S-Video signal loops out for use with downstream equipment like switcher, vision mixer, or VCR 	\$189.95
BC-0301-08 	1 SDI	1 SDI 1 S-Video 2 Composite	<ul style="list-style-type: none"> Converts component serial digital signal to analog composite and Y/C Active loop through for SDI signal with re-clocking Simultaneous outputs for 2 video and 1 Y/C (S-video) PAL/NTSC auto detection with led indicator Pedestal on/off selection for NTSC signals 10-bit processing with two-times over sampling Supports closed captioning Includes color bar generator 	\$289.00
BC-0301-10 	1 SDI	1 SDI 1 S-Video 2 Composite	<ul style="list-style-type: none"> Converts component serial digital signal to analog composite and Y/C Active loop through for SDI signal with re-clocking Simultaneous outputs for 2 composite video and 1 Y/C (S-video) PAL/NTSC auto detection with led indicator Pedestal on/off selection for NTSC signals 10-bit digital encoding with 4x over sampling Supports closed captioning Includes Color Bar Generator and Power Supply 	\$379.00
BC-0103-08 	1 Composite 1 S-Video	1 SDI	<ul style="list-style-type: none"> Converts Composite Video or Y/C to Digital Component (SDI) Illuminated power and input signal indicators Adaptive filtering removes NTSC interface artifacts 2x over sampling for true color reproduction 10 Bit analog to digital conversion 8-bit quantization of output signal Supports closed captioning 	\$495.00
BC-0103-10 NEW 	1 Composite 1 S-Video 1 Component	1 SDI	<ul style="list-style-type: none"> Converts Component, Composite Video or Y/C to Digital Component (SDI) Illuminated power and input signal indicators NTSC or PAL operation with automatic detection Adaptive filtering removes NTSC interface artifacts 2 x over sampling for true color reproduction 12 Bit analog to digital conversion 10-bit quantization of output signal Supports closed captioning 	\$575.00
BC-0909-AD NEW 	1 Component or 1 S-Video or 1 Composite	2 HDSDI/SDI	<ul style="list-style-type: none"> Converts Analog High Definition (SMPTE-260/274/296M) to Digital (HDSDI) Converts XVGA, SXGA and WXGA to Digital (HDSDI SMPTE-292M) Converts Analog Composite (PAL/NTSC) to Digital (SDI SMPTE-259M) Converts Y/C (S-Video) to Digital (SDI) End to end 10bit processing 2x over sampling of Composite and Y/C signals Adaptive comb filter for noise reduction on composite and Y/C signals 	\$1995.00
BC-0909-DA NEW 	1 HDSDI or 1 SDI	1 HDSDI/SDI 1 Component or 1 SDI 1 Component	<ul style="list-style-type: none"> Converts HDSDI to Analog High Definition RGBHV or Y-Pr-Pb Converts HDSDI to XVGA, SXGA and WXGA Converts SDI to Analog Composite (PAL/NTSC) Converts SDI to Y/C (S-Video) Converts SDI to Analog Component RGB/Y, R-Y, B-Y/YUV Converts SDI to VGA PAL/NTSC auto detection with led indicator Active loop through for SDI signal with re-clocking Automatic detection range of 142Mb/s to 1.485Gb/s Automatic Compensation of SDI input for cable length up to 1000' 10-bit processing with 4x over sampling 	\$999.00
MC-0105 NEW 	1 Composite 1 S-Video 1 VGA	1 VGA	<ul style="list-style-type: none"> NTSC or PAL operation with automatic detection Illuminated power and input signal indicators Converts Composite Video or Y/C (S-Video) to VGA (RGBHV) for display on projectors or data screens Transforms interlaced 525/625 images to Progressive Scan Adaptive filtering removes NTSC interface artifacts 2x over sampling for true color reproduction. VGA output processed as 4:4:4/RGB Automatically scales NTSC input to 640x480 RGB Pixel screen format Automatically scales 525 input to 768x576 RGB Pixel screen format Automatic Gamma correction, Automatic color space conversion Seamless switching between VGA and composite or Y/C inputs 	\$249.00

Accessories

V-R70-1M Price: \$95.00



Rack mount adapter kit for all V-R70P and V-R70DP models.
The V-R70-1M can be used to mount any of our 7-inch portables into a standard 19-inch EIA rack. Two monitors can be installed or a single monitor with a blank insert that is included.

V-CB1
Price: \$19.95



Converters and D/A Base Holder for desktop use
For desktop applications like editing and graphics, use the V-CB1 stand to reduce the footprint of the conversion or distribution module. The V-CB1 stand provides a sturdy base with a secure attachment to the module while reducing the desk space to under 4 square inches.

V-BG-P-MS



Price: \$249.00

V-BG-PCB-MS



Price: \$199.00

Color Bar Generator NTSC/PAL (Handheld and PCB)
Use the V-BG-P-MS portable color bar generator in the field or on the desktop. This dual model runs on a standard 9VDC battery or on optional external power supply, and is used to generate a full field color bar test pattern as a composite video signal for PAL or NTSC Systems.

V-R84-1M / V-R104-1M Price: \$99.00



Rack mount adapter kit for all V-R84DP/V-R104DP models.
A single V-R84DP/V-R104DP model with 8.4/10.4 Inch screen can be installed into a standard 19-inch EIA rack with this kit.

RGB-5HD15-X

RGB-5HD15-6	6ft	\$34.95
RGB-5HD15-10	10ft	\$39.95
RGB-5HD15-15	15ft	\$59.95
RGB-5HD15-25	25ft	\$68.50



BNC Breakout Cables

Our RGB-HD-15-X cables are available in 6, 10, 15 and 25 foot lengths and are used to transform individual signals, such as RGBHV from BNC connections to a Female DB/HD-15 connector.

Power Supplies

V-PS12-3.3A



V-PS12-500 / V-PS12-1000



V-PS6-1.2A



Part No	Description	Price
V-PS12-500	12VDC (500mA) regulated power supply w/coax plug	\$16.00
V-PS12-1000	12VDC (1A) regulated power supply w/coax plug	\$24.95
V-PS12-3.3	12VDC (3.3A) w/coax plug	\$79.95
V-PS12-5V-1	12VDC (5A) P/S w/twist lock connector	\$89.95
V-PS6-1.2A	6V (1.2A) P/S w/twist lock connector	\$39.95

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Use our TFT-MegaPixel AV-840/AV-1040 as a direct replacement for podium microphones and benefit from the extra versatility of the integrated computer and Audio/Video monitor. The gooseneck microphone is manufactured by our renowned MXL division and delivers maximum clarity while the video/computer display expands the applications where a podium microphone is required. The system can be operated locally or via remote control RS-232 and GPI, plus there are General Purpose Outputs to provide interface to projectors, screens, lights, etc.

A Universal voltage DC Power supply is also included for the system and phantom power.

Price: TBD

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MODEO

mobile video

BY JOHN LUFF

Seldom does a business get to start with a clean sheet of paper. Market opportunities that have been developing for several years offered Crown Castle International (CCI) just such an opportunity. CCI owns and operates thousands of broadcast and telephony transmission towers in Europe, Australia and North America. Its tenants include AT&T Wireless Services (AWS), Cingular, Nextel, Sprint PCS, T-Mobile and Verizon Wireless, as well as various state and federal government agencies, and broadband data service providers.

Part of its business includes CCI sites, a state-of-the-art tower inventory management system containing more than 117,000 co-locatable sites in the United States. As it turns out, the new business it is developing relies on the control center, which monitors their tower-related businesses.

All of us have seen demonstrations of video delivered to mobile devices. Much of that content has been delivered at extremely "challenged" bit rates. Such poor quality is unlikely

to be a regular and satisfying viewing habit. But if the quality of the content is sized for the display and the channel bandwidth, it might well be possible to get committed consumers. CCI is doing exactly that.

The Modeo (a subsidiary of CCI) network will use 5MHz of unencumbered nationwide spectrum acquired by Crown Castle through the FCC auction in 2003. It is building a network that will distribute multichannel video and other services over that

Modeo will begin delivering multichannel video servers to the top 30 markets from its new control room this year.

bandwidth. Beginning this year, the network plans to deliver live mobile TV to the top 30 markets across the United States. For several months, it has been operating two test delivery systems, in Pittsburgh and

The results have been encouraging. The system chosen for transmission is DVB-H, which uses COFDM transmission. (See Figure 1.) Compression is WM9. The delivered payload includes about five channels of programming regionalized to allow

from all of the transmission sites already, including tower lighting information required by the FAA. By extending that network, Modeo will be able to bring extensive information about the deployment back to the central monitoring site.

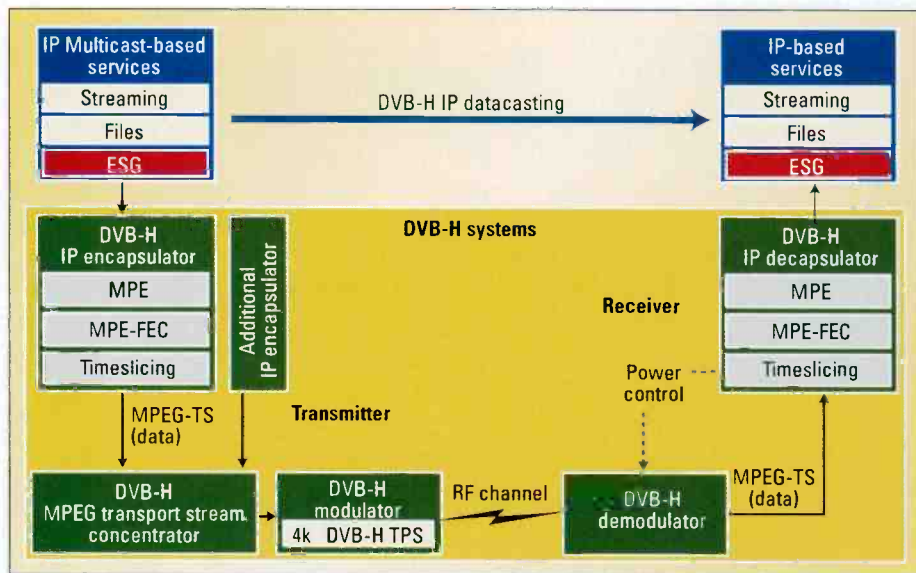


Figure 1. Based on the DVB-H standard, Modeo plans to deliver live mobile TV to the top 30 markets across the United States beginning this year.

Multicast network Modeo employs the OPAL IP encapsulator from Thales Broadcast & Multimedia.

New York City. Both of those, as well as all of the markets in the commercial roll-out, are fed from CCI's headquarters in suburban Pittsburgh. The

specialized programming tailored to each area. The central distribution facility in Canonsburg, PA, as well as the demonstration system, were inte-

Mobile video delivery has different requirements than other content. It would be difficult to deliver the full range of channels available to the general consumer audience, though not all would be of interest to mobile users. News and entertainment programming would be among the program offerings. The content is aggregated in Canonsburg, compressed and delivered to a DS-3 Ku band satellite channel, which is downlinked at each transmission site. (See Figure 2.)

The calculated link budget should provide in excess of 10dB fade margin and more than 99.95 percent availability in all markets served. In every market, all of the transmitters are tightly synchronized to allow users to move from coverage of one transmitter to another, which is a requirement of the DVB-H standard. The resulting system has been shown to provide a solid viewer experience on watching

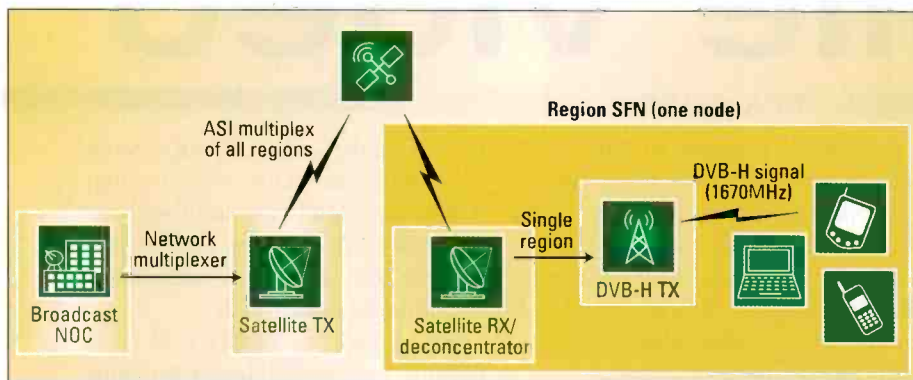


Figure 2. Content is aggregated at the central distribution facility in Canonsburg, PA. Then it is compressed and delivered to a DS-3 Ku band satellite channel, which is downlinked at each transmission site.

demonstration system has allowed the network to experiment with coding and transmission options without interrupting a commercial service later.

grated and designed by AZCAR USA. Monitoring and control is critical in such a national service. CCI has the ability to bring status information

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on PDAs, laptops and likely eventually in cars and other motor vehicles.

The operations center includes satellite and terrestrial receive capability, which brings the signals in. The monitoring center can view both inbound and outbound signals in a control room with access to information about the transmission sites as well. As

each market is rolled out, the monitoring and control systems will be expanded to allow monitoring the reception of the digital satellite signal, as well as provide the ability to decode the transmitted signal and return it to Pittsburgh for analysis and troubleshooting.

The ingest subsystem receives content delivered by programmers either as conventional full bandwidth services or groomed services intended for low-bandwidth distribution streamed over VPNs on either the public Internet or point-to-point circuits. Full-bandwidth content is either processed and compressed live, or it is recorded to a local Omneon server for delay and broadcast. The Windows Media 9 encoders are Thales ARGOS, and the IP encapsulation hardware is Thales OPAL. The Thales subsystem includes DRM and failover redundancy protection.

One of the capabilities in the system

allows content to be downloaded to local memory (disk or flash) in the receiver. Using the program guide and user interface on the local display, a consumer can pick a program for delivery, which is then pulled from the transmitted carousel and locally stored for viewing in the future. Some of this content is stored on the Omneon video server. Delivery of these "file services" uses a FLUTE server, a protocol that might be thought of as similar in purpose to FTP. In addition, the system includes several channels of audio programming provided through a national service.

The transmission network delivers over a national 5MHz channel at 1670MHZ. The nationally delivered single 45Mb Ku satellite signal on AMC9 has the capacity to carry regionalized programming to approximately 30 markets.

The launch was announced formally at CES, though Modeo and AZCAR

Design team

AZCAR, systems integrator

Technology at work

Evertz terminal equipment and monitoring software
Omneon video server
Thales Broadcast & Multimedia
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The Pittsburgh control center can even monitor tower lights throughout the entire system.



Encoding equipment relies on Thales technology.

have been at work on the technical and operational plans for a considerable period of time. In addition to Pittsburgh and New York City, Modeo expects to deploy other markets during the balance of 2006.

AZCAR supplied design and integration services, including most of the origination center equipment. In addition to the package of Thales encapsulation and compression hardware (and support software systems), several other manufacturers' hardware was important to the project. Evertz provided terminal equipment and monitoring software.

As with any 24/7 commercial facility, Modeo has built backup power (UPS and generator) and has provided for disaster recovery and transmission redundancy as the network grows. **BE**

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



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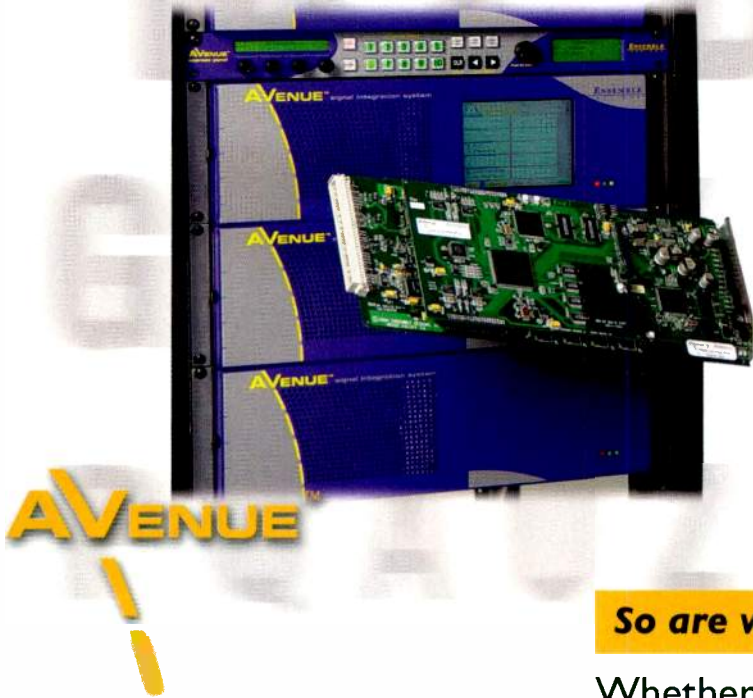
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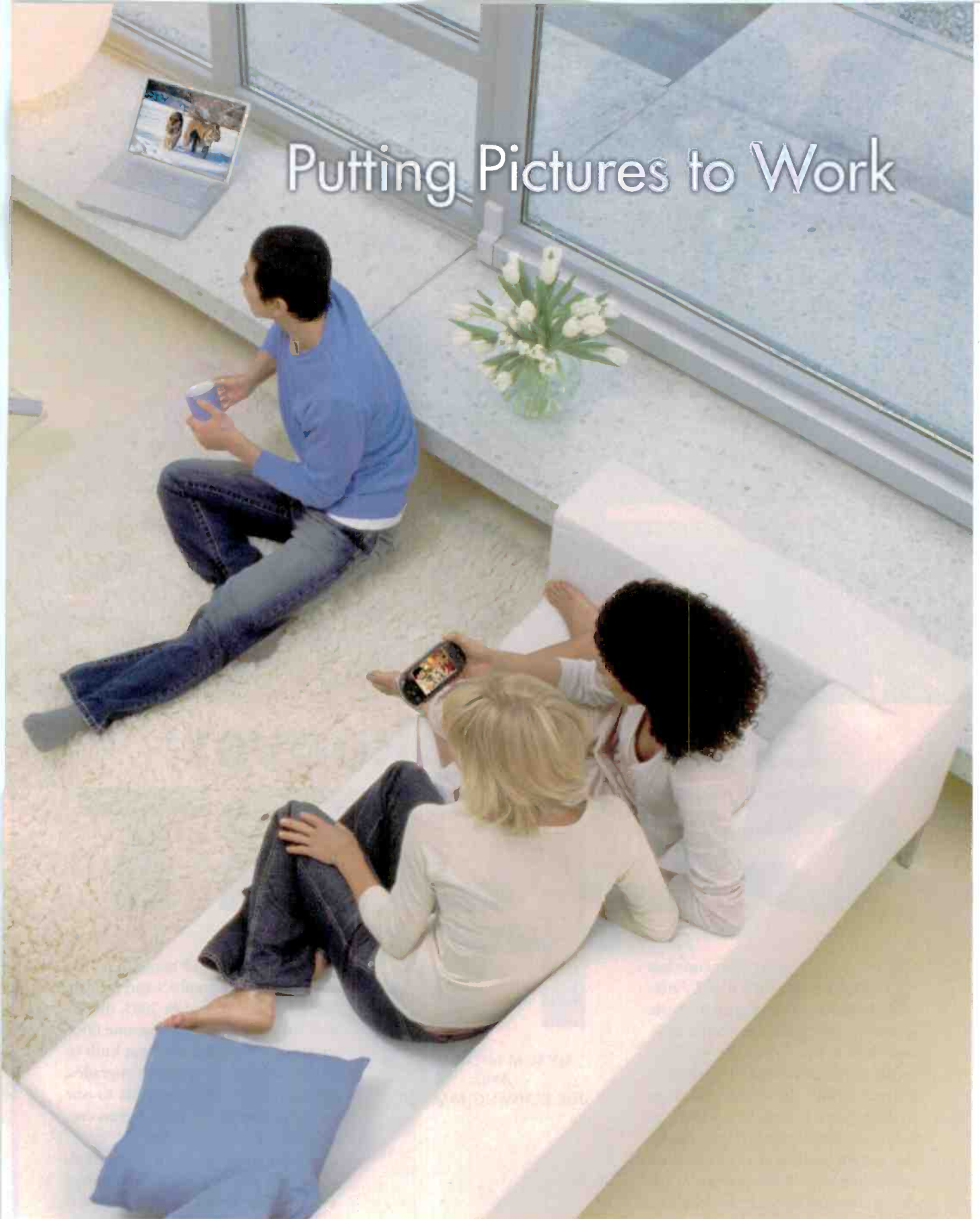
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Extreme makeover: COURT TV

It's a familiar story: Someone has a brilliant idea for a new TV network, he cobble together a basic system to get it going, grows it a little, and then it sits. While the engineer hopes to one day move the station to a larger facility, the system continues to grow into a success beyond its creator's original dreams. Then, finally, the station realizes it needs to do a major overhaul of the systems in order to continue to better its product.

Court TV is no exception. Founded in 1991, it has lived at its current location for 13 years. It now fills 10 floors for its three studios, two control rooms, multichannel master control,

BY TOM MICHALES
AND
JOE SCHWINGHAMMER

The expansive, new control room has no CRT monitors because viewing is done in the video shading room.

post production and many other areas. In 2002, the graphics and post areas were rebuilt, and in 2003, master control was moved to a separate floor and a new technical core was built to support it and other future upgrades. Then, in 2005, enhancements to one of the production control rooms created an extreme makeover.

Initially retained as a consultant, Ascent Media Systems & Technology Services (formerly A.F. Associates) helped define the operational goals and concepts for a new production control room. To make the upgrade possible, one control room was taken offline, and production doubled up



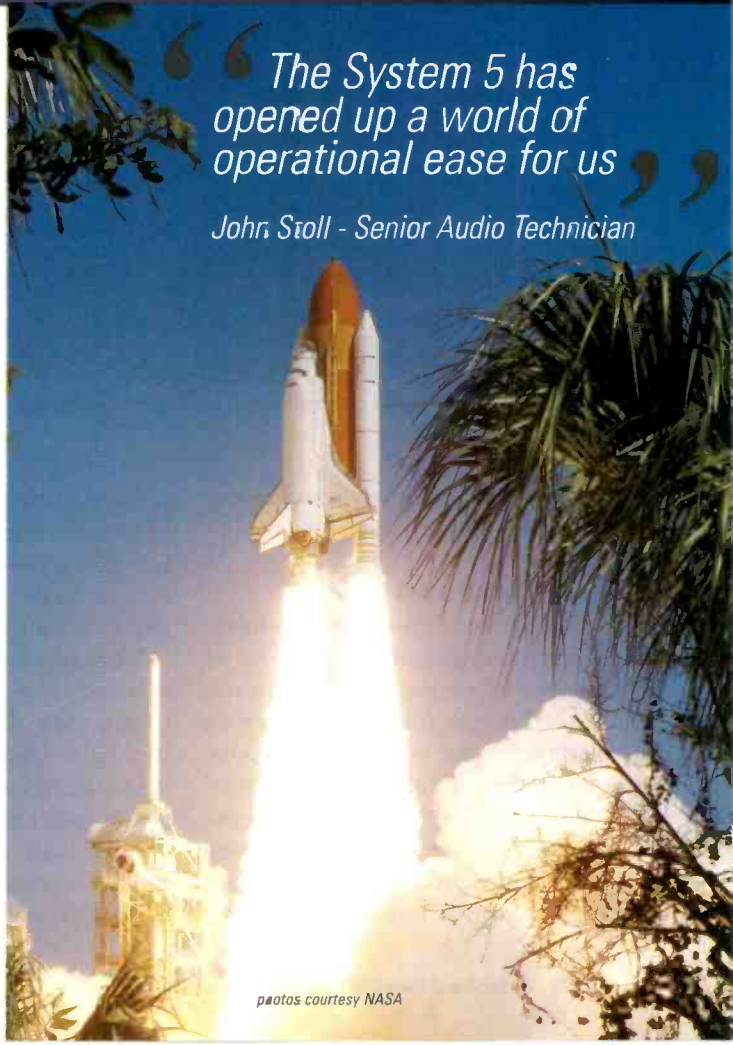
During the last mission by Discovery, audio engineers, Royce Bowie and Greg Wiseman (standing, l-r), with John Stoll, senior audio engineer and audio engineer Beth Weissinger (seated, l-r), in the Johnson Space Center Audio Control Room, handled all the communication and media feeds as well as NASA TV broadcast audio from the System 5-B.

NASA Lifts Off With Euphonix

NASA has installed a 64 fader System 5-B audio mixing system to handle audio from the shuttle and space station communications, mission commentary, media feeds, Presidential and VIP hookups, and audio from the various NASA operations centers together with audio for NASA TV.



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“The System 5 has opened up a world of operational ease for us”
John Stoll - Senior Audio Technician

photos courtesy NASA

in the remaining room while the new system was built out.

Spacious design

Because Court TV is on the air live nine hours each day, it was important to create a comfortable work environment — one that was a break from the ordinary technical space. The new control room is comprised of a generous video control room, audio control room, green room and makeup area, a media and producer room, and a video shading room.

There are three tiers of consoles in the video control room. The front section is for the TD, CG ops, director and assistant director. The middle section is for production staff, including the lead producer and prompter operator. The rear section is for a dial-in phone operator, and space is



The new Court TV control room uses 4M/E Grass Valley Kalypso switcher.

flush with the front wall soffit and is flanked by a pair of Martin Logan Voyage speakers.

All displays at the desktop are LCD-based. This concept was extended from video production to audio production, where an additional Evertz MVP-fed LCD panel monitors video

HDSD9545-PRO profanity delay creates a 10-second delay for live events. The production system is tied to an SDI/embedded AES Thomson Trinitex house router and master control via a frame sync and AES embedder processing chain.

The audio control room is based on a Wheatstone Bridge digital audio mixing system with a D5.1 control surface. Additional equipment includes RTS TIF-4000 hybrids, patchbays and miscellaneous gear in a two-bay-wide equipment credenza located beside the operator. The main console contains the D 5.1 board, and above it is a ceiling-hung 40in NEC LCD with its own output of the Evertz MVP processor. A 360 Systems Digicart/E provides audio clip playback. Audio post operators can drag and drop files onto the Digicart hard drives from the Digidesign Pro Tools system.



In Court TV's old audio control room, staff members used a Wheatstone SP6.



The new audio control room for Court TV features a Wheatstone D 5.1 audio board.

available for executive guests wanting to sit in on the production.

An operational leap

In a dramatic break from tradition, there are no glass monitors in any of the control rooms. This decision was made because color-critical viewing is done in the video shading room, not in the control room. The virtual monitor wall is based on a 72-input Evertz MVP processor system used with four Barco 70in DLP-based rear projection units. It is mounted

signals. The executive producer also has an MVP-fed display that monitors inbound feeds and uses the MVP control panel to select which audio feed to listen to.

The production video control room is based on a Grass Valley Kalypso Classic SD 4M/E switcher, Chyron Duet character generator and Aprisa RePlay still store, Grass Valley Gecko and Kameleon Series modular gear and BDL Autoscript teleprompter control, NEC LCD panels, and RTS intercom panels. An Evertz

To tie the new production environment to the existing studios, new BSPs with empty triax panels, mic connections and other I/Os were installed in each studio. The triax panels will be populated as the video shading system gets moved and rebuilt. New local routers were also installed in the studios to support on-camera monitoring.

Equipment selection

After weighing many factors, Court TV decided that standard definition

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SYSTEMS DESIGN SHOWCASE

was the most prudent choice for its facility. The vast majority of the video feeds that originate in courtrooms are analog, not SDI, and certainly not high definition. The Kalypso platform was chosen not only for its power and flexibility, but also because of the staff's familiarity and comfort level with the Grass Valley product. The technical directors had been switching on Grass Valley's 250 Series for more than 12 years.

The facility evaluated audio consoles from several manufacturers. The audio operators wanted a more traditional TV-specific console, so the Wheatstone D 5.1 was the best choice. One of the big pluses of the system is that it is based on a router, making it flexible. It has an architecture that supports the use of multiple control surfaces using a single router core. In the long run, this is



An Evertz remote control panel for monitor reconfiguration sits at the executive producer's position in the middle of the control room.

a great advantage, as Court TV can provide all control rooms and the radio studio access to all signals in the production environment.

The facility chose the RTS TIF-4000 for IFBs and PLs. The operators were used to standard telco couplers, so the

new system provides improved flexibility, allowing anyone to check in any feed from any location, as well as enhanced operator friendliness, with better displays for conditions.

Graphics

Court TV has always used Chyron graphics products, and this job was no exception. Two dual-channel Duet LEXs were chosen for CG work. The facility selected two four-channel Aprisa RePlays for stills and clips. It picked the RePlay because of its database and search capabilities. Each televised trial has its own extensive set of graphics files. Having these elements organized and easy to find was important for the production staff.

To help manage and publish graphics to all of the production devices, a VertigoXmedia Vertigo Xmediaserver media server system was implemented. Using specific rule sets, the server

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SYSTEMS DESIGN SHOWCASE

publishes content out to edge devices from a central repository for all of the graphics at Court TV. This product has greatly streamlined the creation and distribution of graphical elements.

Integration challenges

Because Court TV had been working in the same control room for 13 years, there definitely was resistance to change. To minimize this, the technicians and production staff were involved early in the process. Equipment was demonstrated, feedback solicited, workflows reviewed and training provided. All of these things helped prepare for the changes to come.

Modifying the signal chain to accommodate the new control room while leaving enough of the infrastructure in place to stay on the air in the legacy control room made the project particularly difficult. Without the benefit of previous system drawings, it was an adventure.

This project was often delayed due to construction issues. Some materials took time to arrive, but even that time was well spent getting the rest of the technical system built. The con-

Design team

Ascent Media & Technology Services

Tom Michales, sr. project manager

Bruce Giuriceo, site project manager

Eddie Ly, sr. project engineer

Tim Caldecott, project engineer

Craig Kellingbeck, project leader

Court TV

Joe Schwinghammer, sr. vp of engineering and facilities

Paul Kelly, director of engineering

Mike Rosker, project engineer

Tom Schoenwandt, project engineer

Mitch Silberbush, project engineer

Janson Design Group, architect

Forcast Consoles, Ernesto

D'Angelo, vp of design and engineering

trol room portion was completed just a couple weeks after construction was complete.

In addition to rebuilding the control room, the facility expanded the intercom system by adding a new RTS Adam frame located in the equipment center. This was trunked to the legacy system located in the

old SVO room, which allowed for a clean, phased implementation and migration strategy with minimal system downtime. In due time, the intercom system will be consolidated in the equipment center.

A lesson learned from using a virtual monitor wall was a lip-sync error present within the control room. Multi-window display processors generally yield a small video delay. To create a simple fix, the control room audio monitor output was delayed three frames. While the Wheatstone system can delay any input, it can also delay the monitor output. So with a small adjustment, the problem was solved.

Operational results

Court TV's staff has been impressed with the system even during the construction phase. Operators visited the new system during construction and were consistently blown away by the system's look and feel. Now that the system has been on the air for some time, the results are spectacular. **BE**

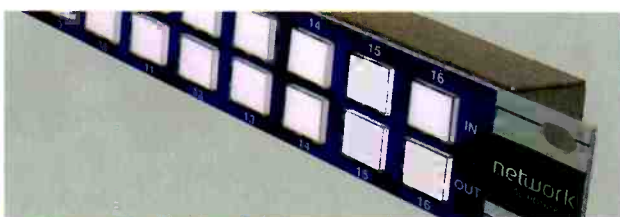
Tom Michales is senior project manager for Ascent Media & Technology Services. Joe Schwinghammer is senior vice president of engineering and facilities for Court TV.

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The old Control A was on-air for at least nine hours a day for the last 13 years.

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Antenna installation and tower construction



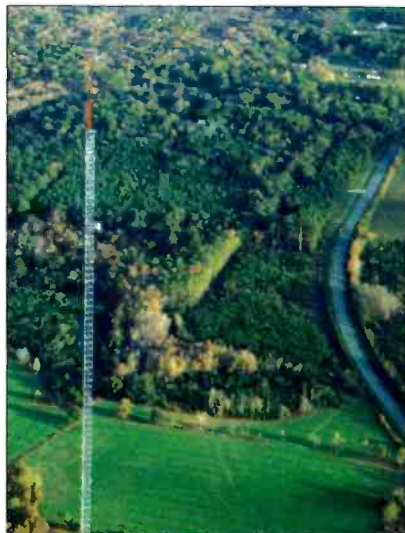
BY DON MARKLEY

Recent events have convinced me that certain areas of antenna installation and tower construction need to be revisited. In particular, there are steps that station personnel should take when antenna or transmission line work is done or when towers are being constructed or modified.

If all goes well, most of these steps will prove unnecessary. But, if there is a problem, the station's staff will need to revisit these steps to make sure nothing was missed.

The planning stage

First, determine what needs to be done as opposed to how it should be done. Figure out what the load criteria is for a tower, what the limits are on the guy radius, what the soil conditions are (if known), what antennas and lines need to be installed, etc. In other words, determine what the final project needs to include and what



Stations should leave the design and installation of the tower to the manufacturer.

standards will apply.

As a minimum for a new structure, the current version of ANSI/EIA/TIA 222 should be met, along with any additional strengthening for ice or unusual conditions. Once those criteria have been determined, preferably in cooperation with the station's consulting engineer, a full set of specifications should be prepared. That

applies whether or not any bidding is involved.

The specifications and the contract clarify what all parties involved will do and how they should interact with each other. There are several points that need to be seriously considered to reduce each party's liabilities, especially those of the station and engineer.

Detailed specifications and a written contract

First, never omit the requirement for detailed specifications and a written contract. Stations often work off of a simple proposal from the tower company because they've worked with the rigger for years and think he is a good old boy who would never do anything wrong. Don't make this mistake!

If something does go wrong, the tower company may not have a choice in how the situation is handled. Often, the insurance companies involved will try to subjugate their damages. That means the insurance companies can sue parties in the name of the insured to recover their losses.

In addition, that rigger who has always been a good old boy may disappear like the morning fog if something really goes wrong. That is why everyone's liability needs to be nailed down by contract before any work is done.

The detailed specifications are good for all parties. In my experience, dependable tower companies are in fa-

That rigger who has always been a good old boy may disappear like the morning fog if something really goes wrong.

vor of tight specifications. The specifications protect the tower company by identifying the conditions that the company must meet.

Leave the design to the experts

In identifying the project goals, the station must be careful not to get involved in the actual design. For example, if the station states that the tower face must be 8ft, it now is involved in the design. If the tower comes down like a gut shot cat, the manufacturer can claim that the face requirement was a limitation placed on the design by the station.

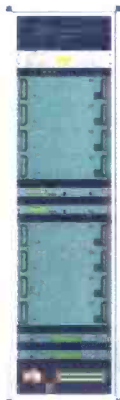
The station needs to state what the goal of the project is and then stay out of the design and the installation. If the station determines that there is something wrong with either the material or the installation services, it can stop work under the terms of the contract until the issues are resolved.

It is highly recommended that no work be done nor should any tower materials be accepted on-site until the station receives a complete set



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of design calculations and material specifications signed by a registered structural engineer, licensed in the state where the project takes place. The statement should attest that the project meets all necessary standards, both national and local. A copy of that statement should be provided to the station's insurance carrier immediately. Written notification of acceptance for insurance purposes should



Tower companies should provide a certificate of insurance for liability coverage. Photos courtesy Dielectric.

be obtained from the insurance carrier before any work commences.

Insurance

On the subject of insurance, stations should demand that the tower company provide a certificate of insurance for a reasonable amount of liability coverage. That insurance should also cover all vehicles that are owned or rented by the tower company.

In today's climate, the liability insurance should be at least \$5 million. If it's a large project, that liability amount jumps to \$10 million.

In addition to the certificate, insist that the station and the station's consultants (broadcast or structural) be co-insured on the tower company's policy. That policy addition doesn't cost much (usually it is free) and reduces the arguments in the case of problems.

Before you decide that your project

is too small to go through all these steps, consider this: A fall from a 60ft STL tower will probably be fatal. The liability and the size of the claims for damages are going to be just as large as if the accident had occurred from a 2000ft structure.

Detailed specifications and contracts are needed for small jobs, because if there is an accident with significant injuries or deaths, everyone within



The liability insurance for a large tower project can be around \$10 million.

shotgun range of the project will probably be sued. The station may get out clean, but that will depend on how carefully it has been protected by the contracts.

Regulatory agencies

Dealing with regulatory agencies is another significant problem. If the station engineer thinks OSHA is a small town in Wisconsin, you are already in trouble.

The new ANSI 222 standard specifies that the project owner is responsible for dealing with OSHA. I highly recommend that you ignore this. Remember, the standard is a recommendation as opposed to an absolute law that you must meet.

The specifications should include that the tower company is responsible for meeting all OSHA requirements. The tower company is, or should be, much more familiar with those re-

quirements than the station staff.

In any case, make sure that the tower company holds regular safety meetings with its staff. The company should identify all hazards on the project and post a listing of those hazards. There should be posted listings of all emergency numbers as well as procedures to be followed in the case of an accident or fire. Everyone in the tower crew should sign all the listings to demonstrate that they have read the material. The tower company should record the training program for its entire staff, and that information should be available for inspection by both the station and OSHA.

In conclusion

There are a number of items to cover in the specifications for a tower or antenna installation project. Obviously, these will seem like overkill to many stations, especially for small projects. However, remember that the damages resulting from an accident depend on the size of the accident, not the size of the tower.

As you consider the preparation of a detailed contract, ask yourself one basic question: Would you rather spend time preparing a thorough document or facing the front office suits as you try to explain why they are out a few million dollars?

The chief engineer doesn't need to do all this by himself; in fact, he probably shouldn't try. The legal counsel for the station should be involved along with its insurance carrier and consulting engineer. Get the experts involved before any trouble occurs. It certainly makes things a lot simpler. **BE**

Don Markley is president of D.L. Markley and Associates.



Send questions and comments to:
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United States downhill skier Julia Mancuso goes over a bump on the course during the third training run on the women's downhill at the 2006 Torino Winter Olympic Games. Mancuso finished third. (AP Photo/Kevin Frayer)

NBC GETS GOLD

BY BRAD DICK, EDITORIAL DIRECTOR

After you've done something six, going on seven, times, you would think that the process would become easier. For David Mazza, senior vice president of engineering for the NBC Olympics, that's true — and not. "When I first took this job in Atlanta in 1994, I was a freelancer. We had budgets, and I thought this would be easy," he said.

On the eve of the 2006 Winter Olympics in Torino, Italy, I sat down with Mazza to find out how the game had changed. It's his responsibility to show millions of American viewers the competition in living color and, this time, in HD. This challenge shows just how far Torino is from Atlanta technologically.

With NBC forking more than \$614 million dollars for the 2006 Olympics and the pressure to deliver in all HD, one would expect Mazza to be a bit frazzled just days before the opening ceremonies. However, during our interview, he was as cool about the events as the snow caps on the nearby mountains. Cool, but not careless. When this kind of money is on the line, there's no room for error, hence his belt-and-suspenders approach to the use of technology. But more about that later.

Something tried, something new

Just three years ago, NBC committed \$2.2 billion for the 2010 and 2012 Olympic broadcasts. These kind

of numbers echo the pressure to be more efficient at everything. Sometimes that means you have to try new things, unproven things.

Each year, changes are made to the NBC Olympics broadcast facility. Sometimes this means new camera technology, tape machines, routers and such. However, one point Mazza strongly emphasizes: He doesn't like being first with anything.

"We're not trying to be new," he said. Covering sports is always tough, you get only one take, and with the Olympics, the risks are even bigger.

"This isn't the place to experiment," he said. And, buying new for newness sake is a sure path to disaster. Mazza and his crew must walk a path between the new (and unproven) and older (but well known and reliable) solutions.

Mazza faces a second equipment challenge: The games require millions of dollars in new equipment for a 17-day broadcast. "Rule number one is not to burn up capital that you're only going to use for three months," Mazza said. "If I can't reuse it, I have to rent it. All our purchases are wrapped up in this kind of philosophy. This also means I won't buy something that's perfectly mature, because the downtime customer wants something newer."

The challenges of HD

While there have been some HD images from previous games, the 2006 Winter Olympics represented the first time that virtually everything brought

to U.S. viewers was available in HD. This begins with most productions being originated and produced in HD, and only at the last minute downconverting the HD images to SD for OTA transmission. Oh, did I mention the entire production was handled in PAL?

So, what were some of the challenges in doing the Olympics in HD? Initially, it seemed straightforward. The needed equipment and budgets were there, so where was the problem? Turns out, the devil was in the details.

First, the system needed to be upgraded for HD. To avoid throwing away the whole SD infrastructure and building an entirely new 1.6Gb/s HD one, the team decided to overlay the new HD on top of the old SD infrastructure.

"This allows the existing SD equipment to be used for monitoring HD," Mazza said. "And actual HD signals were plumbed only where required. The new Sony HD equipment and router were key in this effort's success."

But there was another imp stoking the problem fires. "Technically, what consumed a lot of our pre-games time was solving the aspect ratio issue," Mazza said. While the capture, graphics and production was handled in HD, most of the audience still watched in SD. This meant using center cuts, shooting in safe areas and preventing aspect-ratio production mistakes by way of some automated manner. A key part of the solution included using Sony HDCAM's SD output to automatically generate a 4:3 center cut.

Embracing an HD workflow

"You can't upset how people do things," Mazza said about his decision to keep actual workflow similar to that used in previous games. "With less than a week to train folks, this isn't the time to introduce entirely new workflow practices.

"I'm also a firm believer that you can't just impose workflow on your people, your producers and creative guys. Sure, you may have to get people to change the way they do their work, but you can't impose workflow without listening to what they're trying to do."

Another factor he took into consideration: "The NLE conversion has taken about 10 years. Because we are such a short-term event, our ability to exploit some NLE changes are harder for us to do," Mazza said.

Graphics solutions

Graphics embraced a new HD workflow the most. This was headed by long-time director of graphics engineering and operations for NBC Olympics, Phil Paulty. "One lesson from Athens was that we routed no



The Winter Olympic broadcast center is constructed inside a large, open convention space. Everything that isn't standing on the concrete floor hangs from the black temporary steel girders located just above the room walls.

video between an Avid edit session and a graphics session," Paulty said.

Echoing Mazza's point of listening to the users resulted in a simple, but effective, new procedure for storing images. "At Athens we came up with the idea of using a single graphics folder per day," Paulty said. "We have folders for each day, one per day for the 10 days leading up to the games and one folder for each of the 17 days of the games. This means everyone, including all the audio guys, knows where to drop their work."

An Avid-centric workflow

The Olympics graphics department is responsible for all the eye candy that is so important to an exciting visual Olympics presentation — moving transitions, bumpers, transitions and openings. To make this happen, Paulty's department relied heavily on Avid technology, primarily Avid Adrenalins. A total of 47

Adrenalins formed the backbone of the graphics and editing platform.

Avid's just-introduced ISIS (which stands for infinitely scalable intelligent storage) system was a new addition to this year's Olympics. Operating with Avid's DNxHD 120Mb/s signal, the SAN provides a highly scalable, self-balancing and distributed architecture, which was just what Mazza and Paulty were looking for to implement HD production.

Because HD files are three times larger than SD files, the staff needed



Each of NBC's portable ribs in a box (RIBs) has two outside working rack faces. Between the two rows of racks is a walk space where technicians can interconnect the equipment.

twice as much storage as in Athens just to stay even. And because graphics was the biggest storage hog, the team decided that Avid's ISIS would give them the biggest bang for their HD buck.

Inside the ISIS SAN

Images are stored in 8-bit 1920 x 1080 sizes at 120Mb/s. The NBC Olympic installation relied on a pair of ISIS SANS. Based on an 8TB, 4RU structure, an ISIS can be scaled up to 64TB of storage. A 40TB ISIS was used in graphics, which provided about 380 hours of storage. A second 24TB ISIS supported the videotape room and three NBC edit suites.

The ISIS architecture supported Mazza's belt-and-suspenders approach. Multiple levels of redundancy exist on each server. Each of the four bays of drives that make up the SAN has its own backup drive.

Six drives form the basic storage

module, with a seventh RAID spare drive. Should any problem develop, the spare drive automatically kicks in, and the system immediately begins rebuilding itself in the background. No images or time is lost.

Each ISIS is equipped with double-power supplies, dual-power feeds with auto switchover. Any type of system alert triggered sends an e-mail to Paulty.

Outlying seats connected into the ISIS system. Users could point over to the graphics ISIS and select the desired elements, which were then



David Mazza has been running NBC's Olympic broadcast crews since the 1996 Atlanta Summer Games. His success is grounded on being technologically savvy and believing that new isn't necessarily better.

transferred via GigE to the seat's local storage system for use.

On-site NBC network users "Access Hollywood" and Telemundo also had access to the ISIS SANS. While both operated in SD, the same storage served both HD and SD production needs. The SAN doesn't care whether the images are SD or HD; it's just data. A third ISIS SAN located in New Jersey produced the curling programming.

The benefits are more than just added space. "We also win on the dollar side by combining users rather than having separate storage systems, separate media managers, separate index servers and various bits combined together," Mazza said. "The risk may go up slightly, but that's a balance we try to keep in check."

Fully digital production

NBC creates the Olympic graphics on Avid Deko/Thunders, with

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all images saved as QuickTime files. QuickTime Movies become the basic file exchange format for Olympic graphics. "The term *still store* is obsolete," Pully said. "There are no more stills; everything moves."

The graphics stations were Macs running Final Cut Pro for ingest. Over-the-shoulder shots were managed by After Effects. All graphics and edit suites were the same so operators didn't have to train on multiple setups. All suites have identically loaded and configured software. Each edit station



Phil Pully, director of graphics engineering and operations for the NBC Olympic crew, has a Ph.D. in visual philosophy, which he said works perfectly in helping him design the infrastructure to create dynamic broadcast visuals.

was equipped with 6GB of RAM, dual processors complete with HD I/O. Two graphics Macs, with 3TB of external storage, connected to the local SAN.

Venue ingest was handled by six Avid workstations connected to the primary graphics ISIS SAN. These stations processed the live venue feeds into the ISIS. At the end of each day, every venue created a highlight reel. The reel was then transmitted to the NBC facility and ingested into the ISIS. With six venues and six ingest stations, multiple feeds could be handled simultaneously.

The typical NBC Olympic edit suite consisted of two Avid Adrenaline media composers with DNxHD I/O. Miranda processors were used to embed and de-embed the audio from the SDI stream.

Each production suite had two Sony HDCAM VTRs, a router, HD LCD monitors, a Tektronix WFM and Dol-

by decoder, as well as NHT and Genelec speakers for surround monitoring. Two edit suites were also equipped with Panasonic DVCPRO HD decks.

Flexible graphics production

The Olympic broadcasts place unique requirements on the graphics department. Not only are there thousands of graphic elements, but it's impossible to plan for every contingency.

"Things change, so you need people pushing buttons," Pully said. "When

eo," Pully said. "Now we have four operators. They can pre-build images and let the Avid render it at the desktop. We'll do a QuickTime MXF transfer and simply drop it onto the timeline. We proved this works at Athens."

Pully created a flexible and fast graphics and editing platform at a cost he could afford. "If it wasn't for the PC and Mac platforms, I don't know how I'd afford to do graphics. They've allowed us to go from using custom, proprietary hardware that cost \$350,000 per room to \$40,000," he said.



Each Avid graphics suite was identically equipped, making the transition between suites easy for the temporary staffs.

the director says 'drop cut seven and insert cut six,' automation can't do that. Sports is a seat-of-the-pants operation. For instance, we don't have a graphic for someone breaking a leg or falling on the ice or sky jump. If that happens, we need a custom graphic. You have to be able to change on the fly."

Transferring moving graphics was another issue that had to be solved. The Avid Deko graphics platform provided the solution through Make Deko-Movie. "Every graphic that we make is a movie," Pully said. "We don't make still graphics any more. Backgrounds move. Heads animate. There's always motion in a graphic."

Any information an artist creates, such as clips or CGs, is done with Make DekoMovie. Once an artist saves it as a movie, the graphic can be shipped or dragged and dropped and rendered on any Avid desktop.

"Our workflow had to change because we couldn't tie up 14 edit rooms trying to time graphic changes to vid-

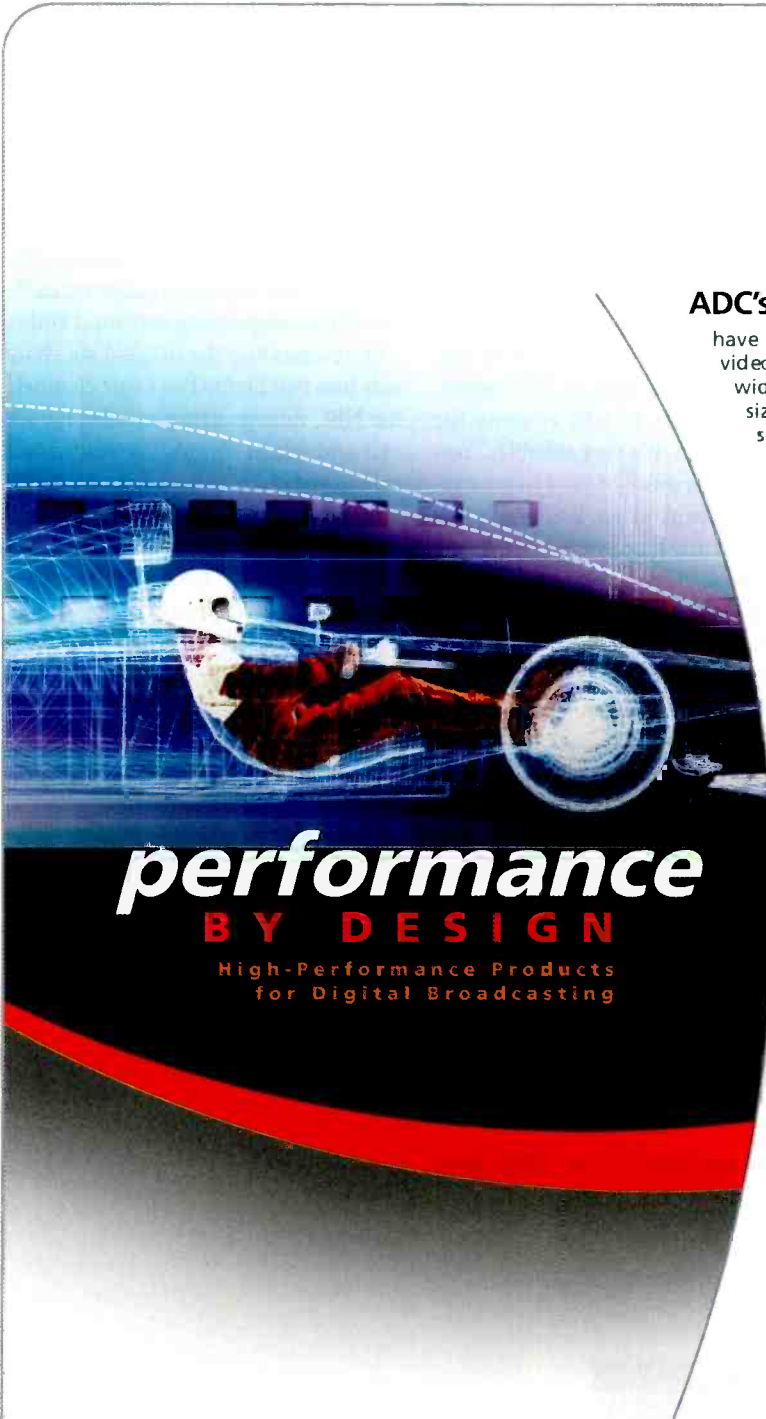
Proxies and metadata

The workflow at the Summer Games in Athens relied on MXF proxies generated by Sony eVTRs. Because that feature hasn't been implemented yet on the HDCAMs, which were employed in Torino, a different solution was needed.

Forty MOG Solutions proxy encoders were used to generate the 16:9 MXF proxies. The real-time MPEG-4 proxies were generated for each venue feed to support desktop browsing at both Olympic suites and back in the United States.

The proxies were handed off to a Blue Order MAM system, which, among other chores, added scene transitions information and generated a storyboard. In addition, during live events, operators manually inserted dynamic metadata such as race results.

Editors could access the proxies within seconds after the ingest started. The proxies were searchable locally and via IP through Internet interfaces to multiple remote locations. The system



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allowed graphic artists and editors to quickly find the footage they needed as well as identify the tape reels containing the master footage, all without tying up a lot of network bandwidth.



The Avid ISIS SAN is located in the smaller center rack, number four from either end. This SAN provided 40TB, or about 380 hours of on-site storage, for the network's graphics department. A second Avid ISIS was used in the tape room and a third back in New York.

Tape is not dead

At this Olympics, NBC recorded almost 20,000 hours of tape, which would be tough to put on spinning disks. Any disk solution would have required a lot of drives, creating its own set of problems. "Besides," Mazza said, "those HDCAM tapes are a lot cheaper than a disk drive. Also, there is the added benefit of distributed risk. If one tape machine breaks, there are still 149 machines working."

Tape is still the most portable of mediums. And, according to Bill Lorenz, project manager of edit systems for NBC Olympics, it's very reliable. "You have to have a piece of tape to go anywhere you want to go. You aren't going to trust any disc system with your entire show. If you can, you'll put a piece of tape down at the same time you record to hard drives. You can take tape anywhere; it's a wonderful way to operate," he said.

Last, but not least: audio

Audio is a huge component of any HD broadcast, and NBC didn't short-change this effort either. Most venues created six discrete audio channels. Once they were returned to the NBC broadcast facility for post production, the discrete channels were encoded into two-channel Dolby Pro Logic II. This turned out to be key to moving some 250 HD video signals around the facility with accompanying surround audio.

By re-encoding the original six channels into two Dolby Pro Logic channels, the NBC infrastructure handled the full mix and effects sound. The studios still monitored discrete surround.

However, to maximize the benefits of capturing in six discrete channels, Dolby modified the encoding software slightly to spread the center image somewhat for decoding in viewer's homes. The result was a wider aural image that reinforced the HD images.

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NBC GETS GOLD



The videotape room is composed of three RIBs, each holding up to 16 Sony HDCAMs. Most venue feeds were first captured and stored on tape here.

At NBC, the graphics department handles all the sweetening for bumpers, promos and teasers. Therefore, along with the HD upgrade, Pauly and his crew needed a different audio mixer. He selected Digidesign Pro Tools driven by an IKON digital console control surface.

"This Mac-based console interfaces seamlessly with the Mac-based edit stations," Pauly said. "Although the console also comes in a PC flavor, the majority of our audio engineers prefer the Mac version."

Ship it home

Once the Olympic content was packaged for transmission to the United States, it was sent via geographically and technologically divergent paths. The SD and HD signals even took different paths. In other words, there was no single point of failure in any of the three paths — belt, suspenders and a second belt approach.

The HD feeds were converted by ShibuSoku converters. The SD feeds were converted by Snell & Wilcox converters. TANDBERG Television transmission encoders were the last devices in the NBC Olympic center to see the images before they were relayed back to the United States.

That's a wrap

Back in 2002, when I interviewed David Mazza at the Salt Lake Winter Olympics ("An Olympic success," March 2002), he compared the Olympic production to doing 16 Super Bowl games — all at once. When I asked the same question again this year, he said, "The Olympics is a giant remote. We still do everything in a temporary fashion; we just do it in a much bigger way. We have a lot more risk. We're on more nights, and we have more stuff and people. But, at the end of the day, we'll do whatever we have to do to stay on the air."

So is it worth all the effort? Mazza quickly says "yes." The only disappointing side, he sighs, is that despite all the effort of his network and crew to produce pristine HD images, 90 percent of his audience never saw them. Most Olympic viewers were still watching in 4:3 and analog NTSC.

Oh well, there's always 2008 in Beijing. Stay tuned. **BE**

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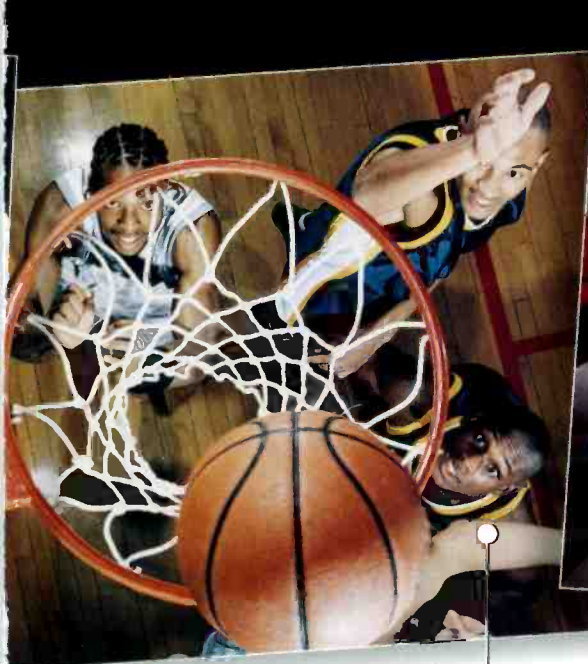


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Five things you should know about

DAM

BY JOHN WADLE

The process that creates a centralized repository for digital files containing non-textual content, such as video recordings, still pictures, audio clips and graphical images, has several names — digital asset management (DAM), media asset management (MAM), digital asset warehousing and content management.

DAM provides tools that allow the content (assets) held in those files to be

archived, searched and retrieved. Asset repositories store digital files. Asset databases store associated metadata describing the content, including file locations, assigned IDs, durations, titles, descriptions, annotations, key words, usage rights and low-res thumbnail images or proxy copies.

The integration of OmniBus' news solution and content management system with AP/ENPS newsroom system allows a news producer to manage the live news broadcast and the production process from the producer's pod.

This definition is not specific to broadcasting, and in fact, DAM found its early adopters in publishing long before it arrived at the broadcast facility. While broadcasters have used asset management systems in the form of program tape libraries and news clip archives since the beginning of TV, the advent

of digital files as the primary media for video and increasing requirements for the repurposing of video assets has created a demand for more sophisticated asset management tools.

In response, solution providers from

the objective here is to offer a discussion of requirements to consider when deciding on a broadcast DAM solution. The following sections cover five things broadcasters should know about DAM.

system manufacturers. Their stake in the DAM landscape is in broadcast operations where their storage devices are located. From this perspective, DAM is primarily a media management tool and an extension of video storage technology. It emphasizes access performance, large storage capacity and multiformat support.

In the movement to IT platforms, video storage systems have added enhanced database capabilities and options for proxy creation. However, their capabilities in these areas are often severely limited as compared with database-centric and client-server platform DAM solutions.

In choosing a DAM provider, decide where your requirements and intended usage fall on the scale shown in Figure 1. There are always some uses (and users) that are exceptions, but your primary use of DAM should match the perspective of the solution provider.

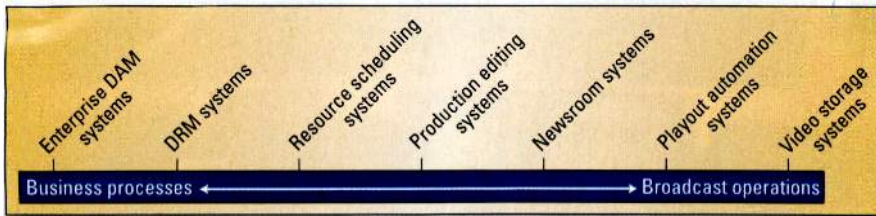


Figure 1. Focus of DAM by type of solution provider

several distinct application areas now offer products for broadcast DAM. These include enterprise DAM companies, automation software providers, editing and production system vendors, newsroom system suppliers, resource scheduling system providers and video storage system manufacturers.

From these diverse perspectives, the scope and required features of broad-

1 A database and media manager

Companies offering DAM solutions have different views on what broadcasters need. Understanding what the potential supplier sees as DAM is essential in selecting a company and product that can meet your current, as well as future requirements.

DAM found its early adopters in publishing long before it arrived at the broadcast facility.

cast DAM have been interpreted differently to leverage the technology found within each company's products. This has resulted in a wide range of products labeled as broadcast DAM, leaving a challenging evaluation process for broadcasters.

This scenario has benefits and disadvantages. Since all broadcasters are not

At one end are enterprise DAM providers with solutions emphasizing database capabilities, sophisticated indexing and search tools, and inclusion of (or integration with) such business systems as rights management. These solutions are primarily designed for business and planning processes, not for broadcast operations or content production.

2 In DAM, "A" isn't just video

In parallel with the demand for repurposing of assets, broadcasters are faced with increasing competition within their traditional markets. For each distribution path and market (e.g., broadcast TV in a major city), product differentiation has become an important tool for maintaining market share.

Besides local news, branding is one of the few options available to enhance the broadcast product within a local market. By branding I mean not just the bug but also animated graphics, overlays, voice-overs and effects sequences that make their mark in the viewer's mind. (See Figure 2.)

Many of the components of branding (e.g., stills, graphics, logos, animations, audio clips) are digital assets in their own right and should be part of your plans for DAM. While the media management capabilities of the devices that store and deliver these components currently lag behind those of video servers, that gap is closing. In other words: A solution for broadcast DAM today should include both video and non-video assets.

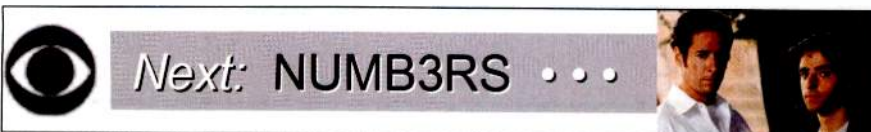


Figure 2. CBS Eyeliner uses logo, text and still with animated reveal.

the same and therefore have different requirements for asset management, multiple solution choices provide a better fit. However, finding one solution to match all operational requirements can be difficult, especially when many products claim end-to-end reach.

Rather than offering an evaluation or categorization of specific products,

With few exceptions, enterprise DAM products do not control video storage, playback or routing equipment and normally do not provide content acquisition (or ingest). In other words, they are designed to track and distribute information about content, not manage the content itself.

At the other end are video storage

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Figure 3. Keywords table with cross-referencing

3 Upstairs, downstairs

In this business, the needs and objectives of management, planning, production, news and operations define a diverse set of requirements for DAM. From their origins in other applications, enterprise DAM systems have developed advanced methods of database organization and indexing to provide sophisticated search capabilities, such as keyword cross-referencing (see Figure 3), phonetic matching, thesauri and

word proximity criteria.

Because of their wide deployment within an organization, many DAM systems offer multiple forms of user interface, such as a Web browser or application GUI. In some cases, this includes the ability to integrate DAM access within related applications (e.g., a window to find and view an asset from within a rights management system). These techniques from enterprise DAM provide a road map for broadcasters to deliver department's requirements via the existing IT infrastructure and systems.

4 DAM for the big and small

DAM provides effective tools for both large and small broadcasters, but the volume and types of content can vary widely. The key to adapting DAM to your requirements lies in workflow or, more correctly, automated workflow.

Most DAM systems include some workflow management, providing tools to define a sequence of processing steps (i.e., tasks) using the capabilities of the DAM system. Beyond defining a workflow of tasks within

the DAM system, advanced workflow managers automatically initiate tasks, monitor jobs through the workflow and assign tasks by external systems.

For example, a workflow to acquire and prepare content for air will use functions of the DAM system, such as content registration, metadata capture and proxy creation, as well as require tasks from other systems to control ingest, verify standards compliance and cache content files for playout. A comprehensive, automated workflow manager within the DAM system is an invaluable tool in optimizing the use of generalized solutions to specific requirements. (See Figure 4.)

5 Old news

From using index cards and tape to databases and video servers, news operations have always found ways to store and catalog their clips. With or without the acronym, this is DAM.

The ability to locate and reuse clips on a specific topic or showing a particular person or location is a core part of news production. As with any mission-critical function, these tools must work reliably without specialized training. These requirements from news — both the functions themselves and the effectiveness of their implementation — will be essential for broadcast DAM overall.

The message here is to use the experience of your news department to assist in the evaluation of a proposed DAM solution. Even if initially they have no plans to replace their current news library system, their input on requirements and ease of use can be invaluable.

Conclusions

DAM for broadcasters is here. As broadcast technology merges with information technology, the proven benefits of digital asset management are close behind. With broadcast solutions operating on IT platforms, proving wide access to assets becomes a business decision, not a technical hurdle. **BE**

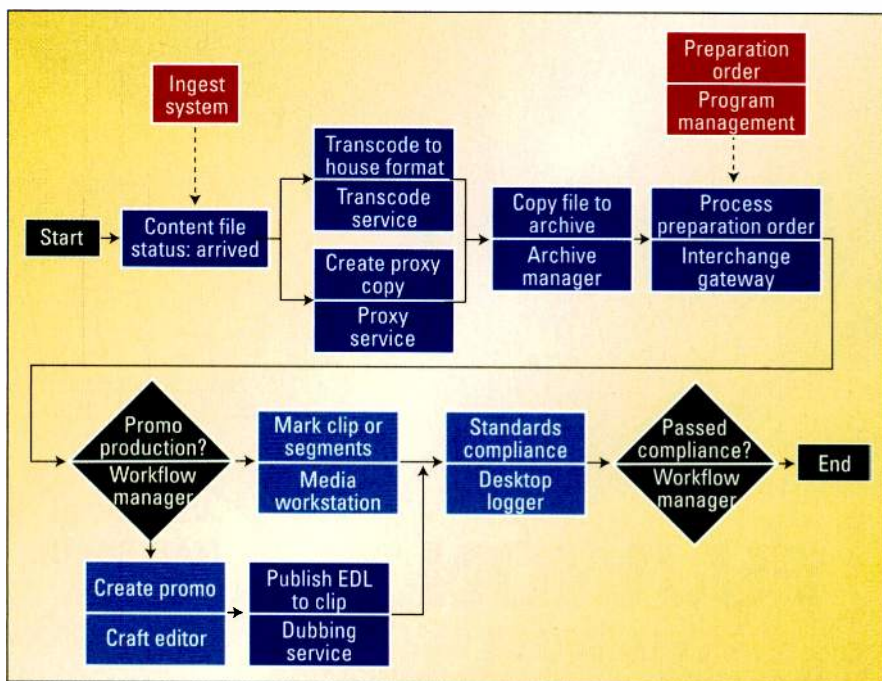


Figure 4. A well-designed workflow optimizes the use of generalized solutions to specific requirements.

John Wadle is product manager for OPUS at OmniBus Systems.

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1/2in IMAGE FORMAT REDUX

BY LARRY THORPE AND GORDON TUBBS

The 1/2in camera-imager format has returned, but this time around it's a *high-definition* 1/2in camera-imager format.

A year ago, two of the major camera manufacturers shut down production of all SDTV camcorders conforming to the 1/2in image format. Born in the 1980s, this image format was destined to propel thousands of cost-effective SDTV cameras and camcorders into a broad variety of sectors of lower-budget production: corporate production and smaller market television stations. The format reached a zenith

in the late 1990s and then entered a slow decline, displaced by increasingly lower-cost 2/3in image format products and higher-end 1/3in image format cameras. Now, however, a contemporary HDTV camcorder squarely centered on a 16:9 1/2in image format has entered the market.

The 1/2in format holds the promise of the same advantages for HD that successfully thrust it into the lower-budget SD world 20 years ago. Namely, the 1/2in format facilitates the production of a more com-

pact camcorder at a lower cost.

A survey of contemporary 2/3in image format SDTV newsgathering camcorders offered by all of the major manufacturers shows these products broadly range from \$20,000 to \$30,000 in cost. Lenses for these camcorders (from all of the manufacturers) span roughly the same pricing range. Broadcasters have made little secret of the fact that they believe that HDTV newsgathering can only be successfully implemented if the HD camcorders and lenses entail a modest cost premium over SDTV ENG camcorders.

The challenge to produce HDTV camcorders and lenses that meet this criterion has sparked an extraordinary diversity of innovative design strategies. The use of the smaller 1/2in image format is only one of these design exigencies. Indeed, no less than three HD image formats have emerged—the traditional 2/3in, the 1/2in and the even smaller 1/3in.

Some of the optical manufacturers have

New tapeless HD systems are emerging in three image-format sizes (2/3in, 1/2in, and 1/3in). Sony's HD XDCAM uses the 1/2in image format.

Photo by Jim Huibregtse.



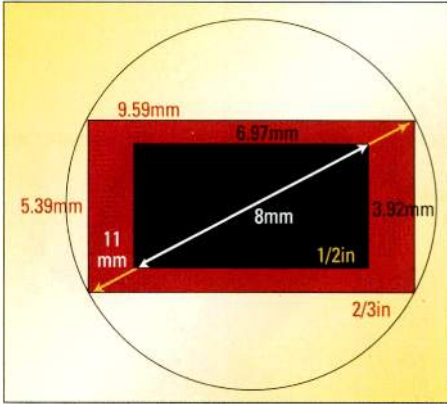


Figure 1. A scaled comparison between the sizes of the standard 2/3in image format and the 1/2in image format

already planned to develop more cost-effective HDTV lenses for both the 2/3in and the 1/2in image formats on the assumption that these two image formats will coexist in the larger HD marketplace. In the case of the separate tape-based HDV format, interchangeable HD lenses for the popular 1/3in image format play a role. This article will, however, focus on the 2/3in and 1/2in formats.

The possible lens options for the 1/2in format

It is useful to open the discussion with a reminder of the difference in image size for the 2/3in and 1/2in image formats. (See Figure 1.)

The dilemma for many end users contemplating the new 1/2in HD systems, however, is that they are entering a marketplace awash in 2/3in camcorders and lenses — both HDTV and high-end SDTV. Accordingly, many are naturally asking:

- Will the same family of 1/2in HD lenses emerge that are operationally compatible with established 2/3in optics (in terms of popular angles of view and ranges of focal length)?
- Can a 2/3in HDTV lens work with these 1/2in HD cameras?
- Can legacy 2/3in SDTV lenses be considered for the new 1/2in HDTV cameras?
- Would a new 2/3in HD lens purchase be a better investment if a downstream transition to a higher-level 2/3in HDTV camera were, for

some end users, a possibility?

The new 1/2in HDTV lenses

New lenses specifically designed for the new 1/2in HDTV cameras are the optimum choice for that format. Their optical performance effectively matches the performance of 1/2in imagers that typically employ a sub-sampling lattice for the 1080-line production format. So far, only 1080-line cameras have been unveiled. The same lenses will match well with the full 1280 x 720 sampling lattice of the alternate 720-line system when that inevitably emerges.

Strenuous design efforts have targeted the production of lenses close in price range to the established 2/3in SDTV lenses. That is a crucial consideration for broadcast HD ENG.

Direct coupling of these 1/2in lenses with 1/2in imager-equipped cameras makes full use of the entire operational capabilities of these acquisition systems in terms of angles of view, range of focal lengths and system sensitivity. In that sense, these new lenses closely match the operational capabilities of the traditional 2/3in lenses presently popular in SDTV and HDTV broadcast newsgathering.

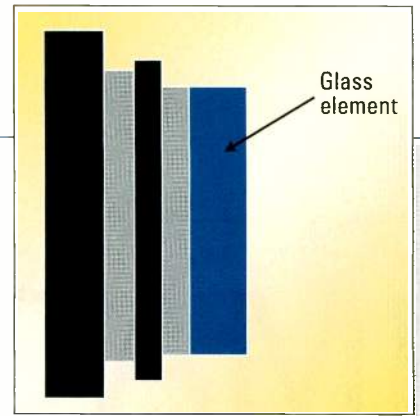


Figure 2. The LO-32BMT adapter supports the mounting of a 2/3in lens on a 1/2in camera

A 2/3in HDTV lens with adapter

For rental houses already well-stocked with 2/3in HD lenses, it is natural to question whether these lenses can be made functional with the new 1/2in cameras.

The answer is that yes, it is technically possible to couple a 2/3in lens to these new 1/2in cameras. However, there are important operational considerations that must weigh on any decision here.

The mating of the 2/3in HD lens with the standardized B4 mount to the 1/2in camera is accomplished by using a relatively simple and inexpensive adapter. (See Figure 2.) The task of the adapter is threefold:

- provide the appropriate mechanical

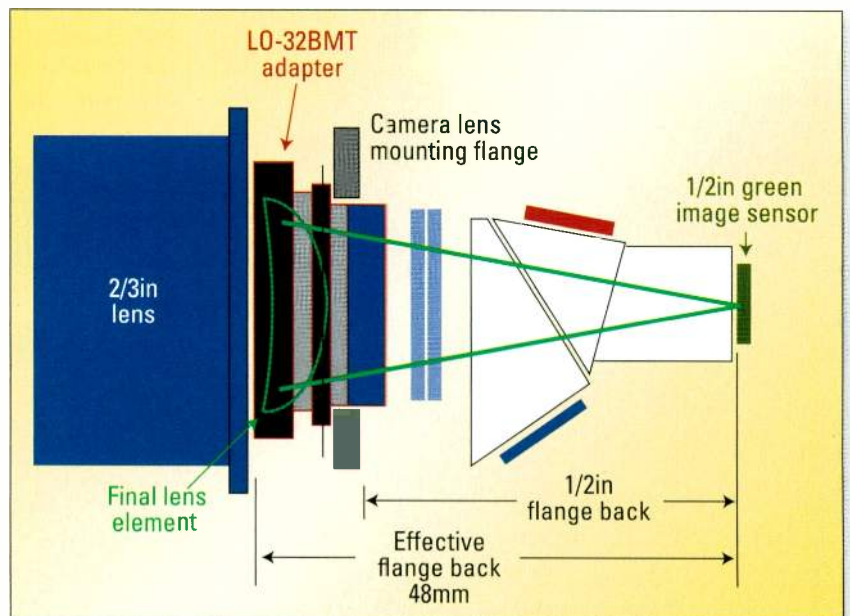


Figure 3. A simplistic illustration of the coupling of a 2/3in HD lens to the 1/2in HD camera

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1/2in IMAGE FORMAT REDUX

coupling between the larger format lens and the smaller image format camera

- restore the correct flange back distance of 48mm required by the 2/3in lens (the smaller 1/2in camera optics have a shorter distance) to ensure that its back focus control operates in accordance with its original design
- restore the effective optical path length for which the 2/3in lens was designed, in terms of the optical interface with the camera's beam-splitting block.

The deployment of the adapter is depicted in Figure 3 on page 98. (This is illustrative only and not an accurate optical tracing.)

The adapter does not make any optical adjustment to image size. Accordingly, the 2/3in HD lens projects its normal size image into the camera optical port. Only that central rectangular portion of the image that lands on the 1/2in 16:9 imagers is relevant for sampling. The camera ignores all of the remaining peripheral circular imagery.

The optical element in this adapter is simple, and its optical transmission characteristics are high. Thus, it leaves no discernible optical footprint on an HDTV optical image in terms of modulation transfer function (MTF) loss, chromatic aberrations, colorimetric alteration or contrast ratio impairment.

Using a 2/3in HDTV lens on a 1/2in HDTV camera

While the technical optical performance can be protected, there are inevitable compromises in the operational aspects. Figure 4 simulates a 2/3in lens set to present a certain angle of view ϕ_1 to a 2/3in CCD. For that same lens focal length setting of f_1 , when that image is presented to the 1/2in CCD, it will intercept only a truncated inner section of the image. In order for the 1/2in sensor to

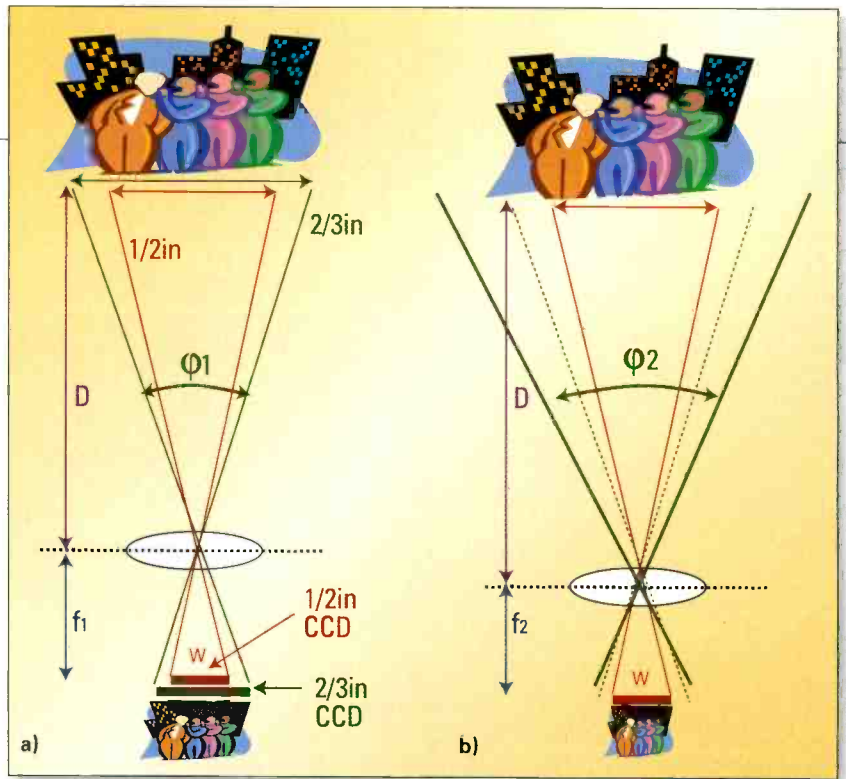


Figure 4. (a) The effective reduction in angle of view when the 2/3in lens is set for a specific image width on a 2/3in image sensor and that same image is projected on to the 1/2in CCD; (b) The lens focal length must be shortened to restructure the same size image onto the 1/2in image sensor.

see the same image being presented to the 2/3in CCD, the focal length of the lens must be readjusted to a shorter focal length that provides the same angle of view — namely, the new setting of ϕ_2 . This effectively shrinks the horizontal width of the image to squarely fit the entire image content to the 1/2in imager size.

Because this is an important opera-

Figure 5, that simulated imagery clearly shows that there is a quite discernible difference in the angle of view seen by the 1/2in camera sensors compared with that seen by a 2/3in camera. If the 2/3in lens is not at the end of its focal range, then a simple adjustment of the zoom control can restore the original wide angle of view to fit to the camera image sensors. (See

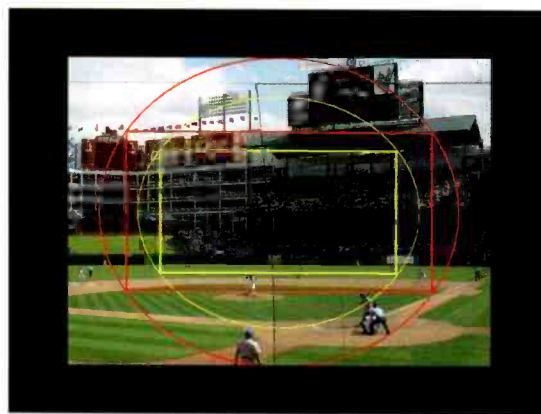


Figure 5. The red circle shows the object image from the 2/3in lens as it is projected into the camera. The portion of that larger image inside the yellow rectangle is all that is seen by the three 1/2in CCD sensors — the associated shortfall in effective angle of view is evident.

tional limitation that must be catered to, it is helpful to illustrate the issue with some simulated imagery. In

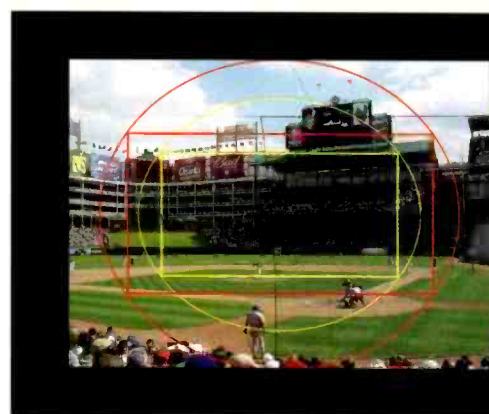


Figure 6. Recovery of the original angle of view created in the 2/3in image format by adjusting the lens zoom control to reduce the focal length.

Figure 6.) If the lens is operating close to its widest angle, then that readjustment to parity with the 2/3in angle of view will not be possible — it does

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not have the requisite focal range.

In practice, what is the magnitude of this shortfall in angle of view? A simple calculation can quantitatively produce that answer. If the width of the image sensor (w in mm) and the focal length f (also in mm) are known, the angle of view can be readily calculated from the well-known formula:

$$\phi = 2 \tan^{-1} w/2f$$

As was shown in Figure 1, the width of the 2/3in sensor is 9.59mm and that of the 1/2in sensor is 6.67mm. Using this information and considering two portable 2/3in HD lenses (a wide angle 4.7mm lens and a telephoto 158mm lens), it is simple to calculate the percentage change in angle of view from the 2/3in lens image to that applied to the 1/2in sensor — at both extremities of the focal range of

	Max wide angle	Max telephoto
HJ11ex4.7	4.7mm	52mm
2/3in camera	91.14°	10.54°
1/2in camera	73.14°	7.66°
Percent change	19.7%	27.3%
HJ22ex7.6	7.6mm	168mm
2/3in camera	64.5°	3.28°
1/2in camera	49.26°	2.38°
Percent change	23.6%	27.4%

Table 1. The percentage change in angle of view from the 2/3in lens image to the 1/2in lens image

each lens. (See Table 1.) The effect is not linear over the focal range of the lenses.

Employment of a 2/3in SDTV lens with adapter

It is perfectly understandable that end users already in possession of a quantity of SD 2/3in lenses from the earlier SDTV ENG era — users who may now be contemplating a transition to HDTV ENG based on a 1/2in camcorder — might seek to ameliorate their capital investment by using

those older SDTV lenses (via the same adapter described earlier). The argument is sometimes presented that a high-quality SDTV lens coupled to an HDTV camera — one that sports a subsampled HD imager — should actually mani-

fest a reasonable technical imaging compatibility. Regrettably, this is not the case.

The optical bandwidth required for 1080-line HDTV is substantially greater than that for SDTV. It is 2.7 times that for SDTV (82 line-pairs per millimeter versus 31 line-pairs per millimeter). The very essence of what constitutes high definition lies in the additional spatial information contained within that frequency region beyond the 31lp/mm boundary of the SDTV system. And, this is

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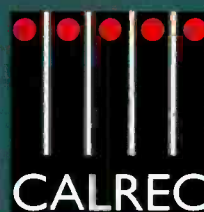
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1/2in IMAGE FORMAT REDUX

where the problems lie.

In an earlier article in this series on HDTV lens design, "Management of MTF" in March 2005, it was shown that the behavior of the MTF of an SDTV lens over those spatial frequencies beyond the SDTV pass-band are much less well controlled than in an HDTV lens. The behavior of the MTF of a typical SDTV lens (measured at a spot spatial frequency of 56Lp/mm, which lies halfway between the 31Lp/mm boundary of the SDTV system and the 82Lp/mm boundary of the HDTV system) is unruly. (See Figure 7.)

These vagaries in optical MTF behavior apply to both the horizontal and the vertical domains. The consequences will be highly dependent upon scene content and are difficult to predict. But, they will mar the image sharpness of the acquisition system. For the record, an even worse

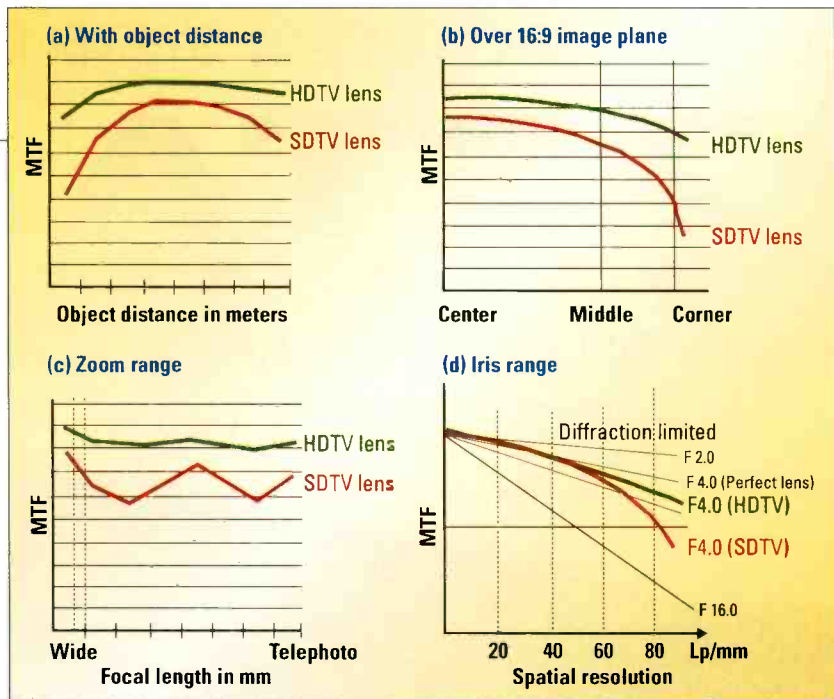


Figure 7. The variations in MTF of generic HDTV and SDTV lenses — measured at a spot spatial frequency of 56Lp/mm — across the image plane (b) and when the operational controls of focus (a) and zoom (c) are manipulated. The relative behavior of MTF with iris setting is indicated by (d).

technical choice would be deployment of older pro-video 1/2in SDTV lenses on these new camcorders. **BE**

Larry Thorpe is the national marketing executive and Gordon Tubbs is the assistant director of the Canon Broadcast & Communications Division.



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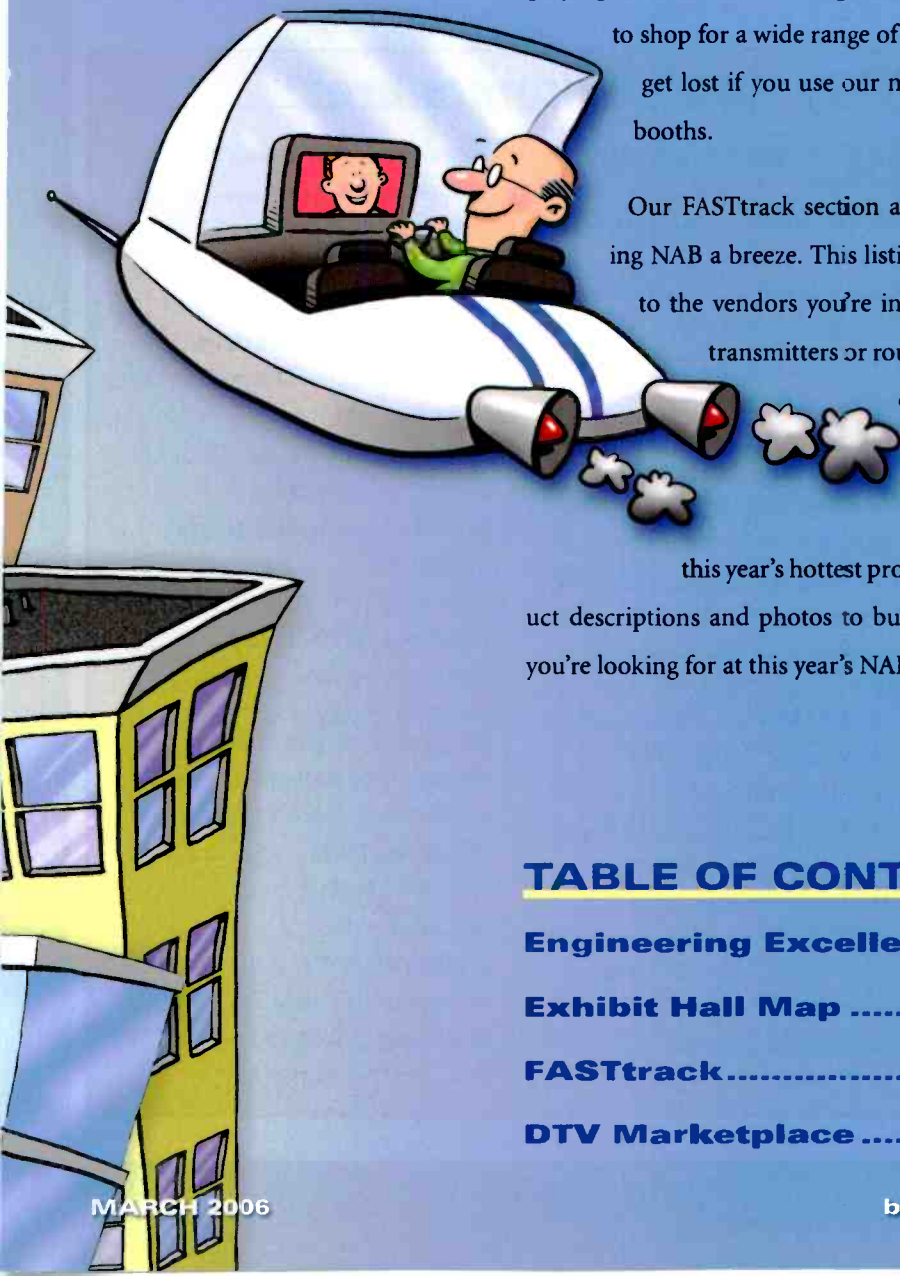
Our FASTtrack section also will save you time and make navigating NAB a breeze. This listing is organized to help you find your way to the vendors you're interested in — whether you're looking for transmitters or routers. Vendors are divided into product categories and then listed geographically for easy reference.

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Brad Dick

Brad Dick
Editorial Director

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Winner: KNTV and Telemundo 110
Submitted by: Ascent

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Submitted by: Ascent

Runner-up: Medcom 112
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New studio technology – HD:

Winner: ESPN 114
Submitted by: Grass Valley

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Submitted by: The Systems Group

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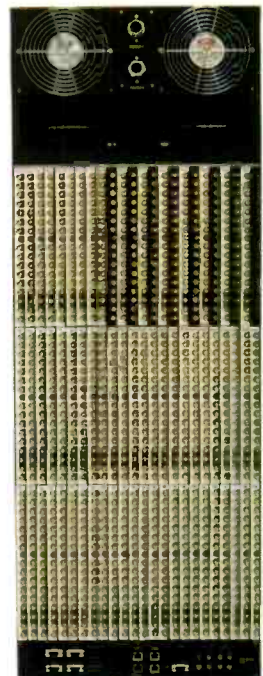
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Tying for the win of new studio technology — station are WMHT, and KNTV and Telemundo

WMHT

Winner of new studio technology — station

SUBMITTED BY CEI

Located in New York, WMHT operates three TV stations, plus two radio stations and a radio reading service for the visually impaired and print disabled.

To meet the challenges of the new digital age, the station purchased a 42,000sq ft office building and added 10,500sq ft of studio space for its new production and broadcast center.

The facility hired systems integrator Communications Engineering (CEI) to provide a turnkey design and integration solution. A major requirement was to move the station's pro-

duction and on-air operations 22mi with no disruptions.

CEI engineers coordinated every aspect of the buildout and transition, including new satellite downlink antennas, tower construction for television and radio STLs, a multichannel master control room, two television studios, a production control room, a 5.1 audio control room, three nonlinear edit systems with shared storage, an FM on-air studio, an FM production studio, audio editing, three audio live and record control rooms, tape and DVD duplication systems, and



media-capable conference rooms.

A primary goal for all new systems was efficient operations with digital file-based content flow.

KNTV and Telemundo

Winner of new studio technology — station

SUBMITTED BY ASCENT MEDIA SYSTEMS & TECHNOLOGY SERVICES

KNTV and Telemundo are individual stations that share resources to transmit simultaneously from the same building. The stations share a 100,000sq ft space in San Jose, CA.

Ascent Media served as the system integrator for the turnkey move and digital upgrade, including the satellite facilities that took approximately one year from design to launch. The firm worked with the NBC team and Gensler, an architectural firm, to design an infrastructure based on SDI

signal distribution with two-channel non-embedded AES audio.

A central equipment room contains 140 racks of core gear, including routing switchers, the NBC hub racks, distribution equipment, MATV, networking equipment, patching, audio equipment, intercom, clock, and reference and studio gear. One Grass Valley Trinix switcher accomplishes routing for both stations.

Two separate, but nearly identical, production control rooms have a fully loaded 64-input Sony MVS-



8000 production switcher system, Calrec audio consoles and Pinnacle EFX Dekos.

Runner-up: TV8 and TV17

SUBMITTED BY OMNEON, NVERZION AND BECK ASSOCIATES

Technology at work: Beck Associates custom consoles; Evertz 5600 MSC master sync generator; Grass Valley Concerto/Encore digital router, 8900 Series terminal equipment and Kayak DD-2 production switcher; Leitch LogoMotion II channel branding, Panacea 16x2 MC switching; Omneon Spectrum media server; NVerzion NControl automation; Pinnacle Deko 1000 CG; Sony DSR-2000 DVCAM VTRs; Telex/RTS Zeus intercom system; Videotek VTM-200 T&M; Wohler audio monitors.



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Discovery Communications

Winner of new studio technology — network

SUBMITTED BY ASCENT MEDIA SYSTEMS & TECHNOLOGY SERVICES

The new Discovery Television and Technology Center in Sterling, VA, features a glass-enclosed, circular master control area surrounded by 10 transmission pods. Its control system is capable of transparently reassigning networks to any number of master control rooms. The facility was built to handle distribution for Discovery Communications' current U.S. networks and designed to seamlessly accommodate growth.

Ascent Media provided the technical integration services for the 53,000-sq ft showcase that serves as the network origination for 13 of Discovery's U.S. networks plus BBC America — comprising 17 network feeds. The facility can support any mixture of 64 channels of HD or SD programming and currently provides West Coast feeds for three networks.

Each of the 10 transmission pods is easily configured by the push of a button and the click of a mouse to control up to six networks in any combination. These pods are monitored by three centrally located supervisory positions, each of which can take full control of any network. This design, resulting in significant cost savings, also allows the networks to be moved from pod to pod with all their associated audio and video monitoring and control, error reporting, graphic control and automation.

Three tightly integrated applications provide the key to this operational scenario. A custom-engineered Evertz MVP 3000 system with integrated packet routers serves as the core A/V controller for the entire facility. Each of the pods' MVP 3000s are responsible for all the audio and video monitoring, error display and logging and tallies, while also displaying all VBI information relating to a signal, such as closed captioning. The system takes full advantage of the extreme flexibility of the facility by reassigning any audio or video sources to any pod. With 20 images associated with each network, it supports and manages in excess of 640 inputs along with the connected audio, regardless of format. It also supports all the routing and control required to move formats between pods.

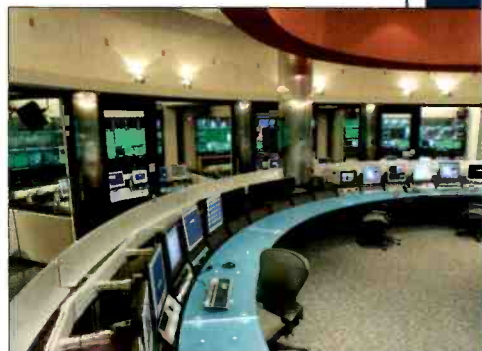
The other critical elements are a Miranda Presmaster multichannel HD/SD master control panel and the OmniBus Colossus automated transmission suite.

Discovery has its eye on the future with specialized technology that comprises a blended infrastructure of both broadcast and IT solutions.

Runner-up: Medcom

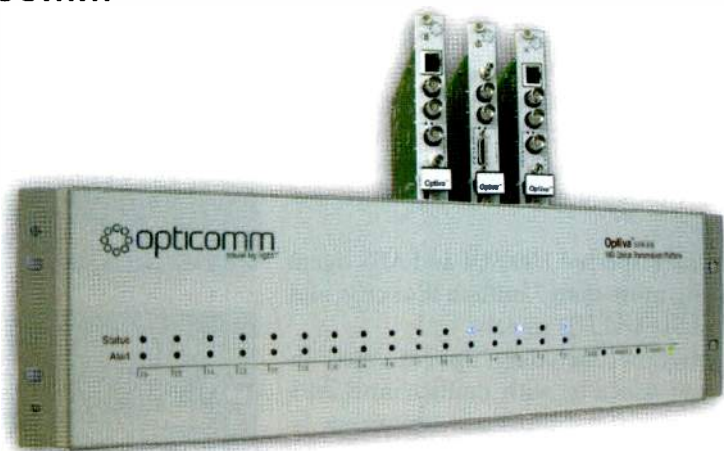
SUBMITTED BY AZCAR

Technology at work: Clear-Com 128x128 intercom matrix; Evertz MVP monitor walls; Floral automation; Leitch Newsflash and NLE systems; Miranda Presmaster MC system with four streams; Quartz 256 x 256 SE-1/AES with control and time code routing switcher; Ross Synergy production switchers; Wheatstone consoles.



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ESPN

Winner of new studio technology — HD

SUBMITTED BY GRASS VALLEY

ESPN's 120,000sq ft, all-digital HD digital center in Bristol, CN, is the future of broadcast production. Networking and automating many of the labor-intensive processes has led to reduced errors and continued system reliability. If there is such a thing, this is HD heaven.

A signal distribution and processing system design has been implemented to support nine different TV networks that originate from Bristol. These include all U.S.-based ESPN-distributed channels and are supported by the facility's massive signal routing architecture that feeds more than 19 nonlinear edit rooms, four master control suites and a large sports content ingest screening area. Signal paths can be changed quickly to accommodate new channels and future internal growth.

The facility features resilient, physically dispersed HD SDI and AES signal paths throughout the building, requiring more than 7 million ft of coax and fiber-optic cable to handle a mixture of SD and HD signals.

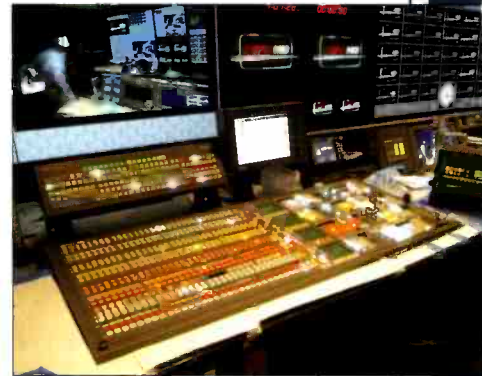
ESPN distributes its highest-rated programs, including "SportsCenter," in the 720p HD format. These widescreen telecasts, with multichannel AES audio, are supported by a variety of multiformat broadcast equipment to produce more than 6000 hours of originally produced HD programming annually.

The requirements of ESPN's production infrastructure are handled by multiple racks of HD routing switchers and a dense AES router for audio routing. The video router can handle both SD and HD signals in the same frame. Routers are controlled through a centralized facility control system.

To support its signal distribution paths, the facility has installed hundreds of modular equipment products to route digital audio and video signals to routers, production switchers, audio mixers and other destinations.

There's a large complement of nonlinear editing and media server equipment, including 25 edit systems tied to 68 main media servers to distribute media on and off the SAN that currently includes a capacity of more than 3500 hours (in SD mode).

The facility houses three HD studios, which are home to all ESPN Bristol-based studio shows, including "SportsCenter." To capture its live shows in widescreen (16:9 aspect ratio) 720p, ESPN uses 20 multiformat HD cameras. Fiber-optic transmitters and receivers, in tandem with air-blown fiber between buildings on the Bristol campus, have enabled the facility to network seven studios via more than 1000 fiber-optic circuits.



Runner-up: NBC's SNL

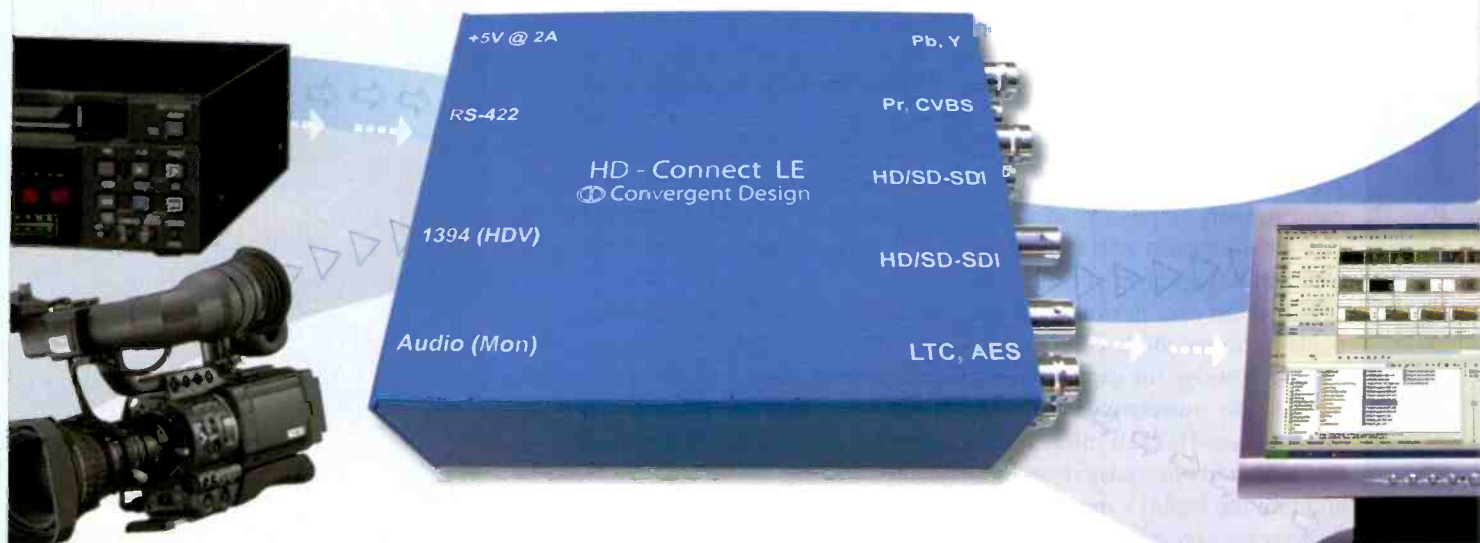
SUBMITTED BY THE SYSTEMS GROUP

Technology at work: Barco OverView DLP projectors; Calrec Alpha 100 console; Digidesign Pro Tools; Enco Digital audio workstations; Euphonix System 5 console; Evertz 5600MSC reference generator and MVP multi-image viewer; Grass Valley Trinx router and Encore control system; Miranda Densité distribution, Imaging series format conversion, XVP-801 crossconverter; RTS/Telex Adam Intercom Matrix; Sony MVS-8000 HD switcher, HDC-950 cameras and BVM-D monitors; Ward Beck 8200 AES distribution.



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Louisiana State University

Winner of new studio technology — non-broadcast

SUBMITTED BY NETWORK ELECTRONICS

Louisiana State University (LSU) recently launched a 150,000sq-ft Football Operations Center. The \$15 million facility includes offices, a locker room, an equipment room, an indoor football field for game preparation and an elaborate video operations center with an extensive technology package to drive training efforts to the highest possible level.

A heavy investment in legacy component and composite gear prevented LSU from immediately reaching its goal of a total SDI infrastructure. Working with Technical Services Group (TSG), a full-service electronic systems contractor, the university implemented a phased approach to take full advantage of its current equipment as it transitions to SDI. TSG designed and built the complete technology layer of the center.

Price point and flexibility played equal roles in equipment selection, particularly router choices. LSU went with a robust Network Electronics routing system to bridge the gap between component and composite gear and an SDI format. The university established a virtual SDI domain within the existing SDI and non-HD SDI infrastructure using the modular and compact routing system's ability to transparently route component signals through transcoders and into the facility's new VikinX VD3232S SDI router. The configuration allows for an easy migration to SDI and HD SDI as legacy gear is replaced and formats move forward.

The university also took advantage of Network Electronics' new CP-MDP router control panel, which provides a live video preview of both sources and destinations via a QVGA high-resolution color graphics display. The CP-MDP capabilities allowed operational setups to be programmed as opposed to mere source selections. The capability greatly enhances efficiency as well as streamlines workflow more than the traditional method of manually selecting multiple devices during a rigorous time-sensitive daily routine.

Total migration to SDI will become a reality in phase two, slated to commence in another year. The extensive audio and video system, which touches every part of the building, will route HD SDI signals to all displays within the facility via Network Electronics' VD3232S. The 32 x 32 router will be expanded to 64 x 64 to meet the demands of the tasks that include support of the Exos Sports online storage system as it converts to SDI. The complex setup also includes extensive HD capabilities integrated into its AV presentation solutions, plasma and video displays and playback.



Runner-up: Columbia Business School

SUBMITTED BY MEDIA 3

Technology at work: Dell dual CPU edit workstation; Electro-Voice RE-20 AT mic; ISDN phone patch; JVC DVD hard disk recorder; M Audio studio monitors; Media 3 BureauCam 3 BCSO-2500; Rane EQ; Sharp DVD recorder; Sony DXC-990 camera, BCS-500 robotic tilt head, ECM-77B mics, PVM production monitor and DSR 11 DVCAM VTR; Telos Zephyr; XStream ISDN encoder/decoder.



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Bay News 9

Winner of station automation

SUBMITTED BY OMNIBUS

Bay News 9 of Tampa, FL, has shifted its broadcast operations to a new 23,000sq ft facility that houses automated server-based production and playout for the 24-hour local news channel, as well as the network's weather, on-demand and Spanish channels.

More space was needed to accommodate the joint broadcast operations of the network's different channels. The engineering and design team also sought to put playout under the umbrella of a single flexible and scalable automation system that could adapt to the company's future growth. Shared and easy access to media in standardized formats for streamlined production and playout was another key element in the facility design.

Ascent Media was chosen to integrate and install the facility's broadcast systems. The facility features integrated control and studio spaces. Two control rooms and one master control room, separated by glass walls, allow staff to make visual contact and voice contact over the intercom. The facility boasts four studios that can be used interchangeably and run simultaneously in English or Spanish to facilitate regular production as well as breaking news and weather coverage.

Under the umbrella of OmniBus Systems' Columbus automation, the four news channels share media via centralized storage on a Pinnacle Systems Vortex media server with 1000 hours of storage at 25Mb/s. An archive storage solution from ASACA is integrated into the system to allow any user at any desktop to pull video from archives.

The automation system serves as the facility's central interface for controlling devices, getting feedback and relaying playout messages. OmniBus' Desktop Control (ODC) interface gives the station's reporters and other staff the ability to search and browse archived material, create graphics, put production elements for studio events into the script and control a variety of other functions from a single desktop. The ODC user interface is installed at all edit stations in the newsroom, at all workstations within the facility and, through a dedicated WAN, at each of the network's remote bureaus.

The real challenge proved to be moving all four channels and the station's online news source to the new studios, control room and newsroom.

Four hurricanes forced the network into a short timeframe for systems planning and building. However, the network launched broadcasts from its new facility on June 27, 2005, without taking programming off air.



Runner-up: WISC-TV

SUBMITTED BY SUNDANCE DIGITAL

Technology at work: 360 Digicart/E audio server; Omneon Spectrum media server system; NVISION NV5128-MC MC switchers and NV8256 digital routing system; Sundance Digital Titan automation, Intelli-Sat broadcast manager and Digital Delivery Management System (DDMS); Telestream FlipFactory.



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Audio	<input type="checkbox"/>	<input checked="" type="checkbox"/>	AES - 16 embedded and 8 discrete stereo channels
Graphics Layers	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Unlimited layers for multiple animations, tickers, crawls, and DVEs
Clip & Graphic Formats	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Support for MOV + alpha, AVI + alpha, WMV, MPEG, DV, DivX, plus over 150 image file formats
Video Bypass	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Auto-detect bypass on hardware, power, or software failure
Station Integration	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Integration with MOS newsrooms, station automation, and traffic with full as-run logging
Data Support	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Drag & Drop data linking from databases, spreadsheets, web & live data feeds
Reliability	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Up to 1 TB internal RAID with redundant power, networking & fans
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TV Guide Channel

Winner of network automation

SUBMITTED BY OMNEON

TV Guide Channel provides nearly 80 million homes in 27,000 different localities with comprehensive program listings and original programming. With its rapid growth, the channel has expanded its programming services, adding more live content and highlighting VOD and HD programming in its program listings.

To accommodate its increasingly sophisticated production and playout needs, the network selected Omneon Spectrum media servers and Pro-Bel automation for a more flexible transmission infrastructure for its transmission center in Tulsa, OK. The first phase in this project, completed successfully in May 2005, involved installation of a new automation and master control facility.

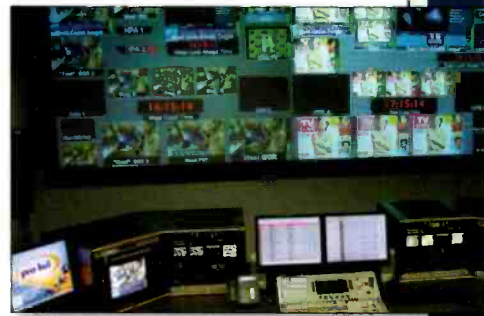
In overhauling its transmission operations, TV Guide Channel sought to move towards a dynamic and flexible output. To this end, the network integrated Pro-Bel's Aurora control system, Sirius multiformat routing for audio and video, TX Series master control and Morpheus automation with Omneon Spectrum media servers, as well as existing Pinnacle DekoCast graphics and branding systems.

Morpheus gives operators at the facility's transmission center the ability to schedule down into the details of playout. The automation solution allows operators to discretely schedule individual graphics without pre-authoring, which offers greater flexibility in presentation styles.

The Sirius and Morpheus systems respond to and react along with the operator, providing cut-in capabilities within master control and allowing users to switch, brand and change content as necessary.

In addition to updating transmission operations, the facility also streamlined the workflow between production and playout. The facility's production center is located in Los Angeles. Material is produced there using non-linear edit systems. Finished sequences are then transferred to the Omneon media servers in the Oklahoma transmission center over fiber, transcoded by Telestream's FlipFactory software. This IP transfer allows TV Guide Channel to maximize the use of both facilities while enabling the greatest flexibility.

As the facility delivers a growing amount of media to more consumers via television and other platforms, network staff will have the tools to efficiently move content around the primary pictures and sound. In addition to simplifying presentation of clever graphics, the new playout system also supports transmission of additional digital data for digital broadcast. As content is distributed to such platforms as mobile phone networks and IPTV, the automated master control will simplify many playout operations too complex and unwieldy to be handled manually.



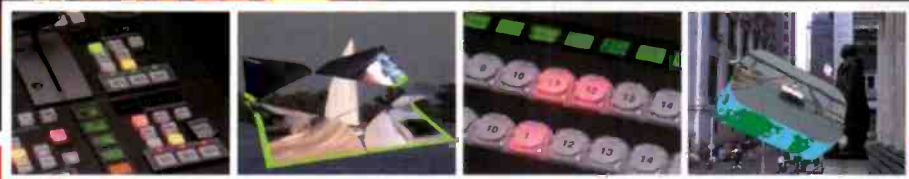
Runner-up: CBC-TV

SUBMITTED BY INSCRIBER

Technology at work: Inscriber AutoCG SD and HD systems; Grass Valley automation; Leitch Digital Das and closed-captioning equipment; Sony routing switcher.

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SBT

Winner of newsroom technology

SUBMITTED BY LEITCH

When Sistema Brasileiro de Televisão (SBT), Brazil's national television network, set out to design a news production facility, the network's goal was straightforward: build a facility that would facilitate the integration of content acquisition, contribution and newsroom technologies; create an end-to-end digital infrastructure; and provide journalists and operators with a wide gamut of tools for their workflow requirements.

The new Leitch system at SBT replaces an existing Digital S tape environment. The system design consists of a NEXIO server newsroom system that includes five NEXIO transmission servers; six NEXIO NewsFlash FX editing systems with approximately 300 hours (at 50Mb/s I-Frame) of high-res storage in a fully mirrored configuration; and two VelocityQ multi-stream NLEs. The low-res portion of the system consists of 10 NewsFlash Predator viewing and editing client seats, along with 120 AP/ENPS client seats. The new facility features a central ingest point, six edit suites, a newsroom complex and a production control room for news play-to-air.

Systems integrator Brasvideo was charged with the system design and installation of the facility. The installation was a major upgrade — a complete transition to digital — and involved a total transformation of the operations that had been in place for many years.

On a typical day in the new facility, as material is being ingested from satellite or remote feeds into the server system via Leitch's Ingest Control Manager, a low-res frame-accurate proxy is created simultaneously. The proxy copy can be viewed and edited by journalists; voiceovers can be recorded and inserted; stories approved and inserted into a MOS-active rundown; and high-res, edited originals can automatically be conformed. Proxy-based, edited content is created faster than real time for rapid playout on the high-res server, or the content can be sent on for further editing, including the addition of dissolves, wipes, and 2-D and 3-D effects by the NewsFlash. All of this is done directly on the journalists' desktop workstations. In addition, Leitch's Rundown Manager provides active MOS status and connectivity to the MOS-enabled AP/ENPS newsroom computer for play-to-air.

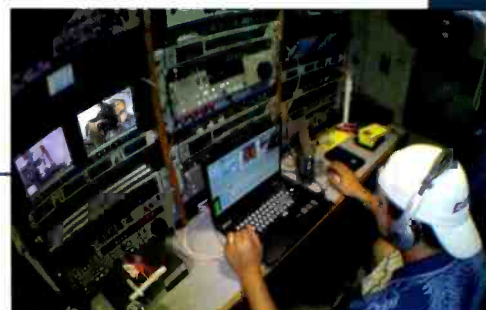
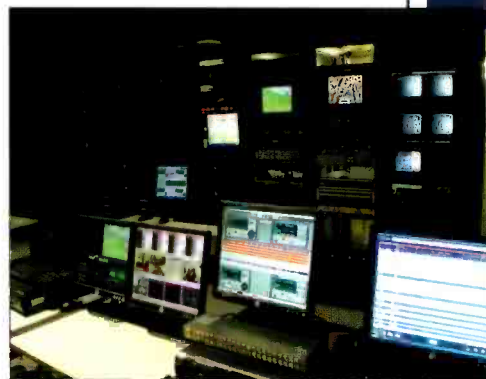
SBT also uses AP's SnapFeed for content contribution from international correspondence. The material is sent via the Internet, converted by the VelocityQ NLEs and sent to the NEXIO server system via LAN FTP.

The news production facility also includes Leitch CCS Navigator and Pilot control software, NEXIO Remote and Pilot applications, 6800 plus modular series products, an X75 SD multiple-path converter/synchronizer for video processing, an Integrator 32x32 serial digital video routing switcher and a SuiteView multi-image display processor; and Videotek serial digital/analog multiformat on-screen monitors and signal monitors.

Runner-up: WFTV

SUBMITTED BY AVID

Technology at work: Avid iNEWS Instinct, NewsCutter Adrenaline XP editors and Unity for News media network; Panasonic P2 cameras; Sony HDV cameras.





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Food Network

Winner of post & network production facilities

SUBMITTED BY SOLID STATE LOGIC

Food Network's corporate and production facility represents a leap forward from its previous locations.

With the move to its new facility, Food Network consolidated what had been separate office and production sites. The two primary objectives: to build a facility that would allow the network's continued growth of successful new programs, such as "Iron Chef America" and "Food Network Star," and to upgrade to a fully digital facility that could seamlessly transition to HD.

The design and installation was a joint effort by Ascent Media, HLW and Scripps Productions. The initial challenge was to create a contemporary production environment within the raw space of a century-old building, including two production studios; two production control rooms; edit, graphics and audio post rooms; and technical support facilities. Steel girders had to be tied between the walls on each side of the building and elevated above the existing flooring. The infrastructure had to be deemed structurally sound and safe before the project began.

Another objective for the new facility was to build a kitchen that would showcase the network to visitors while also serving as a fully functioning studio. The kitchen was fully wired for audio and video and lighting was tied into the dimmer system. As a result, the kitchen/broadcast facility supplements the 7000sq ft main studio for a myriad of productions.

Nine Grass Valley LDK5000 HD upgradeable cameras — four mounted on pedestals, three mounted on jibs and two handheld — support the complex, which also includes a smaller 2000sq ft studio. Significant attention was paid to the microphone distribution system due to the number of shows with live audiences and multiple band mixes. Last summer, the "Food Network Star" finale was shot live in the kitchen.

The audio control room is based on a Solid State Logic C100 digital broadcast console. It replaces the analog console at the Food Network's previous facility and allows vastly enhanced flexibility and speed. It addresses all of the production department's needs, including the ability to create and store recallable setups and to allow different EQ settings and dynamics processing for individual actors to be quickly called and recalled.

The facility's production team also liked the C100 for its ability to route virtually any signal through the entire console and, importantly, the 5.1-channel surround-sound mixing capabilities it provided.

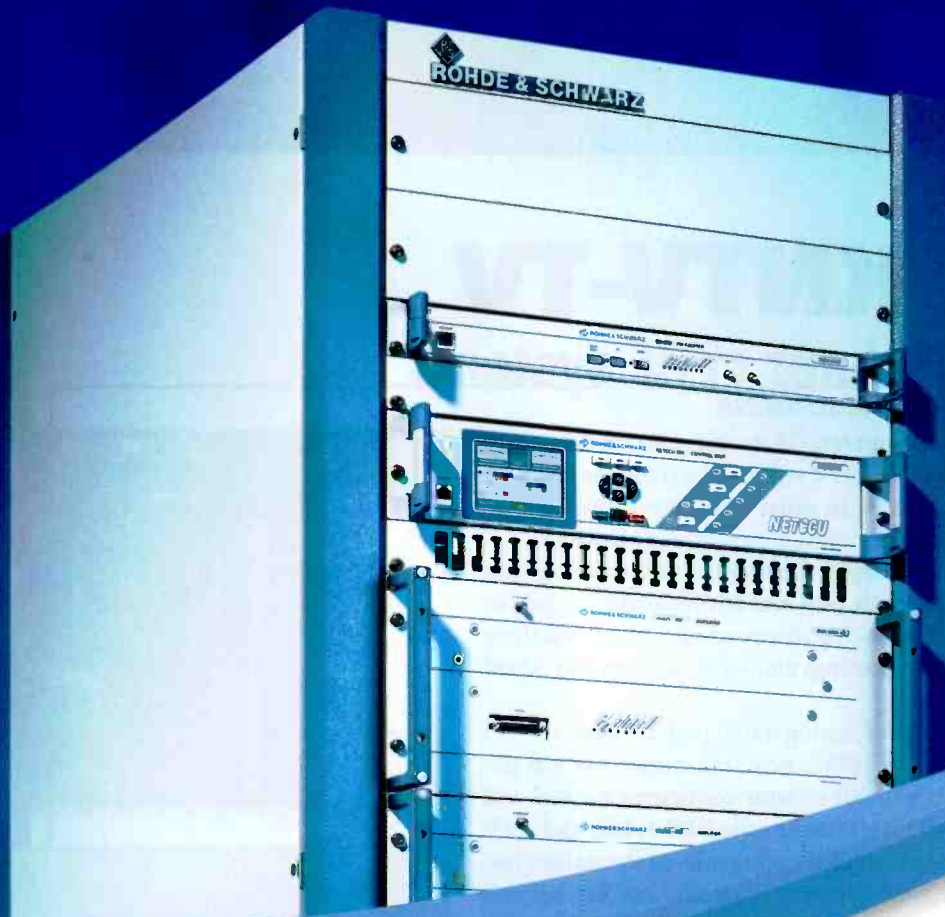
The heart of the production control room is a Grass Valley Kalypso digital production switcher supported by a Pinnacle Deko character generator.



Runner-up: CIRIS

SUBMITTED BY SGI

Technology at work: Apple Final Cut Pro NLEs and XSAN; Ardenco ARDOME MAM, ARDCAP, DART and ArdUpload ingest and PreCut and EasyCut proxy editing solutions; Avid Unity; Front Porch Digital DIVArchive; InfiniteStorage TP9300S; Pinnacle Liquid Edition NLEs; SGI Altix 350 server; Sony PetaSite tape archive.



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KNTV served the Salinas and Monterey, CA, markets for 45 years from Loma Prieta Mountain. In 2001, KNTV switched to cover the San Jose, San Francisco and Oakland DMA. In order to improve coverage, the station decided to move the transmitter location to San Bruno Mountain.

Although KNTV's tower site was an existing facility on a mountaintop near the San Francisco airport, there were both FAA and environmental concerns due to the fact that the tower height was being increased by 57ft. It took three and a half years of planning, petitions, hearings and legal motions that added challenge, time and cost to this project.

Besides monitoring, there is only 30ft of analog signal path between the DA converters and the transmitter inputs. KNTV's new transmitter site was designed to be as reliable as possible, with all systems configured as dual and most as hot standby. The Thales OPTIMUM solid-state VHF NTSC and DTV parallel transmitters satisfied this need. Liquid cooling offered the station two important benefits. The transmitter cabinets are physically smaller because there are no air plenums. They also help reduce operating expenses because heat energy is transferred outside the building, minimizing the requirement for building cooling systems.

The transmitter facility was remodeled to the extreme with construction and project management services provided by McCormick Construction. The existing 35ft x 35ft cement block building was completely stripped before the new construction proceeded. A new roof, new electrical, new flooring, new HVAC, new security system and water storage systems completed the building upgrade. A total upgrade to current seismic code for both the building and the tower were completed. In addition, the existing tower was stripped, and the top 110ft was replaced with new steel before the new Dielectric antennas and transmission line were installed. A new grounding system was required to protect all the solid-state hardware from lightning strikes. SAE designed and installed a special grounding system that provides 5Ω to ground from anywhere on the site.

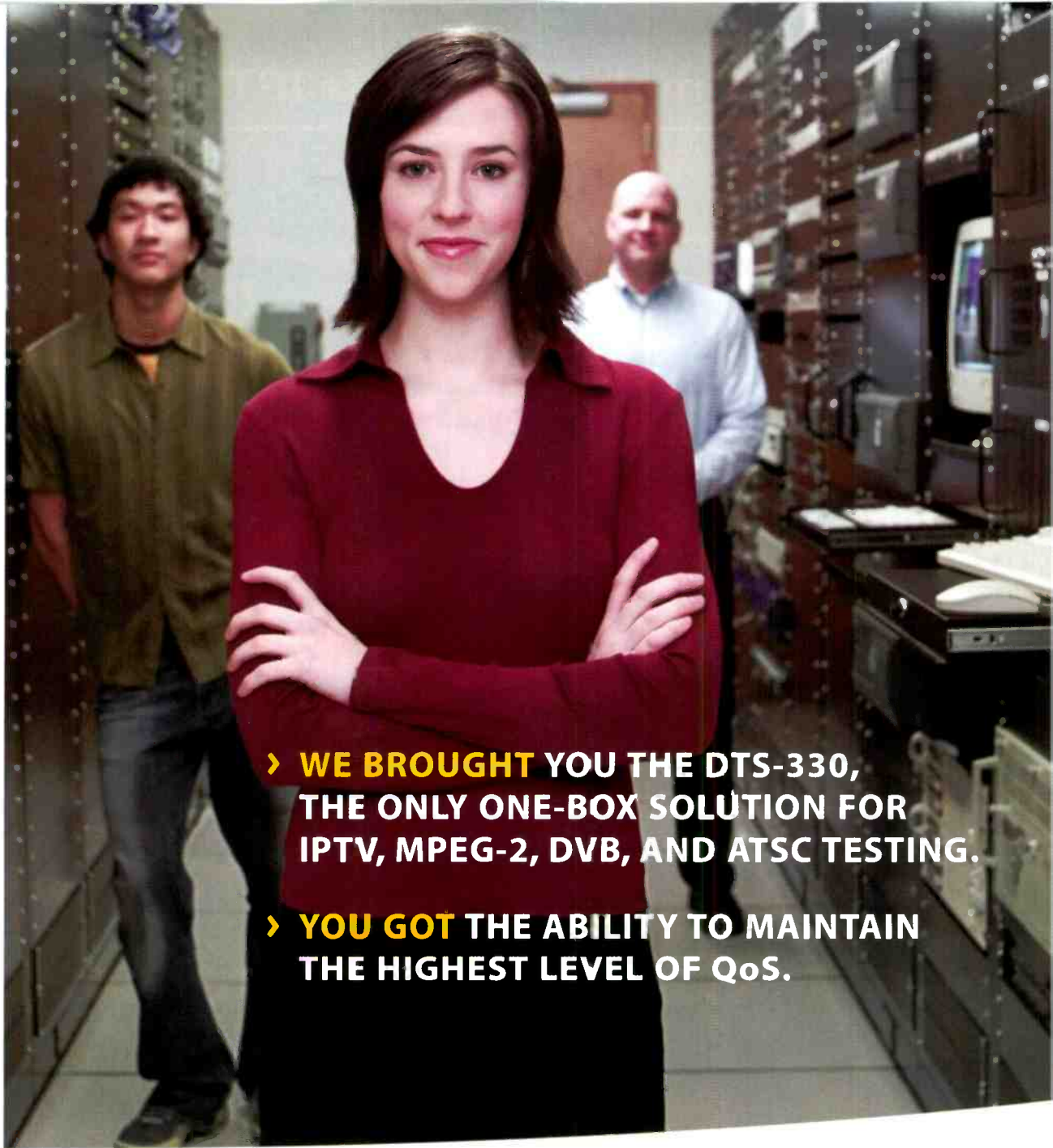
Emergency power for the site's entire load was installed, including a new UPS, automatic transfer switch, diesel generator and fuel storage system. GE provided a kinetic energy UPS system with sufficient capacity to keep KNTV on-air during any momentary power bumps or surges. The emergency power system is fully automatic with adequate fuel storage to keep the site on-air at full power for up to seven days.

Runner-up: WCJB-TV

SUBMITTED BY AXCERA

Technology at work: Axcera Visionary HP80DAW NTSC transmitter and Innovator DT-LDU2A-8 DTV transmitter; Dielectric filters and combiners, transmission line and antenna; MYAT filters and combiners.





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■ See Harris at Booths C807 and SU2929, pages 6 and 8



April 22-27, 2006

■ See PAG (STE-MAN) at Booth C8515, page 7



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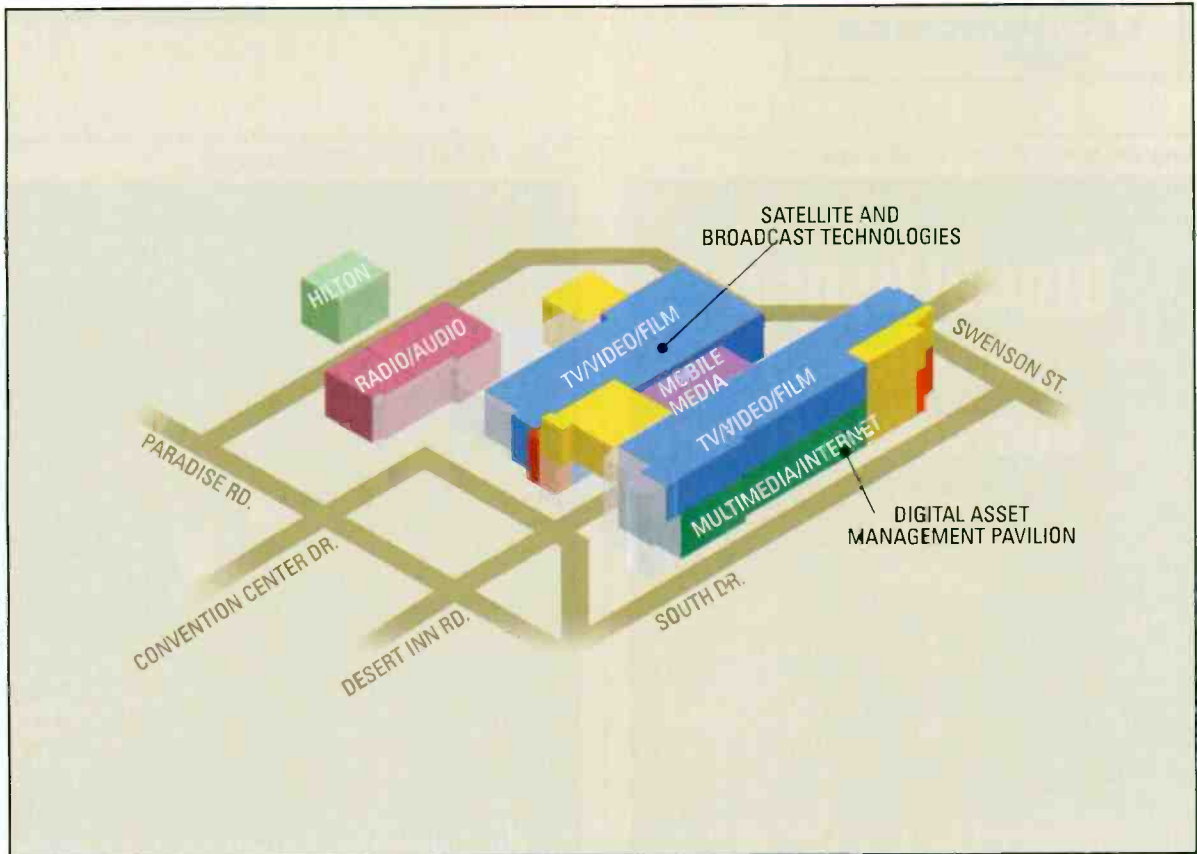
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Left: See Videssence at Booth C7116, page 7

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See Lectrosonics at Booth N3225, page 5

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North Hall**

See EVS at Booth C3230, page 6

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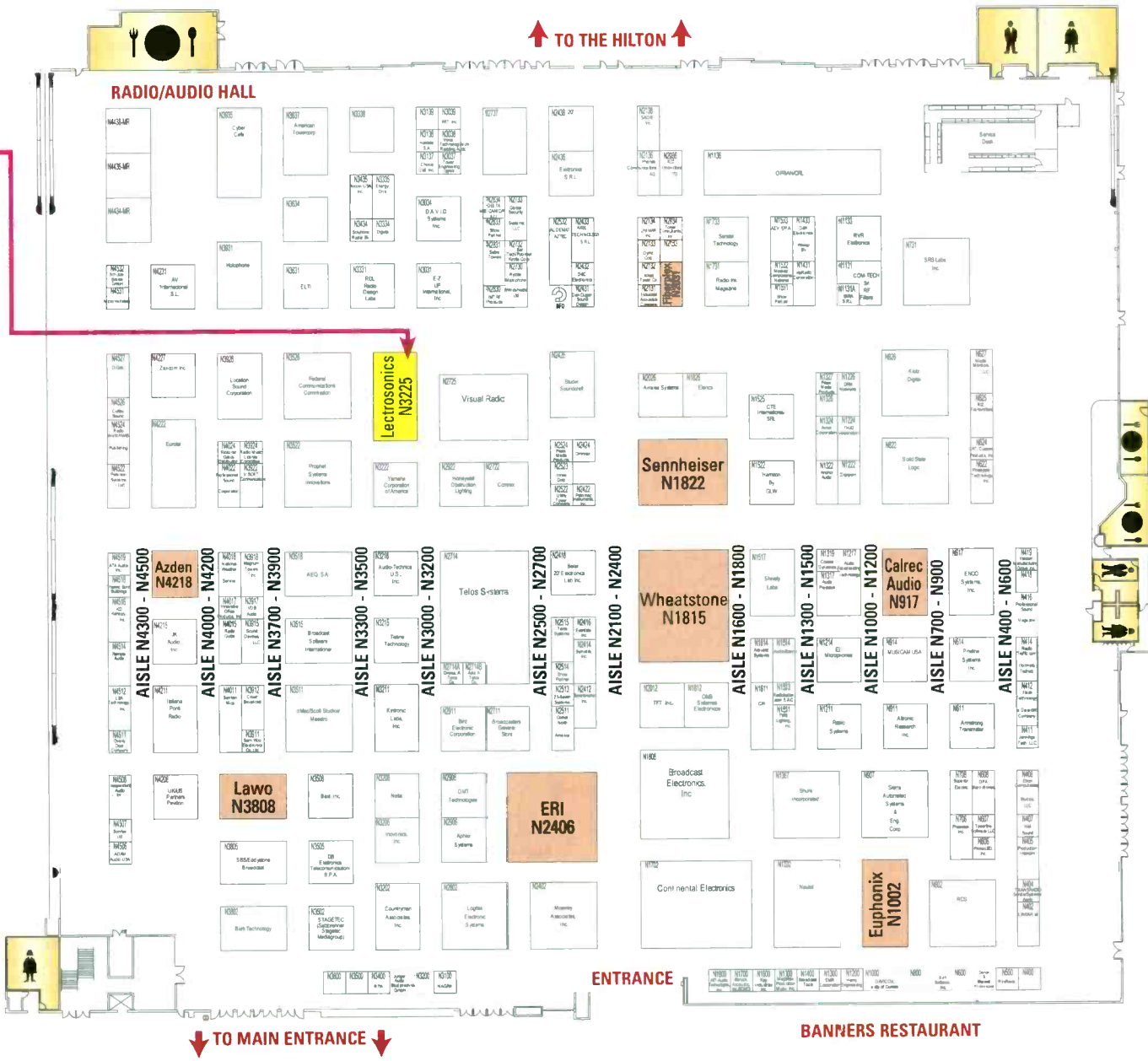
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See Utah Scientific at Booth C4507, page 6

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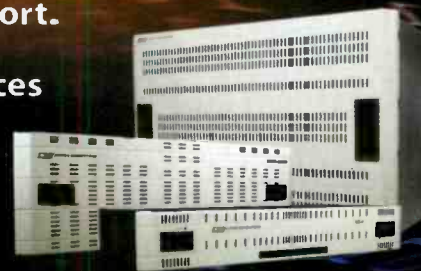


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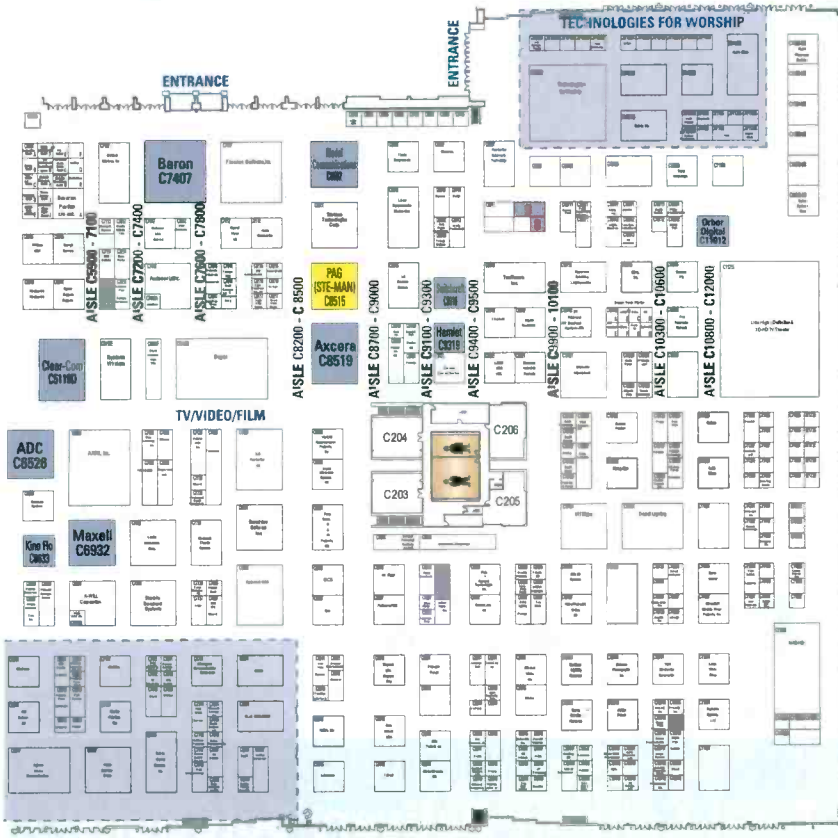
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3	ESE	C1639
4	Miteq	C5145
5	IABM	C5246
6	Videssence	C7116
7	HM Electronics	C9335
8	Eartec	C9912
9	NEC Solutions	C9811
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Right: ■ See Broadcast Engineering at Booth SL4750, page 12

■ See Sencore at Booths C3810 and SU3009, pages 6 and 9

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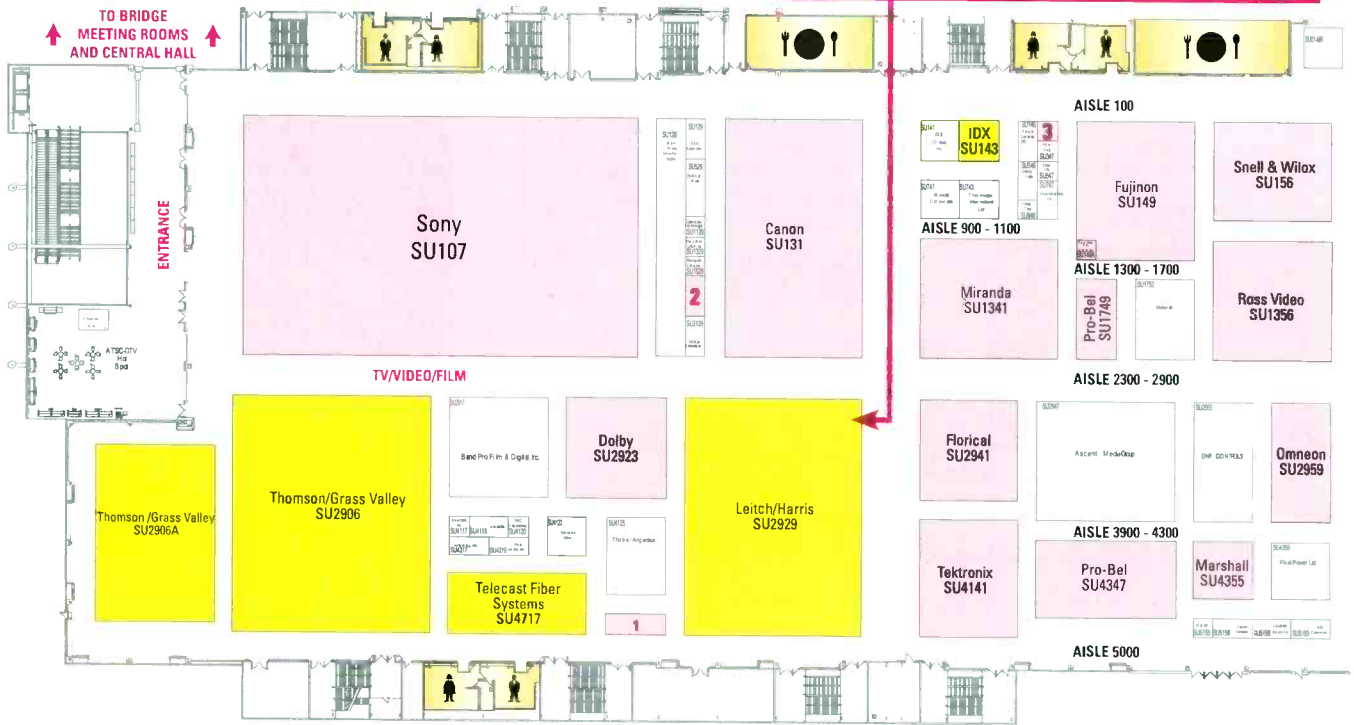
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1	AJA Video	SU5125	3	Eyeheight	SU147
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See Broadcast Engineering at Booth SL4750, page 12

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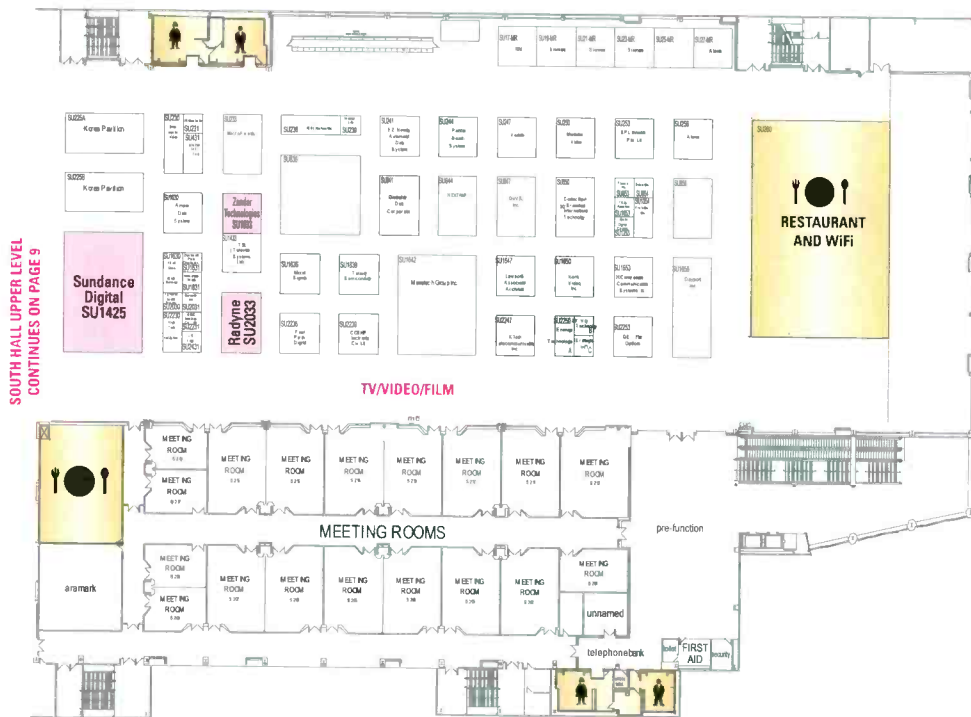


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SOUTH HALL UPPER LEVEL CONTINUES ON PAGE 9

See Thomson/Grass Valley at Booths SU2906 and SU2906A, page 8

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■ See NVISION at Booth SU1414, page 9

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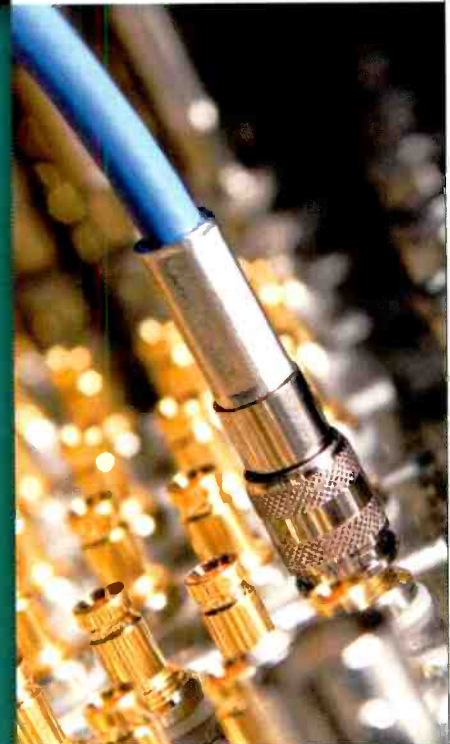
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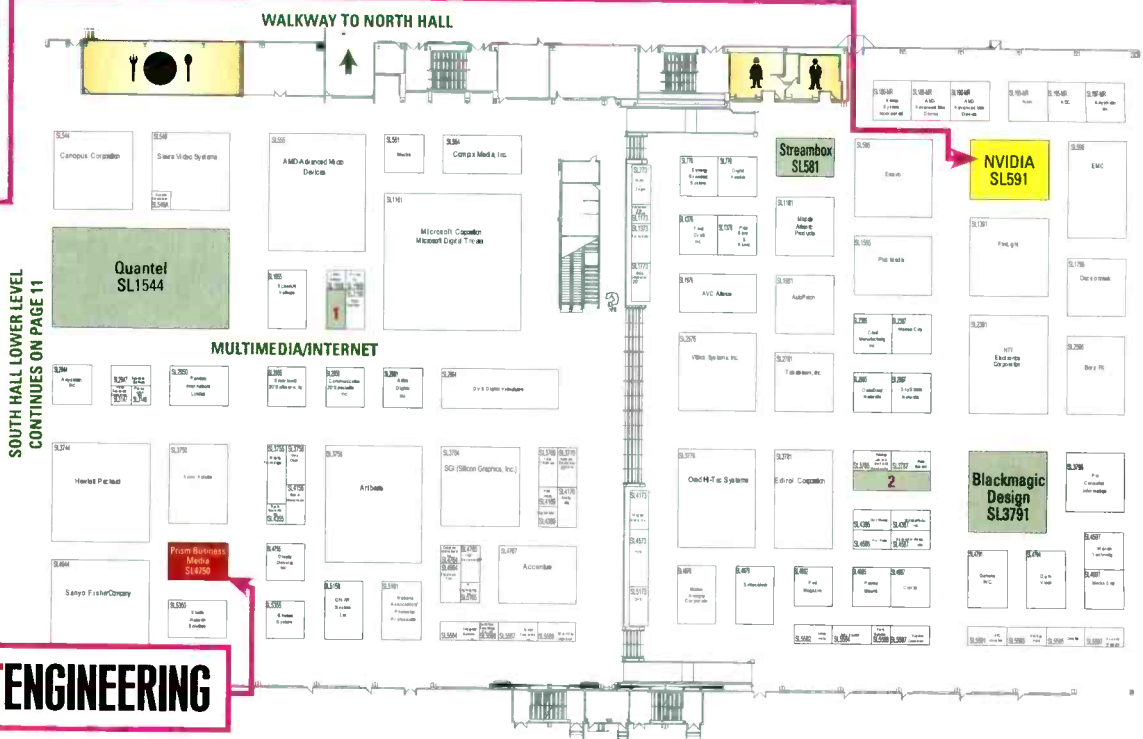


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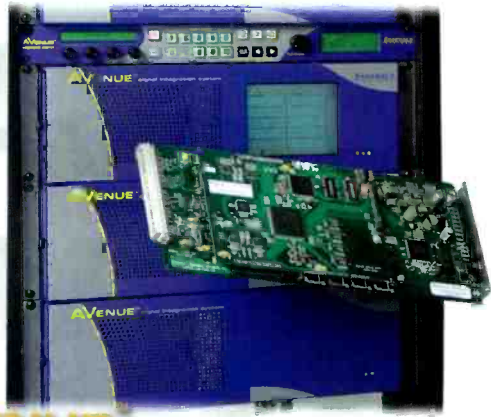


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BROADCAST ENGINEERING

See Ensemble Designs at Booth SU2997, page 9

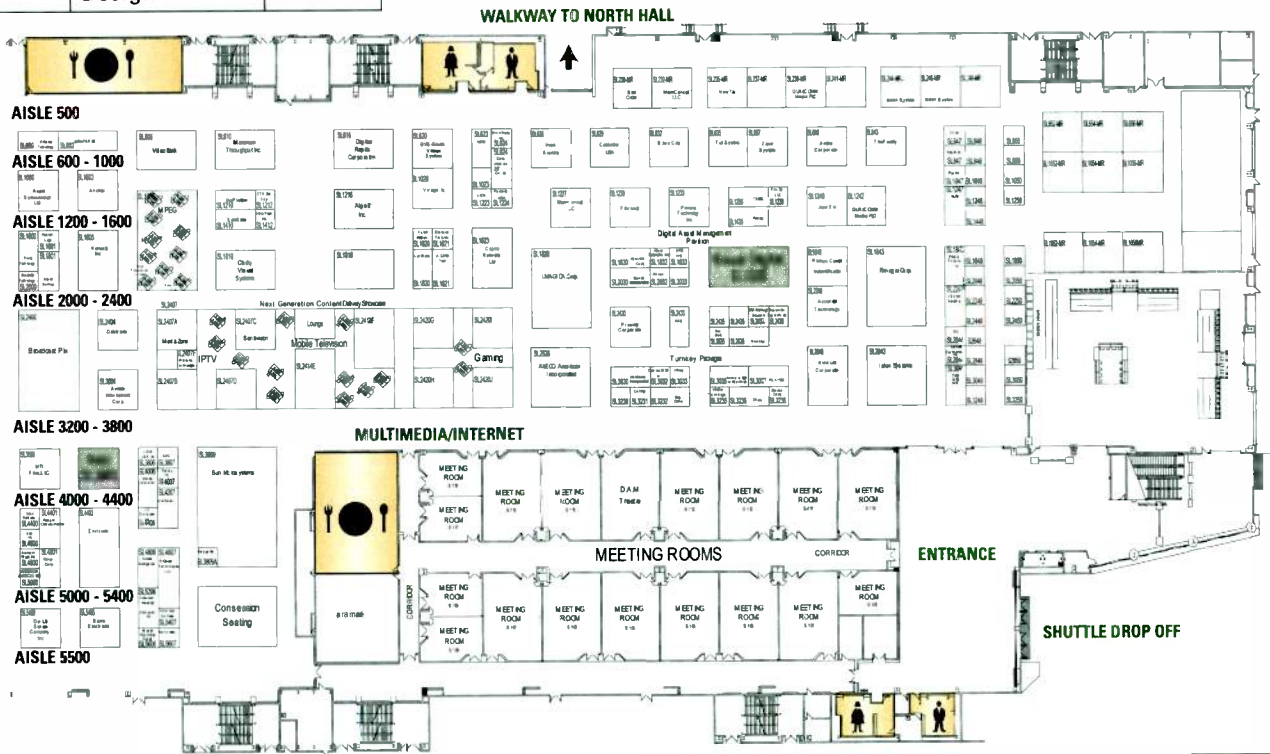
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1	Bitcentral	SL2158
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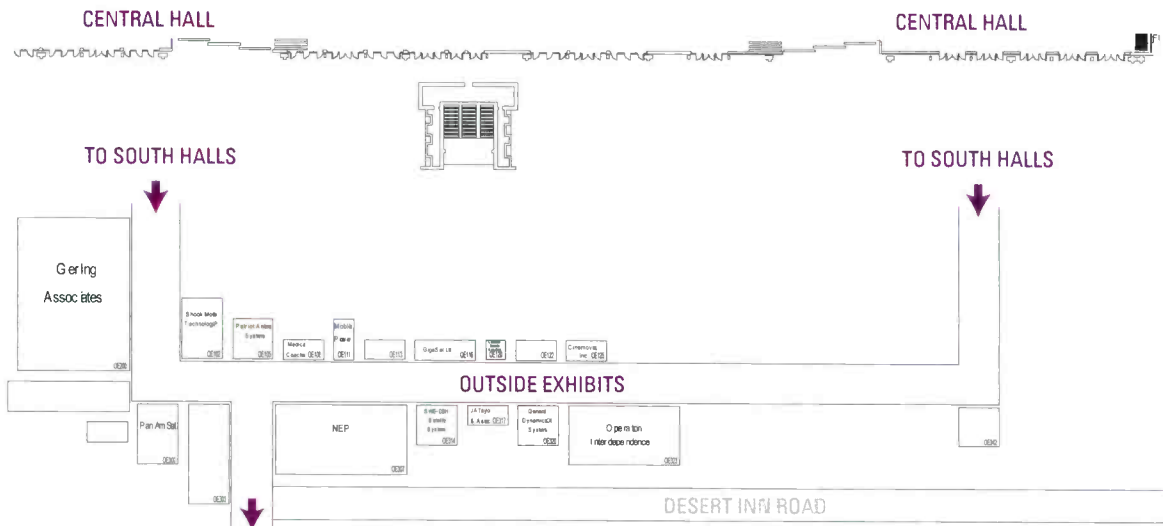
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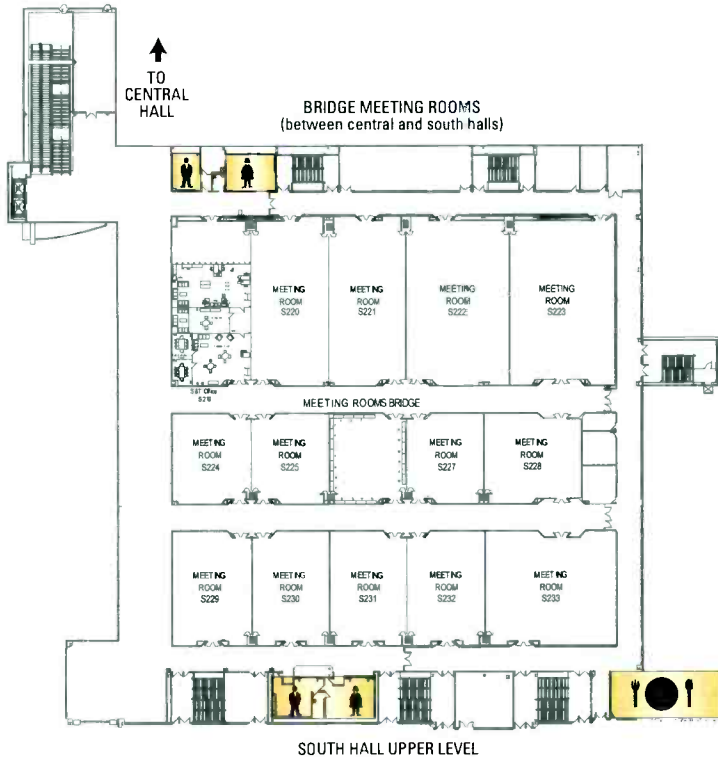
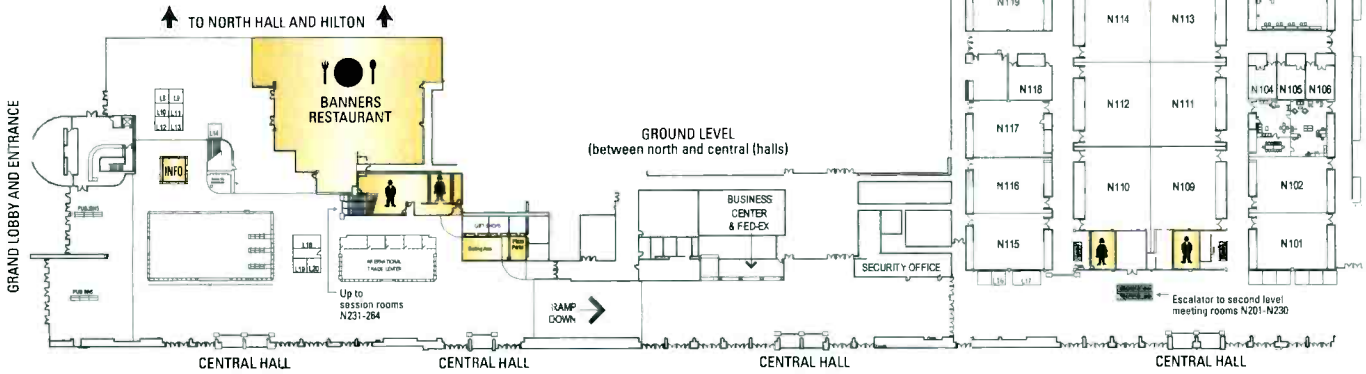
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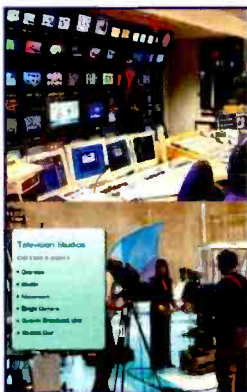
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Next page (insert):

 See Evertz at Booth SU170, page 9

 See IABM at Booth C5246, page 6



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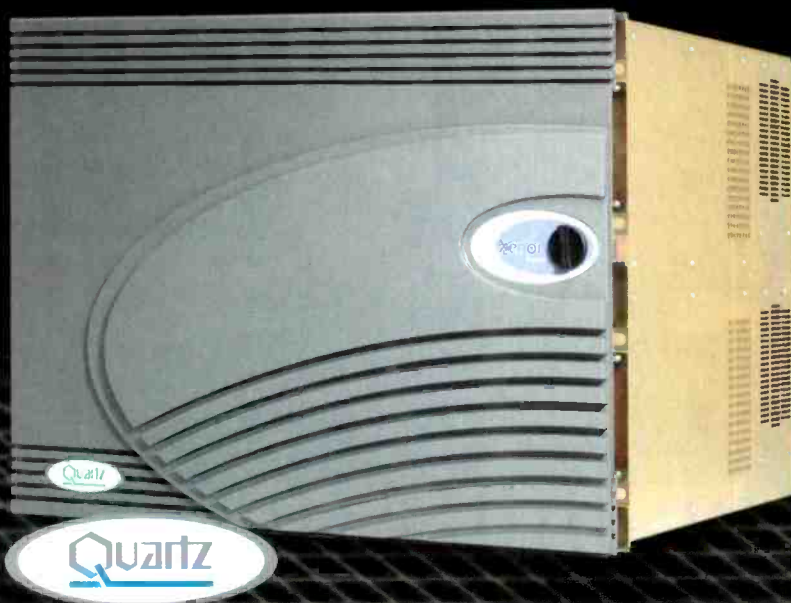


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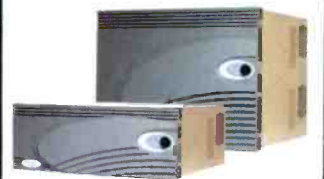
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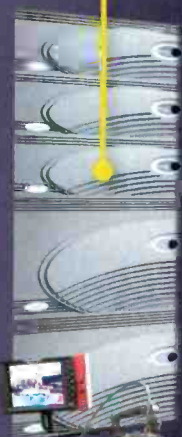
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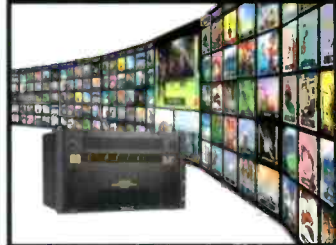
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 CW = Central Hall, Technologies for Worship
 N = North Hall
 OE = Outside Exhibits
 SL = South Hall, Lower Level
 SU = South Hall, Upper Level

COMPANY	BOOTH	PAGE
1 Beyond	SL942	11
16x9	SU2917	8
1st Design	SL942	11
21st Century 3D	C11631	7
2s2	SL4600	13
35Digital	C8935	7
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 Right: See Nvidia at Booth SL591, page 12



**Bridge the 3D Gap
to Real-Time HD
Broadcast Graphics**

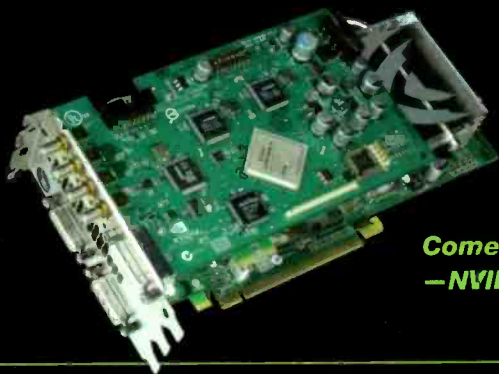


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With 14 models spanning 1 M/E to 3 M/E in 1/2 M/E increments, there's a Grass Valley™ Kayak switcher that's perfect for your production budget.



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Making them the most powerful systems in their class.

To learn more please visit www.thomsongrassvalley.com/KayakHD or contact your Grass Valley representative today.

FAST track

C = Central hall; CW = Technologies for Worship (Central hall); N = North hall; OE = Outside exhibits; SL = South hall, lower level; SU = South hall, upper level

Winding your way through the halls trying to find your way from point A to B? Getting all you want out of your NAB2006 experience will be easier with this guide at your side.

The *Broadcast Engineering* exhibitor map on page 129 gives you an overview of what is where and how far you'll have to trek to get there. Taking your planning a step further, the FASTtrack section on the following pages categorizes the booths by interest. Looking for graphic and animation products? Flip to page 160 for a list of companies featuring graphic and animation products, complete with their booth numbers.

Listings are based on information provided to us by manufacturers.

Booth numbers are provided by NAB and are current as of our press deadline. **BE**

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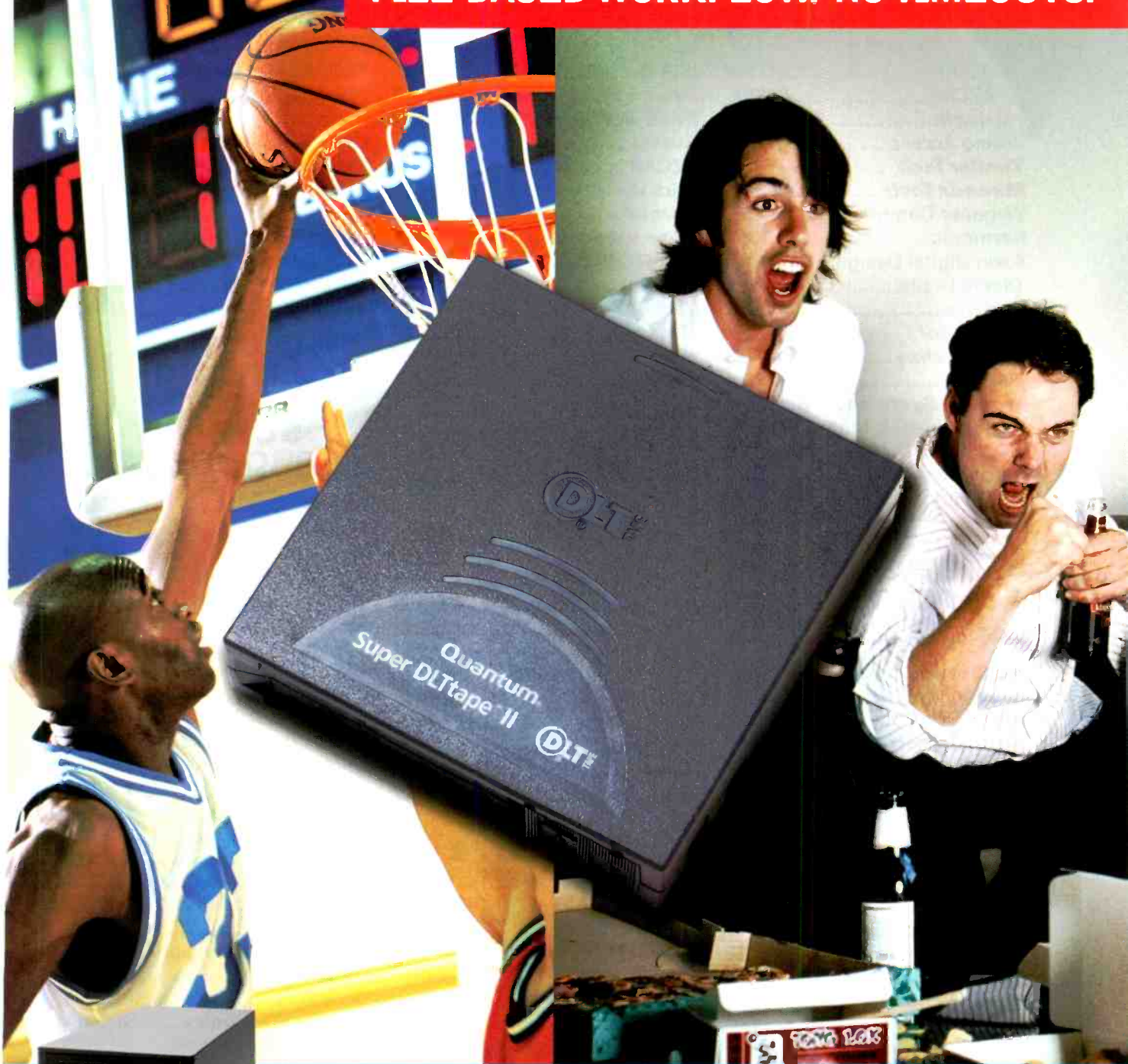
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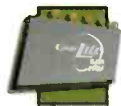
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Central Hall - C3810*

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Thales Broad. &
MultiSU2970
Opticomm SU4183

VIDEO EDITING SYSTEMS

ESE C1639
Fast Forward Video C1851
Panasonic
Broadcast C2518
JVC Pro. Products C3217
Ikegami Electronics..C3226
EVS.....C3230
Astro Systems..... C3246
Prime Image..... C5136
OCTOPUS..... C5416
BOXX Technologies S208
Canopus SL544
Avid Technology..... SL701
da Vinci SL713
Digital Voodoo..... SL778
Dalet Digital Media SL1132
Matrox Electronic Sys. ..SL1137
IPV.....SL1513N
ViewCast..... SL2840
Optibase SL2927
Blackmagic
Design SL3791, SL3985
AJA Video..... SL4913
Brick House VideoSU230
Masstech GroupSU1642
Thomson/
Grass Valley..... SU2906
Harris/Leitch SU2929
DNF CONTROLSSU2955
VideoTechnics.....SU3014
Pixel PowerSU4359
AJA Video..... SU5125

VIDEO ROUTING

Harris.....C807
Allen Avionics C2139
Patchamp..... C3045
Utah Scientific.....C4507
Gefen SL541
Sierra Video Systems SL549
Kramer ElectronicsSL549A
Comprehensive Video
GroupSL2919
Keywest Technology SL3119
Video Accessory SL3147
ISIS Group.....SU141
eyeheight..... SU147
Evertz SU170
Pharos Comm. SU186A

Network Elec. SU199
AZCAR SU205
Zandar Tech. SU1033
Miranda Tech. SU1341
Ross Video SU1356
PESA Switching SU1370
Wegener Comm. SU1376
NVISION SU1414
Scientific-Atlanta... SU1608
Multidyne SU1729
Pro-Bel SU1749
Image Video..... SU2205
Thomson/
Grass Valley SU2906
Harris/Leitch SU2929
DNF CONTROLS SU2955
Opticomm..... SU4183
Pro-Bel SU4347
Leightronix SU4593

VIDEO STORAGE

Fast Forward Video C1851
Panasonic
Broadcast..... C2518
RTI-Research Tech Intl. C2851
JVC Pro. Products C3217
Ikegami Electronics .. C3226
EVS C3230
Prophet Systems.....C4431
Doremi Labs C5712
Maxell C6932
TDK Electronics..... C10741
Sony Electronics.. CW10300
Solid State Logic..... N822
Avid Technology..... SL701
Just Edit..... SL1240
Quantel SL1544
Konan Digital..... SL1835
BitCentral SL2158
Medea SL2387
VELA SL2936
Adtec Digital.....SL2961
Digital Video Sys.SL2964
Datadirect Networks.....SL2985
Merging Technologies....SL3755
SGI (Silicon Graphics) ...SL3764
Bright Sys./MTI FilmSL3800
StorageTek..... SL3809A
Ciprico.....SL4987
Studio Network
SolutionsSL5350
Siemens.....SU23-MR
Sony Electronics..... SU107
ISIS Group.....SU141
Pharos Comm. SU186A
Crispin SU608

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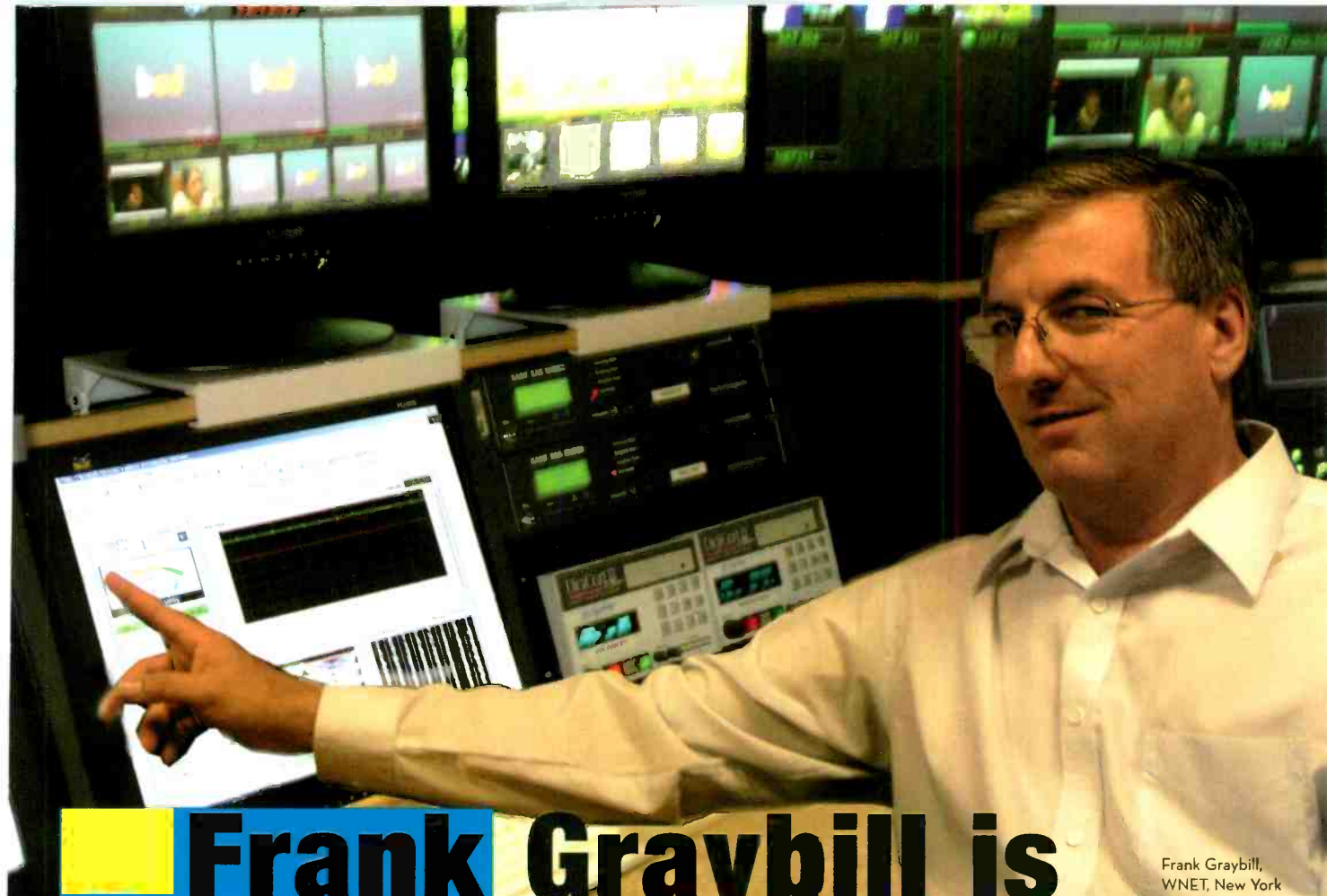
Quantum.....SU783
Wegener Comm. SU1376
Masstech Group.....SU1642
Front Porch
Digital.....SU2236
Thomson/
Grass ValleySU2906
Harris/LeitchSU2929
DNF CONTROLS SU2955
Omneon Video
NetworksSU2959
360 Systems SU2993
Video Technics SU3014
Dayang.....SU4209
Lightworks..... SU5199

WEATHER/DATA SERVICES

AccuWeather C4314
Advanced Designs C5730
Weather Central C6014
Baron Services..... C7407
VIZRT SL1323
Keywest Technology SL3119
Irdeto Access SU793
Triveni Digital SU1999
Pixel Power..... SU4359

WIRE, CABLE, CONNECTORS

White Sands
Engineering C739
Radio Frequency Sys.C1217
Belden CDT Elec. C16551
Dielectric Comm.C2020
WireworksC3043
Patchamp.....C3045
Audio AccessoriesC3047
LemoC3243
Kings Electronics C4711
Gepco C5733
NeutrikC6033
ADC C6526
Whirlwind.....C6541
Switchcraft C9316
Trompeter Elec.SU3006
CanareSU4164
Marshall Elec.SU4355
Telecast Fiber
Sys. SU4717
Fischer
Connectors SU5193



Frank Graybill,
WNET, New York

Frank Graybill is Choosey...

"We needed 8vsb Analyzers for both WNET DT New York and WLIW DT Plainview, NY. I made a list of parameters that we needed to analyze and priced equipment. I thought we'd have to spend \$30,000 or more, then we discovered the 8vsb Analyzer from Modulation Sciences for under \$10,000."

Visit Us at NAB Booth # C118.

When WNET Needed 8vsb Analyzers, Frank Picked MSI

The **msi 4400** has many *standard* features the expensive boxes lack—like full remote control via the Internet, alarm and trend logging, automatic email generation and tap weight comparison over time, and most importantly, a commitment of support for the lifetime of the unit.

All the features we need come standard with the box.

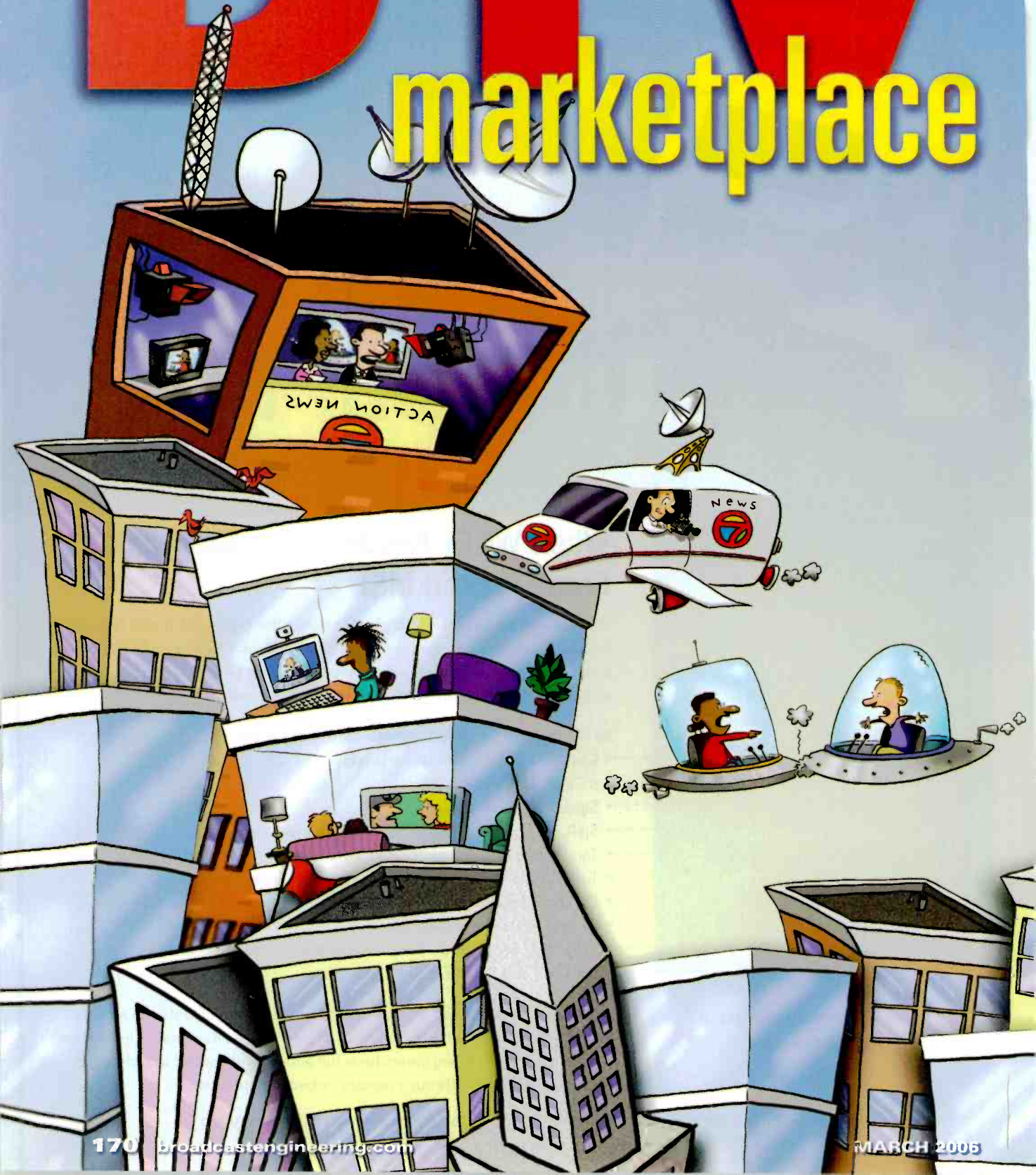
- Eye Pattern & Constellation Displays
- 8 External Alarm Channels
- Signal Quality Metering
- SNR, MER, or EVM Readout with 20 minute History
- Tap Weight Equalizer — Display, Zero, Freeze & Compare
- Trend & Alarm Data Logs — with Negative Time History
- Bit Error Rates — Raw, pre-RS, & post-RS
- E-mail notification of Alarms
- Fully Web Enabled for Remote Operator
- DVB/ASI and SMPTE 310M TS Outputs

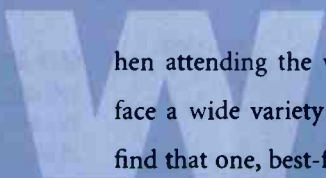
The **msi 4400** delivers accurate real-time data from an antenna at our WNET studios in Manhattan, while at WLIW it takes its signal directly from the transmitter. Our engineers have full access and control of both units from their desks and through remote network connections.



DTV

marketplace





When attending the world's largest electronics media event, you will quickly face a wide variety of technologies, companies and products. How do you find that one, best-fit NLE or transmitter? Who offers the best graphics platform or weather radar? Finding the answers to these and other product-specific questions is sometimes difficult. Fortunately, the editors at *Broadcast Engineering* are geared to help.

More than 300 new products are highlighted on the next 55 pages — more than you'll find anywhere else. To help your search be efficient, we've broken down the hundreds of products into 19 equipment categories. Along with complete descriptions, many listings include a photo so you know more about the solutions being offered. So, read on. The answers to tomorrow's technology challenges lie just ahead. **BE**

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AUDIO ACCESSORIES



**AUDIO TEST SYSTEM
Prism Sound dScope**

The audio test system's new software includes the Acoustics 1 package, which offers transducer/room test support with dB SPL units, measurement mic sensitivity and frequency-response calibration, impulse response by MLS, and swept-sine method.

973-983-9577; www.prismsound.com
BOOTH: N2524, N1327



**STEREO AUDIO DELAY
SYNCHRONIZER
Soniflex RB-DS2**

Resynchronizes audio to video following delay processes such as standards conversion and transmission delay; features balanced analog and AES/EBU digital audio inputs and outputs on three-pin XLR connectors; can act as a combined A/D and D/A unit, with analog inputs delayed and output as AES/EBU and vice versa.

+44 1933 650700; www.sonifex.co.uk
BOOTH: N4507

**AUDIO METER
DK-Technologies
MSD600M**

MSD audio meters; connects directly to a PC to transfer of data for logging signal parameters, opening new applications for automatic monitoring of audio signal levels in playout areas and transmission links and by acceptance testing of program material.

+45 44 85 02 55
www.dk-technologies.net
BOOTH: C2044



**STUDIO MONITOR
JBL Professional
LSR4300 Series**

With supplied Control Center software, users can address system settings, create custom EQ presets, and store and recall system configurations from the computer desktop; a wireless remote control allows control of all features from anywhere in the room.

818-894-8850; www.jblpro.com
BOOTH: N2426

**WIRELESS POWERED
SPEAKER**

Azden APS25b

Powered by a rechargeable battery that can operate the speaker for six to eight hours between recharges; can also be powered via AC; will operate while being recharged; includes mic and line-level inputs, as well as user-installable wireless microphone receiver modules for UHF, VHF or infrared; inputs have individual volume controls; a line output is available for multi-speaker operation; includes a mounting bracket.

516-328-7500; www.azdencorp.com
BOOTH: N4218



**AUDIO MONITORING UNIT
TSL AMU2 8HD**

Offers eight channels of HD/SD embedded audio; Dolby E and Dolby Digital signals can be accurately monitored in a wide variety of system applications.

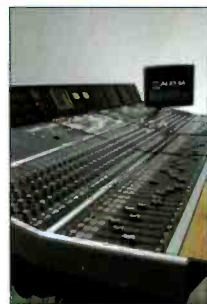
+44 1628 676 200; www.tsl.co.uk
BOOTH: SU1433

**HD AUDIO EMBEDDER/
DE-EMBEDDER
Network Electronics
AV-HD-XMUX**

Offers multiformat SD/HD support; features both optical inputs and outputs as options; embeds four AES streams with selectable sample rate conversion, allowing sampling rates from 8kHz to 216kHz; offers embedding of one RS-422 serial interface with up to 115,200kb/s baudrate; features audio processing functions with group swap, channel shuffle, L/R inversion and variable delay.

800-420-5909
www.network-electronics.com
BOOTH: SU199

**AUDIO MIXERS,
PLAYBACK**



**DIGITAL AUDIO CONSOLE
Calrec Alpha System Plus**

Designed for live production and on-air use; assignable control minimizes screen use, enabling direct access to the majority of console functions; features up to 96 faders, 226 equivalent channels, comprehensive surround panning and monitoring with an optional motorized joystick.

+44 142 284 2159; www.calrec.com
BOOTH: N917





eyeheight

New US freephone: (866) 469 2729

NAB 2006 new products from eyeheight



logoEyesHDI HDTV logo generator

LogoEyesHDI dramatically reduces the complexity and cost of television channel branding. Up to two modules can be accommodated in a 1 U chassis, enabling a full-scale multichannel system to be created quickly and easily with practically unlimited expansion capability. The user interface allows still and animated HD program channel idents to be prepared rapidly from industry-standard TARGA files. Up to 64 channels can be managed from a local or remote PC or under the control of broadcast station automation. Each module incorporates non-volatile RAM storage, sufficient for multiple logos.



legalHHPi HDTV Y/C legalizer

Eyeheight has expanded the capabilities of its legalEyesHDI legalizer with the addition of digital composite signal handling. The enhanced version features separate settings for luma and chroma limits in HDTV, including vector and total video level. Tailored for independent program-makers and editors working for the broadcast market, legalHHPi enables signal levels to be kept within legal limits to prevent over-saturation which in turn could cause color errors or transmitter overload. Levels can be evaluated on a continuous basis and instantaneously corrected. All controls are easily accessible from the front panel.

www.eyeheight.com

eyesales@eyeheight.com



canalettoMDi multi-def color corrector

canalettoMDi is a high-quality multi-def digital color corrector for 1920 pixel x 1080 line television signal formats. Input and output are both to 1.5 gigabit/s HD-SDI SMPTE-274 with SDI auto-sensing. Each R, G and B channel has individually controllable gain, lift and gamma. Overall adjustment of luma, chroma gain and black level is also provided together with overall hue correction. An integral legaliser with automatic luma overshoot suppression and undershoot control ensures that canalettoMDi's output conforms fully to user-specific presets.



keyEyesMDi multi-def downstream linear keyer

A high-definition downstream linear keyer with background, fill and key inputs, keyEyesMDi incorporates all the facilities required for generating HD matte overlays. Fill and key inputs with adjustable horizontal timing are provided. Other production features include matte generators, wipe, independent main and preview keys, and EDH re-insertion for the main output. An integral GPI interface card provides key on/off plus six user-definable control sequences. keyEyesMDi is housed in a compact 1 U chassis designed for local, remote or automated control. Equipped for easy HD-SDI connectivity, it incorporates program and preview outputs.



Playout Application Suite management software

Playout Application Suite enables Eyeheight's playout Master Control switcher, bugEyes logo generator and SQ-2 image-squeeze processor to be configured and managed from a standard PC running Microsoft Windows. It also allows new or existing installations to be checked thoroughly and any wrongly-set parameters automatically repaired. Logging facilities are incorporated to assist integration with third-party automation systems. Playout Application Suite connects via a single RS-232 cable and incorporates an easy-to-use 1024 x 768 pixel GUI.

Color indicates advertiser



FIELD MIXER
Azden FMX-32

A portable three-channel, battery-operated mixer targeted toward mobile professional videographers; offers three balanced XLR inputs with individual level controls and +48V DC phantom power; measures 1.96in x 6.69in x 4.33in; made of all metal; mixer can be attached directly to the camera with supplied hook-and-loop mounting tape.

516-328-7500; www.azdencorp.com
BOOTH: N4218



DIGITAL AUDIO CONSOLE
Wheatstone D-10

Based on the feature set and dimensions of Wheatstone's D-9; offers an array of operator enhancements, including programmable individual channel delay adjustments.

252-638-7000; www.wheatstone.com
BOOTH: N1815

AUDIO NETWORKING SYSTEM

Calrec Audio Hydra System Plus

Designed to provide a powerful network for sharing I/O resources and control data between Calrec digital mixing consoles; uses a scalable, flexible architecture tailored to the requirements of each installation; features remote I/O units with up to 96 inputs or output (analogue or digital) that may be connected onto the same network, providing remotely located sources and destinations that can be used by any or all mixing consoles.

+44 142 284 2159; www.calrec.com
BOOTH: N917



MULTI-APPLICATION CONTROL SURFACE
Euphonix MC Intelligent Controller

Serves as a standalone product as well as the centerpiece of the System 5-MC console surface; has four levels of control; includes a keyboard and trackball and 56 LCD SmartSwitches that can be programmed to send out keystroke commands; features HUI and Mackie Control protocol and EuCon.

650-855-0400; www.euphonix.com
BOOTH: N1002



DIGITAL MINI MIXER
Lawo z4

Features four stereo channel strips with 100mm faders, pan and balance, PFL, and display; high-quality signal processing is included in the four channels; features four freely configurable summing busses with limiters; channel modes include stereo, mono, left or right signal; has an integrated PPM with correlation ratio meter.

+49 7222 1002 0; www.lawo.de
BOOTH: N3808

DIGITAL AUDIO CONSOLE
Wheatstone D-12

Delivers the same feature set of the much larger D 5.1 television console but in a smaller package; features include 5.1 surround inputs, outputs and monitors; internal signal routing puts any source to any fader.

252-638-7000; www.wheatstone.com
BOOTH: N1815

OmniBus OPUS
Content Management



Video Content Management in a Multi-System Workflow

- Intuitive desktop controls
- Complex video content processes made simple
- Search, view, move video content among multiple systems
- Integrates business workflows, operational processes and content management with high-level task management

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OMNIBUS

Innovate | Integrate | Deliver

www.omnibus.tv

1 303 237 4868



DIGITAL AUDIO PROCESSOR
Linear Acoustic AEROMAX-TV

For two-channel main plus SAP audio with front-panel display and controls plus Ethernet remote control; four-channel unit can be configured as 2+2 or 2+1+1 (stereo plus two mono channels).

717-735-3611
www.linearacoustic.com
BOOTH: C2507B, C2507D



CONSOLE
Lawo mc²66

Broadcast and production console has lightweight construction, low-power consumption and compact dimensions; in combination with the routing matrix integrated in the core, it offers maximum flexibility for I/O interfaces and DSP resources; has a matrix capacity of 8192 mono inputs and outputs, as well as up to 512 DSP channels.

+49 7222 1002 0; www.lawo.de
BOOTH: N3808



DIGITAL CONSOLE
Solid State Logic C300

Designed for fast and efficient sweetening and mix creation; addresses the requirements of nonlinear film and TV production; features more than 500 mix inputs and 80 mix busses, with DSP from a single Centuri processor.

212-315-1111
www.solid-state-logic.com
BOOTH: N822



DIGITAL AUDIO MIXERS
Euphonix Max Air V1.4 and System 5-B V2.8.1

Software and hardware upgrades for the on-air digital audio mixing systems include live control surface module resynchronization, configurable aux sends, Image Video TSI-1000 integration, ergonomic improvements to the surface and faster embedded processors; individual control surface modules can be removed and reintroduced without the need to reboot and without loss of audio; can be configured with 24 aux send busses or the original 16.

650-855-0400; www.euphonix.com
BOOTH: N1002

AUDIO RECORDING, STORAGE, PLAYBACK

LOSSLESS AUDIO TECHNOLOGY
Dolby TrueHD

Designed to take advantage of high-definition optical disc formats; features end viewer performance equal to high-res recording studio masters; allows viewers to experience multi-channel surround sound as the codec provides support for all of the new speaker locations designated by SMPTE for digital cinema applications.

415-558-0200; www.dolby.com
BOOTH: SU2923

MULTICHANNEL AUDIO ENCODER/DECODER
Dolby E DP571/DP572

Encodes up to eight channels of digital audio and metadata for use in DTV program production and broadcast distribution; decodes Dolby E bit streams for use in DTV program production and broadcast distribution infrastructure.

415-558-0200; www.dolby.com
BOOTH: SU2923

DIGITAL AUDIO WORKSTATION
Merging Technologies Pyramix version 5.0

A DAW that offers instant and unlimited fades and X-fades, even across 128 tracks; major advances to the systems' firmware has expanded its capability from 64 I/O to 128 I/O; existing users can install the new V5.0 software; features a new interface that can be fully customized to the operator's specific needs.

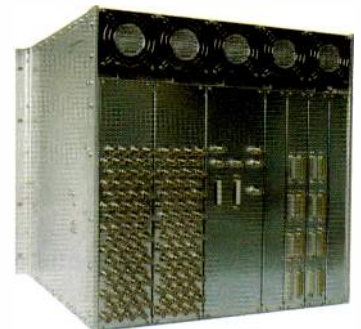
+44 1606 892788
www.merging.com
Booth: SL3755

AUDIO ROUTING, DISTRIBUTION

AUDIO ROUTER
NTP Technology NTP625

A multinorm audio routing matrix; can be installed either as a master control room matrix system or associated to user surfaces and/or control panels for use in studios.

+45 44 53 11 88; www.ntp.dk
BOOTH: TBA



AUDIO ROUTER
Lawo Nova73 HD

Router is scalable up to 8192 mono channels; synchronous system has defined latency of few samples; features a variety of interfaces and direct ATM link; is 96kHz and Dolby-E compatible with integrated signal processing; features STAR2 architecture and redundancy options.

+49 7222 1002 0; www.lawo.de
BOOTH: N3808

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Mantis

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- Multi-band operations
- IATA baggage compliant
- "Two Box" stores antenna & components



LINK

- Wireless Camera System for ENG and Outside Broadcast
- Low signal delay of just 40ms
- Digital COFDM, MPEG 4:2:2 system
- Diversity receive system for robust reception and multiple area coverage



SCM4000

- Single Carrier Modem providing HD contribution rates up to 105 Mbps
- Programmable occupied channel bandwidth

See our latest technology at . . .

NAB2006

Booth #C20C7

MICROWAVE RADIO
COMMUNICATIONS

Innovative Transport Solutions . . .



ANALOG AND DIGITAL AUDIO TRUNKING

Telecast Fiber Adder II BoothPak

Successor to the Adder 162 and 322; is a single-box solution for larger point-to-point audio applications; can handle analog and digital AES audio while converting between them; features factory-configurable modules.

508-754-4858
www.telecast-fiber.com
BOOTH: SU4717

AUTOMATION, INCLUDING NEWS AND MASTER CONTROL

AUTOMATED CABLE VOD CONTENT CREATION

Anystream Agility VOD
A cable VOD content creation tool that features Nielsen audience measurement technology integration; provides automated schedule-based advertising and promotional spot rotation within cable VOD content; features pre-built configurations that define and enforce package requirements for all major U.S. cable systems.

202-661-4665; www.anystream.com
Booth: SL2944



INTEGRATED RECEIVERS/DECODERS

Scopus Video Networks IRD-2900

Supports a wide range of front-end options, including ASI transport-stream input and output supporting rates over 155Mb/s, up to four QPSK L-Band inputs and up to four pairs of balanced outputs; features a dual decoder for decoding two programs within the same transport stream, as well as built-in full transport stream descrambling capability.

609-987-8090; www.scopus.net
BOOTH: 4175

OPERATIONS MANAGEMENT

ScheduALL Media Connection Services

Allows bi-directional API access for strategic third-party companies with industry-standard media partners; designed for use in the asset management, traffic, automation, rights management and content management areas of broadcasting, cable and satellite operations.

303-399-5454; www.scheduall.com
BOOTH: SL1955



ENCODER

Adtec Digital adCode

A media ingest station for MPEG-2 standard-definition encode, review and approval of commercial and program material from FireWire (DV25), SDI, analog composite or YC sources.

615-256-6619; www.adtecinc.com
BOOTH: SL2961

HD CONTROL ROOM

Grass Valley Ignite HD

Designed to allow broadcasters and video production studios to efficiently and cost-effectively migrate from SD to HD production, leveraging Grass Valley's Kayak HD video production switcher frame; is available with one to four M/Es and up to 32 control ports; is scalable from 24 to 93 video inputs and 24 to 96 audio inputs.

503-526-8150
www.thomsongrassvalley.com
BOOTH: SU3500, SU2906

MONITOR

Florical Supervisory Monitor

Enables centralized operations to have a dashboard view of up to 10 channels per monitor in a moving timeline display; the operator can control channels and troubleshoot problems using SNMP.

352-372-8326; www.florical.com
BOOTH: SU2941

MEDIA MANAGEMENT

Avocent EWMS1000

Broadcasts high-quality, full-motion streaming video from virtually any source to multiple display devices up to 1000ft without wires; can be deployed in either a point-to-point (extension) or point-to-multipoint (broadcast) configuration.

800-275-3500
www.av.avocent.com
BOOTH: SU4572

DIGITAL ARCHIVE AND CATALOG SYSTEM

Crispin NewsCat

Enables the news department to store, index and later locate and quickly retrieve news stories aired from a video server; also organizes and manages the content so operators can find what they need on-the-fly; digitally archives stories after airing and provides a method to easily locate material at a later date; archived video clips are linked to a database containing all script information from the newsroom computer system.

919-845-7744
www.crispincorp.com
BOOTH: R218, SU608



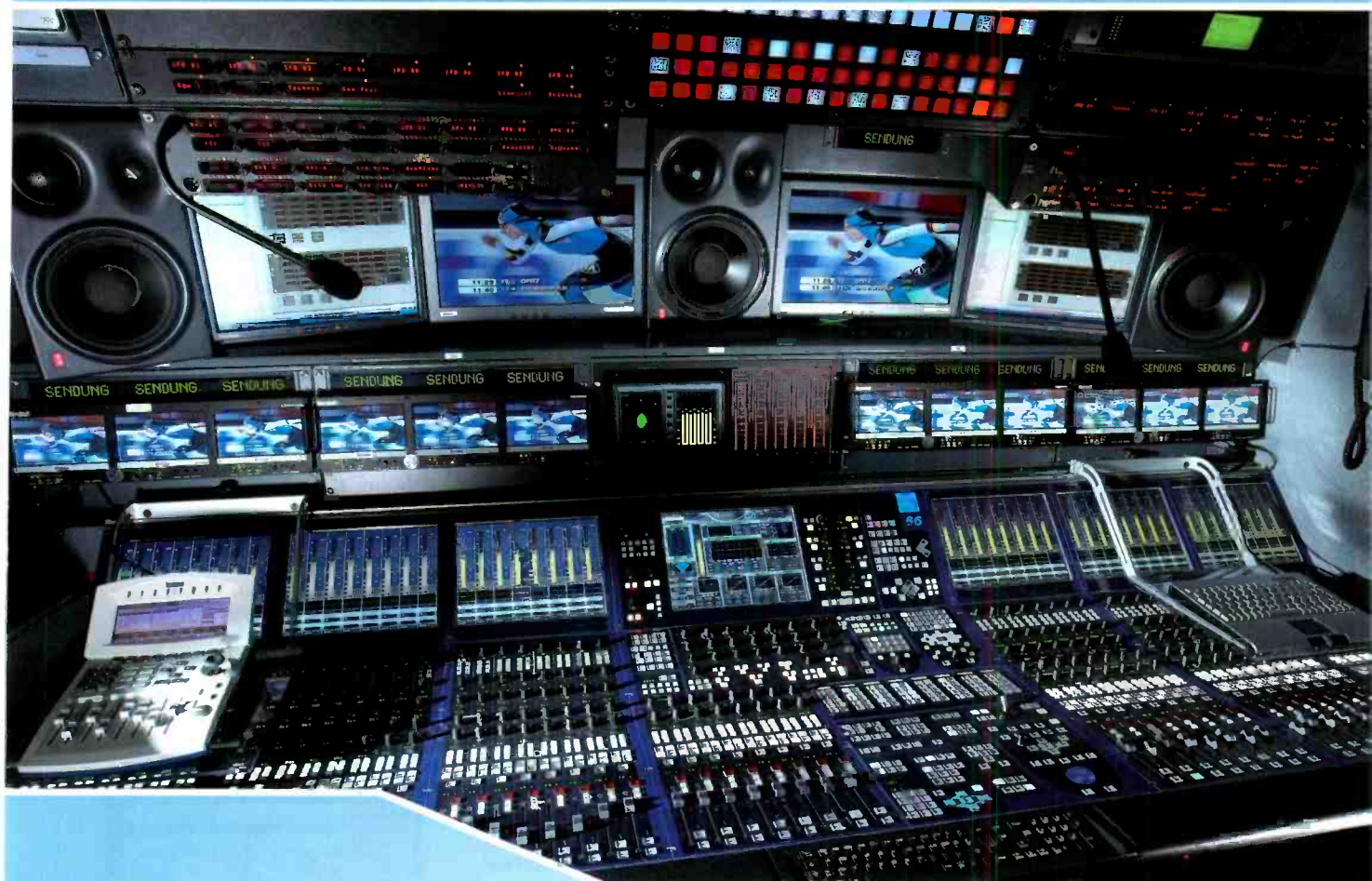
PATHFIRE INTERFACE

Digital Transaction Group Xe System

Provides a hands-off, automated ingest and playback process for Pathfire-delivered syndicated programs; with the Xe Pathfire interface, syndicated programs are automatically transferred to the station's play-to-air server.

512-837-3737; www.dgtv.com
BOOTH: C11031

We could have also called it the **Standard-Fast-Operating-Ultimate-Matrix-Capacity-DSP-Core-HDTV-OB-Van** Mixing Console



mc²66. More Power. More Speed. More Flexibility.

The toughest boxers, the fastest skiers, the most brilliant opera singers – when the best in the world line up to compete, the mc²66 must not be missed out. Its plus points: the largest audio matrix, the most powerful DSP core, and fast and efficient operation. No wonder that, within a short time, the mc²66 has established itself as the new reference console for OB vans. The best thing to convince yourself is what is one of the most successful mixing consoles in Europe: The mc²66, made by Lawo.



NETWORKING
AUDIO
SYSTEMS

Headquarters: Lawo AG · Rastatt/Germany · +49 7222 1002-0 · www.lawo.de
Lawo North America Corp. · Canada · +1 416 292-0078 · www.lawo.ca

NAB

Las Vegas, 22/27 April 2006, Booth No N.3808, North Hall

AUTOMATED VIDEO INTERFACE
Crispin Digital Transfer Agent

An intuitive, fully automated interface that seamlessly moves programming from third-party content delivery systems to a video server in preparation for play-to-air; eliminates the need for manual tasks in the program acquisition process; no dubbing or segmenting of programs is required.

919-845-7744; www.crispincorp.com
BOOTH: R218, SU608

CONTENT DELIVERY PLATFORM

Harris H-Class Content Delivery Platform

Solutions include the H-Class Airtime Sales, H-Class Scheduling, H-Class Digital Asset Management, H-Class Media Ingest, H-Class Playout Automation and H-Class Intelligent Transport; offers platform-based advantages, including content management and sharing, intra-application messaging, increased security and scheduling functionality; management of content assets, associated metadata and content relationships enables the delivery of rich media across multiple distribution channels.

513-459-3400; www.harris.com
BOOTH: SU2929

ASSET AND WORKFLOW MANAGEMENT

Obor Digital Zeus

For physical asset management, tracks equipment using such identifiers as name, description, location, type, cost, serial and model number, manufacturer, service history, current status, and user-defined fields; for technical workflow management, provides ticket generation and management, automatic routine ticket generation, interdepartmental communications, shift notes, service scheduling and more.

407-352-6501; www.obordigital.com
BOOTH: C11012



NEWSROOM COMPUTER SYSTEM
OCTOPUS Newsroom OCTOPUS5

All incoming information, such as wires, Web feeds, media, faxes and e-mails, are organized and ready to be used as ideas for last-second news coverage; offers a global search engine, keyboard shortcuts for frequently used actions and saved screen layout recall; features a new service for transferring stories and even whole rundowns, allowing channels to share their assets between offices around the world.

+420 221 181 511
www.octopus-news.com
BOOTH: C5416

AUTOMATION
Sundance Digital FlexEvents

Enables complex secondary event command sets to be organized into named macros placed within the station's traffic log for auto-execution within the Titan or FastBreak NXT on-air playlist.

972-444-8442
www.sundancedigital.com
BOOTH: SU1425

PLAYOUT SYSTEMS
ON-AIR Systems playKast

Part of the K Series of channelKast products; offers a simple way of integrating systems together; features simple integration capabilities into traffic, billing and archive systems.

+44 20 7663 3663
www.on-air-sustems.com
BOOTH: SL5158



MASTER CONTROL AND BRANDING
Harris Icon suite

The SD/HD master control and branding products include IconMaster, IconStation and IconLogo; based on the Leitch NEO modular platform, IconMaster combines critical master control functions with multilayer integrated branding and can be used with other advanced applications to create a plug-and-play system all in the same frame; IconStation combines logo insertion with multiple real-time data-fed crawls and a squeezeback DVE.

513-459-3400; www.harris.com
BOOTH: SU2929



MANAGEMENT SOLUTION
SintecMedia OnAir

Manages airtime sales, traffic operations, content acquisition, broadcast rights, long-term and detailed schedule planning, and promotion planning; features real-time, interactive report and graphical analysis tool for revenue and inventory management, with analysis at the individual channel level or consolidated across multiple channels in the organization.

866-746-8321; www.sintecmedia.com
BOOTH: SL4979

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OFF-AIR LOGGING AND MONITORING
Transmedia Dynamics
MediaTraX

The off-air compliance logging and media monitoring is designed for the off-air recording of multiple channels; allows broadcasters and media monitoring companies and departments do away with tape-based methods; can be delivered in either Windows Media 9 format or MPEG-1, both in time-code frame-accurate streams; uses industry standard servers and commodity disks.

+44 1296 745080; www.tmd.tv
BOOTH: SU186H



CONTENT MANAGEMENT CONTROL SYSTEM
Wegener MediaPlan

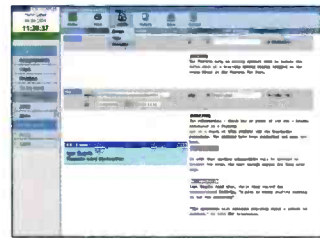
Allows operators digital asset management in an end-to-end environment, supporting ingest of analog and digital assets, management of archived digital assets, remote tracking, and updating or deleting of individual assets on the company's iPump media servers, targeting the company's receiver groups, regions or individual sites.

770-814-4000; www.wegener.com
BOOTH: SU1376

MEDIA ASSET MANAGEMENT
Konan DigitalArc

Manages media life cycle and controls the entire process of media flow, from ingest to archiving; an embedded workflow engine provides advanced status management for all assets; users can subscribe to automatic notification services to track media and story status across every step of the workflow.

626-579-0943; www.videssence.tv
BOOTH: C7116



REMOTE NEWSROOM COMPUTER SYSTEM
OCTOPUS Newsroom
Field Reporter

All incoming information, such as wires, Web feeds, media, faxes and e-mails, are organized and ready to be used as ideas for last-second news coverage; offers a global search engine, keyboard shortcuts for frequently used actions and saved screen layout recall; features a new service for transferring stories and whole rundowns, allowing channels to share their assets between offices around the world.

+420 221 181 511
www.octopus-news.com
BOOTH: C5416



REMOTE MONITORING AND CONTROL
Harris Nucleus

The next-generation, user-configurable, real-time control panel is designed to centralize the operational control of processing, branding and routing products; offers improved access to device control parameters, a user-friendly display and a higher degree of user customization.

513-459-3400; www.harris.com
BOOTH: SU2929

AUTOMATION

Sundance Digital
FastBreak NXT XPress

The automation solution is ideal for operator-supervised program playback and spot insertion; features include switch events, clock triggers and automatic or manual Join-in-Progress (JIP) cues; base configuration provides two Sundance workstations: Media Prep for ingest and content management, and Air Control to supervise the actual playout.

972-444-8442
www.sundancedigital.com
BOOTH: SU1425



BROADCAST MONITORING AND LOGGING SYSTEM
Volicon Observer 2.0

New features include closed caption display, Exportview for scheduled archiving, support for Front Porch Digital archiving and Sundance automation solutions, and multi-rate streaming for simultaneous coding of channels running at multiple bit rates.

781-221-7400; www.volicon.com
BOOTH: C2316

PRODUCTION CONTROL SYSTEM

Ross Video OverDrive
version 4.0

Production control system has control interfaces for Avid Deko and Vizrt graphic systems; features an enhanced RundownControl GUI and a MOS interface to Autocue's QNews NCRS; hot-standby backup operation is now included with redundant server packages.

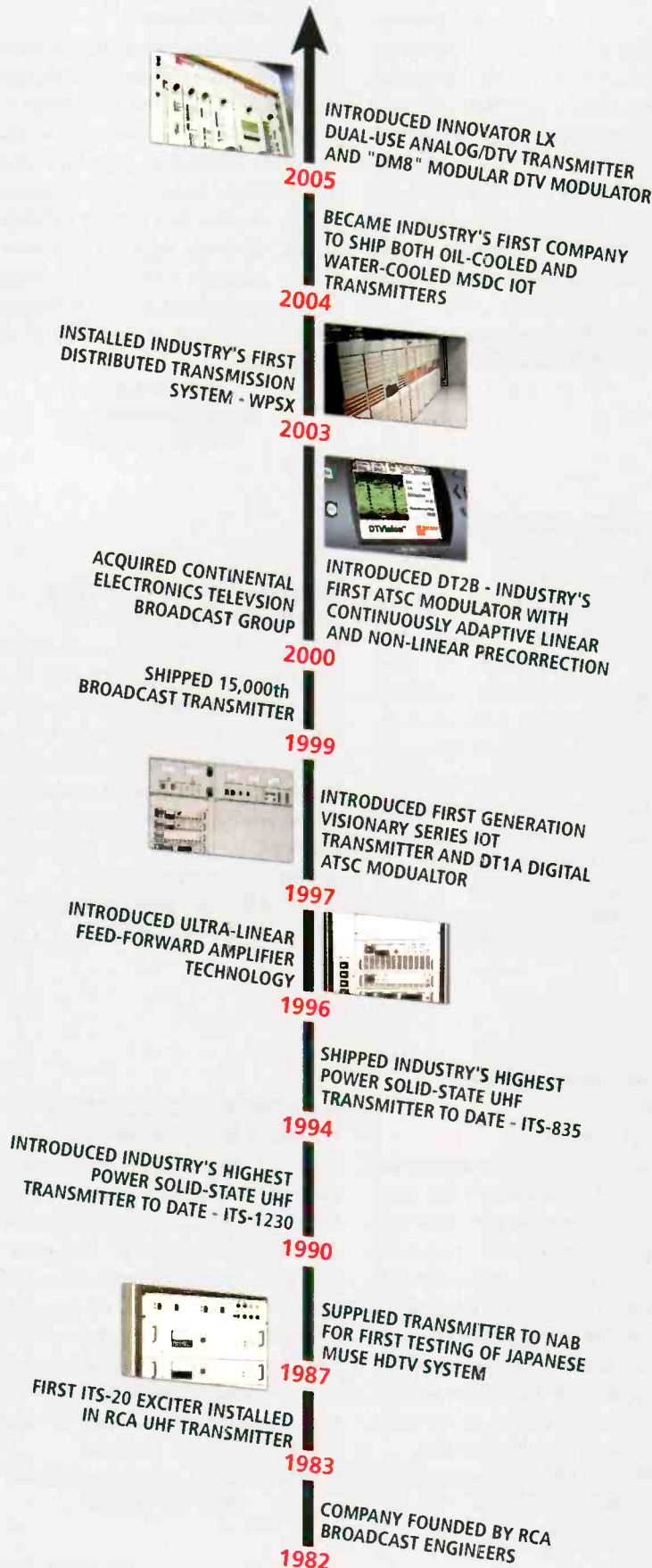
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2004



Digital TV/Television Broadcast Magazine Top Innovation Award
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2003



Broadcast Engineering Magazine Pick Hit
DTxA2B Distributed Transmission Adaptor



Digital TV/Television Broadcast Magazine Top Innovation Award
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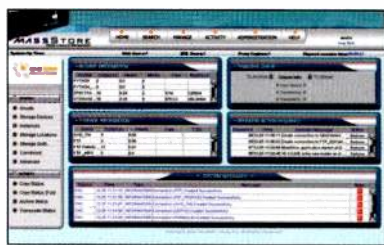
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MAM SYSTEM
Transmedia Dynamics
Mediaflex Version 3

Supports Windows Media 9 and simultaneous parallel ingest from multiple systems; offers scene change recognition in both high- and low-res formats and Web capabilities for searching and streaming media; quickly and accurately inserts subtitles into file-based media content; the new add-on subtitle insertion application is compatible with Softel's insertion software and Omneon's video server.

+44 1296 745080; www.tmd.tv
BOOTH: SU186H



NEWSROOM
INTEGRATION SYSTEM
Masstech Group MasStore
News Interface

Integrates a newsroom automation system with the media lifecycle management infrastructure; searches and retrieves material from the archive directly from within the newsroom's automation system; backs up content and projects to any standard tape library system.

905-886-1833
www.masstech.com
BOOTH: SU1642

AUTOMATION
Pebble Beach Neptune

An automation system for large multichannel systems with complex functional requirements, such as archive control, low-res media browsing and complex secondary events; there is no limit to the number of playlists, clients or devices; a full range of fault-tolerant options are available.

+44 1932 333 790; www.pebbletv.com
BOOTH: SU244

ASSET MANAGEMENT
Controlware OpenBroadcast

The software suite offers management, monitoring, scheduling, switching and billing solutions for media networks; NetSwitch and EasySwitch network management software help move video and media between locations; enables broadcasters to switch video and data connections via a telecommunications network; the networks can be based on different technologies such as PDH, SDH, ATM, DTM or IP.

732-919-0400; www.cware.com
BOOTH: SU1653

WORKFLOW DESIGN TOOL
Marquis Broadcast
Operal version 3.0

New software will provide workflow modelling and graphics-based process tools, enabling users to more easily identify potential workflow bottlenecks; supports additional industry standard interfaces for seamless integration with business process management systems for use in larger broadcasting operations using form-driven process monitoring.

+44 118 984 4111
www.marquisbroadcast.com
BOOTH: C807, SU2959

DIGITAL NEWSROOM
SYSTEM
JustEdit vsnnews

News management system allows text and video to be edited in the same application; integrates the rundown planning assigning of resources, text editing, material ingest, storage and cataloging, archive integration, shared editing of video/audio with voice-over from journalist workstations, graphics in real time and the automatic publication of news on the Web; integrates with most NLEs.

+34 902 35 37 39; www.vsn-tv.com
BOOTH: SL1240

NEWS PRODUCTION
SYSTEM

BitCentral Précis

Provides total integrated management of all video assets from acquisition to air; the all file-based workflow improves speed-to-air and video quality while reducing operating costs; the system is browser-based, making it fully scalable to as many individuals as required, regardless of where they're located; requires no changes to a station infrastructure; is designed with an easy and affordable HD upgrade path.

800-214-2828
www.bitcentral.com
BOOTH: SL2158

AUTOMATION SYSTEM
OmniBus Systems iTX

Replaces all of the functions of a broadcast master control and playout chain in a single software application; ideal for both SD and HD content; acts as a video server, master control, and graphics and logo inserter with automation, ingest, editing and basic content management; integrates with video or IT storage to manage video files.

704-319-2231; www.omnibus.tv
BOOTH: SU2983

AUTOMATION SYSTEM
Pro-Bel Morpheus

Manages everything from server playout to complex channels where schedules are changing regularly and unpredictably; at the core is Pro-Bel's Mediaball concept, a package of media and data elements that are brought together at transmission time to create a virtual asset; now includes a media browse facility, which provides effortless access to media across a facility or facilities.

925-735-9269; www.pro-bel.com
BOOTH: SU4347

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CAMERAS, LENSES, ACCESSORIES



ENG/EFP LENS

Fujinon HA16x6.3ERM

The 2/3in HD lens combines wide-angle of 6.3mm and high magnification (16X zoom ratio), enabling production crews to carry just one lens for a range of shooting environments, including handheld production; features a telephoto focal length of 202mm with the 2X extender; the minimum focusing distance is 0.4m.

973-633-5600

www.fujinonbroadcast.com

BOOTH: SU149



HD CAMCORDERS

Sony XDCAM HD PDW-F330 and PDW-F350

Part of the XDCAM HD Series and Professional Disc system; both offer 24p recording in SD or HD, interval recording and slow shutter; the same Professional Disc media used in the SD version of the XDCAM system is also compatible with the new HD version; users can record up to two hours of HD content on the versatile optical media.

800-686-SONY

www.sony.com/professional

BOOTH: C9618



FIBER-OPTIC HD CAMERA

Ikegami Electronics HDL-40 with Fiber Extension

Integrates the HDL-40 one-piece full-digital box-type HDTV camera with Telecast Fiber Systems' HD/POV fiber-optic video, audio and two-way data transceiver module; offers 1080i/60i or 720/60p image capture; uses fiber optics for transmission distances of 3mi or more; offers one-connector operation for HD-SDI camera output, as well as all camera controls and genlock.

201-368-9171; www.ikegami.com

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HDTV ZOOM LENS

Canon HJ18ex28B IASE

A lightweight, compact Super Telephoto portable HDTV zoom lens; features Canon eDrive technology; designed for portable cameras and aircraft, robotic camera mounts, TV trucks, and anywhere else that needs telephoto performance, small size and extreme light weight; weighs 5.7lbs.

516-328-5000

www.canonbroadcast.com

BOOTH: SU131



HD CAMCORDER

Panasonic AJ-HPC2000

A P2 DVCPRO HD 2/3in camcorder; is equipped with three HD resolution 2/3in CCDs and 14-bit A/D processing; offers dynamic range and low-light recording in 720p, 1080i HD or 480i formats; the 2/3in CCD imager allows the use of widely available professional-quality lenses and accessories.

201-392-4127

www.panasonic.com/broadcast

BOOTH: C2518

HDTV CAMERA

Hitachi DK-H31S

A compact, two-piece full HDTV camera built for demanding environments; provides full HDTV resolution in either 1080i or 720p formats due to the use of 2/3in CCDs; the small head is typically used for increased magnification optics (larger lens) inside robotic assemblies.

516-921-7200

www.hitachikokusai.us

Booth: C3926



HDTV STUDIO LENS

Fujinon HA27x6.5ESM

Features a long focal length and an extremely wide viewing angle magnification up to 27X and the widest angle at 6.5mm; features high optical performance, reduced flair, improved color balance, a reduction in operating noise, and a smaller size and weight than previous models; is available with Fujinon's Precision Focus Assist, which automatically corrects for minute focus errors.

973-633-5600

www.fujinonbroadcast.com

BOOTH: SU149

TAPELESS HD DNG

Ikegami Electronics

HDN-X10 Editcam HD

Features a non-tape-based recording system and 2/3in 2.1 megapixel CMOS sensors for superior picture quality and wide dynamic range; uses the Avid DNxHD mastering codec to deliver HD-resolution full-raster (1920 x 1080) images that can be edited in real time; features a data rate of 145Mb/s to capture images in the 1980/60i, 1080/24p and 720/60p HD formats on Ikegami's FieldPak2 recording media.

201-368-9171; www.ikegami.com

BOOTH: C3226

TRIPOD

Broadcast Microwave

Services Field-Coder II

A portable, modular tripod is mounted to the COFDM transmitter's base unit; includes a 1W digital transmitter and encoder with full COFDM DVB-T specifications; an optional external 4W PA and weatherproof power supply is available to allow the Field-Coder II to provide long distance links.

858-391-3050; www.bms-inc.com

BOOTH: C2326

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CAMERA SYSTEM

Grass Valley HD Wireless Camera System

Given a bandwidth of 55Mb/s to 75Mb/s, high-quality HD images can be transferred using JPEG 2000 with a latency of just one frame; ideal for intercutting HD images with cabled cameras in studio situations; offers reception across the sort of spaces required for typical sports and event coverage — up to 3280ft, with an optional roaming kit; is dockable with existing LDK 6000 series of HD cameras and the LDK 8000 HD camera.

503-526-8150

www.thomsongrassvalley.com

BOOTH: SU3500; SU2906



24P CAMCORDER

Sony HDW-F900R

Features a more compact and lighter chassis, HD-SDI outputs and new accessory boards for slow shutter, image inversion and downconversion with 3:2 pull-down; can take advantage of the optional video cache feature of Sony's HDW-730/750 camcorder series; features three 2.2 megapixel CCDs, 12-bit DSP; has the same optical axis as its predecessor model, with virtually identical image-making capabilities.

800-686-SONY

www.sony.com/professional

BOOTH: C9618

COFDM CAMERA-BACK TRANSMITTER

Nucomm Campac

A miniature 2GHz COFDM wireless camera transmitter; designed to deliver full broadcast quality in a small, lightweight and rugged aluminum case that fits on the back of a portable video camera; transmitter mounts to professional cameras using a standard Anton Bauer battery clip or Sony V clip.

908-852-3700; www.nucomm.com

BOOTH: C320

SOLID-STATE MEMORY DRIVE

Panasonic AJ-PCD20

A five-slot P2 solid-state memory drive; the P2 internal/external drive is designed for high-speed file transfer of 25Mb/s DVCPRO or 50Mb/s DVCPRO50 video into non-linear editing systems and servers; users can mount five 8GB P2 cards at the same time and have access to the contents on all five cards for continuous editing of recorded clips in sequence.

201-392-4127

www.panasonic.com/broadcast

BOOTH: C2518

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www.millertripods.com

CAMERA LIGHT
16x9 Lux-DV

A camera light that works with Sony camcorders of any size; is compact, low-profile and weighs less than 8.8oz when fully equipped with two barn doors, flip-out 5600°K dichroic filter and power cord; the 20W bulbs feature a built-in mirror and diffuser and employ IRC technology for 30 percent more efficiency.

818-972-2839; www.16x9inc.com
BOOTH: SU2917



HDTV LENS

Canon DIGI SUPER100xs

The Advanced Focus version of the DIGI SUPER100xs HDTV long-field lens; enables camera operators to instantly achieve exact focus at all times; provides full HDTV image quality while implementing an unprecedented control of focal length over the formidable range from 9.3mm to 930mm (1860mm with extender).

516-328-5000
www.canonbroadcast.com
BOOTH: SU131

CAMERA ZOOM LENS

Carl Zeiss Telephoto DigiZoom

Camera zoom lens; focuses to 22in from the image plane, 11in from the front of the lens; has the ability to focus tightly on objects as small as 66mm x 117mm, bringing them fully into frame in precise focus; industry standard-pitch zoom, focus and iris gears and brightly marked, oversized windowed cine scales are employed for ease of use and optimal compatibility with cine lens accessories.

818-841-9655; www.bandpro.com
BOOTH: SU2917

WIDE-ANGLE LENS
CONVERTER

Schneider Optics Century

An HD compact 0.8X wide-angle converter; features universal screw-on threads for easy installation; fits DV/HDV cameras such as the Sony HDR-FX1 HDV/HVR-Z1U, Panasonic AG DVX100A/B, Canon XL-2 and more; measures 1.14in x 3.54in at its broadest point; weighs 10oz; comes with a rectangular sun shade.

818-505-9865
www.centuryoptics.com
BOOTH: SU4122

BOOM POLE

M. Klemme Technology
Avalon Graphite

Boom poles constructed from high-quality graphite tubing; are durable and lightweight; five telescoping sections lock together via a captive collet for maximum holding power with minimum torque; each unit is fitted with the company's proprietary pole top equipped with cable retaining slots and a replaceable stainless steel threaded mounting stud.

760-727-0593
www.mklemme.com
BOOTH: N4011

HD SLOW-MOTION
CAMERA SYSTEM

Sony HDC-3300

A multiformat HD slow-motion camera for high-end studio and sports broadcasting; achieves 3X speed slow-motion effects in full HD resolution; can output normal speed signals simultaneously for live feeds through separate digital signal processing; includes three 2/3in high-speed progressive CCDs; enables recording at 1920 x 1080/180i or 150i, as well as 1280 x 720/180p or 150p.

800-686-SONY
www.sony.com/professional
BOOTH: C9618



HD CAMERA

Panasonic AK-HC1500

A compact, 1080i/720 switchable HD camera; compatible with all international HD standards; the multiformat camera weighs 3.3lbs; features a variable frame rate functionality and cine gamma curve, which is key to many special effects and sports-related applications.

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www.panasonic.com/broadcast
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212-983-5200
www.liveshots.com
BOOTH: C4815

CAMERA STABILIZING
SYSTEM

Sachtler Artemis DV Pro

A MiniDV, DV Cam, HD DV camera stabilizing system; optimized design adds just the right amount of inertia to professional lightweight cameras; enables a dynamic balance and gives operators full control of every movement.

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www.sachtler.com
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POWER SUPPORT SYSTEM
Anton/Bauer STASIS

A lightweight shoulder mount that redirects the geometry of a mini-DV camera to the body; improves the ergonomics and performance of a professional mini-DV handheld; the frame supports the camera weight; its adjustable front plate comfortably takes weight off the operator's hand.

800-422-3473
www.antonbauer.com
BOOTH: C5119A



TRIPODS
Miller Camera
Support Sprinter II

ENG tripods feature Miller Sprint-Loks — dual, side-action leg locks that let both stages of a two-stage tripod be adjusted independently using one hand; each leg has two Sprint-Loks, co-located on the upper leg clamp; features patented transport clips and a mid-level spreader, with adjustable center hub and telescopic extensions.

973-857 8300
www.millertripods.com
BOOTH: C5736

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CONVERTER
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9B11DA-C

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www.oxygendct.com
BOOTH: TBA

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CAMERA PEDESTAL
Vinten Vision Ped Plus

The successor to the company's Vision Pedestal; new features include camera balance developed from the Osprey range of pedestals, an increased payload of 30kg, and a manual pump and an inlet for use with an external supply; also features a pressure gauge for clear and reliable setup, a new detachable skid for improved overall stability and a revised wheel braking system that ensures a smooth rolling base at all times.

+44 1284 752121;
www.vinten.com
BOOTH: C5119C

LIGHT PEDESTAL
Vinten Osprey Light

A 40kg capacity pedestal; improves wheel/floor interface, using crab-only steering for creative shot development; has the ability to be broken down into skid and column modules; is easy to transport; can be pressurized in any location with its manual integral pumping system and also comes with standard four-bolt interface, allowing simple attachment of any flat base head or bowl adapter for spherical based heads.

+44 1284 752121
www.vinten.com
BOOTH: C5119C

CAMERA-MOUNT SYSTEM
Panther Broadcast Multi Mount Kit

Mounts cameras, lamps and accessories; features three powerful suction pads; achieves a payload of up to 80kg, depending on the application; the base plate allows users to mount a camera (3/8in), fluid head or even a remote head; users can also attach a Euro mount, which makes it compatible to many of the Panther accessories.

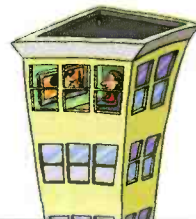
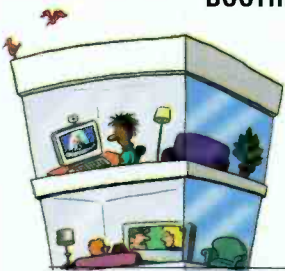
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CGS, PROMPTERS, CAPTIONING



PROMPTING EQUIPMENT *Vinten Vision* *iScript Systems*

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www.vinten.com
BOOTH: C5119C



CHARACTER GENERATOR *Harris Inscribe G3*

Part of the G-Series, the HD/SD-selectable character generator offers MOS and automation interfaces, real-time animation and 3-D FlyBy, multiple-format clips, and OverLay, which enables elements such as clocks, timers, tickers and time/temperature bugs to remain visible while messages and pages are being changed; customized and third-party applications, such as news tickers and school closings, can also run simultaneously on the system.

513-459-3400; www.harris.com
BOOTH: SU2929

CHARACTER GENERATOR OPTION *VertigoXmedia VxScaler*

Field-upgradable module for the VertigoXG character generator; provides high-quality upconversion and downconversion; enables simultaneous HD/SD output from a single box; with the module, VertigoXG can downconvert an HD source to SD, upconvert SD to HD, capture and SD source as an HD clip for inclusion in an HD project, and capture an HD source as a clip in SD or a different standards; uses a three-step process that includes motion estimation, de-interlacing and scaling at 10-bit YUV 4:2:2.

514-397-0955
www.vertigoxmedia.com
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Jeff Lovetinsky, Director of IT
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CG VIDEO AND AUDIO CLIP PLAYER **Pixel Power Clarity5000**

A dual-channel HD/SD switchable character generator; features a new video and audio clip player option that supports up to two streams of uncompressed HD video and key; the video clips can be used as full-frame backgrounds or passed through the internal 2-D DVE channels and composited with other graphic elements.

954-943-2026
www.pixelpower.com
BOOTH: SU4359

DVB-ASI INPUTS **VertigoXmedia VxASI**

An option for the VertigoXG character generator; provides four DVB-ASI inputs with real-time demuxing and decoding of MPEG-2 video and audio streams; the decoded video and audio streams are sent to the VertigoXG rendering and compositing engines as standard SDI or HD-SDI video inputs and can be fully branded, DVE'd, mixed and output as either SDI or HD-SDI signals.

514-397-0955
www.vertigoxmedia.com
BOOTH: SL4726

GRAPHICS, ANIMATION PRODUCTS

GRAPHICS PROCESSOR **Miranda Technologies Imagestore Intuition**

An SDI channel branding processor; features a new MPEG video/audio clip playout capability that improves the output of multi-level graphics over moving backgrounds; the MPEG clip playout can also be used for backup material in emergency situations; the automated character generator has been enhanced with multi-language support and soft shadows; the CG offers playout of text crawls, rolls and dynamic text layers.

561-400-3320; www.miranda.com
BOOTH: SU1341

INTERFACE **Autodesk Incinerator**

Web interface uses computing cluster technology to provide real-time Lustre capabilities for primary and secondary color correction; includes real-time visual effects processing at HD and 2K resolutions and accelerated 4K processing.

800-551-1490
<http://usa.autodesk.com>
BOOTH: SL3719



WORKSTATION GRAPHICS SYSTEM **NVIDIA Quadro FX 4500 SDI**

Graphics system has 512MB memory, 256-bit memory interface, a graphics memory of 33.6GB/s, PCI bandwidth and express graphics bus; features a rotated-grid FSAA and High-Precision Dynamic-Range technology; has improved pipeline color compression and early z-culling to increase effective bandwidth and improve rendering efficiency and performance.

408-486-2000; www.nvidia.com
BOOTH: SL591



COLOR CORRECTOR **eyeheight canalettoMDi**

High-quality digital color corrector is designed for 1920 pixel x 1080 line television signal formats; features 1.5Gb/s input/output HD-SDI SMPTE-274 with SDI auto-sensing; each R, G and B channel has individually controllable gain, lift and Gamma; adjustment of luma, chroma gain and black level is also provided together with hue correction.

+44 1923 256 000
www.eyeheight.com
BOOTH: SU147



COLOR CORRECTOR **Quantel Pablo**

The suite is comprised of turnkey software, hardware workspace and user interface single-vendor responsibility; available in HD, 2K or 4K configurations; features the company's new TimeMagic technology, 40TB of online workspace and high-speed background connections to SAN and NAS; brings together hardware and software-based color correction technologies in one system.

703-448-3199; www.quantel.com
BOOTH: SL1544

INTERCOM, IFB PRODUCTS



WIRELESS INTERCOM SYSTEM **HME PRO850**

Version 3.10 of the intercom system now features AC850 battery charger that charges up to four BAT850 NiMH rechargeable battery packs simultaneously in three hours; includes a new setup wizard; features include frequency agility, a PC and PDA interface, and simultaneous dual-channel interface.

800-848-4468
www.hme.com/proaudio.cfm
BOOTH: C9335



Color indicates advertiser

INTERCOM

Clear-Com Eclipse

1RU four-way VoICE VoIP interface frames operate back to back; provides up to four remote user panels intelligently linked backed to the matrix with all the functionality of a locally connected panel; has up to four intelligent trunk lines between remote matrix, systems; features up to four four-wire audio pairs and four asynchronous RS-422 data links.

510-496-6600
www.clearcom.com
BOOTH: C5119D

DIGITAL WIRELESS TRANCEIVERS

Eartec STx 1000

Allows up to four people to communicate simultaneously; the transceivers are not voice-activated, and there are no buttons to push; to operate, users turn the units on and talk through the headsets, just like on a wired intercom; features a range up to 1/4mi, rechargeable batteries and an eight-hour capacity; no base station or FCC license is required.

800-399-5994; www.eartec.com
BOOTH: TBA



HEADSET

HME ComLink

Wireless digital 2.4GHz all-in-one headset allows users to work in dark or small locations without the risk of snagging headset cables on other equipment; frequency hopping spread spectrum ensures secure communication through 64-bit encryption; no license required; is compatible with HME's portable DX100 or rack-mounted DX200 systems.

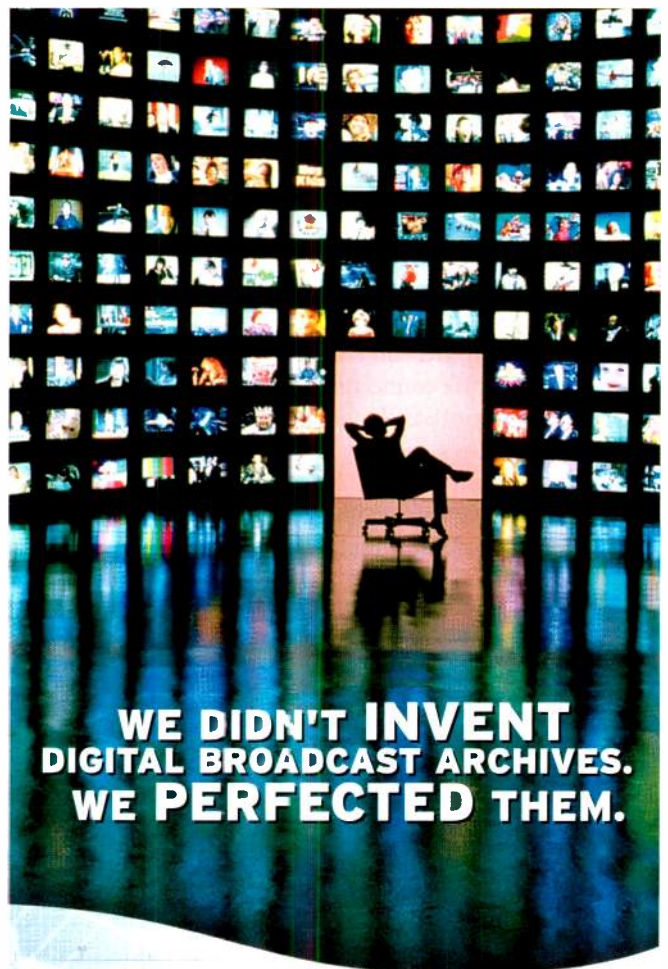
800-848-4468
www.hme.com/proaudio.cfm
BOOTH: C9335

INTERCOM INTERFACE

Riedel Connect Duo

Combines an ISDN S0 interface, allowing two simultaneous connections using two ISDN B-channels and an analog POTS telephone hybrid in a 1/2RU device; ideal for mobile units; fully compatible with all intercom systems; easily integrates to Riedel's Artist matrix intercom system; capable of remotely controlling panels via ISDN; can be configured directly from Riedel's Director software or optional Windows configuration software.

+49 202 292 90; www.riedel.net
BOOTH: C8507



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or visit us online at www.fpdigital.com.
US: 936.520.6042, International: +33 4 50 88 37 70
DIVAcomplete@fpdigital.com**

See us at NAB booth #SU 2236





INTERCOM INTERFACE
Riedel Connect IP

Provides intelligent and seamless intercom interfacing to IP-based networks; 19in, IRU unit allows for matrix-to-matrix connections, from matrix to control panels and distribution of audio lines over IP; converts one AES3-stream and can be configured to individual bandwidth needs; bandwidth is scalable, resulting in audio quality up to 20kHz at 230Kb/s; supports remote user control key panels.

+49 202 292 90; www.riedel.net
BOOTH: C8507

DIGITAL AUDIO MATRIX
Telex Communications
ADAM

Employs an AIO-16 input/output card, which offers 16 channels of audio and an individual VOX option per port; the card is also equipped with one data driver per port and can be operated with individual data drivers or in the existing multi-drop mode; with the card, it is possible to implement ADAMs with 272 ports in a single 7U frame, 512 ports in two frames or 720 ports in three frames; other features include two new master controllers, two clock masters and two specially designed power supplies.

952-884-4051
www.rtsintercoms.com
BOOTH: C4535

IPTV

SDI-TO-IP GATEWAY
Network Electronics
SDI-IP-GTW

For the transmission of uncompressed SDI over IP networks; allows the real-time contribution and distribution of SDI over WAN, where access to dark fiber or wavelengths is limited; provides standard compliant SDI-over-IP transport in accordance with Pro-MPEG Code-of-Practice #4.

800-420-5909
www.network-electronics.com
BOOTH: SU199

TRANSMITTER
Fox Electronics QoIP Cue
over IP Transport System

Provides primary and/or backup transport of your network cues and GPI switching commands; a cost-effective point-to-point or point-to-multipoint system that transports six independent network DTMF cue commands and six relays over IP; GPI relays can be tied to the DTMF cues or can be transmitted separately, providing up to six independent switches for equipment at one or more remote sites.

800-604-0301
www.foxelectronics.net
BOOTH: TBA

VIDEO NETWORKING
SOLUTION
Scopus Video Networks IP-
based video networking

Allows broadcasters and service providers to leverage a unified network infrastructure and, as a result, simplify network operations; based on a superior product portfolio that performs satellite reception, real-time encoding and headend video processing through IP networking.

609-987-8090; www.scopus.net
BOOTH: 4175



IPTV OPERATIONAL
MONITORING
Sencore IPTV Starter Kit

Pre-packaged solution for measurement and monitoring; addresses existing network and streaming services needs; helps determine suitability for IPTV services.

800-SENCORE
www.sencore.com
BOOTHS: SU3009 AND C3810

LIGHTING
EQUIPMENT

HMI LIGHT
ARRI ARRIMAX 18/12

Light combines the variable beam spread of a Fresnel and the light output of a PAR; uses a unique reflector concept for beam control that eliminates the need for spread lenses; optical system has 22.8in diameter specular; flatted reflector is adjustable; provides continuous focus from 15 degrees to 50 degrees.

845-353-1400; www.arri.com
BOOTH: C6926

DV BATTERY
ADAPTER PLATE
Litepanels DV Adapter Plate

A self-contained lighting source capable of running off of two standard Panasonic, Canon or Sony DV camera batteries; attaches easily to the Litepanels Mini head; snaps on to the back of the Mini Flood or Spot head; once the plate is secure, two batteries fit easily in place to power the fixture for up to eight hours.

818-752-7009
www.litepanels.com
BOOTH: C9618

DMX LIGHTING
Kino Flo Mega4Bank
DMX system

Can harmonize light levels in a fixture array or switch tubes independently of one another from a DMX control board; the system includes a fixture, mounting plate, extension cable and Mega4Bank DMX Ballast; the Ballast operates 4Bank fixtures, double fixtures, single fixtures and the company's Blanket-Lite; is designed to run on high output 8ft and 6ft True Match lamps.

818-767-6528; www.kinoflo.com
BOOTH: C6633





LIGHTING CONTROL SYSTEM

Matthews Studio Equipment ROAD FLAGS

Duplicates studio lighting effects on location or in the studio; consists of two easy-to-assemble frames, a single scrim, silk diffusion and solid flag packed into a lightweight case; its breakdown component design allows users to switch out light modification fabrics with ease, speed and cost savings.

925-735-9269

www.msegrip.com

BOOTH: SU4347

FLUORESCENT LIGHT

Videssence V168-442TT V-Beam

Produces 2.4 times more light using 25 percent less wattage and one-third fewer lamps than the previous V192-632TT V-Beam; is 99.9 percent aluminum with 95 percent reflectance; focuses the light of four 42W triple tube fluorescent lamps to provide a more powerful, even beam for key lighting in studio applications; is a 168W unit.

626-579-0943; www.videssence.tv

BOOTH: C7116

MICROPHONES, ACCESSORIES

WIRELESS MONITOR SYSTEM

Sennheiser Electronic 3250 Series

An upgraded version of its 3000 Series wireless monitor system, the new SRSR3254-U single-channel transmitter, SR3256-U dual-channel transmitter and EK3253-U body-pack receiver are compatible with the company's Evolution series wireless G2 monitor series; offer higher RF output levels and extended tuning capability.

860-434-9190

www.sennheiserusa.com

BOOTH: N1822

ANTENNA COMBINER

Sennheiser Electronic ASA3000

The 1RU active antenna splitter for multichannel wireless microphone systems combines up to 16 channels of Sennheiser 3000 Series receivers, configured as eight EM3031 single-channel, eight EM3032 dual-channel or EM3532 dual-channel true diversity receivers; operates across the entire UHF range from 470MHz to 870MHz or with selective filtering.

860-434-9190; www.sennheiserusa.com

BOOTH: N1822

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**DUAL-CHANNEL
ON-CAMERA
UHF RECEIVER**
Azden 200UPR

The 63-frequency UHF receiver operates in the 794MHz to 806MHz band; records the sound from two subjects simultaneously; is available in three pre-packaged systems, which include the receiver and two mic/transmitters; features a crystal-controlled PLL synthesis and a two-channel, 3mm, -58dB balanced mic-level jack; each channel has on/off switches, LEDs, group frequency selectors and dual high-gain antennas.

516-328-7500
www.azdencorp.com
BOOTH: N4218

DYNAMIC MICROPHONE
Beyerdynamic TG-X 48

Features a supercardioid polar pattern, an integrated pop shield to reduce pop noise associated with close vocal milking and high gain-before-feedback characteristics; rugged metal housing is coated with a soft lacquer on the barrel for optimal handling; comes with a microphone clamp and pouch.

631-293-3200
www.beyerdynamic-usa.com
BOOTH: N2412



MICROPHONE
Lectrosonics SM
(Super Mini)

A small professional audio wireless transmitter; when used in its native Digital Hybrid mode, it performs without the hindrance of an analog compandor or the headroom-limiting pre- and de-emphasis found in most analog systems; delivers 107dB signal-to-noise ratio and flat frequency response to 20kHz.

800-821-1121
www.lectrosonics.com
BOOTH: N3225

WIRELESS MICROPHONE
Azden 100LT

Offers 63 user-selectable channels in the 794MHz to 806MHz band; includes the 100UPR receiver and 10BT body-pack transmitter, both of which are housed in small, 3 7/8in x 2 3/8in x 13/16in cases, ideal for smaller digital cameras.

516-328-7500
www.azdencorp.com
BOOTH: N4218

WIRELESS MICROPHONE SYSTEM
Lectrosonics 200 Series

Includes a rack-mount diversity receiver, two compact receivers and two belt-pack transmitters; ideal in situations where RF interference is a problem.

800-821-1121
www.lectrosonics.com
BOOTH: N3225

DIGITAL WIRELESS MICROPHONE TRANSCIVERS
Zaxcom TRX900 and TRX990

Wireless microphones provide integrated audio recording, IFB receivers and time-code transmission; record up to six hours of audio directly to a Flash memory card and then transfer the .WAV files to either a PC or Mac for post-production; includes integrated audio recording, time-code transmission and RF remote control.

973-835-5000; www.zaxcom.com
Booth: N4227

MICROWAVE, FIBER-OPTIC, TELCO EQUIPMENT

TIME DIVISION MULTIPLEXER/DE-MULTIPLEXER
Network Electronics SDI-TD-MUX-4

Capable of time division multiplexing four SDI, DVB-ASI or SDTI signals into one HD signal; multiplexes in accordance with the SMPTE 346M-2000 standard; allows usage of a standard HD infrastructure for transport and switching of the multiplexed signal; both SDI and DVB-ASI are accepted synchronous or asynchronous and will be format-detected automatically.

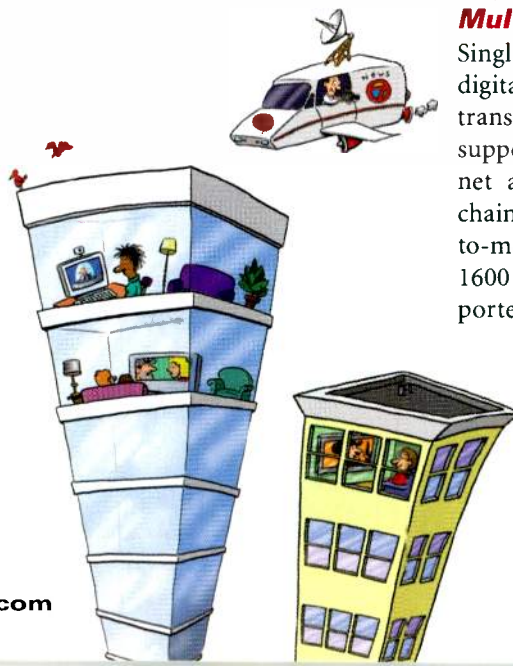
800-420-5909
www.network-electronics.com
BOOTH: SU199



FIBER-OPTIC TRANSPORT SYSTEM
Multidyne RGB-5000

Single-fiber, single wavelength, digital, RGB and UXGA fiber-optic transport system now offers CWDM support; provides 10-Base T Ethernet and bi-directional data, Daisy chain and Star capability for point-to-multipoint configurations, and 1600 x 1200 pixel resolution supported over one optical fiber.

516-671-7278
www.multidyne.com
BOOTH: SU1729



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DIGITAL SNAKE HEAD *Fiberplex LightViper VIS-4832*

Features 16 AES3 inputs (32 audio channels) via two 25-pin D connectors and four AES3 returns (eight audio channels) via one 25-pin D connector, with simultaneous line level analog outputs via a second 25-pin D connector; will pass 96KHz digital data natively; by syncing the unit with a 48KHz word clock, the system will pass 48KHz digital data as well; capable of passing both RS-422 and 10/100 Ethernet control data with optional accessories.

301-604-0100
www.lightviper.com
BOOTH: N2031

MULTI-IMAGE DISPLAYS



MONITORING SYSTEM *Zandar Technologies FusionPro+*

A signal monitoring system supporting all common formats, including composite video, SDI, HD-SDI, as well as RGBHV and DVI computer sources and audio; is highly modular with a range of plug-in interface cards enabling users to combine formats in one system; includes support for UMDs, tallies, clocks and time code.

+353 1 293 8966; www.zandar.com
BOOTH: SU1033



HDTV VIDEO AND AUDIO MONITORING *Zandar Technologies Predator HD8*

HDTV video and audio monitoring multiviewer system; features Zandar's new Z-Configurator user software and ZdH Zandar dual-head display facility; comes in a compact 1RU system; has eight auto-sensing inputs, allowing both HDTV 720p and 1080i formats and legacy SDI (270Mb/s) signals to be used together, bridging the migration to HDTV signal formats.

+353 1 293 8966; www.zandar.com
BOOTH: SU1033

MARCH 2006

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Whether you need analog audio, AES, intercom or even A-D and D-A signal conversion, there is an Adder system ready to handle any audio challenge. Up to 256 channels per fiber, at 24-bit resolution, with optical redundancy for quiet, reliable sound.



SHED/HDX and COBRA

For Triax and hybrid cabled cameras, we have solutions to liberate you from your heavy copper. SHEDs eliminate your costly hybrid cables on HD cameras, while Cobras replace triax on HD or SD camera systems...with ten times the distance.



VIPER I / SIDEWINDER

For 14 years the Viper and Sidewinder have supported ENG/SNG applications around the globe. The reel-mounted Sidewinder and Viper Mussel Shell are immediately familiar as the workhorse systems that have proven themselves in the most extreme conditions...day in and day out.



VIPER II

With small "throw down" modules that can be converted to rack mount, the Viper II is an expandable system that grows with your facility. Modules range from video/audio to Ethernet to robotic HD/POV, for incredible flexibility using simple building blocks.



COPPERHEAD HD/SDI

Our camera-mounted CopperHead makes light work of a wide range of applications, from news coverage to digital cinematography. Turn your ENG camera into a remote production camera, and avoid the cumbersome, expensive triax backs and base stations.



DIAMONDBACK II

Picking up where its predecessor left off, the DBII now offers 8 channels of broadcast-quality NTSC/PAL video on each wavelength. With optional audio and CWDM technology a huge backbone can be implemented on a single optical core.



Save time on your event production schedule. On a single lightweight cable we support all your broadcast signals from the field and the booth to the truck. From Telecast, the leader in fiber for television broadcast production.



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**MULTI-IMAGE
DISPLAY PROCESSORS**
e-mediavision.com
X-View Series

Processors start from four input quads to 32-input display systems; monitor and view input signals such as composite video, SDI, HD-SDI, computer and IP streams on large screen display walls; integrate with the X-Com remote management and control plug-in to enable remote management via IT network infrastructure for local or remote sites.

+44 208 755 2014
www.e-mediavision.co.uk
BOOTH: TBA



**16-CHANNEL
MULTIVIEWER**
FOR-A MV-16S

Supports analog composite and SD-SDI mixed inputs; the viewer can be set to divide the screen in many ways, such as 4, 5+1, 8+1, 9, 12, 12+1 or 16 sections; enables the combination of small and large images; an optional UXGA or DVI output is available, which is well-suited for displays on large-sized screens.

714-894-3311; www.for-a.com
BOOTH: C3210

LCD MONITORS
NEC MultiSync 90 Series

LCD desktop displays that use advanced technologies, including in-plane switching and vertical alignment LCD module technology; the "i" models, which use IPS-based modules, address color critical needs and include the 19in MultiSync LCD1990SX_i, the 20in (20.1 viewable) MultiSync LCD2090UX_i and the 21in (21.3 viewable) MultiSync LCD2190UX_i monitors.

866-NEC-MORE
www.necdisplay.com
BOOTH: C9811



**MULTI-IMAGE DISPLAY
PROCESSOR**

Miranda Technologies
Kaleido-Alto HD

Features multiple new HD monitoring capabilities; now offers advanced video and audio probing, including signal black, freeze and luminance too high, audio presence, overload, mono and out of phase alarms; the alarms can be reported on-screen or via SNMP to other monitoring devices; can be combined with the new Allegro RGB real-time, MPEG-4 streaming encoder to provide 10-channel remote monitoring and production over IP.

561-400-3320; www.miranda.com
BOOTH: SU1341



HD/SD LCD MONITOR
Panasonic BT-LH2600W

A 26in production-quality LCD monitor; features a true widescreen panel, one-piece design, high resolution, low delay and standard HD-SDI/SDI with embedded audio; features increased resolution (1366 x 768), pixel mapping of any of five areas of the screen for superior camera focusing, audio level meters superimposed and translucent (up to eight channels), and an 80 percent (of 4:3) safe-area frame marker in 16:9 mode.

201-392-4127
www.panasonic.com/broadcast
BOOTH: C2518

HD MONITOR
Marshall Electronics
TFT-MegaPixel

Provides high-pixel density for 10.4in to 3.5in displays in one-, two-, three- and four-screen configurations; newly developed proprietary technology delivers a completely digital image process onto each screen; features improvements in brightness, contrast ratio and viewing angles; configurations are available with HD-SDI, SDI, DVI, component HD/SD and composite video inputs; all models feature screens calibrated to SMPTE/IBU standards for color gamut and color temperature.

310-333-0606; www.lcdracks.com
BOOTH: SU4355

**NEW MEDIA,
STREAMING
PRODUCTS,
MULTIMEDIA/
INTERNET**



**MODULAR RECEIVER
DECODER**

Sencore Atlas MRD 3187

Is a 1RU chassis that supports up to two decoders; with eight available I/O slots, it can be configured either as a single-eight slot or as two independent four-slot modular receiver decoders; is available with a wide range of interfaces, including: QAM/8-VSB, DVB-S2, COFDM, 10/100/1000 Ethernet, SD/HD-SDI, NTSC and PAL; features a Web-based client and multicast unit management system.

800-SENCORE
www.sencore.com
BOOTHS: SU3009, C3810





ENCODER

Vela Argus 200/250

Supports the MPEG-2 and MPEG-4 (ASP) encoding profiles; both boards encode a variety of resolutions, from SIF to full-resolution MPEG-2 and MPEG-4 formats; features an embedded hardware stream processor, resulting in system resource savings and increased efficiency.

727-507-5367; www.vela.com
BOOTH: SL2936

INTEGRATED ENCODER

Axon Digital Design DDE51

Hot-swappable modular Dolby Digital encoder has 18 encoders in a 4RU enclosure; features dual redundant supply.

+31 0 13 511 6666; www.axon.tv
BOOTH: SU1414A

VIDEO TRANSPORT

Streambox SBT3-7500 ACT-L3

The encoder solution is built on Streambox's ACT-L3 codec and advanced proprietary video compression technology; is integrated in one compact portable device that features a lower power requirement to flexibility of mobility without sacrificing broadcast-quality video; matches MPEG-2 video quality at a 75 percent lower data rate and is up to 50 percent more efficient than MPEG-4.

206-956-0544
www.streambox.com
BOOTH: SL581

DECODER

Radyne Tiernan HD4040

HD and SD decoder offers simultaneous HD/SD, 4:2:2 or 4:2:0; is available in several different configurations; offers video audio front-panel confidence monitors; has up to eight audio channels with analog and digital outputs; includes QPSK as standard with 8PSK and DVB-S2 as options; includes Web-browser control and front-panel video display; upgradeable to HD if bought with SD only.

602-437-9620
www.radynecomstream.com
BOOTH 2033

SD/HD MPEG-4 ENCODER

Snell & Wilcox MEMPHIS

The compression scheme is made through the company's Ph.C phase correlation motion estimation and Prefix compression pre-processing; a new 3RU version is available; can be initially integrated as a conventional encoder into a traditional ingest-for-playout environment and later upgraded into a fully configured ingest workstation for use in an IT-based infrastructure.

212-481-2416; www.snellwilcox.com
BOOTH: SU156



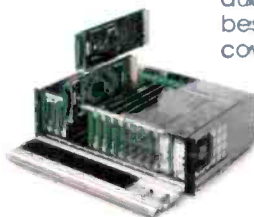
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with Vistek from Pro-Bel

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- Modular Infrastructure
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VIDEO ANALYSIS SOFTWARE
Inlet Technologies
Semaphore

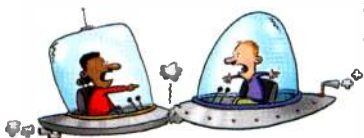
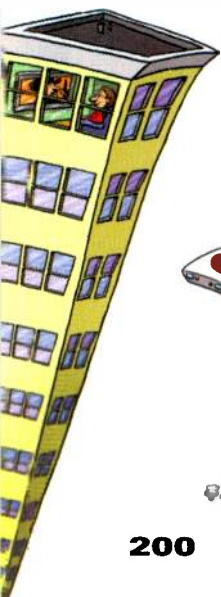
Supports both SMPTE standards for advanced encoding; new customizable parameters and alerts allow for a higher level of automated control in the encoding process; prior to encoding, a user can set job-specific parameters with alerts that will warn them if any part of the encode goes outside of these settings.

919-856-1080; www.inlethd.com
 BOOTH: SL3803

PORTABLE STREAMING MEDIA ENCODER
ViewCast GoStream

Uses ViewCast's Osprey video capture cards to convert SD video content to multiple streaming media formats for delivery to Internet audiences; EZStream buttons allow users to pre-define encoding profiles for a specific event and simply select the button, followed by the Start button, to begin a streaming session.

972-488-7121
www.viewcast.com
 BOOTH: SL2840



POWER PRODUCTS, BATTERIES, GENERATORS

BATTERY POWER SYSTEM

Anton/Bauer
QR-JVC 7/14HDV

A Gold Mount power system to be used with the JVC GY-HD100 camcorder; supplies the proper regulated operating voltage to the GY-HD100 camera while providing the ability to use standard 12V video accessories, all powered from the same battery.

800-422-3473
www.antonbauer.com
 BOOTH: C5119A

MULTI-CHEMISTRY BATTERY CHARGER

IDX Technology VL-4Si

Advanced battery charger system handles up to four Li-Ion, NiCd or NiMH batteries simultaneously; LCD display monitors battery condition; direct USB PC interface; charges NP-style batteries with A-E2NP adapter; quick charge at 3A for one to three channels or 2.3A for four channels.

310-891-2800; www.idx.tv
 BOOTH: C4235, SU143



CAMERA BATTERIES
IDX Technology ENDURA System Batteries

The four new Li-Ion V-Mount battery packs include the 98Wh E-10 (with PowerLink) and E-10S and 71Wh E-7 (with PowerLink) and E-71S; the PowerLink system allows two E-50/E-80/E-10 V-Mount batteries to be stacked together on a camera back, allowing for longer runtimes and on-camera lights without a battery belt.

310-891-2800; www.idx.tv
 BOOTH: C4235, SU143



TWO-CHANNEL CHARGER
PAG V2

Designed for PAG and Sony V-Mount Li-Ion batteries; features a tough but lightweight moulded-construction; fits easily into a camera bag, making it ideal for location use; offers PAG ACS software, which is designed to extend the battery cycle life.

818-760-8285
www.paguk.com
 BOOTH: C8515

UNINTERRUPTIBLE POWER SUPPLY
Staco Energy Products
FirstLineUPS

For 10kVA, 15kVA and 20kVA sizes; has a standard battery run-time of more than eight minutes, with optional batteries for virtually unlimited run time; front-end harmonic correction eliminates the need for additional filtering.

937-253-1191
www.stacoenergy.com
 BOOTH: C107

PRODUCTION SWITCHERS, VIDEO EFFECTS, KEYERS

KEYER
eyeheight keyEyesMDi

HD downstream linear keyer features background, fill and key inputs; incorporates all the facilities required for generating HD matte overlays; fill and key inputs with adjustable horizontal timing are provided; includes matte generators, wipe, independent main and preview keyers, and EDH re-insertion for the main output.

+44 1923 256 000
www.eyeheight.com
 BOOTH: SU147

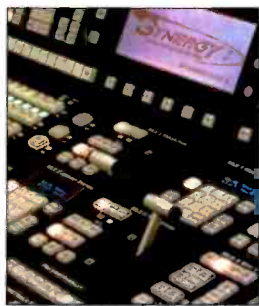
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**SD/HD PRODUCTION
SWITCHER VIDEO EFFECTS**
Snell & Wilcox IMPAKT

A 3-D DVE option for the company's Kahuna production switcher; Kahuna now offers up to four twin-channel 3-D DVEs that users can apply in either SD, HD or both; work in source-based or bus-based modes; allows background and fill-and-key manipulation; provides a variety of powerful effects including spheres, slabs, zooms, warps, tiling, ripples, rolls and peels, fragmentation, lighting effects, and corner pinning.

212-481-2416
www.snellwilcox.com
BOOTH: SU156



**DIGITAL PRODUCTION
SWITCHERS**
Ross Video Synergy SD

Version 16 of the switcher includes additions to the array of device control interfaces, operational enhancements and support for the latest version of the Ross OverDrive; added device interfaces include Avid Airspeed and EVS maXS servers, and Canon and Sony robotic cameras.

613-652-4886
www.rossvideo.com
BOOTH: SU1356

HD CHROMA KEYS
Crystal Vision Safire HD

Modular chroma keyer works with all HD formats as well as SDI; features additive and multiplicative keying; allows areas of the final picture to be a mixture of both foreground and background; control options include the Safire Controller 2RU control panel and the Statesman PC control system.

954-788-3334
<http://crystalvision.tv>
BOOTH: C7912

SD SWITCHER
Grass Valley Kayak SD

Designed for organizations that want to create SD content today and HD in the future; features all the power of a Kayak HD system; can be made HD-capable via an easy software upgrade.

503-526-8150
www.thomsongrassvalley.com
BOOTH: SU3500, SU2906

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SD/HD VIDEO PRODUCTION SWITCHER

Snell & Wilcox Kahuna

New features include compact versions of the 1-M/E, 2-M/E and 3-M/E control panels, as well as a micro control panel; the new compact 2M/E and 3M/E panels enable users to integrate the switcher in space-constrained environments; the new Kahuna 1M/E and micro panels provide the ability to have a specialist operator control the output from larger systems during a live event, or to operate specialized equipment such as the Kahuna IMPAKT DVE.

212-481-2416
www.snellwilcox.com
BOOTH: SU156

ADVANCED MEMORY SOFTWARE Broadcast Pix Scripts

Designed for Broadcast Pix's line of production switchers, which features a built-in graphics system and clip store; scripts take advantage of this tight integration by recalling not only key settings, but also the exact clips, titles and animations to fill the keys; can be extended to control camera position and lens, as well as video servers.

781-221-2144
www.broadcastpix.com
BOOTH: SL2400

SWITCHER Laird Telemedia LTM-DV4X1A

Accepts DV IEEE 1394 inputs from up to four DV devices, such as VTRs, cameras or NLEs; will lock and switch any of the four sources glitch-free; devices used do not have to be genlocked or synchronous; allows insertion of external audio in to the DV stream from either a line level or microphone source.

845-339-9555
www.lairdtelemedia.com
BOOTH: SL3769

SWITCHER OPTION

Grass Valley MatchDef

Provides a series of internal high-quality video input scalars; allows users to work in mixed formats while creating a consistent look for their productions; gives Kayak HD and Kayak SD operators the ability to seamlessly insert SD sources into and HD production, HD sources into and SD production and/or to cross-match dissimilar HD formats into either an HD or SD project.

503-526-8150
www.thomsongrassvalley.com
BOOTH: SU3500, SU2906

SATELLITE EQUIPMENT, SERVICES

REMOTE SNG SYSTEM Stratos Global Stratos Mobile Media System

Based on Inmarsat's Broadband Global Area Network (BGAN) mobile satellite service; includes a low-cost and lightweight BGAN satellite terminal/antenna, handheld video camera, voice handset, power adapters, batteries, cables and laptop PC; offers IP data speeds of up to 492kb/s; offers broadband data with simultaneous voice through a single, portable device.

708-457-2508
www.stratosglobal.com
BOOTH: SU3006, C9843



DEMODULATOR

Radyne Tiernan DD240XR

Digital video broadcast demodulator offers DVB-S and DVB-S2; features data rates up to 144Mb/s for DVB-S and up to 80Mb/s for DVB-S2; offers QPSK, 8PSK and 16QAM operation; has built-in M&C for field upgrades.

602-437-9620
www.radynecomstream.com
BOOTH 2033

DECODER/DEMODULATOR

MRC MRX4000

When connected to an existing CodeRunner 4 central receiver, the integrated demodulator/decoder leverages existing technology to provide integrated functionality; supports new and old FCC band plans for both analog and digital transmission; full BAS enhancements are available for CodeRunner 2 ENG transmitters.

800-490-5700
www.mcrbroadcast.com
BOOTH: C2007

OUTDOOR TWT AMPLIFIER

MITEQ/MCL MT2300

Weighs less than 32lb; is available for Ku-Band applications at 125W; 200W will be available in the future; features an event log and continuous attenuator adjustment in dB; can be customized to include such options as an L-Band block upconverter and an internal linearizer; redundancy is available in 1:1 and phase combined configurations.

630-759-9500; www.mcl.com
BOOTH: C5145

SATELLITE NEWSGATHERING

Scopus Video Networks DSNG E-1720

The encoder modulator with integrated L-Band upconverter features modulation and upconversion in 1RU; provides broadcast quality of 70/140 IF and 950MHz to 2150MHz L-Band outputs as well as a separate L-Band monitoring output; supports various satellite modulation schemes in the form of QPSK/8PSK/16QAM.

609-987-8090; www.scopus.net
BOOTH: 4175



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HIGH-SPEED DATA TRANSFEROR

BMS Digital Media Transport

Offers extended network capabilities to mobile ENG field units using the BMS Truck-Coder II digital microwave system; transmits recorded video files back to the studio while you're live on the air; sends pre-recorded program segments as files to the studio over the digital radio link; these files can be sent simultaneously with live video and audio using unused bandwidth capacity.

858-391-3050; www.bms-inc.com
BOOTH: C2326

TRANSMITTER

BMS Truck-Coder II

COFDM digital transmitter has 100 available presets that can be entered through front-panel controls or downloaded through a front-panel Ethernet port; indoor component is a single-unit, rack-mounted controller; outdoor component is an antenna-mounted RF unit configured to operate in the 2GHz frequency band.

858-391-3050; www.bms-inc.com
BOOTH: C2326



SD ENCODER

Scientific-Atlanta D9034

An MPEG-4 SD encoder; supports both MPEG-2 and MPEG-4 part 10 (H.264) video together with MPEG-4 Picture-In-Picture video services in the same chassis; features adaptive motion compensated temporal filtering with PreSightPlus noise reduction and integrated frame synchronizer.

770-236-6609
www.scientificatlanta.com
BOOTH: SU1608



MARCH 2006

CHANNEL RECEIVER

Modulation Sciences PRO-3

Delay corrected PRO Channel generator; offers three independent solutions to correct delay introduced by the advent of digital ENG; includes selective calling, main channel push-down and antenna diversity, front-panel tenability, four user presets, a DELcor channel and the DELiminate squelch.

800-826-2603; www.modsci.com
BOOTH: C118

Zandar

TECHNOLOGIES

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Zandar Technologies is a world leader in the provision of multi-window display solutions - with everything from simple screen splitters to advanced visual display systems. The virtual monitor wall concept is proven - don't be left with an outdated monitor stack, when you can have a display wall that is configurable, dynamic, and controllable. We have product to match your specific input sources, for display devices from CRT to rear projection, with extensive control options & interfaces. With Zandar you can be sure of excellent image quality, unsurpassed system flexibility and genuine value.

- Fusion Series:** Modular 3RU (26 inputs) and 1RU (8 inputs) racks; input cards for composite video/YC, SDI, HD-SDI and VGA sources; high resolution RGBHV output.
- Predator Series:** Fixed configuration solutions for 4, 12 or 16 video inputs; selection from composite video, YC, SDI or HD-SDI inputs; RGBHV output.
- DX Series:** For 4, 8, 12 or 16 composite or SDI video inputs (auto-detecting); high quality composite, component, SDI and VGA outputs.
- MX Series:** For 4, 8, 12 or 16 NTSC or PAL inputs; composite, component or VGA outputs; preset layouts or custom layouts on request.

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- Command & Control
- Security & Surveillance
- Broadcast Multi-video
- Mosaic & Interactive Channels
- Audio Visual Presentations
- Video-conferencing



FusionPro



DX



Predator

HEADQUARTERS:

Bracken Court, Bracken Road,
Sandyford, Dublin 18, Ireland.
Tel: +353 1 2938 966 Fax: +353 1 2936 955
E-mail: sales@zandar.com

US OFFICE:

1970 E. Osceola Parkway, No. 330,
Kissimmee, FL 34743, USA.
Tel: 321 9390 457 Fax: 321 9390 458
E-mail: advancedms@msn.com

WWW.ZANDAR.COM

Visit us at NAB Booth #SU1033

broadcastengineering.com

203

STUDIO, FACILITY SUPPORT PRODUCTS

COAX PATCHING SYSTEM *ADC High-Density Coax*

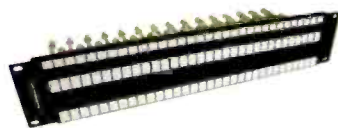
A high-density patching system designed for AES audio, 5.1 and 7.1 audio applications where coax medium is preferred but space is critical; the 1.5 rack space panel features 4 x 48 coax ports (96 circuits) with a patent-pending switchable termination feature that allows the user to select or deselect a 75Ω termination function on each circuit pair.

800-366-3891; www.adc.com
BOOTH: C6526

MATRIX SWITCHER Extron Electronics MVX Plus 128 VGA A

A 12 x 8 matrix switcher for VGA and stereo audio; combines the performance of a wideband matrix switcher with the convenience of 15-pin HD VGA style connectors.

714-491-1500; www.extron.com
BOOTH: TBA



MONITOR CIRCUIT VIDEO PATCHBAYS *Switchcraft MVPM*

Monitor circuit video patchbays that offer performance in high-density panels; a single row of isolated single jacks allows for the monitoring of signals without interrupting the signal path; panels are available in 1RU, 1.5RU and 2RU versions; all panels meet SMPTE 292 specifications.

773-792-2700
www.switchcraft.com
BOOTH: C9316

CONTROLLER *ESE ES-700 Series*

Programmable event controllers provide several contact closure outputs at predetermined times; compares SMPTE, IRIG and ESE time code depending on model; is available with thumbwheel, keypad or PC interface; standalone clock or timer comparators are also available.

310-322-2136; www.es-web.com
BOOTH: C1639

TALLY MAPPER Videoframe 96-FlexGPI VF0073

Tally router features relay outputs; routes GPI tallies to different venues, studio setups or technical directors; point and click to create multiple maps on Windows PC, and upload them to the unit to reconfigure; PC connects via RS-232 serial or over TCP/IP 100Base-T Ethernet; includes an SNMP agent for monitoring the optional redundant power supply.

530-477-2000
www.videoframesystems.com
BOOTH: SU5164

PATCHING SYSTEM *ADC UniPatch GigE*

A professional grade normal-through Gigabit patching system; features a high-density 32-port normalled through card frame system to patented ADC-Krone Direct-Edge LSA plus termination system; uses a Mil Spec switching contact and is rated for 30,000 insertions/withdrawals.

800-366-3891; www.adc.com
BOOTH: C6526

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SWITCHERS

Brick House Video Callisto

SDI/composite switchers feature a new audio module that provides silent audio switching with cross fade options; Callisto-F incorporates push button controls on the front panel as well as a standard control interface to allow direct operation without the need for a remote control panel.

+44 1962 777733

www.brickhousevideo.com

BOOTH: SU230



SIGNAL INTEGRATION SYSTEM

Ensemble Designs Avenue

An expandable, modular tray-based signal integration system; housed in a 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, protection switches and more.

530-478-1830

www.ensembledesigns.com

BOOTH: SU2997

ANALOG MATRIX SWITCHERS

Avocent Matrix KVM

Supports consolidated control of multi-user, multi-rack server environments; provides end-to-end Cat 5 connectivity for access from the server to the desk; feature full-system management with an advanced Java-based administration tool, optimal video resolution and a patented OSCAR on-screen graphical interface; the switching solution includes four KVM switchers and three user stations.

800-275-3500

www.avocent.com

BOOTH: SU4572

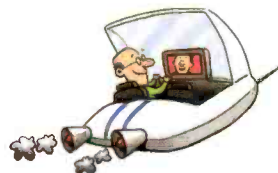
ALARM MONITORING SYSTEM

Pharos Communications Pharos Exception

Designed for use in television production studios, MCR environments, post-production facilities or playout centers; provides notification of alarm monitoring signals from third-party equipment; incoming signals can be grouped, time-masked and forwarded to a predefinable list of users at their workstations or via the Web-based Pharos Information center.

+44 118 950 2323; www.pharos-comms.com

BOOTH: UK PAVILION



LightViper In The Real World

Super Bowl Pre-Game Show • Jacksonville, FL • Production by Audio Specialties



February 2005 & 2006: For six days leading up to the Super Bowl, live broadcast of the *Best Damn Sports Show Period* streamed live audio to Fox SportsNet, then went live to Fox Television before the game on Super Bowl Sunday. Audio Specialties of Burbank, CA deployed the portable fiber optic LightViper system to handle the audio feeds.

"I was extremely pleased with how well the LightViper performed in this high-profile network TV live broadcast situation. The main fiber run to the F & F Productions High-Def broadcast remote truck was approximately 1,000 feet away from the venue's live stage and we also needed to provide a separate monitor split from the LightViper system for the audience. The audio quality was excellent; we used all 32 mic inputs on the head end of the snake system.

"The LightViper digital snake elegantly solved one of our larger planning headaches for this show which was the long run to the broadcast truck's distant location. The terminations into both Yamaha digital consoles for live PA and audio master control in the remote truck went without a hitch; the new optical audio path was 'invisible' and performed flawlessly. I can't imagine doing a critical job like this now with a conventional copper snake.

"LightViper also saved us a lot of time and we all know what that translates into."

—Steve Cormier, Audio Specialties,
Burbank, CA



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www.lightviper.com • 301.604.0100
sales@lightviper.com

sound@the speed of light
LightViper
FIBER OPTIC AUDIO SNAKE



IDENTIFIER
eyeheight TB-12

Multichannel source identifier is operated via a panel of 2 x 12 user-legendable pushbuttons; can be used with an eyeheight playout system or to control a third-party crosspoint matrix; channel names can be edited, saved and uploaded to an eyeheight MW-3E switcher module, enabling the system to recall and display the correct source idents whenever the panel acquires a different channel.

+44 1923 256 000
www.eyeheight.com
BOOTH: SU147

MONITORING SYSTEM
Barco networked broadcast monitoring system

Allows facility-wide distribution of video sources, supported audio and associated metadata over a standard IP network; unlimited sources can be networked to an unlimited number and type of displays, with each display's graphical layout customized to accommodate each user's dedicated requirements.

678-512-6100; www.barco.com
BOOTH: SL3738

TECHNICAL FURNITURE SYSTEM
TBC Consoles IntelliTrac

Front and rear device tracks allow unlimited lateral positioning of critical monitors; rack bay turrets may be easily upgraded or relocated, allowing quick, user-friendly modifications; a full range of articulating arms for distance, height and tilt control may be used for mounting flat panel monitors, speakers, phones and task lighting.

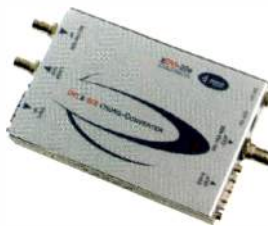
631-293-4068
www.tbconsoles.com
BOOTH: SU1390

TECHNICAL FURNITURE
Forecast Consoles
MASTERail

Designed to offer infinite potential layouts and design configurations; universal mounting system allows for random placement of all monitors, EIA rack boxes, speakers, script stands and special-purpose devices anywhere along the length of the console.

800-735-2070
www.forcast-consoles.com
BOOTH: SU146

TBCS, FRAME SYNCS, CONVERSION EQUIPMENT



VIDEO CONVERTER
Doremi Labs XDVI

Multiformat converter for DVI, SDI, VGA and HD-SDI; converts any input to any output; converts computer DVI (or VGA) output to HD video; provides high-quality HDTV upconversion and HDTV crossconversion by converting between any SD or HD format to its HD-SDI video output.

818-562-1101
www.doremilabs.com
BOOTH: C5712

VIDEO PROCESSOR
Axon Digital Design HXT10

Video processor is an HD combined frame synchronizer, 16-channel embedder and ultra-high-quality down-converter; enables simultaneous feeding of HD, SD with embedded audio and composite transmissions in the transmission output module.

+31 0 13 511 6666; www.axon.tv
BOOTH: SU1414A



VIDEO COMPRESSION TOOL

Inlet Technologies Fathom

Enables advanced encoding of SD and HD content in real time; software is optimized to integrate with the existing workflow infrastructure of VOD and offline content creation applications in the post-production market, facilitating the transition to HD; facilitates content creation and distribution with smaller file sizes and higher-quality output in a short amount of time.

919-856-1080; www.inlethd.com
BOOTH: SL3803

CONTROL PANEL
Videoframe VTECS VF0054

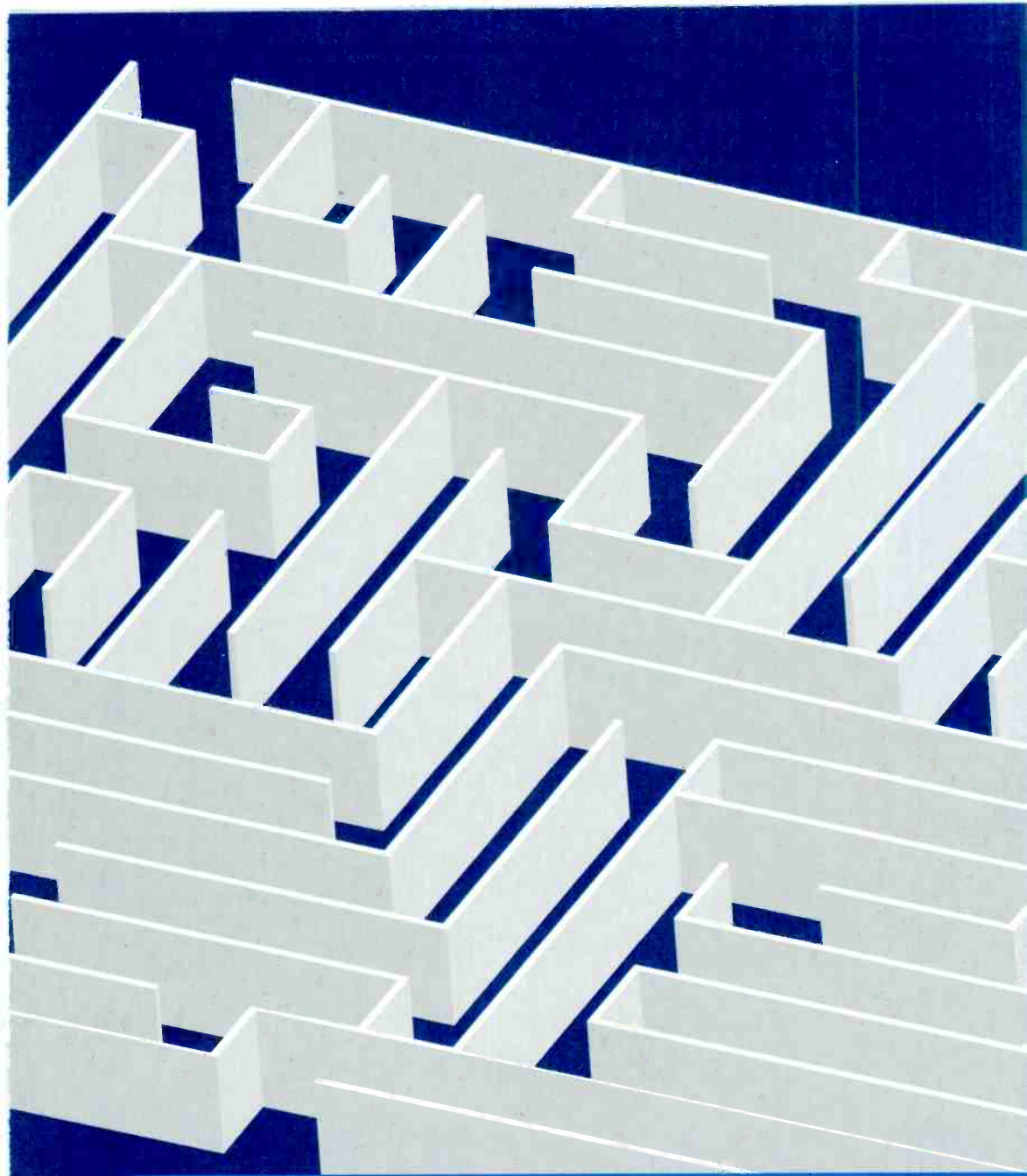
An intelligent knob-per function frame sync or proc amp control panel for master control splash or QC positions; controls interface and processing equipment from multiple vendors using VNODE interface; interfaces with router to follow the X-Y panel or to cause monitors at the QC station to follow this panel; panel allows multiple pages of controls per router source or processing channel.

530-477-2000
www.videoframesystems.com
BOOTH: SU5164

CONVERTER
Convergent Design
HD-Connect LE

Integrates video, audio, time-code and deck control into one effective box; the portable unit offers the features of conversion to HD or SD, allowing users to output to a wide variety of formats; features two modes of deck control: RS-422 to 1394 and 1394 to RS-422.

719-661-3388
www.convergent-design.com
BOOTH: C10845



OVERWORKED NEWS WORKFLOW

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"We thoroughly surveyed the market and found no other competing product to be as comprehensive, easy to install, or attractively priced as the Précis solution from BitCentral."

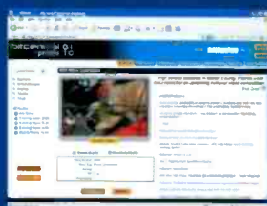
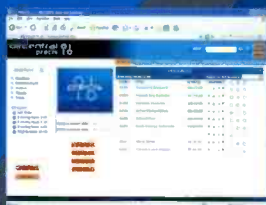
Dan Billings, Director of Engineering and Technology,
Waterman Broadcasting

"Précis doesn't just digitize the workflow,
It redefines the workflow."

Craig Porter, Chief Engineer Channel 4, San Francisco



Straight to Précis



Should You Be Next?

These stations have already gone straight to

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KDRX KVAL

KTMD KPIK

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WZVN WNCN

WTAP WVIR

KECI KMTR

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NAB Booth #SL 2158

www.precis.tv

OASIS*

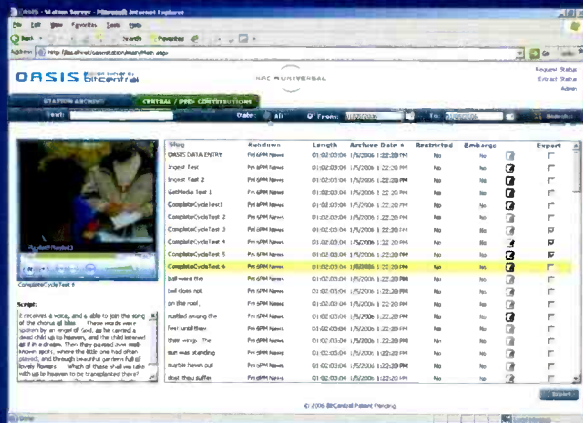
Video Archive and Sharing Solution

- Cost effective online archives for Avid
- Cost effective online archives for Grass Valley
- Cost effective online archives for just about any other news system

BitCentral's OASIS enables proprietary formats from various vendors to be archived at a cost less than broadcast tape stock. No need for expensive proprietary storage systems that restrict you going forward. Your video is automatically archived with scripts etc. and is immediately searchable and viewable through a browser interface.

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BitCentral's OASIS also enables news broadcasters to easily share and repurpose their content. OASIS enables news operations utilizing systems from various vendors to easily share content with only a click of a mouse. This ideal solution positions local station's current and archive media to be instantly searchable and retrievable.



* Patent Pending



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TBC CONTROL SYSTEMS
Ensemble Designs
TC400D and CP10

Controls video, chroma, setup, hue and timing of digital and analog VTRs, TBCs and frame syncs; built-in networkability; any size system can be achieved with control of any VTR from any control panel; TC400D provides control of the proc-amp functions of four VTR TBCs; features hands-on control of levels and timing.

530-478-1830

www.ensembledesigns.com

BOOTH: SU2997



BIDIRECTIONAL CONVERTER
Blackmagic Design
Multibrige Extreme

Bidirectional A/D and D/A converters allow editor to switch seamlessly between HD and SD material; supports dual-link HD-SDI 4:4:4; converts analog equipment to SDI-based systems by simultaneously converting from D/A and A/D; supports Windows XP and Mac OS X.

702-257-2371

www.blackmagic-design.com

BOOTH: SL3791, SL3985



SDI-TO-ANALOG CONVERTER WITH GENLOCK

Ensemble Designs
BrightEye 15

SDI video input signal is converted to analog composite and then synchronized to the reference signal; analog composite output is timed with respect to the reference, including ScH phase.

530-478-1830

www.ensembledesigns.com

BOOTH: SU2997

SD/HD FRAME SYNCHRONIZERS
LYNX Technik P VD 5600 Series

Includes a range of multiformat SD/HD frame synchronizer products; offer single- or dual-channel functionality on a single card with optional firmware plug-ins to add up-, down- and crossconversion capability into each frame synchronizer; offer programmable video delay, full video and audio proc with support for embedded and external AES; fit into existing LYNX 2RUs and are fully compatible with the LYNX control system.

+49 6150 18170

www.lynx-technik.com

BOOTH: C9246

CONVERTER
Teranex Mini

Handheld, portable DTV format converter converts SD video to and from HD in real time; enables HD field monitoring and conversion of SD camera and graphics sources to HD; has SD/HD-SDI inputs and outputs along with optional DVI, analog component and HDMI outputs; may be used to feed a VTR, display or video projector.

407-858-6000

<http://teranexlive.dimentians.com>

BOOTH: SU4983

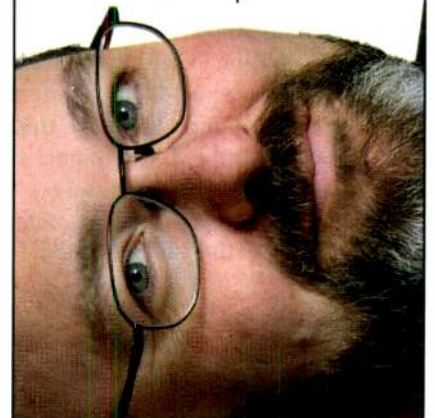


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empowering creativitySM

"I've spent half my career in pursuit of the perfect signal-based workflow. Now the folks upstairs want data-based."

Thank goodness I found these guys."



learn more at: empoweringcreativity.com

AUDIO/VIDEO SYNC

Pro-Bel VALID8

Quickly and accurately diagnoses and rectifies audio and video sync problems; works with any HD or SD standard; files can be compressed, recorded, replayed and standards-converted, with the VALID8 signal then measured for video/audio delay.

925-735-9269; www.pro-bel.com
BOOTH: SU4347



**SIGNAL PROCESSOR
FOR-A FA-9000**

HD/SD signal processor supports all formats, including HD, SD, analog, digital and audio; uses 12-bit internal processing for high-quality images; functions include an up- and downconverter and color corrector; a median-based noise reduction, a logo generator and a Dolby-E decoder are provided in 1RU.

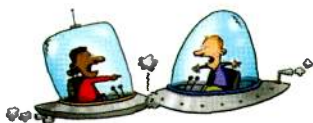
714-894-3311; www.for-a.com
BOOTH: C3210



**VIDEO CAPTURE CARD
AJA KONA 3**

An uncompressed video capture card for SD, HD and dual link 4:4:4 HD for PCI Express (PCIe) Apple G5 Power Macs and Apple Final Cut Pro; features a 4-Lane PCI-Express bus interface with integrated QuickTime drivers; captures and plays back uncompressed 10-bit and 8-bit digital video and 24-bit 48kHz digital audio.

530-274-2048; www.aja.com
BOOTH: SL4913, SU5125



SYNCHRONIZER/DECODER

Snell & Wilcox IQDEC

Features video decoding, frame synchronization and powerful noise reduction; modules pack a 12-bit Golden Gate premium decoder, synchronizer and audio embedder with noise reduction on a single compact card; advanced 3-D decoding algorithms, powered by Golden Gate technology, extract information from analog picture sources; provides a bridge between analog legacy operations and digital environments.

212-481-2416
www.snellwilcox.com
BOOTH: SU156

**UP/DOWN/
CROSSCONVERTER**

Miranda XVP HD

Includes new XVP-811i HD/SD up/, down/crossconverter; new interface features sophisticated aspect ratio conversion using the soon-to-be standardized Advanced Format Descriptor; offers 5.1 to left/right downmixing for easy audio monitoring of downconverted HD signals; a Dolby E Metadata insertion capability provides efficient distribution of audio information across a plant, including dialogue level and dynamic range control information.

561-400-3320; www.miranda.com
BOOTH: SU1341

STANDARDS CONVERTER

Pro-Bel CIFER

A joint development with Digital Vision; converts between all the primary HD standards (regardless of frequency), any SD standard, and from SD to HD or vice versa with no loss of picture quality.

925-735-9269; www.pro-bel.com
BOOTH: SU4347

**HD TRANSLATOR/
CROSSCONVERTERS**

**Evertz 7710XC-HD
and 7710XC-AES4-HD**

The 7710XC-HD is designed to provide high-quality conversion of HD (SMPTE 292M) signals to other common 1.5Gb/s HD video formats; features 10-bit processing, two HD serial digital outputs, one OSD output and external genlock; the 7710XC-AES4-HD with external AES provides high-quality conversion of HD signals to other common 1.5Gb/s HD video formats.

905-335-3700; www.evertz.com
BOOTH: SU170

HDTV UPCONVERTER

Snell & Wilcox Quasar

An HDTV upconverter integrates motion estimation techniques based on the company's Ph.C technology to produce clear, sharp HD outputs from a variety of SD inputs; combines three Snell & Wilcox technologies in a single compact 1RU, including Ph.C motion estimation, premium HD upconversion and Prefix compression pre-processing for noise reduction and dropout filtering.

212-481-2416
www.snellwilcox.com
BOOTH: SU156

**TEST &
MEASUREMENT
EQUIPMENT**

FIBER SOFTWARE

JDSU Optical FiberCable v4

Enables complete qualification of fiber infrastructure as required to deliver the highest-quality triple-play services via multi-wavelength (CWDM/DWDM) and FTTx delivery mechanisms; designed to provide fast and efficient post-analysis of testing carried out in the field; integrates the latest fiber characterization test documentation (loss, reflectance, fiber bend detection, dispersion analysis, multi-wavelength analysis) for higher-capacity fiber build-out programs.

317-788-9351; www.jdsu.com
BOOTH: SU4201



Color indicates advertiser



TEST AND MEASUREMENT CONSOLES

Harris Videotek VTM Series

The fully customizable, multiformat, multifunction test and measurement consoles enable users to pick from a list of video and audio options to create the ideal precision test instrument for their specific environment; feature 1RU chassis, tactile-feel lit controls and intuitive navigation; outputs to any VGA monitor with Videotek Q-See customizable display.

513-459-3400; www.harris.com

BOOTH: SU2929

SURROUND SOUND ANALYZER

Modulation Sciences SpiderVision

A complete audio analysis solution; features a built-in, full-color display; in a half-rack-wide case, it has the same form factor as a standard waveform monitor for easy mounting; features a simple push-button or remote screen selector; is a true plug and play instrument; important user selectable features include operating level adjustment, VU, peak or PPM metering standards and SpiderVision or standard XY display modes.

800-826-2603; www.modsci.com

BOOTH: C118



VOIP ANALYZER

Sencore MIP 1860

MPEG-over-IP cross-layer analysis system tests solution for design and verification of all MPEG-over-IP equipment, systems or networks; an acquisition device that records and analyzes hundreds of MPEG/IP streams at full GigE speeds; has an embedded TAP function for non-intrusive network analyzing; allows live video decoding of any transport stream for complete confidence monitoring is available.

800-736-2673

www.sencore.com

BOOTHS: SU3009, C3810

INTELLITRAC

1.888.console | tbconsoles.com

pcr | mcr | acr | noc | toc | sat ops | ingest | edit | digital newsroom

**MULTIFORMAT
WAVEFORM MONITORS**

**Tektronix WFM6100
and WFM7100 Series**

The SD-capable WFM6100 offers high performance monitoring and measurement capabilities for systems using composite analog video and SD digital video formats; the HD-capable WFM7100 help users manage hybrid HD/SD/composite video systems; both series offer options for Dolby audio monitoring, high-performance SDI-signal measurement and in-depth digital data analysis.

800-833-9200; www.tektronix.com
BOOTH: SU4141



AUDIO ANALYZER

Rohde & Schwarz UP300

Offers a frequency range up to 80kHz includes all conventional audio engineering measurements; generates the required test signals; features dual-channel analog inputs and outputs.

410-910-7800
www.rohde-schwarz.com
BOOTH: C830



**WAVEFORM,
VECTOR
AND AUDIO
MONITOR**

**Hamlet
Flexiscope**

A multiformat, multistandard handheld waveform, vector, audio, picture monitor; uses a built-in 3.5in diagonal high-quality TFT display; shows the picture in 4:3 or 16:9 formats; displays conventional waveform, vector and audio displays together with data analysis; easy to plug-in input option modules allow operation in all current formats and enables future standards to be accommodated.

+44 1494 729728
www.hamlet.co.uk
BOOTH: C9319



**ANALYZER
K-WILL VP21P**

Video-quality evaluation system analyzes the 720p HD format on a fully automated and real-time basis; a double-stimulus system performs detailed, pixel-by-pixel measurement and reference comparisons, and copies videos; debugs encoder/decoder operations; has automatic dubbing, DVD authoring and DVD playback.

310-512-6979
www.kwillcorporation.com
BOOTH: C6936



CABLE CHECKER

**Canare Cable Checker
FCT-FCKIT**

Allows fast, easy confirmation of HFO cables in the field; features the company's HFO connector design for reliable transmission and easy cleaning; the compact design features a backlit digital display to measure optic loss and electrical continuity; its small build and light weight help make mobile installs smooth, secure and constant.

818-365-2446; www.canare.com
BOOTH: SU4164

**MULTIFORMAT HD/SD-SDI
ON SCREEN MONITOR**

Videotek VTM Series

A user-configurable, field upgradeable, multiformat test and measurement console; available with HD/SD, SD-only or composite analog input modules; includes a robust array of test and measurement functions like waveform, vector, gamut, audio, picture and timing displays.

800-231-9673; www.videotek.com
BOOTH: SU2929



**PORTABLE TEST SIGNAL
GENERATORS**

Hamlet Protean Axiom

Part of the Protean series of test signal generators; the Axiom supports all HD signal formats, with the convenience of a built-in alphanumeric character generator, which can be burnt into any test pattern.

+44 1494 729728
www.hamlet.co.uk
BOOTH: C9319

**TEST SIGNAL GENERATOR
DK Technologies PT8612**

A new option for the PT5300 HD/SD VariTime sync generator; offers a test pattern based on the EBU Tech 3305 standard and extended to all common HD formats to check lip sync; outputs four independent test signals in 270Mb/s and 1485Mb/s SDI formats with individual formats and timing.

+45 44 85 02 55
www.dk-technologies.net
BOOTH: C2044

**DIGITAL VIDEO
MEASUREMENT SYSTEM**

Rohde & Schwarz DVM 400

Monitors, analyzes, records and replays MPEG-2 transport streams; comes equipped with an integrated, high-res color display, so users do not need a laptop or external monitor to operate the system; operates by its keys and rotary knob, or via the supplied USB mouse; an external monitor and keyboard can be connected; includes various interfaces and space for three plug-in cards.

410-910-7800
www.rohde-schwarz.com
BOOTH: C830

TV RF SYSTEMS

AIR-DIELECTRIC COAXIAL CABLE Radio Frequency Systems Heliflex

Available in sizes from 3/8in to 9in; minimizes discontinuities and achieves low return loss over the entire UHF bandwidth; with dual feeder lines, the product's proximity facilitates phase matching and eliminates the need for inherent temperature compensation.

203-630-3311; www.rfsworld.com
BOOTH: C1217

TRANSMITTERS AND REPEATERS DMT transmitters and repeaters

Range includes digital and digital-ready analog models in VHF and UHF bands, with air or liquid cooling; offer 0.1W to 40kW output power; compatible with all types of digital terrestrial TV networks.

856-423-0010; www.dmtonline.com
BOOTH: C316

DIGITAL SFN REPEATERS Elti HALO

Compact digital SFN repeaters feature an echo canceller to guarantee optimized transmission and low degradation in signal quality; automatic mode detection allows the SFN network cell to be switched instantaneously; features an output power range up to 250W and no required measurement during installation.

+386 02 564 32 00; www.elti.com
BOOTH: N3631

UHF ANTENNA Jampro JUHD

The UHF panel antenna can be configured to provide various azimuth and elevation patterns; by using optional beam tilt and null fill, the elevation pattern can be shaped to maximize coverage; designed as either a side- or a top-mount horizontally polarized antenna.

916-383-1177; www.jampro.com
BOOTH: C1517



TRANSMITTER

Axcera Innovator LX Series

A low-to-medium power transmitter line; uses the latest LDMOS devices for broadband operation across the entire UHF band; allows users to minimize spare parts stock, which is especially important to group owners and networks; enables simple, inexpensive channel changes for users with channels out of the core or expected to be displaced in the future.

800-215-2614; <http://broadcast.axcera.com>
BOOTH: C8519

Turns out, the most important component of any station automation solution is people.

Hundreds of installations have taught us that communication is key. So it pays to work with people who involve you in the design process. People who deliver modular, cost-effective software solutions. And people who stick around to make sure it all works.

Automation just got easier.



www.crispincorp.com sales@crispincorp.com 919-845-7744

Come visit us at RTNDA, Booth R218 or at
NAB, Booth SU608 South Hall.



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EXCITERS

**Screen Service Italia
SCT 100U/S 10W**

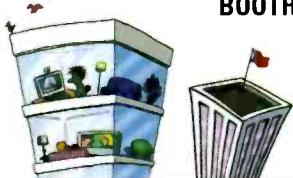
UHF stereo transmitter has a modular construction; conventional cooling and AGC and ALC controls; features three-slope linearity pre-correction; can program the local oscillator from front panel; has a preset for precision offset; features a soft-start circuit, low-power consumption, a SAW vestigial filter and sync restore.

+39 030 3582225; www.screen.it
BOOTH: C333

**UHF ANTENNA
ERITRASAR UHF**

Dual-channel transmitting antenna; allow stations with N+1/N-1 or adjacent DTV/DTV assignments to share a single antenna; can be top or side mounted, or used as a structural member in the company's STACKER optimized antenna structure solution; offers 12 Azimuth patterns to choose from; features a maximum of 6MHz per channel for NTSC.

708-570-0663; www.eriinc.com
BOOTH: N2406



**UHF IOT TRANSMITTER
Acrodyne (Ai) Quantum
Depressed Collector**

A UHF IOT transmitter for 8-VSB and COFDM digital applications; features power levels up to 120kW average ATSC 8-VSB and DVB-T COFDM; plug-in technology and tube removal allow easy exchange of IOTs using a built-in IOT hoist assembly, without circuit assembly disconnection; the IOT is cooled by clean, safe de-ionized water; all glycol is eliminated from the cabinet environment.

888-881-4447
www.acrodyne.com
BOOTH: C6207

**700MHZ ANTENNAS
Dielectric Communications
7C Series**

Slotted coaxial antennas designed for applications requiring a lightweight, 6MHz or 10MHz solution in the 700MHz band; can be horizontally, vertically or circularly polarized.

207-655-8100; www.dielectric.com
BOOTH: C2020

**TELEVISION ANTENNA
Radio Frequency
Systems (RFS) 611-CP**

Top-mounted, circularly polarized omnidirectional antenna; supports the low VHF band; features corrosion-resistant stainless steel elements, radiation pattern circularity and a comparatively low wind-load; can be supplied with single- or dual-feed line systems for redundancy.

203-630-3311; www.rfsworld.com
BOOTH: C1217

**DIGITAL SOLID-STATE
UHF TRANSMITTER
LARCAN Magnum**

Users can choose between 2.5kW, 5kW, 10kW, 15kW or other options; features versatile air-cooling and multiple regulated power supplies; includes Intuitive Advanced Diagnostics and an extensive monitoring system designed to simplify maintenance; fits in 10kW of power in 25sq ft of space.

303-665-8000; www.larcan.com
BOOTH: C4119



Fox Electronics, Inc.



Transport DTMF and Relays over IP

The Fox QoIP™ and GPI-100 efficiently and cost effectively transport DTMF and relays point-to-point / multipoint over IP.



Fox Electronics, Inc. distributes equipment and systems from more than ninety digital and analog equipment manufacturers for the cable, broadcast, and educational markets. For more information please contact us.

www.foxelectronics.net

800-604-0301

info@foxelectronics.net



VIDEO EDITING

HD/SD NLE

Leitch VelocityHD

The latest version of the post-production HD/SD NLE includes support for the HDV format and variable frame rate processing for content from Panasonic's AJ-HDC27 VariCam camcorder and expanded IEEE-1394 I/O support; delivers full-quality, real-time HD playback and editing of multiple video and dynamic graphics streams.

513-459-3400; www.harris.com
BOOTH: SU2929

PROMOTIONS

CRAFT EDITOR

Leitch VelocityNX

A comprehensive editing and effects toolset for NEXIO server environments; ideal for broadcast production environments that need high-end post features along with true shared storage, sports applications that need editing and slow-motion server output or news operations that require additional compositing capability.

513-459-3400; www.harris.com
BOOTH: SU2929

NEWSROOM SYSTEM

Video Technics NewsFlow v4.0

A highly scalable tapeless newsroom production, play-to-air and archive system; features reliable digital and analog Apella servers integrated with Mac- and PC-based nonlinear editors networked within NAS and SAN storage devices; can streamline the media ingest from Sony's XDCAM system to Adobe Premiere Pro; with plug-in technology, users seamlessly ingest XDCAM files to the NewsFlow centralized database, without transcoding.

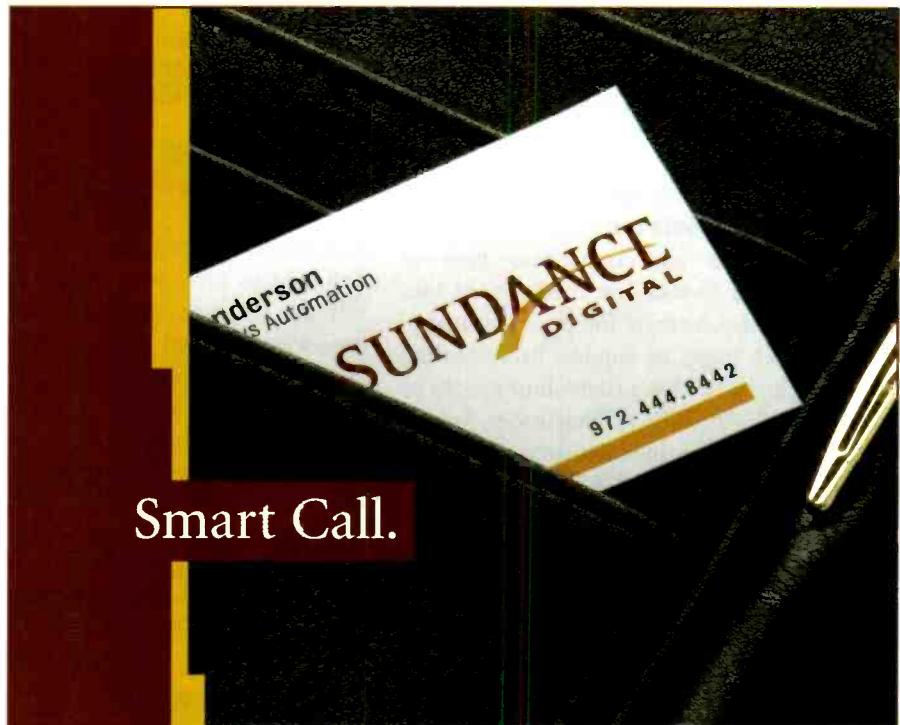
404-327-8300
www.videotechnics.com
BOOTH: SU3014

PRODUCTION AND PLAYOUT ENVIRONMENT

Dalet Digital Media Systems News Suite

The integrated system offers cost-effective, scalable, tapless newsroom operation; the DaletPlus NewsWire, a newsroom computer system, features customizable metadata forms, a single cross-media database, integrated video browse and journalist editing; the DaletPlus MediaCutter allows users to browse, log and edit clips from any desktop.

212-825-3322; www.dalet.com
BOOTH: SL1132



Smart Call.

With Sundance Digital automation software, good broadcasting also means improved business results — more efficiency, greater accuracy, increased productivity and higher profitability. Now, how smart is that?

The secret lies in managing digital workflow. By integrating digital television and information technologies, our automation software handles the core operations of your broadcast business. This Digital Workflow Management helps you perform the same complex tasks you're already doing. Only with greater speed, more control and unprecedented flexibility.

That not only improves your on-air product, but also your bottom line. Just the kind of thinking that makes Sundance Digital the smartest call in the business.

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WORKSTATION DVS CLIPSTER

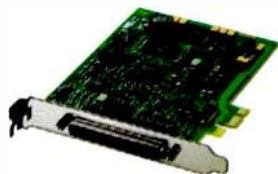
Real-time workstation has multiresolution, zoom and pan, conforming, color-correction, cropping and versioning capabilities; software supports workflows for dailies and various compressed formats, such as JPEG2000, WM-9 and QuickTime; employs technologies, such as 64-bit CPU, operating system architectures and multicore processor support.

818-846-3600; www.dvs.de
BOOTH: SL2964

INDEPENDENT ENCODER OCTOPUS Newsroom Video Twister

Encodes and transcodes high-res media files or live media feeds into low-res formats for proxy browsing, Web pages or wireless broadcasting; can be used as a standalone system or with OCTOPUS Newsroom System as a low-res media source.

+420 221 181 511
www.octopus-news.com
BOOTH: C5416



DUAL-LINK CAPTURE CARD Blackmagic Design DeckLink HD Pro PCIe

The dual link HDTV 4:4:4 12-bit SDI card offers high-quality 14-bit analog video monitoring for Mac and Windows computers; features twin HD-SDI inputs and outputs for 4:4:4 high-definition connections; can instantly switch to 4:2:2 HD-SDI or standard definition SDI; supports all SD and HD standards; offers SPDIF/unbalanced AES audio input and SPDIF/unbalance AES audio out, Word Clock out, Tri-Sync/Black Burst reference input and a built-in RS-422 remote control port for broadcast deck control.

702-257-2371
www.blackmagic-design.com
BOOTH: SL3791, SL3985

VIDEO ROUTING

ROUTER Utah Scientific Utah-400

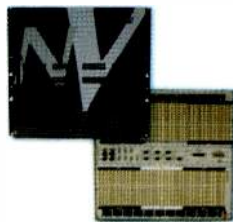
A router with the ability to expand seamlessly from 64 x 64 to 1152 x 1152; includes HD and SD digital video switchers and a digital audio switcher; all SD switchers are fully upgradeable to HD operation by means of a simple board exchange.

801-575-8801
www.utahscientific.com
BOOTH: C4507

DATA ROUTER Network Electronics SL-D32P

A 32-port, configurable data router; designed to provide a flexible solution for machine control routing in broadcast facilities; ports can be configured as controller or tributary either via software or a GP that is available on each port; features redundant power supplies with front indicators and interoperability with the VikinX modular range of routers.

800-420-5909
www.network-electronics.com
BOOTH: SU199



DIGITAL VIDEO ROUTER NVISION NV8288

Designed for use in video production trucks and other applications where space is limited; built for HD; supports all standard SD data rates; is ASI-compliant; can be configured for systems ranging in size from 12 x 12 to 288 x 576; all modules, including power supplies and cooling fans, are front-serviceable and hot-swappable; runs at data rates up to 1.5Gb/s; is engineered to be 3Gb/s-capable for future signal formats such as 1080p HD.

530-265-1000; www.nvision.tv
BOOTH: SU1414

MASTER CONTROL SWITCHER PESA MCLite

A compact, multichannel SDTV master control switcher; available with a wide range of processor and control options; features a flexible and open architecture; multiple processors and control panels can be arranged in any combination, with up to eight channels being controlled from a single control panel or from station automation.

800-328-1008; www.pesa.com
BOOTH: SU1370

MASTER CONTROL SWITCHER Pro-Bel Masterpiece

Offers HD and SD switching, advanced audio processing and flexible keying and DVE options; upgrades include an HD DVE, the option to install Dolby E decoders and logo storage; features four keyers and can handle audio mixing.

925-735-9269; www.pro-bel.com
BOOTH: SU4347



LARGE APPLICATION MULTIFORMAT ROUTING SWITCHERS Harris Platinum

The high-capacity, small-footprint routing switchers provide high-quality signal routing up to 256 x 256 in 15RU and 512 x 512 in 28RU; support a mix of video and audio signals from analog to HD; built for reliable 24/7 operation; designed to offer flexibility to incorporate future feature additions; redundant, load-sharing power supplies and fans, along with front-loading, hot-swappable modules, ensure that systems remain online even during upgrades.

513-459-3400; www.harris.com
BOOTH: SU2929

Building a Secure Digital Audio Network A How-To Webinar from Wheatstone

Broadcast Engineering and the Wheatstone Corporation will conduct a FREE, live webinar that will teach you how to build secure digital audio networks, ranging from the simple to the most complex. Whether you're adding to an existing system or building a greenfield facility, the information in this webinar will make your task easier.

Learn how to:

- simplify wiring, even in complex facilities
- design a custom, networked audio and control system
- provide expanded control and operational features
- seamlessly integrate both analog and digital audio signals
- build a secure backup routing path
- assemble an integrated, networked audio switching and distribution system using Ethernet technology



Moderated by:

Brad Dick

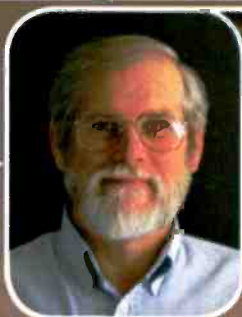
Editorial Director

Broadcast Engineering

Wednesday, March 29th, 2006

2 p.m. Eastern

This webinar will cover:



Speaker:

Andy Calvanese, VP of Engineering, Wheatstone

What is a digital audio network? An overview covering hardware, operational function and practical advantages over traditional practices.

Topics include:

- System components
- Localized and centralized I/O
- Star, ring and IP based systems
- Control surfaces and other interfaces
- TDM versus IP high speed interconnects
- System administration



Speaker:

Paul Picard, Technical Support Engineer, Wheatstone

A closer look at hardware connections, communication protocols and software components that tie it all together.

Topics include:

- Understanding system interconnects
- Audio over IP basics
- Controlling the system
- Interfacing house routers
- Planning the installation
- Cabling specifics - audio and LAN wiring



Speaker:

Kent Hatfield, VP of Technology & Operations, WXXI-TV

Learn about digital audio networking from a client point-of-view. Kent discusses his experience in specifying, installing and operating a working network at WXXI-TV in Rochester, NY.

Topics include:

- Developing audio networking goals
- Specifying the system
- User interfaces
- Connecting it all together
- Programming the system
- Broadcast operations

Organized and moderated by:

 **Wheatstone Corporation** and **Broadcast Engineering**
THE JOURNAL OF DIGITAL TELEVISION

For more information or to sign up, log on to:

www.broadcastengineering.com/webcast/wheatstone

ROUTING SWITCHERS
PESA Cheetah

The 128NE offers a 128 x 128 routing matrix requiring one power supply of less than 600W to drive the compact 7RU system; supports PESA's Matrix WatchDog redundant crosspoint matrix; the 11RU 128XE is designed to offer broadcasters the flexibility to select between a 128 x 128 configuration with output options or output expansion up to 128 x 256 without option slots.

800-328-1008; www.pesa.com
BOOTH: SU1370

ROUTER CONTROL SYSTEM
NVISION NV9000-SE

Features a new Java-based, easy-to-use client interface; portable configuration editor allows users to develop configurations off-line and upload to the server; new optimized wizards provide a flexible means of adding devices and tasks; bulletproof redundancy assures uninterrupted 24/7 operation.

530-265-1000; www.nvision.tv
BOOTH: SU1414

OPTICAL SWITCHING PLATFORM

Opticomm OptiLinx OLX-3000

Switches digital signals up to 4.25Gb/s with any of its 144 ports, housed in a 4RU chassis; designed to accept up to three modular port cards with up to 48 Small Form Pluggable (SFP) transceiver modules per port card; each SFP transceiver module provides the physical ports for one input-output pair; features include complete optical transparency and full duplex switching capacity up to 612Gb/s.

858-450-0143
www.opticomm.com
BOOTH: SU4183



VIDEO STORAGE

TECHNICIAN SUPPORT
Meta Media Creative Technologies Xsan Technician Support

Provides focused and relevant support for the active Xsan integrator or administrator; allows users access to Meta Media's knowledge base of Xsan integration and troubleshooting expertise; is purchased as a yearly package; provides unlimited e-mail and two hours of telephone support per month to a single user.

800-305-2163
www.metamediatech.com
BOOTH: TBA

REMOTE MONITORING
Front Porch Digital DIVAmonitor

Enables real-time, remote monitoring of DIVArchive and all connected broadcast and storage devices; accessed through the DIVAmonitor portal, hardware and software in the archive layer is monitored by a team of support professionals working at the 24/7 network operations center.

303-440-7930; www.fpdigital.com
BOOTH: SU2236



VIDEO DIGITAL RECORDER
Fast Forward Video VDR 200

The compact industrial and professional VDR offers simple operation in broadcast-quality video applications, including video assist, location recording and video analysis, as well as for use in inspection systems and in sports and hazardous environments; features an AC/DC power option; records to a removable 2.5in IDE drive; can serve as a direct replacement for tape-based recording systems.

949-852-8404; www.ffv.com
BOOTH: C1851

Color indicates advertiser



HD MEDIA SERVER
Omneon Video Networks Spectrum HD

Features integrated capability for the simultaneous playback of SD and HD content on either the same channel or independent channel; HD MediaPort payout modules can support one or two channels of HD MPEG payout of 4:2:0 and 4:2:2 material at bit rates up to 78Mb/s.

408-585-5109; www.omneon.com
BOOTH: SU2959

SERVER
Silicon Graphics (SGI) Altix 4000

Platform is comprised of modular blades: interchangeable compute, memory, and I/O blades, as well as special purpose blades for plug-and-solve configuration flexibility; the blade-to-NUMalink architecture enables users to mix and match eight standardized blade choices; is socket-compatible with upcoming single- and dual-core Intel Itanium 2 processors; offers the ability to upgrade or expand the CPU, memory, I/O or visualization capabilities.

800-800-7441; www.sgi.com
BOOTH: SL3764



NEWS PRODUCTION SERVER
Quantel Newsbox

A news production server with the ability to ingest material, view rushes, choose shots, edit stories, review finished pieces and play them out to air; features common progressive user interface and toolset the same as all the sQ systems from Quantel.

703-448-3199; www.quantel.com
BOOTH: SL1544

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STORAGE
JustEdit vsnstorage

Shared storage for the entire network supports all the workstations working at full capacity; each video server supports simultaneous high-resolution editing; are equipped with GigE or Fiber Channel; storage capacity ranges from 100 hours to 2600 hours in high-resolution; maximum data security has RAID 0, 0+1, 5 and 6 support, backup power supplies and hot-swappable drives.

+34 902 35 37 39; www.vsn-tv.com
BOOTH: SL1240



HOLOGRAPHIC OPTICAL RECORDING TECHNOLOGY
Maxell Holographic Media

A joint venture with InPhase Technologies; features 300GB storage capacity and a 160Mb/s transfer rate; uses a laser beam to form and store data in a number of 3-D hologram images of data pages into the same location; each location can hold hundreds of pages of data; an entire 5¼in-diameter optical disc can store millions of pages; each piece of optical media is capable of custom encryption.

201-794-5900; www.maxell.com
BOOTH: C6932



VIDEO PLAYER/ RECORDER SYSTEM
Merging Technologies
VCube HD-2K

A video hard disk-based video player and recorder system; can be used as an HD VTR replacement, a dual-link 4:4:4 recorder, a frame store for a graphics and animation houses, an SD/HD digitizing station for network servers, or as a 24fps screening system for film dubbing, screening or digital cinemas.

+44 1606 892788; www.merging.com
BOOTH: SL3755



KONAN

DIGITAL

VISIT US AT
NAB 2006!
BOOTH #SL 1835

KONAN DigitalArc — The NEXT Generation of Media Asset Management



konandigital.com
+1 818 649 8655

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PORTABLE DISC RECORDER

Sennheiser Rosendahl bonsaiDRIVE

A miniature, lightweight, extremely portable hard disc recorder; captures both high-quality video and multi-track audio; simultaneously handles 4:2:2 PAL or NTSC video signals alongside 10 audio channels; allows users to specify their choice of standard IDE drive, which neatly slots into the unit itself; video is handled in either composite, S-video or component formats.

860-434-9190
www.sennheiserusa.com
BOOTH: N1822



EDITING SERVER
Quantel sQ

Available in SD, HD and resolution-transparent versions; users can update from SD to HD by adding HD I/O cards to the existing unit; for maximum flexibility, resolution-transparent I/Os offer the ability to increase or decrease the resolution of any content stored in the sQ in real time as the story is being played out of the system.

703-448-3199; www.quantel.com
BOOTH: SL1544

FOUR-CHANNEL SERVER
Dayang VIPS 2000

Four-channel server can be assigned to simultaneous input or output, or be deployed in dual-channel in/out mode; can perform ingest and play-out of files in DV, MPEG-2I, MPEG-IBP and GXF formats in NTSC, PAL or ASI; supports VDCP and SNMP networking protocols are supported.

+ 44 0 1234 271 053
www.dayang.com
BOOTH: SU4209

HD RECORDER

Panasonic AJ-HPS1500

A P2 DVCPRO HD recorder; serves as a bridge between HD and SD, with the capability of optional up- and downconverting between SD and HD recorded material; provides upgradeable capacity using five P2 card slots; offers two slots for adding removable hard disk drives.

201-392-4127
www.panasonic.com/broadcast
BOOTH: C2518

MEDIA INTERFACE ADAPTORS

Omneon Video Networks MultiPort 4100 Series

Line of media interface adapters available for Omneon Spectrum media server systems; supports simultaneous playback of SD and HD MPEG-2 material; features integrated capability for the simultaneous playback of HD and SD content on the same or independent channels; includes connectors to allow for the use of external up- and downconversion equipment.

408-585-5109; www.omneon.com
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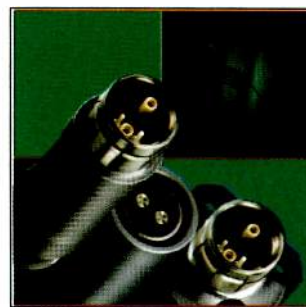
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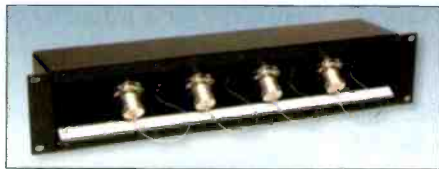
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Panasonic's AG-HVX200: A smart camcorder

BY BARRY BRAVERMAN

It's a heck of a lot of technology crammed into one pint-size box: MXF-native P2, true adjustable frame-rate capability and 1080p 60fps 4:2:2 initial sampling at an astounding 19 bits! No wonder you may be feeling particularly out of sync these days in the face of such dizzying advances in camcorder and imaging technology. Who can possibly keep up?

I recently revisited Panasonic's AG-HVX200 after experimenting with an early prototype model for several weeks last fall. Now outfitted with a regular production model, I recaptured several of the same scenes: a day interior inside a BMW sedan, a walking night exterior along Hollywood Boulevard, a typical soap opera set replete with emoting talent and a

As I previously observed, one thing continues to be evident: The AG-HVX200 represents the most significant progress in small-format video in more than a decade, since the introduction of the first consumer DV camcorder (the Sony DCR-VX1000) in 1995. Any way you parse it — and we're talking 81 different possible shooting modes here — the camcorder is one remarkable image-capture machine.

Toward a tapeless workflow

The 5.3lb basic AG-HVX200 is a 1/3in native 16:9 camcorder. Marrying the functionality of the Varicam and the company's P2-based SPX800 and popular DVX100A/B models, the unit captures DVCPRO HD (not HDV!) at 1080i and 720p in the forgiving 4:2:2 color space.

That means no long-15 frame MPEG GOP structure to sabotage fast pans, no fill high-motion scenes with ugly macroblocks and no protracted 44-hour HDV re-conform sessions from the NLE. There are no convoluted shenanigans when attempting to cut DVCPRO HD picture and sound natively on the timeline. Intra-frame compression (as opposed to HDV's *inter-frame* MPEG-2 type) facilitates workflow along the lines we're used to in a professional post-production environment.

The Panasonic challenge

The question of native chip resolution in the HVX200 has been the subject of much speculation, as Panasonic has not (yet) specified the native pixel density of the camcorder's CCD. This has understandably aroused the

suspicions of some shooters and engineers who automatically deduce a sinister motive and raise fears of black helicopters amassing on the horizon.

In addressing the issue, let me say first that the AG-HVX200 is a very smart camcorder, designed for a similarly smart and well-informed user. Panasonic faced a major challenge in designing this camcorder's 1/3in 16x9 HD CCD. Adequate low-light performance was paramount in the company's mind as it is (rightfully so) a major concern for most small-format shooters. Happily, the camcorder exhibits exceptional low-light sensitivity for a 1/3in HD camcorder — about 1.5 stops better than the popular HDV camcorders.

Most shooters, of course, will read-



The P2-based AG-HVX200 is shown here with the Chrosziel 16x9 matte box and follow-focus for EFP applications.

Studio City Laundromat illuminated by ugly overhead fluorescents. The production version proved to be considerably quieter in the shadows — this conclusion drawn primarily from the low-light scenes exhibiting large areas of unfilled shadows.



Advanced heat sinks in the AG-HVX200 dissipate the heat away from the processor and thereby help reduce noise in underlit shadow areas.

ily acknowledge the value of good low-light performance but do not understand the trade-offs inherent to achieving this goal. Just as fine-grain film is associated with slower, less-sensitive emulsions, cramming

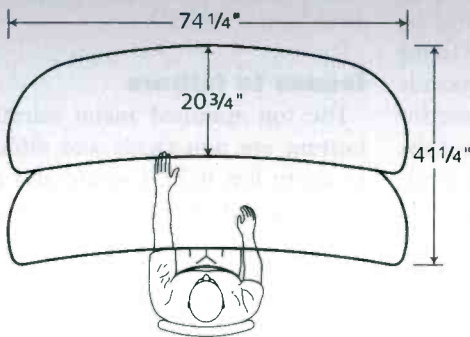
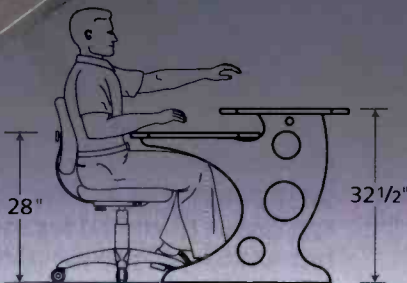
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smaller and similar pixels onto a nominal 1/3in surface (actually 1/4in) will have exactly the same effect. Indeed, a higher resolution imager may not always be desirable in small-format video due to because of this kind of performance trade-off; a 2 million-pixel imager, for example, would almost certainly be perceived as too dark by nearly everyone.

Marketers, of course, love to focus on numbers, such as the clock speed of PCs and the pointless but impressive sounding "700X digital zoom" emblazoned on the side of some consumer camcorders. Broadcast professionals know better, so manufacturers usually don't try such skulduggery on us. However, the tendency of shooters, especially novice-types, to judge camcorders (and everything else) on the basis of numbers alone, such as the "native resolution" of a CCD, is a

bound to find one that accurately reflects the original analog value out of the imager. It also means that regardless of video format — and there are 81 available options — the camcorder cache is crunching a huge amount of data, which is then parsed for the desired scanning mode, resolution and frame rate.

As would be expected, the unit exhibits increased noise at gain levels above +6dB or when shooting scenes containing large unfilled shadow areas. Reducing overall camcorder detail to -3 or -4 combined with increasing detail coring to +3 or +4 should be considered to help suppress this noise, which appears to be present in all three color channels.

Two camcorders in one

The AG-HVX200 is really two camcorders in one. As a video camcorder,

The NLE removes the invalid frames during capture to restore the original 24p frame rate with little or no loss of quality in the process.

Some functions such as time-lapse, pre-record (up to seven seconds in SD and three seconds in HD), loop record and slow shutter are available only in the Video Camcorder mode.

Going native in film camcorder mode

The film camcorder enables 720p recordings at adjustable frame rates from 12fps to 60fps. The camcorder's native mode is highly efficient because only unique frames are delivered to the recording medium. So while a 4GB P2 card can capture only four minutes of video in non-native modes over 60p, the card's total run-time may be increased 2.5 times to 10 minutes at 720p24 in native mode.

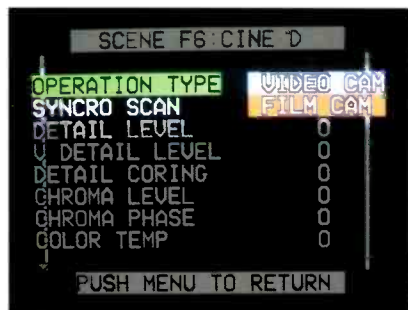
The unit permits ready playback of off-speed clips by switching the camcorder to VCR/MCR mode and viewing the desired scene on the the built-in LCD screen, electronic viewfinder or external HD monitor. Unlike the Varicam, no external frame converter is required to view slow-motion or accelerated effects.

Recordings in native mode cannot (currently) be output to an external drive (even to the Firestore). The target computer must be fitted with the appropriate P2-enabled log and capture software. All popular NLEs now support P2 capture, including Apple's Final Cut Pro, Canopus Edius and Avid Xpress Pro HD.

Issues to fathom

The top-mounted menu selection buttons are non-tactile and difficult to see in low light. I would also like to see the button array rotated 90 degrees to reflect the operator's perspective from behind the camcorder.

A fiber-optic system similar to the Apple Powerbook should be implemented to help illuminate the menu selection keys in low light. I found the camcorder setup much easier to perform using the (included) remote

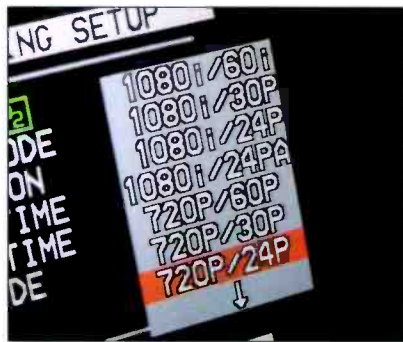


Are you shooting film or video? The AG-HVX200 offers different capabilities, depending on which way you go. ENG shooters in Video Camcorder mode can access the pre-record, loop record and slow shutter functions.

real and ongoing danger.

Suffice it to say that the CCD is a quintessential analog device, the silicon crystals embedded in it outputting a stream of electrons in direct proportion to the amount of light striking its surface. It is this analog stream that is amplified and digitally sampled, raising the *real* issue of how precisely these operations are performed in a given camcorder system.

The analog signal from the imager is sampled at 1080p60 4:2:2 at 19-bits. With 524,288 possible values assignable to each sample during initial processing, the camcorder's DSP is



The frame rate of the camcorder cannot be changed while running. As a result, in-camcorder ramping effects are not possible.

it applies the Varicam model to output 60p video. Thus, when shooting 1080i24p, the unit outputs 60fps by applying a 2:3 pull-down. In terms of storage, the maximum recording time on a P2 card is the same for 1080i and 720p — the benefit of the Video Camcorder mode being a valid DVCPRO HD stream output via FireWire to an external VCR, laptop or hard drive such as the Firestore FS-100, CitiDISK HD or Specialized Communications' CinePorter.

The Advanced 24pA mode popularized in the DVX100 works in the same way here using a 2:3:3:2 conversion of 60fps 1080i and 480i video streams.

control. Unfortunately, the button arrangement on the remote is not consistent with the camcorder; the Set button usurps the spot where the right navigational arrow should be.

Of particular interest to non-NTSC producers, the camcorder currently lacks 50p capability for down-conversion of DVCPRO HD files to PAL. This could be significant to larger rental facilities and broadcasters trying to maintain support across multiple television standards.

Camcorder operators also should be aware that the camcorder is utterly silent when recording to the P2 card or laptop, coming up to speed instantly without the usual servo convulsions. While one would think this is a positive point, the innocuous red REC light in the viewfinder may not be sufficient in some cases to get operator attention. I would prefer a more ob-

vious crawling "RECORD" message in the viewfinder or at the bottom of the side LCD screen. Ideally, this message could be enabled or disabled as a menu option. Given the short runtime of the P2 card, it is especially critical to know when the camcorder is running and when it is not.



The AG-HVX200 operates as a superb standard-definition DVX camcorder, recording consumer DV 4:1:1 (not HD!) to tape. The 16:9 HD imager contributes an enormous amount of fineness to the SD image — a valuable consideration for ultimate output to standard-definition DVD.

The relatively short runtime of the P2 media continues to be the major issue for shooters and producers, especially in documentary and ENG

Final thoughts

While producers of narrative fare, commercials and music videos may not object to four- and eight-minute P2 loads (at 1080i over 60), ENG shooters will almost certainly balk at the abbreviated run-times. For these shooters, recording to tape in SD remains a viable option, as does the use of an external drive like the Firestore, with a continuous runtime of 90 minutes or more.

With the introduction of the Panasonic AG-HVX200, the industry trend toward a tapeless IT-based workflow has taken a major leap forward. The P2 MXF-based system, introduced more than a year ago in the AJ-SPX800, has been rapidly gaining ground in the rough-and-tumble world of TV news. One reason is the retention of valuable metadata recorded in-camcorder,



The AG-HVX200 accommodates two P2 cards of 4GB or 8GB each for up to 40 minutes runtime at 720p24pn (native mode). The card not being recorded to can be off-loaded to a laptop, dedicated Panasonic 60GB P2 store, or generic Firewire or USB 2.0 hard drive.

including GPS settings and voice notes. While the HVX does not record either metadata type in its present form, one would expect this to change in a future revision.

For ENG and broadcast applications today, whether one uses the actual card media or not, the camcorder obviates the need for capture sessions and expensive VCRs, thus potentially realizing savings of tens of thousands of dollars in heavy iron

outlays and more than offsetting the current (temporary) high cost of the P2 media. Many folks will still cite the economy of videotape for backup and archiving. But even here, however, the necessity of using videotape at all is becoming increasingly doubtful, as lower-cost, higher-capacity P2 cards have recently entered the market.

For storage and backup, large capacity optical discs also are looming. In late spring, Panasonic is expected to ship the first Blu-ray burners with 50GB capacities. HVD (Halographic Versatile Discs) also may be imminent; the first iteration of 5in discs with a 330GB capacity are due for shipping mid-year, according to the HVD Alliance.

For shooters of every stripe, including EFP and ENG camcorder operators everywhere, the AG-HVX200



The P2 card may be inserted directly into a laptop, permitting immediate access to footage without capturing. The P2 PCMCIA card mounted on the desktop enables file transfers at speeds theoretically up to 640Mb/s!

represents a major achievement in HD resolution imaging and workflow. For broadcasters, the promise of P2 in combination with a low-cost HD camcorder is a dream come true. **BE**

Barry Braverman is a veteran cinematographer with more than 20 years experience in feature films, documentaries and music videos. He is currently serving as a digital media expert and consultant to major studios. His latest book, "Video Shooter," is available from CMP Books at www.cmpbooks.com.

BitCentral's Précis revolutionizes workflow at KRON4-TV

BY CRAIG PORTER

KRON4-TV in San Francisco is one of the largest news stations in the nation, broadcasting 10 hours of content from more than 20 news shows every day. The decision to move away from a tape-based news system was largely driven by the ability to enable new efficiencies and ways to contribute content.

At KRON4, the goal was not to just digitize the existing workflow; it was to develop an entirely new and more efficient system from capture through archives. The station implemented BitCentral's Précis play-to-air system.

file-based workflow include:

- *Logging tapes.* The producer or writer now makes the cuts instead of logging and developing cut sheets given to the editors.

- *Linear editing.* All editors, producers, writers and photographers use the same software for nonlinear editing.

- *Tape duplication.* Because multiple people in the station can simultaneously edit a video file, there is no need to duplicate tapes for additional users.

- *Dependence on a video path.* Video can be submitted from anywhere over a broadband wired or wireless connection.

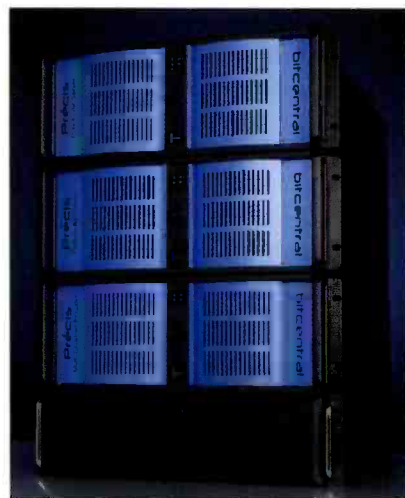
- *Tape playback.* The new system eliminates the labor previously required to prepare hundreds of tapes per day and plug them into decks.

- *Archive tapes.* Everything that goes to air is automatically archived as files and can be instantly retrieved. The station now stores video on spinning disks, which is cheaper than buying tape stock.

- *Tape deck maintenance.* The entire process is now managed by one rack of nonproprietary industry-standard servers. Maintenance and support of these servers is substantially less than the decks they replaced.

One of the key factors of the success at the station is the open architecture that is totally interoperable. The end-to-end system enables the staff to manage all non-live video over the existing Gig-E infrastructure. The transition to HD newsgathering will be a requirement soon, so the system must be able to support all formats and still operate at high speed.

The station purchased a Canopus Edius nonlinear video editing plat-



Shown here is the BitCentral Précis with storage.

form because it is similar to other NLEs but has a shorter learning curve. In addition, it works efficiently with any video format, including SD, HD, HDV, MPEG and DV.

Précis is fully integrated with the nonlinear video editor, so editors simply save from the timeline to their stories within a show. The entire news staff continues to do all its textual work, such as scripts and metadata, in Avid's iNEWS newsroom computer system. This in turn drives the Précis system. The tight integration of the systems means that duplicate data entry is eliminated, and journalists can see status of any video clip from within iNEWS.

The move to a file-based workflow was a critical first step for several other projects that the station plans to implement in the future. Précis has made the transition fast, easy and complete.

BE

Craig Porter is director of engineering of broadcast systems at Young Broadcasting.



KRON4 streamlined production by integrating BitCentral's Précis play-to-air system with a Canopus Edius nonlinear video editor and Avid iNEWS newsroom computer system.

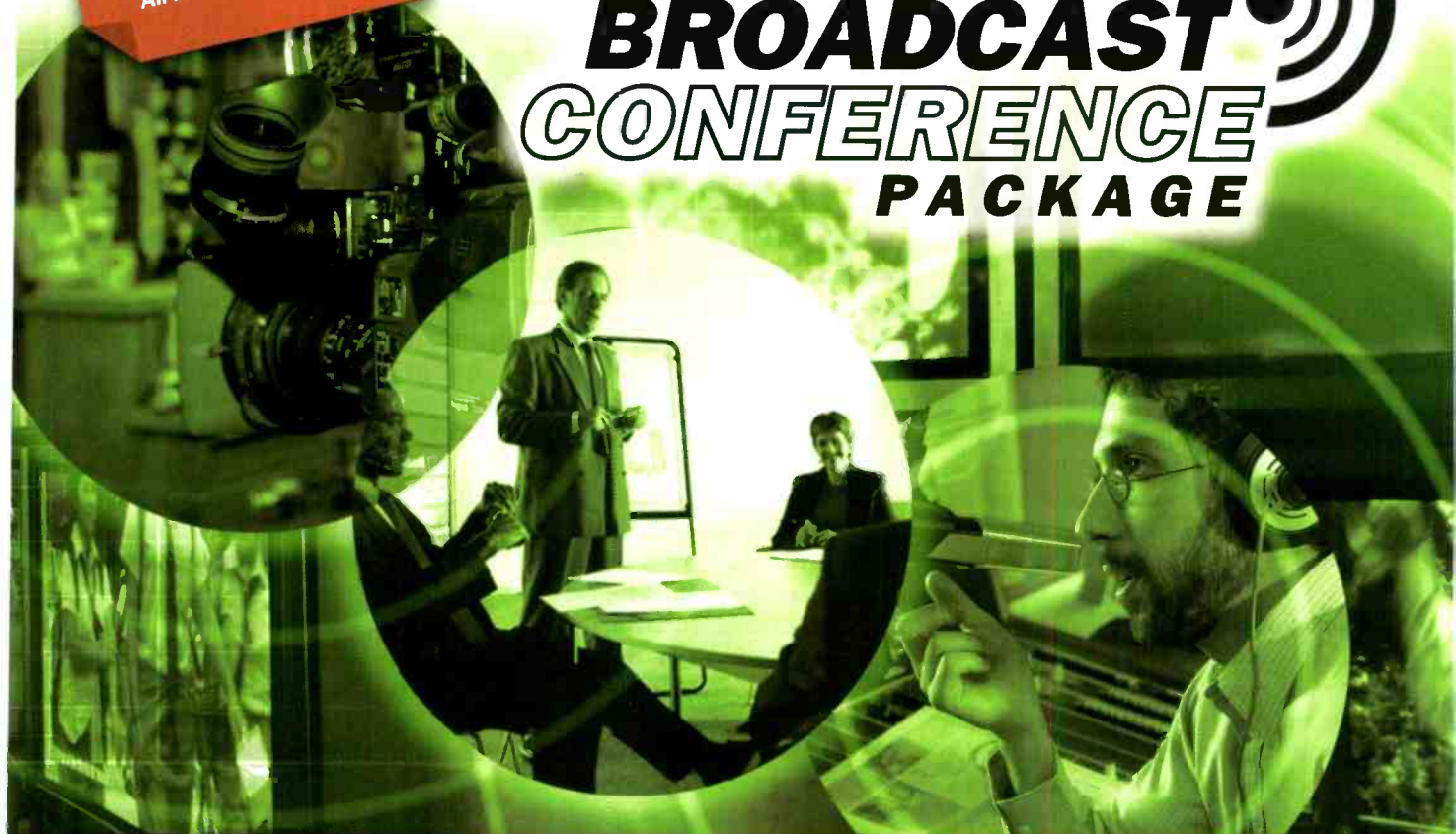
Videotape requires many people to manage the process, but managing video content as electronic files can eliminate duplication of effort and many wasteful steps. Moving from physical media such as tape to digital video files is like going from letters and stamps to e-mail.

Some of the processes that were automated or eliminated by moving to a

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Newsroom automation

BY JOHN LUFF

Newsroom automation is undoubtedly an important aspect of broadcasting. However, exactly what type of automation to have is a question in the minds of news directors and general managers everywhere.

Broadcasters automate master control or production operations to improve processes and methods of operation, as well as find financial gains. The purpose should never be to institute any type of operation for reasons that do not actually improve operations in a carefully considered and thoroughly planned manner.

Process automation

There are a couple of types of newsroom automation systems that newsroom managers often consider. The highest level is process automation and is often known as simply a newsroom computer system. It begins with ingest of wire copy and ends with outputting of teleprompter script and display in the control room of run-downs. Often, managing the stories as they move through the entire process — from acquisition through editing and on to air — is integral to process automation.

To be clear though: It is a process that is automated. The implementation can be customized to a large extent to match the specific operations of each installation. It can issue commands to load text into lower thirds, cue up stories on servers and trigger events — and that is at the lowest level of a valid purpose for automating. Today, it is often considered as the end purpose.

All of the major newsroom systems can be installed to include some level of production automation. And using extended tools, the device level auto-

mation can be carried to a high level.

Production automation

These relatively new tools might be thought of as middleware. (See Figure 1 on page 235.) Middleware takes the raw information from a newsroom computer system and assembles a production script. These tools can control camera shots, microphone selection, the video switcher and the effects used to assemble the final on-air production.

The intent of middleware is to limit the number of operations that must be done manually on multiple keyboards. One might presuppose that the goal is to eliminate labor. Production automation can be used to allow a lighter newscast, perhaps an early morning or late-night feed when it is impractical to bring in a complete crew. Economics might show that such a production cannot pay for it-

self any other way.

These systems used in newscasts are also used in university environments for distance learning and in government and industries where limited production staff can facilitate more throughput than might otherwise be possible. The systems have complex scripting language tools that allow a user to create a complete description of a program that can run somewhat unattended. I say somewhat because there are no known voice recognition production systems that would allow a journalist to speak and the production to simply follow along. However, this is technologically within reach in the near future.

Middleware products allow actions to be chained together on a timeline with triggers issued manually, to move from one portion of the script to another and for actions to occur relative to absolute timings. Early



Henry Boze, vice president engineering and TV at Jefferson-Pilot Communications, conducts a search for archived video at WWBT-TV using Crispin's NewsCat application, an integrated news cataloging and archive system.

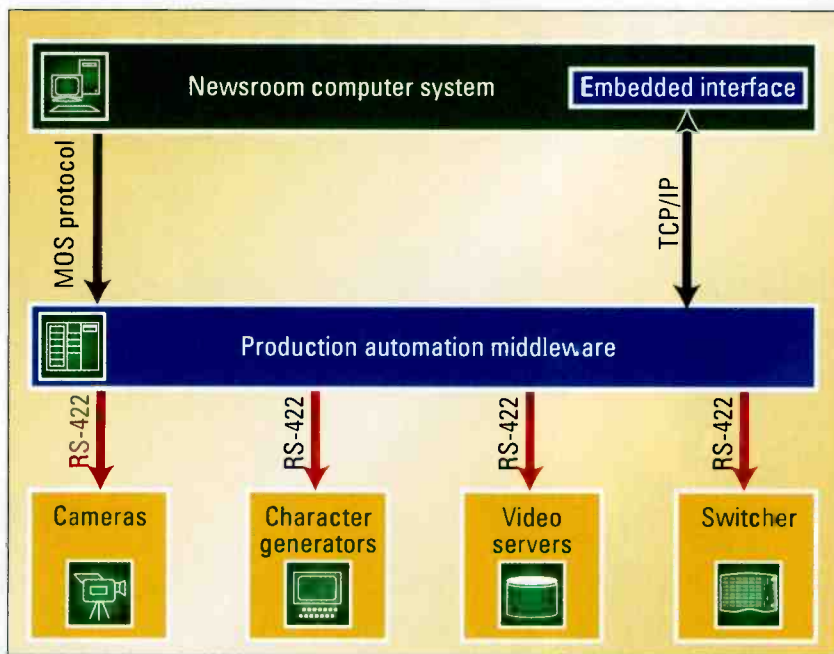


Figure 1. Production automation middleware

versions used PC-resident hardware and software solutions for many common production needs, such as character generation. Sometimes they are interfaced with off-the-shelf components (video switchers, for instance), which allow more complex effects than could be achieved in real time in computers.

Do you remember the Play Trinity? Although, ultimately, the product and

Production device automation

Just a notch below the middleware class of newsroom production automation sit a few products that perform the low-level machine control functions, offloading the control of complex devices from the newsroom computer system. They stop short of full automation scripting, but do allow a tight integration between the

A critical part of the interface between the newsroom computer system and production automation is the Media Object Server technology.

company both died out quickly, the concept was quite powerful and was not far from this genre. The company built special-purpose hardware and stuck it in the PC, eliminating the need for switcher keyboards, clip player control panels and other external interfaces. Such a box has been contemplated since the early Video Toaster, and with the addition of production scripting, it could have been a powerful production automation solution all in one box. Alas, it didn't make it.

newsroom computer system and device control.

They provide a method of tying CG text, playout of stories and other elements to the script so that a single operator can control the program. By linking to the newsroom computer system, rundown changes are facilitated and the effect they have on production support devices is minimized. It is important to see these as separate systems with links and not a single integrated package, supported

by the newsroom computer system directly.

Media Object Server technology

A critical part of the interface between the newsroom computer system and production automation is Media Object Server (MOS) technology. MOS is an API that both the newsroom computer system and the devices under control write interfaces to. It is based on XML and allows reliable and simple interfaces to be written by multiple manufacturers with reliable interoperation. SMPTE has been studying MOS as a candidate for a standardized interface for master control automation for all the same reasons.

MOS is a powerful language and allows the newsroom computer system to interface to many devices directly. But by using production middleware, other protocols are brought into one interface often with touchscreen or dedicated keyboard access in the control room for the operator to use.

For example, servers that use VDCP and do not support MOS can become part of the automation system through the middleware solution. Using such solutions also makes future changes less problematic because there is a common device control platform that may be easier to update as new devices are brought online.

Conclusion

In reality, the combination of a powerful newsroom computer system and one of the forms of production automation can greatly enhance productions. It can provide operators a way to execute complex productions without errors and facilitate last-minute changes that might otherwise have been left out. Though not for everyone, it is a way to execute at a lower cost and with an astounding degree of reliability. **BE**

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



Send questions and comments to: john_luff@prism2b.com

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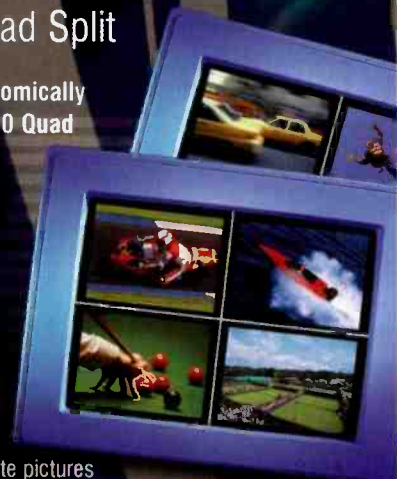
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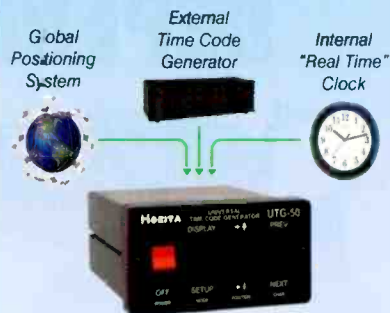
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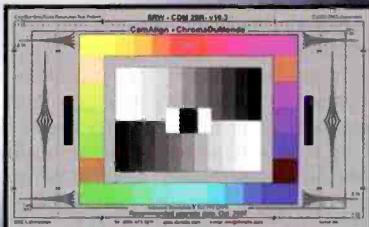
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Broadcast quality

BY PAUL MCGOLDRICK

It seems like it has only been a few years since all the manufacturers were touting the claim that their equipment was of broadcast-quality. Their claims had some truth to them because the fact of the matter is that the broadcast industry has never defined a specific quality for images.

The current definition of broadcast-quality relies solely on a single figure

Some of the digital tuners being designed for future products offer technology stories that would make most RF engineers' hair curl.

drawn in the RS-170A standard. That drawing only defines scan timing and is simply an update from the monochrome EIA RS-170 standard.

Thank goodness the days have passed when stations could get away with transmitting a VHS signal as broadcast-quality. The plain truth is that a lot of present-day consumer and prosumer gear produce a picture quality equal to or better than what we were producing in the 1970s and 1980s.

That fact has not been lost on some of the larger broadcasting equipment manufacturers, whose initial investment in research and development led to the quality we see today across the board. Indeed, there have been rumors over the last couple of years that some vendors were considering pulling out of the broadcast market.

The market is one in which the costs are much higher because of the specialized sales forces needed and the limited distribution chains. No doubt, those rumors will be compounded next month at NAB.

But just as the quality of consumer equipment has leapt up to commonly accepted standards of broadcast-

quality, there is another level of quality taking a nosedive.

When you look at some of the cartoons on children's television channels, you have to wonder what goes on in the heads of the producers of that cheap, sloppy stuff. And though some video game manufacturers spend a bunch of money designing products capable of decent images on large screens (decent in quality, not

in content), there are other handheld gaming systems that make me question how anyone can look at the displays for more than a couple of minutes without getting a headache.

During my last visit to Silicon Valley, I saw video that ranged from superb MPEG-4 quality (some of which you will get to see next month at NAB) right down to the unimaginable, poor quality that people seem to be willing to put up with.

The trend to make cell phones into smart phones means that the vendors have to add features that encourage consumers to go out and buy the latest and greatest. I'll give a bonus to whoever invented the marketing name smart phone. Smart implies digital, and, of course, we all know that digital is the way to improve *everything!*

The industry's technology began with still cameras, moved on to movie cameras, and then some manufacturers started adding GPS to their products — not so you could find your way around but as a future advertising feature for the carrier to direct you to the nearest McDonald's.

Now the move is toward putting a

tuner in the phones so that you can watch TV. Some of the digital tuners being designed for future products offer technology stories that would make most RF engineers' hair curl. Stories like the frequency percentage of the IF they can pass, with all the obvious artifacts, that they can correct with algorithms in the later digital world.

Another oncoming horror is the need by consumers to transfer video from the smart phone to a large domestic-type display. ICs are being developed to either convert (and the industry cannot get its story straight as to whether this is coding or decoding) digital video signals in the camera to NTSC or PAL, or to take raw analog video and filter/buffer it to feed to the larger display.

Can you imagine how awful cell phone images will look on a 40in TV? What's the point of promoting HDTV if consumers will watch this kind of fuzzy TV? I may faint outright if somebody calls it broadcast-quality. **BE**

Paul McGoldrick is an industry consultant based on the West Coast.



Send questions and comments to:
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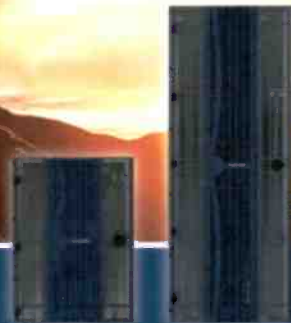
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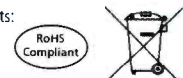
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Currently, all Leitch product shipments to the European Union are Waste Electric and Electronic Equipment (WEEE) compliant, as indicated by their CENELEC WEEE labeling. We are also committed to complying with the EU directives regarding the Restriction on the use of Hazardous Substances (RoHS). Our RoHS compliance initiative is well underway, and we fully expect to be shipping RoHS compliant product to the EU after June 30, 2006.

Leitch also continues to monitor similar environmentally focused legislation originating in other parts of the globe. We will continue to uphold our responsibility as a world-class supplier that complies with all national and international standards and certifications.

Look for these symbols on our RoHS and WEEE compliant products:



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HOS6800+	HD-SDI to Single-mode Optical Transmitter	5
HOS6800+xx	HD, SD, ASI Single-mode CWDM Optical Transmitter	5
OB56800+C	Passive CWDM Optical Splitter and Combiner	7
OD56800+CL4, CU4, CL8, CU8	Passive CWDM Single-mode Optical De-multiplexers	6
OH56800+	Single-mode Optical to HD-SDI Receiver	7
OMS6800+CL4, CU4, CL8, CU8	Passive CWDM Single-mode Optical Multiplexers	6
OS56800+, OSM6800+	Single-mode Optical & Multi-mode Optical to SDI Receivers	9
SOS6800+, SOM6800+	SDI to Single-mode & SDI to Multi-mode Optical Transmitters	8
SOS6800+xx	SD Single-mode CWDM Optical Transmitter	8
Up-converters/Down-converters/Cross Converters		
HDC-3901, HDC-3901-AD	HDTV Down-converter, HDTV Down-converter with De-multiplexer	41
HDC6800+, HDC6800+A	HDTV Utility Down-converter	11
HUC-3901	HDTV Up-converter	40
HUC6800+, HUC6800+C	HDTV Utility Up-converter	11
X75	HDTV Multiple Path Synchronizer, Converter, Processor	81, 82
XHD-3902-C	Advanced Broadcast-quality HDTV Cross Converter and Frame/Audio Synchronizer	39
XHD-3902-D	Advanced Broadcast-quality HDTV Down-converter with Audio Processing	38
XHD-3902-M	Advanced Broadcast-quality Multi-Path HDTV Converter with Audio Processing	40
XHD-3902-U	Advanced Broadcast-quality HDTV Up-converter with Audio Processing	38
XHD-3902-UUCD	Advanced Broadcast-quality HDTV Converter with Audio Processing	39
XHD6800+UD, UCD	Broadcast-quality Up-converter	10
Audio/Video Simplicity Products		
AVM-3901-A, B, C, B4, C4	SDI/Audio Synchronizer/Processor & Multiplexer	50
AVM-3902-B4, C4	SDI/AES and Embedded Audio Synchronizer/Processor & Multiplexer	51
AVS-3901-B, C	SDI/AES Synchronizer/Processor	50
AVS-3902-B, C	SDI/AES and Embedded Audio Synchronizer/Processor	51
AVS6800+B2, C2	SDI/AES Synchronizer/Processor	25
DAS-3901	Composite Video/Analog Audio Synchronizer/Processor/Multiplexer	49
EA56800+B2, C2	Broadcast-quality Digital-to-Analog, Video and Audio Monitoring	24
HFS56800+	HDTV Audio/Video Frame Synchronizer and Processor Amp	13

HFS5A6800+	HDTV Audio/Video Frame Synchronizer and Processor Amp	13
SFS-3901	SDI and Embedded Audio Synchronizer/Processor	49
SFS6800+	Audio/Video Frame Synchronizer and Processor Amp	25
Decoder/Synchronizers and A-to-D Converters		
ADC-3901	Analog Component Video to SDI Converter	56
ADC-6801	Analog Component to SDI Converter	16
ADV6800+	Analog Component Video to SDI Converter	17
DEC-3902	Composite Video to SDI Decoder	52
DEC6800+, DES6800+	Composite Video Decoder; Composite Video Decoder/Synchronizer	15
DES-3901-S	Composite Video to SDI Decoder/Synchronizer with SDI Input	53
DES-3902	Composite Video to SDI Decoder/Synchronizer	52
DES-3901-S	Composite Video to SDI Decoder/Synchronizer/Noise Reducer with SDI Input	54
DNS-3902	Composite Video to SDI Decoder/Synchronizer/Noise Reducer	53
Encoder/Synchronizers and D-to-A Converters		
DAC-6801	SDI to Analog Component Converter	17
DAV6800+	SDI to Analog Component Video Converter	18
ENC6801+, ENS6801+	SDI Video Encoder; SDI Video Encoder/Synchronizer	15
ENS-3901	SDI to NT-C/PAL Color Encoder/Synchronizer	54
Video Synchronizer — Delays		
AVM-3901-A, B, C, B4, C4	SDI/Audio Synchronizer/Processor & Multiplexer	50
AVM-3902-B4, C4	SDI/AES and Embedded Audio Synchronizer/Processor & Multiplexer	51
AVS-3901-B, C	SDI/AES Synchronizer/Processor	50
AVS-3902-B, C	SDI/AES and Embedded Audio Synchronizer/Processor	51
AVS6800+B2, C2	SDI/AES Synchronizer/Processor	25
DAS-3901	Composite Video/Analog Audio Synchronizer/Processor/Multiplexer	49
DLY-3901-4	SDI Delay Processor	55
EA56800+B2, C2	Broadcast-quality Digital-to-Analog, Video and Audio Monitoring	24
HFS6801+	HDTV Frame Synchronizer/Processor	10
HFS6800+	HDTV Audio/Video Frame Synchronizer and Processor Amp	13
HFS5A6800+	HDTV Audio/Video Frame Synchronizer and Processor Amp	13
SFS-3901	SDI and Embedded Audio Synchronizer/Processor	49
SFS6800+	Audio/Video Frame Synchronizer and Processor Amp	25
VFS-3901	SDI Frame Synchronizer/Processor	55
VFS-3901H-1	HDTV Video Frame Synchronizer/Processor	41
VFS6800+	SDI Frame Synchronizer/Processor	16
XHD-3902-C	Advanced Broadcast Quality HDTV Cross-converter and Frame/Audio Synchronizer	39
Audio Conversion Products		
ADC-3981	4-Channel Analog to 2 AES Audio Converter	57
ADC6800+A2BC, A4BC	Audio Analog to AES Converters	18
ADS6800+A2BC, A4BC	Audio Delay Synchronizer with A to D Conversion	24
DAC-3981 (-60°)	2 AES 4-Channel Analog Audio Converter	57
DAC6800+BCA2, BCA4	AES to Analog Audio Converters	19
EA56800+B2, C2	Broadcast-quality Digital-to-Analog, Video and Audio Monitoring	24
Audio Synchronizer — Delays		
ADS6800+A2BC, A4BC	Audio Delay Synchronizer with A to D Conversion	24
ADS6800+B2, C2	AES Audio Delay Synchronizer	23
AS-3901-AD, DA, DA-600	4-Channel Analog/2-Channel AES Audio Synchronizer/Delay/Processor	43
AS-3901-B, C	2 AES Audio Synchronizer/Delay/Processor	43
AVM-3901-A, B, C, B4, C4	SDI/Audio Synchronizer/Processor & Multiplexer	50
AVM-3902-B4, C4	SDI/AES and Embedded Audio Synchronizer/Processor & Multiplexer	51
AVS-3901-B, C	SDI/AES Synchronizer/Processor	50
AVS-3902-B, C	SDI/AES and Embedded Audio Synchronizer/Processor	51
AVS6800+B2, C2	SDI/AES Synchronizer/Processor	25
DAS-3901	Composite Video/Analog Audio Synchronizer/Processor/Multiplexer	49
DSA-3901-A	Analog Audio Synchronizer/Delay Processor & De-multiplexer	60
EA56800+B2D, C2D	Broadcast Quality Digital to Analog, Video and Audio Monitoring	24
HFS56800+	HDTV Audio/Video Frame Synchronizer and Processor Amp	13
HFS5A6800+	HDTV Audio/Video Frame Synchronizer and Processor Amp	13
MSA-3901-A, B, C, B4, C4	Audio Synchronizer/Delay Processor & Multiplexer	59
MSA6800+A2, A4	Analog Audio Multiplexers with Synchronizer and Delay	20
MSA6800+A2B2, A2C2, A4B2, A4C2	Analog Audio Multiplexers with Synchronizer, Delay & AES Outputs	21
MSA6800+B2, B4, C2, C4	AES Multiplexers with Synchronizer & Delay	22
SFS-3901	SDI and Embedded Audio Synchronizer/Processor	49
SFS6800+	Audio/Video Frame Synchronizer and Processor Amp	25
XHD-3902-C	Advanced Broadcast-quality HDTV Cross-converter and Frame/Audio Synchronizer	39
Multiplexers and De-multiplexers		
AVM-3901-A, B, C, B4, C4	SDI/Audio Synchronizer/Processor & Multiplexer	50
AVM-3902-B4, C4	SDI/AES and Embedded Audio Synchronizer/Processor & Multiplexer	51
DAS-3901	Composite Video/Analog Audio Synchronizer/Processor/Multiplexer	49
DMX-3901-A, B, C	SDI Demultiplexer to 4 Analog or 2 AES Audio	59
DMX-3901-B4, C4	SDI Demultiplexer to 4 AES Audio	60

DM-192, DM-154, DM-145GCR, DM-145, DM-141A - Frequency Agile Analog Demodulators



The **DM-192** is a 192-channel agile demodulator that provides features and performance found on demodulators over twice its price! It shares all of the features of the **DM-154** plus front panel selectable synchronous or envelope detection and three types of full-time audio outputs. The DM-192 is ideal for high quality reception and testing. The

DM-154 demodulator can be used for FCC compliance testing. Controls include forced mono mode, a Zero Carrier Pulse (chopper), 4.5 MHz aural carrier output, external IF loop and remote control via an RS-232 port. The **DM-145** and **DM-145GCR** have the capability of providing full time stereo audio and SAP outputs. The DM-145GCR adds the capability of Ghost Cancellation Reference (GCR) correction to the Video output. The most affordable model in our family, the **DM-141A** receives "off-air" or CATV signals, processes these signals and provides two buffered composite baseband video outputs. Additionally the DM-141A provides balanced stereo audio outputs and front panel speaker.

Features

- Multi-band tuning (VHF/UHF/Cable)
- HRC/IRC tuning capability
- Random access, search or up/down channel selection
- Front panel Cable/Antenna selection
- Synchronous detection
- Envelope and synchronous detection on DM-192
- Up to 4 MHz bandwidth for FCC testing
- Audio output configurations for every requirement
- Front panel LED channel display
- Front panel memory retained for one week in event of power loss
- Standards available: NTSC, PAL-M and NTSC-J

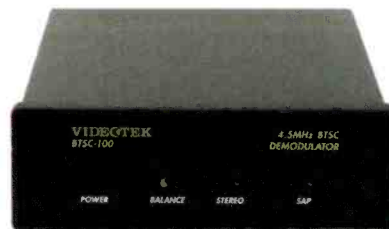


DM-100 - Utility Analog Demodulator

The **DM-100** is the perfect demodulator for utility applications in cable TV, industrial TV headends, trucks, presentation rooms, and more. The DM-100 accepts either Antenna or Cable TV RF inputs, and outputs both video and balanced BTSC stereo audio. Compact size — three units in 1RU space.

OPTIONS:

- DM-100X:** DM-100 without external power supply
- PS-120:** Multiple Unit power supply
- PS-48:** -48 VDC power supply
- DAT-1:** Rackmount frame
- DM-100J:** Channels plans for Standard M, Japan



BTSC-100 - Aural BTSC Demodulator

The **BTSC-100** is an aural TV demodulator that decodes a 4.5 MHz or aural composite input into balanced left and right BTSC stereo audio and Secondary Audio Program (SAP) outputs. The BTSC-100 is designed for use in applications where the existing audio is only available in 4.5 MHz or aural composite formats, and where fully demodulated stereo and SAP audio is required.

OPTIONS:

- DAT-1:** Rackmount frame

DEMODULATORS

DDM-800 - Multi-channel 8VSB/QAM Frequency Agile Demodulator



The **DDM-800** is a compact, one rack-unit, Frequency Agile Digital Demodulator capable of demodulating 8VSB, 64 QAM and 256 QAM modulated signals and converting them to DVB-ASI output format. The DDM-800 can house up to four separate demodulators in one package. The demodulated MPEG-2 output streams can then be locally decoded,

analyzed, multiplexed or passed to a cable facility via QAM modulators or to a data distribution network. The DDM-800 front panel interface enables quick setup through direct entry keypad and navigation keys. The status display for each demodulator shows SNR and Bit Error Rate (BER). External communications supports configuration through an intuitive Web Browser GUI via the 10/100 Base-T Ethernet connection, SNMP and Serial communications. The DDM-800 has the flexibility to add three optional demodulators (DDM-Opt-801) to its base unit, providing a space efficient and economical solution for Cable, Satellite and Broadcast facilities.

OPTIONS - DDM-Opt-801: 8VSB Demodulator with single ASI output. (Three additional allowed per base unit)

Features

- High Demodulator Density: Four ATSC Receivers in compact 1RU package
- Supports 8VSB and QAM modulated transmissions
- Factory or Field installed modules (Single Demodulator is standard)
- Ethernet communications, Web Browser, and SNMP support with Alarm Time Stamp
- Real-time clock with battery backup, instant memory save feature for all settings
- Front panel LCD display
- Power and Summary Alarm LED indicators
- Universal, Multi-drop Serial port
- Programmable GPI Alarm outputs
- Standards available: ATSC

DM-200 & DM-200A - High-performance Frequency Agile Analog Demodulators



Representing over a quarter century of continuous commitment to meeting the requirements of the most demanding video RF engineers, Harris offers the **DM-200** and **DM-200A** high-performance demodulators. With a signal-to-noise figure better than 56 dB, the DM-200 series is ready to take charge at your laboratory bench, cable headend rack or broadcast facility. Whether you are performing FCC compliance testing, monitoring or recording off-air

signals, or rebroadcast to your cable plant, don't settle for second best. No one else offers all the performance, all the features, and all the controls — in a single package. For CATV and satellite services, the DM-200A offers all of the same features and specifications as the DM-200 except that the DM-200A does not include a quadrature output. With a custom-designed SAW filter and a full complement of professional features, the DM-200 and DM-200A are ready to handle your most stringent performance applications.

OPTIONAL ACCESSORIES- **DRT-3:** Dual Rackmount Tray, **BLK-3:** Blank filler panel for either side of DRT-3

Features

- Full FCC 4.1 MHz bandwidth video for compliance testing
- Better than 56 dB Video SNR
- Differential gain: $\leq 1.0\%$
- Differential phase: $\leq 1.0^\circ$
- Proprietary high performance SAW filter ensures optimal performance
- Quadrature output for ICPM measurements (DM-200 only)
- Simultaneous BTSC stereo and SAP outputs
- 4.5 MHz and composite audio outputs
- Zero Carrier Pulse control allows depth of modulation measurements
- Remote control via user selectable RS-232/422/485 port

Harris Videotek® Demodulators - 8VSB, 64 QAM, 256 QAM and NTSC

For nearly three decades, the Videotek® brand name has become synonymous with high performance TV demodulators at the lowest cost to the industry. With a range of models to support applications from basic monitoring through full FCC proof-of-performance testing, Videotek has become one of the largest suppliers of frequency agile demodulators in North America. All analog models provide video and BTSC stereo signal demodulation for off-air broadcast, CATV and closed circuit monitoring applications. 8VSB demodulators use advanced digital technology to provide transport stream outputs. High definition, standard definition, and analog MPEG-2 decoding features are available in select products.

Digital Demodulators	ASI Output	SMPTE 310 Output	LVDS Output	ASI Input	SMPTE 310 Input	LVDS Input	HD SDI Output	SD-SDI Output	NTSC Output	HD CAV Output	Remote Control	Audio Output	Size
DDM-800	4*	NO	NO	NO	NO	NO	NO	NO	NO	NO	Web Browser SNMP, Serial, GPI	NO	1RU
DDM-540	1	YES	YES	YES	YES	YES	YES	YES	YES	YES	Serial	1-AES 2-Analog	2RU
DDM-520	1	YES	YES	YES	YES	YES	NO	YES	YES	YES	Serial	1-AES 2-Analog	2RU
Analog Demodulators	Cable Channel #	Remote	Video Outputs	Video SNR	Audio Output	QUAD Output	4.5 MHz/Comp	IF Loop	Zero Carr Pulse	Detection	Diff Gain	Diff Phase	Size
DM-200	2 - 125	RS-232/422	2	> 56dB	Stereo/SAP	YES	YES	YES	YES	Synchronous	< 1%	< 1.0°	1RU x 1/2 Rack Width
DM-200A	2 - 125	RS-232/422	2	> 56dB	Stereo/SAP	NO	YES	YES	YES	Synchronous	< 1%	< 1.0°	1RU x 1/2 Rack Width
DM-192	2 - 125	RS-232/422	2	> 50dB	Stereo/SAP/ PRO	YES	YES	YES	YES	Synchronous/ Envelope	< 4%	< 4.0°	1RU
DM-154	2 - 99	RS-232	2	> 50dB	Stereo/SAP	YES	YES	YES	YES	Synchronous	< 4%	< 4.0°	1RU
DM-145GCR	2 - 99	NO	2	> 49dB	Stereo/SAP	NO	NO	NO	NO	Synchronous	< 5%	< 5.0°	1RU
DM-145	2 - 99	NO	2	> 49dB	Stereo/SAP	NO	NO	NO	NO	Synchronous	< 5%	< 5.0°	1RU
DM-141A	2 - 99	NO	2	> 49dB	Stereo	NO	NO	NO	NO	Synchronous	< 5%	< 5.0°	1RU
DM-100	2 - 99	NO	1	n/a	Stereo	NO	NO	NO	NO	Synchronous	n/a	n/a	1RU x 1/3 Rack Width
BTSC-100	n/a	n/a	n/a	n/a	Stereo/SAP	n/a	YES (IN)	n/a	n/a	n/a	n/a	n/a	1RU x 1/3 Rack Width

* Options allow up to four, one is standard # All video demodulators tune VHF and UHF channels 2 through 69

DDM-520/DDM-540 - 8VSB Frequency Agile Demodulator/Decoder



The **DDM-520** and **DDM-540** are frequency agile 8VSB demodulators with MPEG-2 HDTV/SDTV decoders. The MPEG-2 transport stream generated by the DDM-520 and DDM-540 is compliant with the SMPTE 310M, DVB-ASI and DVB-SPI requirements. The MPEG-2 HDTV decoder decompresses the demodulated MPEG-2 program streams, accepting either HDTV (main profile at high level) or SDTV (main profile at main level) formats, and generates a multitude of signals including RGB and YPbPr analog Component Video, NTSC analog composite video, SVGA and Serial Digital signals for monitoring the video program selected. A separate connector provides for the selected AES or Dolby® Digital (AC-3™) encoded audio bit stream output. In addition, the decoder will produce an analog stereo audio output for the selected channel for monitoring purposes. The DDM-520 and DDM-540 are packaged in a standard 2RU rack mountable chassis. The DDM-540 provides for additional monitoring of signals with an HD/SDI output that conforms to SMPTE 292M and 299M.

Features

- 12 Button Numerical Keypad for direct data entry of channel
- Signal to Noise Ratio and Bit Error Rate information available
- HD/SDI output (DDM-540)
- Closed Caption decoded and displayed on the output video
- Transport stream display selection for PSIP table information
- Auto programming of available 8VSB channels
- SMPTE 310M, DVB-ASI, DVB-SPI transport stream inputs and outputs
- Constellation diagram display selection
- CAV, SVGA, SDI, NTSC outputs
- Dolby® Digital (AC-3™) and Stereo Audio outputs
- Standards available: ATSC

LCD MONITORS

FSM-15R - 15" LCD Display with Drawer



The **FSM-15R** is the perfect solution to a conventional monitor taking up valuable rack space. A 15" TFT active matrix LCD supporting up to 1024x768 resolution mounted in a one-unit high (1.75") drawer with industrial heavy-duty hinges. Easy action drawer withdrawal and return for ability to raise for display. Unit pushes back into the rack to minimize space during viewing.

Features

- One (1.75") rack unit high
- 15" active matrix TFT LCD display
- 1024x768 resolution, supporting 16.7 million colors
- Extra wide viewing angle
- High brightness and contrast ratios
- Plugs directly into standard VGA output
- Video and power cables provided
- Display powers off when in closed position
- 18" slides for stable rack mounting
- Recessed front panel handle fits behind rack doors

FSM-17RK - 17" Rackmount Flat-Screen LCD Monitor



The **FSM-17RK** Flat-Screen LCD Monitor is the perfect match for any VTM Series™ or other multimedia devices such as editors and data servers. A 17" TFT active matrix LCD panel supporting up to 1280x1024 resolution with 16.7 million display colors is housed in a 9RU ultra-thin 3" deep space saving rackmount. The FSM-17RK is VGA / SVGA / XGA compatible with a flicker and static free extra wide viewing angle that is low on power consumption and high in display solutions.

Features

- 17" TFT/LCD Flatpanel
- 1280x1024 resolution, supporting 16.7 million colors
- Plugs directly into VGA output
- Extra wide viewing angle
- Space saving, 3.0" depth

Flat Screen LCD Monitors

	Screen Size	Screen Type	Horizontal Scan	Vertical Scan	Optimum Resolution	Input	Mounting
FSM-17RK	17" Diagonal	TFT	39-76 kHz	50-77 Hz	1280 x 1024 60 Hz	RGB Analog	9RU Rackmount
FSM-15R	15" Diagonal	TFT	15-63 kHz	50-77 Hz	1024 x 768 60 Hz	RGB Analog	1RU Drawer

APM-210 - Stereo Audio Program Monitor



The **APM-210** is designed to provide superior audio fidelity from a sleek 1RU package. Designed for ease of integration with Harris' Videotek® state-of-the-art test and measurement instruments (VTM Series™, TVM-950, TVM-900, TVM-850, and ASM-100) via a

looping input connection and provided 37-pin audio adapter cable, the APM-210 is an ideal multi-purpose monitor. The APM-210 audio's high quality and low distortion is attained using a 2-way speaker system, with a low and high frequency driver per channel, plus wide volume control range with balance adjustment. Front panel, direct input mode switching allows the selection of stereo and L + R monitoring for up to 10 different channels. Two, 10-segment, color LED bargraph meters are provided with selectable peak or average response ballistics and reference level. Five reference level selections allow a wide range of audio input levels. A front panel headphone jack mutes the speaker output for isolated listening requirements. Shielding permits use adjacent to waveform or picture monitors without magnetic interference making the APM-210 ideally suited for use in remote vans, editing suit, VTR monitor bridges or for any system that requires high quality professional aural monitoring of stereo audio signals.

APM-200 - Stereo Audio Program Monitor



Engineered for aural monitoring of stereo audio, the compact **APM-200** requires only one rack unit space. High-quality, low-distortion volume levels are output through two 5 inch speakers. Input mode switching allows the selection of L - R, L + R, stereo, reversed

stereo, L only or R only monitoring. Ten segment, two color LED bargraph meters are provided with switchable peak or average response ballistics. Shielding permits use adjacent to waveform or picture monitors without magnetic interference. The APM-200 is ideally suited for use in remote vans, editing suit, VTR monitor bridges or for any system that requires professional monitoring of stereo audio signals.

APM-800 - Stereo Audio Program Monitor



Engineered for dual aural monitoring of up to eight inputs, the **APM-800** has two color bargraph meters, internal speakers, headphone jack and external speaker amplifiers. High quality, low distortion volume levels are output through two 3" speakers. The APM-800 has switchable peak or average meter response, stereo or

monaural operation, and eight selectable inputs. Magnetic shielding permits use adjacent to waveform or picture monitors without interference. The APM-800 is ideally suited for use in remote vans, editing suites, VTR monitor bridges or for any system that requires monitoring of multiple audio signals.

AUDIO MONITORING



The **ASM-100** is an advanced audio monitoring instrument providing all the features required to maintain high quality audio in today's arena of multi-format, multi-channel scenarios. The unit draws many of its features from the value packed VTM series of multi-format on-screen monitors. Providing a high resolution 1024 x 768 XGA output for use on any standard computer monitor, the ASM-100 will accept and display up to 8 channels of analog or AES/EBU audio (base unit). Options are available for de-embedding SD and HD SDI inputs, Dolby® Digital and Dolby® E inputs with 8 channel analog decode, and a remote control panel. A unique advanced test tone option provides a means to verify surround sound channel placement and proper phase alignment.

Eight channels of audio can be displayed simultaneously along with lissajous patterns for proper amplitude and phase monitoring. Scales can be customized by adding text to each meter and a full range of meter ballistics are available. A 72-hour trending chart can be viewed directly below the meters to track historical amplitude and phase movement. The peak values are averaged over time and displayed to assist in determining overall audio sound level.

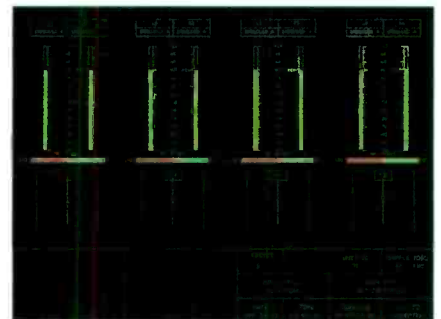
The unique Videotek® CinePhase™ display designed for intuitive viewing of surround sound levels is coupled with a new multi-channel phase display which presents all critical interchannel relations at a quick glance. A loudness ballistic selection coupled with Metadata readout provides valuable information for developing or monitoring modern multi-channel audio. Built-in on-screen alarms will continuously monitor for out of tolerance conditions and can report those conditions to the SpyderWeb® software for logging. Communication ports are available in serial RS-232/422 and Ethernet 10/100 Base-T.

Features

- Audio inputs include 8 analog, 8 AES/EBU, 2 embedded sources HD or SD
- Real time chart recording of data samples
- Eight channel plotting of phase and level with average value display
- Analog, AES/EBU, Dolby® Digital (AC-3™), Dolby® E from external or embedded sources
- CinePhase™ multi-channel Level and Phase display
- XGA Frame capture

Options

- Dolby® Digital (AC-3™), and Dolby® E metering and decoding
- Embedded source from SD
- Embedded source from SD and HD
- Embedded Tone output (CineTone™)

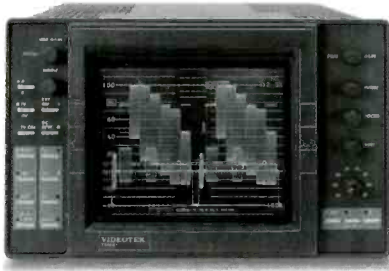


Multiple Lissajous Screen



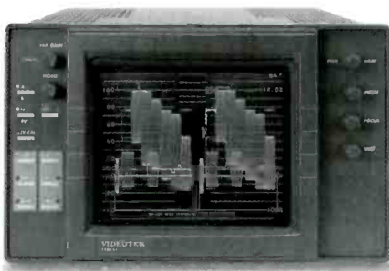
CinePhase™ Display includes multi-channel Phase Display

TSM-61 - Waveform Monitor with Line Select



The **TSM-51** and **TSM-61** are an excellent value in waveform monitors. Market-proven traditional features are combined with ergonomically designed controls for a variety of measurement functions. Selection of filter response and time base sweep are easily accomplished via tactile membrane control switches. Rapid A/B comparisons may be made by directly switching between the A and B inputs. The TSM-61 includes Line Select for lines 14 to 21, 1H and 1H mag sweep and a Differential Gain filter.

TSM-51 - Waveform Monitor



VSM-61 - Vectorscope



The **VSM-61** is designed for convenience and ease of operation in observing the vector display of video signals. Proven, reliable circuit design permits accurate measurement of differential gain and differential phase. Requiring only three rack units (5.25 inches) and one half-rack width, the VSM-61 vectorscope may be mounted in the optional DRC-1 double rackmount case along with Videotek's TSM-51 or TSM-61 waveform monitor for complete signal monitoring.

	SD-SDI Inputs	Analog Composite Inputs	CAV Inputs	Looping Inputs	WFM	Line Select	Vector	Eye Pattern	Alarms	Audio	Remote Control	Video Monitor Output	Size
TVM-821D	2	NO	NO	YES	YES	NO	YES	NO	YES	Stereo Lissajous	NO	NO	3RU 1/2 Rack
TVM-675	NO	3	1*	YES	YES	NO	YES	NO	NO	Stereo Lissajous	NO	YES	3RU 1/2 Rack
TSM-61	NO	2	NO	YES	YES	YES**	NO	NO	NO	NO	NO	YES	3RU 1/2 Rack
TSM-51	NO	2	NO	YES	YES	NO	NO	NO	NO	NO	NO	NO	3RU 1/2 Rack
VSM-61	NO	2	NO	YES	NO	NO	YES	NO	NO	NO	NO	NO	3RU 1/2 Rack

* 3 Inputs shared as one CAV ** Vertical interval

TVM-821D and TVM-821D/DC - Serial Digital Waveform Monitor/Vectorscope



The **TVM-821D** serial digital waveform monitor/vectorscope brings the most commonly needed functions within quick, easy and affordable reach. Button per function design provides simple operation. With two serial digital inputs A/B Parade and Overlay modes provide for level comparison and easy system timing. Waveforms can be displayed as RGB or Y,Pb,Pr. LEDs provide a display of input EQ for verification of signal integrity as well as alarms for EDH, Gamut, EAV and SAV data problems. X-Y display of stereo analog audio for gain and phase measurement. Four memories give fast recall of setups. Memories can be recalled from GPI inputs and there is a GPI output for alarm indication. Designed for portable applications, the **TVM-821D/DC** offers all of the same features and specifications while operating from a 12 volt DC source.

TVM-675 - Analog Component/Composite Combination Waveform Monitor/Vectorscope and Audio Monitor



The **TVM-675** is a full-featured half-rack-width combination waveform monitor/vectorscope and stereo audio monitor engineered to observe either composite or component analog signals. The audio may be displayed alone or in any combination with waveform and/or vector. One, two or three composite video signals may be observed individually or in any combination of three inputs. Waveforms can be displayed in ether parade modes or overlaid for comparison of timing and amplitude characteristics. R-Y mode for improved resolution of differential phase measurements of composite signals. All three composite inputs may be displayed simultaneously with Flat, Low Pass and Chroma filters. Vector displays can also be overlaid for simultaneous observation and comparison of the phase and amplitude of up to three composite signals. Four user defined setups can be stored in memory.

A³ — Advanced Audio Analysis options for the TVM-950, TVM-900, TVM-850 and TVM-840

TVM-A³-OPT 2

View up to eight (8) audio channels as Bar graphs or in the unique CineSound® display. Includes eight (8) Analog inputs, four (4) AES/EBU shared input/output pairs, and 16 channel of Embedded audio. Use the TVM-A³-4004 to add four (4) more AES/EBU inputs. Analog monitoring outputs for up to eight (8) channels simultaneously.

TVM-A³-4004

Audio expansion module. Adds four (4) additional AES/EBU input pairs to the TVM-A³-OPT 2.

TVM-A³-OPT 3 View up to eight (8) audio channels as Bar graphs or in the unique CineSound® display. includes eight (8) Analog inputs, eight (8) AES/EBU input pairs, four (4) shared AES/EBU output pairs, and 16 channels of Embedded audio. Analog monitoring outputs for up to eight (8) channels simultaneously. Includes channel mapping, loudness metering, customizable meter scales, and peak level reporting.

TVM-A³-OPT 4

View up to eight (8) audio channels as Bar graphs or in the unique CineSound® display. Includes eight (8) Analog inputs, eight (8) AES/EBU input pairs, four (4) shared AES/EBU output pairs, and 16 channels of Embedded audio. Analog monitoring outputs for up to eight (8) channels simultaneously. Includes channel mapping, loudness metering, customizable meter scales, and peak level reporting. Adds decoding of Dolby® Digital, Dolby® Digital Surround EX, Dolby® E, and Dolby® Pro-Logic I signals for metering and provides a 2-channel mixdown analog output.

TVM-A³-OPT 5

View up to eight (8) audio channels as Bar graphs or in the unique CineSound® display. includes eight (8) Analog inputs, eight (8) AES/EBU input pairs, four (4) shared AES/EBU output pairs, and 16 channels of Embedded audio. Analog monitoring outputs for up to eight (8) channels simultaneously. Includes channel mapping, loudness metering, customizable meter scales, and peak level reporting. Adds decoding of Dolby® Digital, Dolby® Digital Surround EX, Dolby® E, and Dolby® Pro-Logic I signals for metering and provides a fully decoded analog output. Includes Dolby® metadata display.

Mounting Options

SSC-2 Single Standard Case for TVM-950, TVM-900, TVM-850 and TVM-840

PTC-2 Portable Case with Handle for TVM-950, TVM-900, TVM-850 and TVM-840

DRC-2 Double Rackmount Case for TVM-950, TVM-900, TVM-850 and TVM-840

BLK-1 Blank Panel for DRC-2

EPC European Power Cord

TVM MULTI-FORMAT SIGNAL ANALYZERS WITH INTEGRAL LCD

RCU-1000 Remote Control Panel for the VTM Series™, TVM-950, TVM-900, TVM-850 and TVM-840



The RCU-1000 remote control panel replicates all of the front panel controls of the VTM Series™, TVM-950, TVM-900, TVM-850 and TVM-840 instruments. It can control up to ten (10) units in any mix of models up to 1,000 feet away.

Dimensions:

Height: 1.75"

Width: 19.0"

Depth: 2.75"

	Standard HD/SD-SDI Inputs	Standard SD-SDI Inputs	Option Inputs	Looping Inputs	WFM	Line Select	Vector	Eye Pattern	Alarms	Audio	Remote Control	Video Monitor Output	Size
TVM-950	2	0	2	Yes, passive	YES	YES	YES	Option	YES	Advanced Analysis Options	YES	YES	3RU 1/2 Rack
TVM-950-E	2w/Eye	0	2	Yes, active	YES	YES	YES	YES	YES	Advanced Analysis Options	YES	YES	3RU 1/2 Rack
TVM-900	2	0	2	Yes, passive	YES	YES	YES	NO	YES	Advanced Analysis Options	YES	YES	3RU 1/2 Rack
TVM-850	0	2	2	Yes, passive	YES	YES	YES	Option	YES	Advanced Analysis Options	YES	YES	3RU 1/2 Rack
TVM-850-E	0	2w/Eye	2	Yes, active	YES	YES	YES	YES	YES	Advanced Analysis Options	YES	YES	3RU 1/2 Rack
TVM-840	0	2	2	Yes, passive	YES	YES	YES	NO	YES	Advanced Analysis Options	YES	YES	3RU 1/2 Rack

Video Input Options

TVM-OPT EYE-2, Dual HD/SD-SDI Input Module with Eye pattern plus Jitter display for the TVM-950. Replaces the standard HD/SD-SDI Input module with two (2) HD/SD-SDI active looping inputs with auto-detection of input formats (1080i, 1080p, and 720p at all popular frame rates including standard definition 525/625) and HD and SD Eye pattern with Jitter display. Monitoring output of selected input. Must be installed as inputs A and B.

TVM-OPT EYE-1, Dual SD-SDI Input Module with Eye pattern plus Jitter display for the TVM-850. Replaces the standard SD-SDI Input module with two SD-SDI active looping inputs with auto-detection of input formats (525/625) and SD Eye pattern with Jitter display. Monitoring output of selected input.

TVM-OPT HD/SD, Dual HD/SD-SDI Input Module for the TVM-950 and TVM-900. Adds two (2) HD/SD-SDI passive looping inputs with auto-detection of SMPTE 292M and SMPTE 259M-C input formats (1080i, 1080p, and 720p at all popular frame rates including standard definition 525/625). Monitoring output of selected input.

TVM-OPT SD, Dual SD-SDI Input Module for the TVM-950, TVM-900, TVM-850 and TVM-840. Adds two (2) SD-SDI passive looping inputs with auto detection of SMPTE 259M-C input formats (525/625). Monitoring output of selected input.

TVM-OPT ACV-2, Dual Composite Analog Input Module for the TVM-950, TVM-900, TVM-850 and TVM-840. Adds two (2) Composite Analog passive looping inputs with auto-detection of NTSC and PAL.

TVM-OPT AAP, Advanced Analysis Package adds Data Analyzer functions in quadrant or full-screen views to the TVM-900 and TVM-840.



Harris' Videotek® **TVM-900** multi-format HD/SD-SDI video and audio signal analyzer with integral XGA TFT color LCD display is the most cost-effective, versatile, modular, and intuitive test instrument available in a half-rack scope package.

Features

- Dual, auto detecting HD/SD-SDI Inputs
- Standards: SMPTE-292M, SMPTE-259M-C
- Supports 4:2:2 and 4:4:4 (Dual Link) Formats
- Customizable display functions and screen location
- Patented Gamut display
- Video Relative Timing Display
- Peak Value Report
- Picture Thumbnail
- 608/708 Closed Caption detect/alarm/display
- Comprehensive Alarm set
- 16 direct-access user presets
- Integral XGA TFT color LCD display
- Illuminated controls and indicators
- Ultra-quiet cooling system
- DVI - I output
- USB port for control and data transfer
- 10/100BaseT Ethernet, SNMP agent, Web Server
- SpyderWeb II Remote Control and Logging
- GPI and Router control

Options

- Additional Dual HD/SD-SDI Input Module
- Dual SD-SDI Input Module
- Dual Analog Composite Input Module (NTSC, PAL)
- Advanced Analysis Package
 - Pixel locator/Data Word Analyzer
- A³, Advanced Audio Analysis Modules:
 - Meter and monitor up to eight channels of Analog, AES/EBU and Embedded
 - Dolby® Digital, Dolby® Surround EX™ Dolby® E, Pro-Logic I formats
 - Dolby® decoded outputs
 - "Loudness" metering and alarm
 - Multiple audio Lissajous display
- Remote Control Panel, RCU-1000



Harris' Videotek® **TVM-850** and **TVM-840** multi-format SD-SDI video and audio signal analyzers with integral XGA TFT color LCD display are based on the most advanced, versatile, modular, and intuitive test instrument platform available in a half-rack scope package. TVM-850 users can display and evaluate up to four input sources simultaneously, while the TVM-840 displays and evaluates one source. The **TVM-850-E** includes SD Eye Pattern with Jitter display.

Features

- Dual, auto detecting SD-SDI Inputs
- Standards: SMPTE-259M-C
- Display four different inputs, simultaneously (TVM-850)
- Customizable display functions, screen location, multiple displays
- Video Relative Timing display
- Patented Gamut display
- Pixel locator/Data Word Analyzer (TVM-850)
- Picture Thumbnail
- A/B Parade and Overlay
- 608 Closed Caption detect/alarm/display
- Comprehensive Alarm set, Peak Level Report
- 16 direct-access user presets
- Integral XGA TFT color LCD display
- Illuminated controls and indicators
- Ultra-quiet cooling system
- DVI - I output
- USB port for control and data transfer
- 10/100BaseT Ethernet, SNMP agent, Web Server
- SpyderWeb II Remote Control and Logging
- GPI and Router control

Options

- Dual SD-SDI Input Module with Eye Pattern (TVM-850)
- Additional Dual SD-SDI Input Module
- Dual Analog Composite Input Module (NTSC, PAL)
- A³, Advanced Audio Analysis Modules:
 - Meter and monitor up to eight channels of Analog, AES/EBU and Embedded
 - Dolby® Digital, Dolby® Surround EX™ Dolby® E, Pro-Logic I formats
 - Dolby® decoded outputs
 - "Loudness" metering and alarm
 - Multiple audio Lissajous display
- Remote Control Panel, RCU-1000

TVM MULTI-FORMAT SIGNAL ANALYZERS WITH INTEGRAL LCD



Harris' Videotek® **TVM-950** is the flagship of our multi-format HD/SD-SDI video and audio signal analyzers with integral XGA TFT color LCD display. These instruments are the most advanced, versatile, modular and intuitive available in a half-rack scope package. Input options are available for HD/SD-SDI, SD-SDI and Analog Composite video. The **TVM-950-E** includes HD/SD Eye Pattern with jitter display. The TVM-950 can display and evaluate up to four input sources simultaneously.

100% digital signal processing enables a precision presentation of Waveform, Vector, Gamut, Audio, Picture, Timing, and Data Analyzer screens, each of which can be viewed in any quadrant or full screen. Along with picture thumbnail, and powerful MULTI mode, complete display flexibility is a reality.

The TVM-950 has impressive features: illuminated controls, modular platform for easy upgrade, HD/SD-SDI auto-detect, passive looping inputs which accept 1080i, 1080p, 720p formats at popular frame rates including SD- 525/625, dual link, real-time alarms (with time stamp, adjustable limits and peak value report), frame capture/transfer, EIA 608 & 708 closed caption, Teletext, XDS, Alarm Status, and Metadata displays.

The TVM-950 can be quickly and easily configured, with direct access to display functions, selectable screen location and context-sensitive pop-up menus, plus the industry's most intuitive navigation system. Complete presentation changes can be instantly applied with any of the 16 front panel preset selections.

Options include dual HD/SD Eye Pattern with Jitter display, dual HD/SD-SDI and dual Analog Composite inputs; Advanced Audio Analysis with CineSound® Surround display and comprehensive Dolby® decoding.

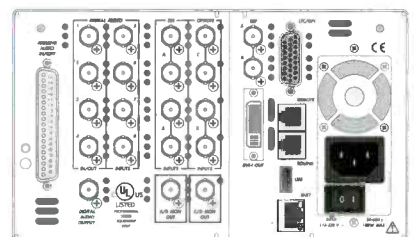
The TVM-950HD integrates seamlessly into any Broadcast, Post-production, Telecine, Satellite, or Cable facility. It's the ultimate choice for quality control, troubleshooting, and compliance check applications.

Features

- Dual, auto detecting HD/SD-SDI Inputs
- Standards: SMPTE-292M, SMPTE-259M-C
- Multiple Reference Inputs
- Supports 4:2:2 and 4:4:4 (Dual Link) Formats
- Display four different inputs, simultaneously
- Customizable display functions, screen location, multiple displays
- Video Relative Timing display
- Patented Gamut display
- Pixel locator/Data Word Analyzer
- Picture Thumbnail
- A/B Parade and Overlay
- 608/708 Closed Caption detect/alarm/display
- Comprehensive Alarm set, Peak Level Report
- 16 direct-access user presets
- Integral XGA TFT color LCD display
- Illuminated controls and indicators
- Ultra-quiet cooling system
- DVI-I output
- USB port for control and data transfer
- 10/100BaseT Ethernet, SNMP agent, Web Server
- SpyderWeb II Remote Control and Logging
- GPI and Router control Options

Options

- Dual HD/SD-SDI Input Module w/Eye Pattern
- Additional Dual HD/SD-SDI Input Module
- Dual SD-SDI Input Module
- Dual Analog Composite Input Module: NTSC, PAL
- Dual ASI Input Module
- A³, Advanced Audio Analysis:
 - Meter and monitor up to eight channels of Analog, AES/EBU and Embedded
 - Dolby® Digital, Dolby® Surround EX™, Dolby® E, Pro-Logic I formats
 - Dolby® decoded outputs
 - "Loudness" metering and alarm
 - Multiple audio Lissajous display
- Remote Control Panel RCU-1000



TVM Back Panel

PERSONAL TEST MONITOR



The Harris Videotek® **PTM-305** portable, battery powered, personal test and measurement instrument provides multi-format functionality and versatility that set it apart from other handheld devices on the market. With a powerful array of features and functions that include two Video Signal Generators, Color Monitor, Waveform, Vectorscope and an Audio Analyzer/Monitor, the lightweight PTM-305 is ideal for monitoring field production camera setup, equipment installation, or troubleshooting signal path issues related to analog and standard definition digital formats.

This PDA-sized personal test monitor was designed to offer the convenience of portability without sacrificing function and performance. To enhance the user's experience, the PTM-305 features an integrated 320 x 240 color LCD display, utilizing touch-screen technology and the provided stylus to control and configure each operation. And maintaining power in the field won't be a problem — the PTM-305 runs on standard "AA" Ni-cad batteries for up to four hours when fully charged (dependent on enabled functions). No special battery packs are required.

The PTM-305 includes two video inputs, one for monitoring composite analog NTSC and PAL video signals and the second for monitoring SD-SDI signals formatted in SMPTE 259M with embedded audio. The test signal generator has both composite analog video and SD-SDI outputs that may be active simultaneously. A balanced analog audio output from an internal audio tone generator is also included.

Standard accessories include a sunshield, stylus, batteries, charger/adapter, and a belt-style pouch.

Specifications

- Multiple functionality
 - Color Monitor
 - Vectorscope
 - Waveform Monitor
 - Test Signal Generator
 - Embedded Audio Monitor
 - Serial Data Analyzer
- Multi-formats
 - SD-SDI
 - Composite Analog
- Portable, handheld PDA-sized
- Weighs under one pound
- Integrated 320 x 240 color LCD Display
- Touch Screen Operation

Features

- EDH generation
- One Group Audio embedding
- Audio Frequency & Amplitude adjustable
- Zoom and Pan for Picture and Waveform
- RGB or Y,Pb,Pr Waveform
- Digital Line Select
- 75% or 100% Vectors
- Adjustable Persistence
- Analyze any one pair from 4 groups of embedded audio
- Stereo Headphone output
- Analog Audio tone output
- Auto shutdown of unused functions

VTM TELEVISION SIGNAL MONITOR

VIDEOTEK® TEST AND MEASUREMENT



The Harris Videotek® **VTM-100** Television Signal Monitor displays waveform, vector and audio information for analog composite, Y/C (requires optional YC-1 adapter), and component video signals plus analog audio on a composite video monitor. The VTM-100's three passive looping inputs auto-detect the incoming video format for NTSC or PAL and change the graticule and output format accordingly. The VTM-100 provides a waveform and/or vector display of the input video. The waveform and vector can be displayed independently or as a combination of both. All waveform/vector displays can be keyed or mixed with the picture on screen. Other features include line select, waveform filters, V Gain, and H Mag. The input format and SC/H measurement are displayed on screen with alarms for SC/H, Burst and Sync level, for easy reference and user convenience. The VTM-100 provides convenient operation and control from the front panel through a drop-down menu or remotely via a mouse or any PC. With features usually found only in more expensive test instruments such as waveform parade and overlay, vertical and horizontal sweep rates and magnifications, flat/low pass and chroma filters or full field line select the VTM-100 is the complete test instrument for any analog video testing application in a cost effective package.

Features

- Waveform, Vector, and stereo audio displays in multiple combinations
- Selectable formats, composite, Y/C, or component
- Three composite or one component passive looping inputs
- Composite waveforms include parade or overlay of up to three inputs with filters
- Sync, burst, and SC/H phase numeric readout and alarms
- SC/H phase, sync and burst amplitude alarm limits are user selectable
- Alarm indication of text message and display color change
- Menus and displays controlled via front panel, mouse, or PC
- Component waveforms include parade, overlay, and bowtie
- Picture mixed or keyed
- Bright, full field line select
- Time base modes: 1H/2H/3H/ and 1V/2V/3V
- Magnifications: x1, x5, x10, and x20
- Flat/low pass/chroma filter selection
- NTSC and PAL standards

	SD-SDI Inputs	Analog Composite Inputs	CAV Inputs	Looping Inputs	WFM	Vector	Line Select	Audio	Output Type	Size
VTM-203	2	2	1	NO	YES	YES	YES	Option	VGA CMO-200 (Optional)	1RU
VTM-200	2	2	NO	NO	YES	YES	YES	Option	VGA CMO-200 (Optional)	1RU
VTM-180	NO	2	NO	NO	YES	YES	YES	Option	VGA CMO-200 (Optional)	1RU
VTM-150	2	2	1*	YES	YES	YES	YES	Analog Standard	VGA TMO-150 (Optional)	1RU
VTM-100	NO	3**	1**	YES	YES	YES	YES	Analog Standard	Analog Composite	1RU

*Input "B" assigned as composite or CAV ** Inputs are shared formats

VTM MULTI-FORMAT ON-SCREEN MONITORS

VTM-200 Multi-format On-Screen Monitor



The **VTM-200** Multi-format On-Screen Monitor provides Harris' patented means to monitor and measure 601 and AES digital and composite analog (NTSC or PAL) video and audio signals. The primary output is SVGA compatible for display on any standard computer monitor capable of locking to 50 Hz (PAL/625) and 59.94 Hz (NTSC/525) vertical sweep rates. The output display includes video picture, waveform, vector and optional audio – each in one high resolution quadrant of the screen or any element in a full screen view. Standard inputs include two 601 serial digital (525 or 625) and two analog composite (NTSC or PAL). The VTM-200 also optionally accepts four AES stereo pairs and four analog stereo pairs as inputs and displays two stereo pairs plus the phase differences in the standard audio display. For accurate

setup, a “zoom” feature allows the user to individually adjust and measure black level, white level and audio reference levels. Easy to operate, all functions are via dedicated buttons or knobs. The VTM-200 is at home in mixed format facilities, graphics suites, production and post production areas and remote vehicles. The popularity of our VTM-200 Multi-Format On Screen Monitor has led to the expansion of the family of NTSC/PAL compatible models: the VTM-180 and the VTM-203. All models support VTM-200 features and specifications, and are distinguished by unique input options.

Features

- Two Analog Composite and two 601 Serial Digital inputs
- Dedicated buttons for all common functions
- Versatile user configuration
- SVGA display output
- Zoom view on waveform Black (0 Units) and White (100 Units)
- Zoom view on vectors - each quadrant plus a center zoom for checking each color and black/white balance
- Zoom view on audio to set 0 dB reference
- Universal switching power supply 90 to 260 VAC, 50 or 60 Hz.
- Standards available: NTSC, PAL, 525 and 625

VTM-150 Multi-format On-Screen Monitor



The **VTM-150** Multi-format On-Screen Monitor combines a cost-effective display output at SVGA resolution to monitor and measure 601 digital, CAV, and composite analog (NTSC or PAL) video and analog audio signals. The output display includes a waveform and vector overlay, alarms, and analog stereo audio levels mixed or keyed over internally generated color background or picture. Inputs include two composite analog NTSC/PAL with one shared CAV and two 601 SDI digital inputs. Standard output is compatible for display on any SVGA computer monitor. The VTM-150 is easy to operate with dedicated buttons or knobs. Front panel setups are capable of being stored as 8 user presets. Alarms include Gamut (RGB) and EDH for SDI, Peak video, SC/H, Loss of Signal (sync or carrier), and Peak audio. The unit offers an output option for SDI and analog composite.

Features

- Two looping composite inputs, with NTSC/PAL auto detection
- Two looping SDI inputs, with 525/ 625 auto detection
- One CAV input (3 BNCs) configurable as Y/C, RGB, Y CB CR
- On screen display includes waveform, vector, audio and alarms mixed or keyed over internally generated color background or picture
- Standard display output for display on a computer monitor
- Alarms include Gamut (RGB) and EDH for SDI, Loss of Signal (sync or carrier) for composite and SDI, Peak video and SC/H for composite and Peak audio
- Eight user presets
- Four analog audio inputs
- Standards supported: NTSC and PAL composite, RGB, Beta 75 & 100, MII 75 & 100, EBU 75 & 100, SMPTE and Y-C component, plus 525/59.97 and 625/50 SDI
- Standards available: NTSC, PAL, 525 and 625

VTM Series Preconfigured Packages and Options

	Standard HD/SD	Standard SD Inputs	Video Optional Inputs	Looping Inputs Inputs	WFM	Gamut	Eye Pattern	Vector	Pixel Locator/ Data Word	Line Select	Relative Timing	Closed Caption	Alarm Log	Audio	Output Type	Size
VTM -4100 PKG	2	0	2	YES	YES	YES	Option	YES	Option	YES	YES	YES	YES	Advanced Audio Analysis Option	XGA DVI	1RU
VTM -3100 PKG	0	2	2	YES	YES	YES	Option	YES	Option	YES	YES	YES	YES	Advanced Audio Analysis Option	XGA DVI	1RU

VTM Console (model VTM-ASX)

Console for all VTM Series™ on screen monitor instruments. Included are the chassis, power supply, cooling system fans, system controller. Front panel controls with USB port, and back panel connections for Ethernet, 2nd USB port, one router and remote port, and LTC/GPI interface. A Graphic Display Engine and at least one input module are required for operation.

Options

VTM-OPT 40, GDE Module (display engine) affords unit display capability of four (4) - input sources at a time. Includes Video Relative Timing display and Alarms with Peak Level Reporting.

VTM-OPT 10, GDE Module (display engine) affords unit display capability of one (1) - input source at a time. Includes Video Relative Timing display and Alarms with Peak Level Reporting.

VTM-OPT AAP, Advanced Analysis Package. Software upgrade only. Adds Pixel Locator / Data Word Analyzer.

VTM-OPT EYE-1, Dual SD-SDI Input module with SD Eye pattern. Two active looping connections with auto-detection (525/625). Monitoring output.

VTM-OPT SD-SDI, Dual SD-SDI Input module. Two passive looping connections with auto-detection (525/625) and Line Select. Internal and Blackburst references. Monitoring output.

VTM-OPT EYE-2, Dual HD/SD-SDI Input module with HD/SD Eye pattern. Two active looping connections with auto-detection (1080i, 1080p, and 720p at all popular frame rates including SD 525/625). Monitoring output.

VTM-OPT HD/SD, Dual HD/SD-SDI Input module. Two passive looping connections with auto-detection (1080i, 1080p, and 720p at all popular frame rates including SD 525/625) and Line Select. Internal and Blackburst/Tri level references. Monitoring output.

VTM-OPT ACV-2, Dual Composite Analog Input module. Two passive looping connections (NTSC/PAL) with auto-detection and Line Select.

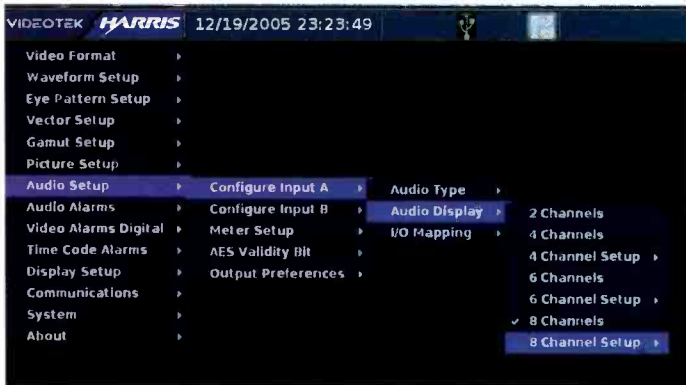
RCU-1000, Remote Control Panel for VTM Series instruments. Replicates all of the front panel controls. 1RU.

A³, Advanced Audio Analysis Options for VTM Series Instruments

Harris offers a wide range of audio options to complement the advanced technology of the VTM Series test instruments. Options provide the ability to monitor/decode Dolby® Digital, Dolby® Digital Surround EX, Dolby® E, embedded, AES/EBU and analog audio. Additional tools include numerous International meter scales and ballistics, Metadata information display, Lissajous and CineSound® displays plus many more professional features. Please refer to the chart below for additional information.

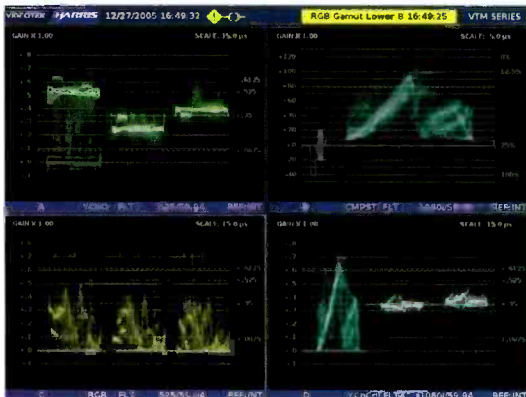
Audio Options	Loudness Monitoring	SNR	Channels Displayed	Embed. Audio	Analog Input	Analog Outputs	AES/EBU Inputs	AES Input Expansion Channels	AES/EBU Outputs**	Channel Map	Dolby Digital Output	Dolby 2-ch. Decode	Dolby 8-ch. Decode	Alarms	Dolby Metadata Display
VTM A³-Opt. 2	NO	100dB	8	YES	8	8	4	4*	4	NO	NO	NO	NO	YES	NO
VTM A³-Opt. 3	YES	100dB	8	YES	8	8	8	Standard	4	YES	NO	NO	NO	YES	NO
VTM A³-Opt. 4	YES	100dB	8	YES	8	8	8	Standard	4	YES	YES	YES	NO	YES	NO
VTM A³-Opt. 5	YES	100dB	8	YES	8	8	8	Standard	4	YES	YES	YES	YES	YES	YES

*Provided by A³-4004, Audio Expansion module option. Adds 4 AES/EBU input pairs. ** Shared with AES/EBU Inputs 1 thru 4.



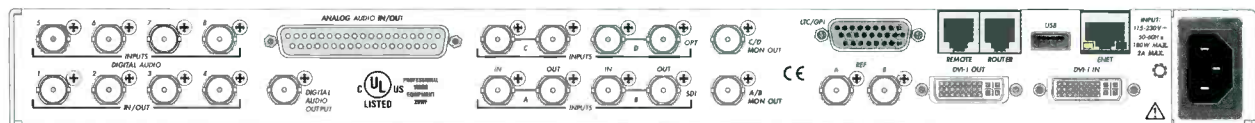
Example of Intuitive SETUP Navigation

The VTM Series™ console is easily configured via direct access-to-display functions, selectable location and context-sensitive pop-up menus. The intuitive navigation system enables easy access to all functions for even the most inexperienced users.



Q-See™, Harris' patented display technology, enables users to configure their screen for any specific need. Whether full-screen, quadrant with picture thumbnail, or the convenient MULTI mode, Q-See™ can make it happen. Choose from waveform, vector, gamut, audio, picture and timing displays, and place each in any quadrant on the screen.

Q-See™ is just one more way the VTM Series™ proves it is the most versatile instrument in its class. When equipped with the proper input options, the VTM Series™ can output four different waveforms to the Q-See™ display, from four distinct signals — in essence, handling a job that used to require four separate monitoring instruments.



VTM Series Back Panel

Features

- User-configurable hardware
- Display engine flexibility
- Dual auto detecting inputs for HD/SD-SDI, SD-SDI, or Analog Composite
- Standards: SMPTE-292M, SMPTE-259M-C, NTSC/PAL
- Supports 4:2:2 and 4:4:4 Dual Link
- Multiple Reference Inputs
- Capability of displaying up to four different inputs simultaneously
- Customizable display functions, screen location, multiple displays
- Video Relative Timing display
- Patented Gamut display
- Picture Thumbnail
- A/B Parade and Overlay
- 608/708 Closed Caption detect/alarm/display
- Comprehensive Alarm set, Peak Level Report
- 16 direct-access user presets
- Illuminated controls and indicators
- DVI-I output
- USB ports front and back
- 10/100BaseT Ethernet, SNMP agent, Web Server, SpyderWeb II
- GPI and Router control

Options

- Selectable Graphic Display Engines
- Pixel locator/Data Word Analyzer
- Selectable Video Input Modules
 - Dual HD/SD-SDI Input
 - Dual HD/SD-SDI Input with Eye Pattern
 - Dual SD-SDI Input
 - Dual SD-SDI Input with Eye Pattern
 - Dual Composite Analog Input (NTSC/PAL)
 - Dual ASI Input
- A³, Advanced Audio Analysis Modules
 - Meter and monitor up to eight channels of Analog, AES/EBU and Embedded
 - Dolby® Digital, Dolby® Surround EX™, Dolby® E, Pro-Logic I formats
 - Dolby® decoded outputs
 - "Loudness" metering and alarm
 - Multiple audio Lissajous display



Harris' Videotek® VTM Series™ features the world's first user configurable, field upgradeable, multi-format test and measurement console. The innovative modular platform makes the VTM Series™ fully customizable and affords broadcasters unprecedented flexibility to choose exactly how they'll apply the award-winning Videotek technology. It's the perfect solution for today's multi-format environment.

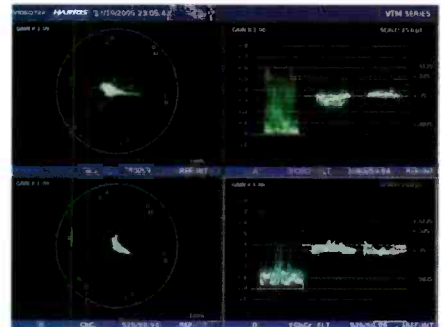
Start with the number of signals that can be monitored. When fully equipped, the VTM Series™ is the only test instrument of its kind that monitors and displays as many as four inputs simultaneously. Videotek's proprietary graphic display engines enable multiple input configurations to accommodate any environment. HD/SD, SD and composite analog inputs are available. Users can mix and match the appropriate graphic display engine to other options like eye-pattern with jitter display and audio packages featuring Dolby® decoding to create the ideal instrument for their specific need. A further benefit is a clear upgrade path when technical requirements change.

Based on the popular VTM products and featuring the same technological advances introduced in Harris' Videotek TVM instruments, the new VTM Series™ will impress with its functionality offering Waveform, Vector, Gamut, Audio, Picture, Timing, and Data Analyzer screens. But that's just the beginning. The unique patented Q-See™ display enhances the performance of this instrument when viewed on any common XGA monitor.

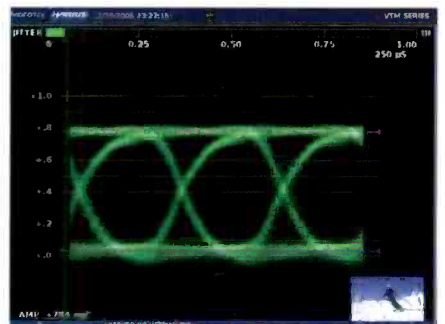
The VTM Series™ is also loaded with features designed to enhance the user's experience: illuminated controls, simple and intuitive navigation and a compact 1RU console. Favorite display configurations are instantly recalled using the assignable one-touch presets.

Whether customized with specially selected options or preconfigured by Harris' experts, the VTM Series™ is the optimal choice for any facility.

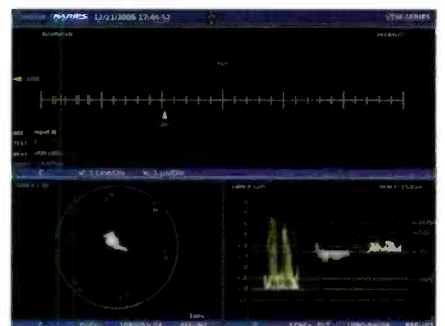
VTM Series™ Display Versatility Featuring Q-See™ Technology



Vector and Waveform Display of HD and SD signals.



HD Eye Pattern Waveform and Jitter Display with Amplitude Cursors and Picture Thumbnail.



MULTI Mode Display showing Relative Timing with Waveform and Vector.

MPEG-4 CIF full motion video and audio streaming) makes PC control and monitoring over large networks entirely manageable. A built-in Web Server and optional SNMP (Simple Network Management Protocol) are industry-standard means of controlling and monitoring the X75™ over Ethernet. The Leitch CCS (Command and Control System) Navigator™ software and NUCLEUS™ customizable control panels further enhances the remote control aspects of the X75™ for any application. The CCS-P protocol allows for integration into automation systems.

Limitless Applications

Expanding video processing to include "anything in" to "everything out" and M-PATH Multiple Path and Simulcast conversions, the Leitch X75™ is equally suited for use in analog, digital, or high-definition hybrid facilities. The X75™ provides a simple solution for even the most complex applications. For production and editing, the X75™ provides conversion to and from any signal type for HDTV productions. In news environments, it can time base correct any tape format — analog, digital or HDTV. For broadcast, the X75™ can perform up-conversion for HD output, down-conversion for monitoring/logging, and cross-conversion for programs that are recorded in other than the native format for the station. For ease of timing video relative to audio over large systems, the video to audio timing tool allows for an out of service robust video and audio test signal that can be analyzed for any video to audio timing differences through analog/digital, MPEG code/decode, and up/down/cross conversion processing.

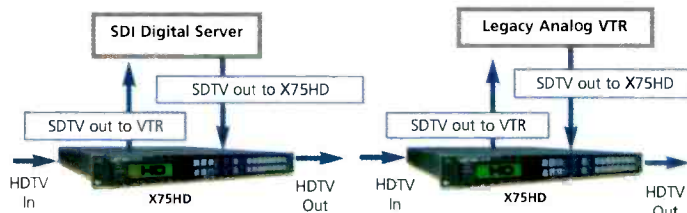
M-PATH™ Multiple Path Processing Supports Bi-Directional Processing

The exclusive M-PATH™ feature provides multiple directional connectivity between analog, digital and high-definition tape transports or routing systems. Enabling simultaneous converter and frame synchronizer operation, M-PATH mode routes HDTV optical fiber or HD-SDI and converts and synchronizes directly to the SDTV analog and SDI video outputs, which feed the inputs of analog composite and component and digital tape machines and routing systems. The analog or digital outputs of tape machines or

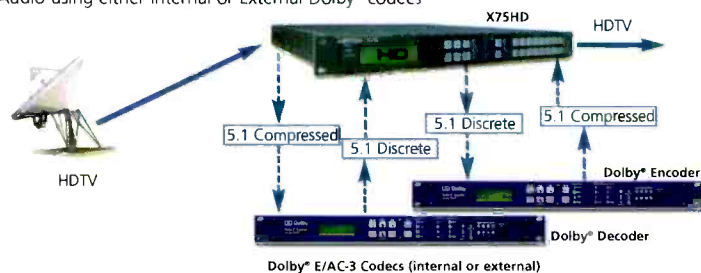
routing systems can be simultaneously connected to one of the synchronizer's SDTV analog or digital inputs where it can be processed and output via the HDTV optical fiber and HD-SDI port. Audio signals are handled in a similar fashion, with eight or sixteen channels of processing in each direction. Analog (two stereo pairs) and 2 or 5 AES inputs and outputs or 8 AES inputs and outputs with embedded HD-SDI and SDI audio are also supported..

X75™

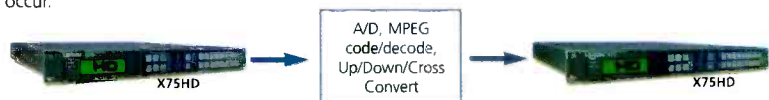
M-PATH — Simultaneous UP and DOWN Conversion Example



Compressed/Embedded Audio — Audio Processing for Discrete, Embedded and Compressed Audio using either Internal or External Dolby® codecs



Video to Audio Timing Measurement Tool — Send robust video/audio test signals through your system (inter/intra-facility) and measure the video to audio timing differences that may occur.



Multiple Path Converter, Synchronizer...and More

Combining HD and legacy standard-definition video and audio processing capabilities, all in a space-saving 1RU package, the X75™ is the definitive, all-in-one solution for broadcasters who have made or are making the transition to HDTV.



More Than Just a Synchronizer

- Upgrade from SDTV to HDTV
- Audio Embedder/De-Embedder for SDI and HD-SDI
- Bi-Directional Standard/High-Definition Converter
- Video Processor with Auto-Switch Time Base Corrector
- 8, 16 or 32 channel internal audio processing with up to 8 AES I/O
- Integrated optional Dolby® E compression and/or Dolby® E/AC-3 decompression options
- Video and Surround Sound Audio Processing
- Closed Caption Processing
- MPEG-4 Monitor Streaming Option
- Video to Audio Timing Tool Option
- Video and Audio Test Signal Generators
- Digital Noise Reducer with Digital Bandwidth Filtering Option
- Audio Limiter Option
- Auto-sensing, multi-standard device (PAL-B/PAL-M/NTSC/SECAM/NTSC) for worldwide use
- Redundant Power Supplies

More Functionality with Less Equipment

With capabilities that far exceed a synchronizer, the X75™ allows broadcasters to do more with less equipment. Video processing features include level/color control; 3D adaptive color decoding; noise reduction; frame synchronization and time base correction for nonsynchronous signals; and up-, cross-, and down-conversion with aspect ratio conversion for hybrid facilities. The X75's 8, 16 or 32 channels of internal audio processing include level control, analog/digital conversions, and embedding and de-embedding for both SDI and HD-SDI serial digital signals for interfacing any audio signal in a professional environment. Integrated Dolby®

compression and decompression and voice-over brings even more functionality.

Infinitely Flexible I/O

The exceptionally flexible input options for the X75™ with HD upgrade capability provide up-, down- and cross-conversion from up to seven input video formats — more than any similar product currently on the market — to almost any output video format. In addition, the X75™ features auto-detected inputs with auto-changeover and user-selectable alarms for reduced downtime. Providing separate connections for all video input and output formats, the X75™ allows for convenient front panel selection between multiple input devices — all of which may be connected simultaneously. Video input

format options for HDTV optical fiber, HD-SDI, and optional analog composite/component/(Betacam®) and Y/C (S-VHS/Hi-8) inputs are possible. Dual SDI inputs are included. Ten broadcast-quality outputs of the same signals are provided, as well as optional streaming video and audio over Ethernet, RGBS, DVI-D, or auxiliary PAL-B / PAL-M / SECAM / NTSC composite video outputs.

Effortless Control

Control and monitoring of signals passing through the X75™ is enabled using IP over Ethernet. Instant operator control from the local or remote control panels allows for easy manipulation of video and audio signals. Using two Ethernet ports per unit (one for control, monitoring and video thumbnails, and the other for

X75™

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 is 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.

INT-EX1x2 and INT-EX1x6 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.

For applications where price and space are limited, the INT-EX1x6 distributes 16 signals of virtually any format without extra processing and cost, allowing distribution of wideband analog video, SDI video, and AES audio. The INT-EX1x6 offers 16 channels of 1 input, 6 output distribution and redundant power supplies with fail alarms via GPI contacts in a single 2RU frame that can be mounted in either the front or rear of your equipment rack.

HDA-1508 HD/SD Digital Distribution Amplifier

Standalone, 1/3RU digital distribution amplifier with cable equalization and eight outputs for HD/SDI and SDI video data rates of 143 Mb/s to 1.45 Gb/s.

DDA-108 Digital Distribution Amplifier

Standalone, 1/3RU digital distribution amplifier with cable equalization and eight outputs for serial digital video data rates of 143, 177, 270 and 360 Mb/s.

DDA-144 Serial Digital Distribution Amplifier with Analog Composite Monitor Outputs

Standalone, 1/3RU SDI monitoring distribution amplifier with equalization, reclocking and composite video encoding. Includes four serial component digital outputs and four composite analog outputs.

VDA-16 Video Distribution Amplifier

Standalone video distribution amplifier with cable equalization, one looping video input, and six isolated video outputs.

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 in, 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.

ADA-16 Audio Distribution Amplifier

Standalone audio distribution amplifier with one balanced/unbalanced audio input and six unbalanced audio outputs. Uses barrier strip input/output connectors.

ADS-24 Stereo Audio Distribution Amplifier

Standalone audio distribution amplifier with one stereo balanced/unbalanced audio input and four stereo balanced/unbalanced audio outputs.

Additional Distribution Amplifiers

ARG6800+	Analog Audio Remote Gain Distribution Amplifier	HDC6800+	HDTV Down-converter
VSM6800+	SDI Monitoring Distribution Amplifier	DHSE6800+	Dual HDTV, ASI, SDI, Reclocking Distribution Amplifier
VTM6800+	Triple Monitoring Distribution Amplifier	DHSD6800+	Dual HDTV, ASI, SDI, Distribution Amplifier
VCA6800+	Composite Video Equalizing & Clamping Distribution Amplifier	DVSE6800+	SDI, ASI Video Equalizing and Reclocking Distribution Amplifier
VDA6800+	Composite Video Distribution Amplifier	DVSD6800+	SDI, ASI Video Equalizing Distribution Amplifier
VEA6800+	Composite Video Equalizing Distribution Amplifier	HDC-3901	HDTV Down-converter and Distribution Amplifier
VRG6800+	Composite Video Remote Gain Distribution Amplifier	HDC-3901-AD	HDTV Down-converter and Distribution Amplifier with audio outputs
VPD-6830	Composite Video Programmable Distribution Amplifier	VSM-3901	SDI Monitoring Distribution Amplifier
AES6800+	AES Audio Distribution Amplifier	HSE-3901	HDTV / SDI Reclocking Distribution Amplifier
VSE6800+	SDI Video Equalizing Distribution Amplifier	VSE-3901	SDI Reclocking Distribution Amplifier
VSD6800+	SDI Video Distribution Amplifier	AES-3981	AES Audio Distribution Amplifier
HSD6800+	HDTV, ASI, SDI Distribution Amplifier	VEA-3901	Video Equalizing Distribution Amplifier
HSE6800+	HDTV, ASI, SDI Reclocking Distribution Amplifier	ADA-3981	Analog Audio 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		

The affordable, compact Leitch Panacea™ routing switcher line has become the market leader for small routing applications, offering the largest selection of matrix sizes, options and built-in control features, allowing you to purchase a router tailored to your applications.



Panacea 1RU — Single-Format Matrix Options				
Single 16x16	Single 16x8	Single 16x4	Single 16x1	Single 8x8

Panacea 2RU — Single and Dual-Format Matrix Options				
Single 32x32	Single 32x16	Single 32x8	Single 32x4	Single 32x1
Dual 16x16	Dual 16x8	Dual 16x4	Dual 16x1	Dual 8x8

Comprehensive Format Coverage

Panacea™ offers comprehensive format coverage, with HD-SDI, SDI/ASI, AES, and analog video and audio available in the most complete and flexible array of matrix sizes.

Advanced Control Options

The advanced control options of Panacea™ include local and remote control panels RS232/422, X/Y and IP/Ethernet, with Web and SNMP control direct to the frame. With the most versatile and advanced selection of control features, Panacea™ raises the standard for small routing. Panacea™ also shares a common control base with all other Leitch routers, so integration into existing and new router installations is effortless.

Superior Performance

The Leitch unit of Harris 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.

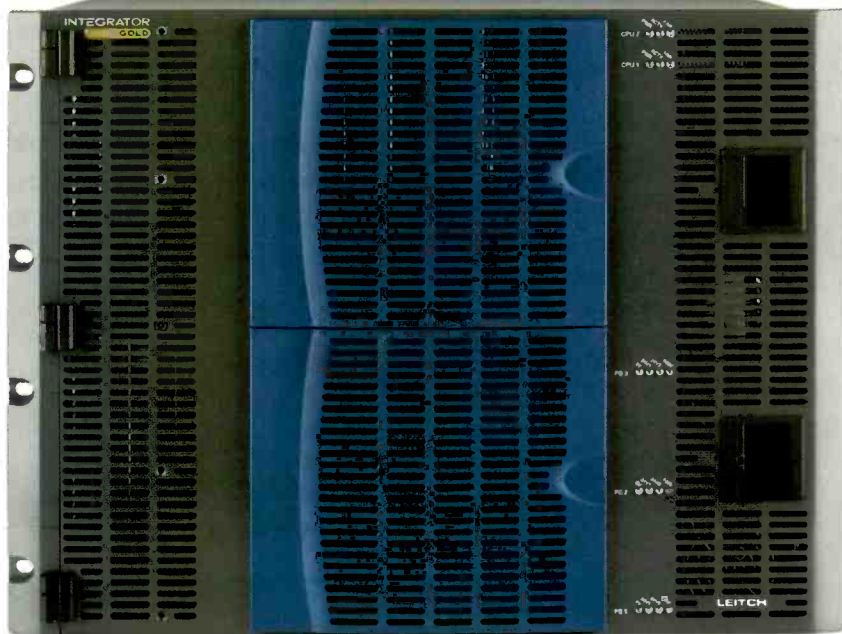


Panacea™ allows you to tailor your small router to your application.

Key Benefits

- Flexible matrix partitioning options allow for flexibility and customization
- Choose either integrated universal AC or DC power supplies or external (brick) universal power supplies
- Redundant power supplies
- Clean switching of discrete SDI or HD-SDI video option
- Quiet switching of discrete AES/EBU digital audio option
- Signal diagnosis capabilities (i.e., signal presence, error detection)
- Control via X/Y, serial RS-232/422, local control panel, optional remote control panel or direct-to-frame IP/Ethernet/SNMP

Flexible, multi-format routing switchers that provide unrivaled performance and control options for all mid to large routing applications.



INTEGRATOR™

Expandable Architecture

Integrator™ is a series of economical, scalable, multi-format routers packed with advanced features and redundancy that provides 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 256x256, and our 8RU Integrator GOLD™ wideband digital multi-rate

router will easily expand from 8x8 to 256x256. Other features include optional redundant hot-swappable logic cards and power supplies and incorporated alarms for control, fans and power supplies.

Comprehensive Control

A powerful and complete control system is provided through programmable control panels and our RouterMapper, RouterWorks, CCS Pilot™ 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; uploadable 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.

New Integrator GOLD™ encoder and decoder boards support analog video via high-quality 10-bit conversion.

Control Topologies

TCP/IP (Ethernet)	Standard	<input checked="" type="checkbox"/>
RS-232/422	Standard	<input checked="" type="checkbox"/>
X/Y Coaxial	Standard	<input checked="" type="checkbox"/>



frame needs to operate within a system. A complete failure of both modules —or of the complete frame — would only affect the signals in that frame. The rest of the system would continue to operate. In addition, communications from control panels and applications do not have to be brought to a centralized controller, thereby enhancing the ability to widely distribute systems and removing another single point of failure.

Enhancements to traditional routing control include secure access rights with level, source and destination restrictions per user; tie-line management; and timed events, allowing distributed events to occur simultaneously. Platinum™ offers native support for all legacy Leitch router protocols, CCS™ PROTOCOL (protocol common to all Leitch processing product lines) and SNMP. Drivers are also available to interface to most common third-party routers and/or control systems.

Platinum™ routing switchers are supported by an extensive line of Leitch applications, protocol interfaces and control panels. This includes several new hardware-based control panels applicable to control and monitoring of routing, as well as other product lines. In addition, the award-winning CCS Navigator™ application, which provides user-configurable GUIs applicable to complete facility-wide control and monitoring, has been

extended with several router-specific enhancements.

Exceptional Serviceability and Support

In environments that require routing of a large number of signals, exceptional serviceability is critical. The Platinum™ line is designed to provide maximum ease of serviceability, allowing problems to be easily detected even in multi-channel facilities and ensuring that your system remains online even during upgrades. Leitch CCS™ allows you to monitor your router from

anywhere in the world, enabling faster troubleshooting time and improved operational efficiency. Should an upgrade be required for Platinum™, its frontloading, hot-swappable modules and individually replaceable fans guarantee easy service with no need to take the system off-line.



Key Features

- Routing for large systems
 - 256x256 in 15RU
 - 512x512 in 28RU
- Video Routing
 - HD-SDI digital multi-rate from 3Mb/s to 1.5Gb/s
 - Digital video signals including SMPTE 310, SDI, ASI, HD-SDI
 - Analog video via conversion to/from SDI on I/O modules
- Audio routing
 - Digital audio signals including balanced and un-balanced AES
 - Analog stereo audio via conversion to/from AES on I/O modules
- Module I/O in groups of 8
- Route to/from digital & analog signals with no external processing
- Front-loading, hot-swappable modules for 24/7 operation
- Redundancy throughout
 - Power supplies, resource modules, signal paths
- Enhanced control and monitoring capabilities with support for Leitch Command Control System™ (CCS™)
 - New desk and rack-mount HW-based control panels
 - Enhancements to award-winning CCS Navigator™ application
- Secure access rights with restrictions by level, source and destination
- CCS™ PROTOCOL, SNMP and third-party protocol support

PLATINUM™

PLATINUM™

The Platinum™ line of routing switchers combines a highly robust architecture with the flexibility required to future-proof your investment, delivering unsurpassed value for your larger routing needs.

Designed to support high-quality routing for 24/7 operation, Platinum™ routing switchers are well-suited to network, local broadcaster, mobile production, cable, telco, military, government and corporate applications — any environment that requires routing of a large number of signals.

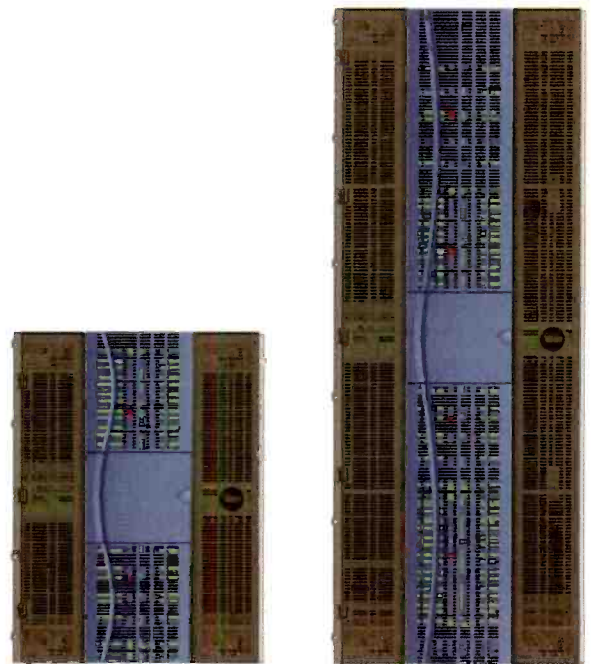
The Platinum™ line provides high-quality signal routing up to 256x256 in 15RU and 512x512 in 28RU. Supporting a mixture of almost any type of signal within the same frame (i.e., analog stereo audio, AES, analog video, SDI, ASI, HD-SDI, etc.), Platinum™ combines wide bandwidth, multi-rate routing with built-in optional conversion of analog signals on input and/or output modules. The built-in conversion also enables the user to route to/from one type of signal to another without the addition of external processing.

Higher Reliability

Platinum™ routing frames are designed for harsh, 24/7 operation (including mobile truck environments), and feature front-loading, hot-swappable modules for ease of serviceability. Employing the latest technology, Platinum™ allows more functionality at lower power consumption, and is supported by redundant, load-sharing power supplies. Airflow is from front to

back, with each fan individually replaceable without taking the system off-line.

For further reliability, Platinum's I/O modules support either eight inputs or eight outputs, thereby limiting the number of signals affected by any one module. With Platinum™, complete signal paths can be made redundant, and our software allows for manual or automatic rerouting of signals in the event of a failure. Each Platinum frame supports redundant control and sync modules. In addition, Platinum™ supports the



Leitch Command Control System™ (CCS™), which is designed such that no external controller is required, eliminating yet another single point of failure in your system.

Enhanced Control and Monitoring

Platinum's distributed control system is unique in the industry, requiring no separate, centralized controller. Each Platinum™ frame features redundant control modules that store configuration information related to that frame in non-volatile memory and contain all the information that

ROUTING SWITCHERS

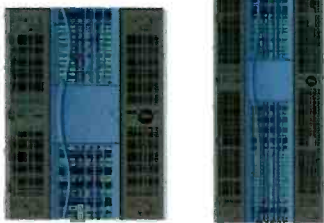


No matter what your requirements, we've got the router for you. Any size, any budget, any signal format — our portfolio can deliver. And you won't sacrifice quality or performance for price. We offer affordable, broadcast-quality routing switchers that route all signal formats from analog to HD for any sized application. Which ever system you choose, you're investing in world-renowned Leitch routing technology. Robust architecture, exceptional scalability, space-saving frames, superior control, unsurpassed reliability — that's what you can expect from every router in our portfolio.



Large Routing

Platinum™

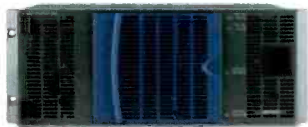


256x256, 512x512 and larger

The Platinum™ line of routing switchers combines a highly robust architecture with the flexibility required to future-proof your investment, delivering unsurpassed value for your larger routing needs. Designed to support high-quality routing for 24/7 operation, Platinum™ routing switchers are well-suited to network, local broadcaster, mobile production, cable, telco, military, government and corporate applications — any environment that requires routing of a large number of signals.

Medium Routing

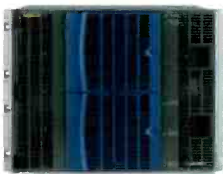
Integrator™



32x32 to 128x128

Integrator™ is a highly scalable, multi-format medium to large scale router designed for high reliability in mission-critical applications. Integrating all digital and analog signal formats in the same frame, Integrator supports signal formats including composite, component, SDI, HD-SDI, ASI, E3, DS3, AES, Stereo, Mono and Data.

Integrator GOLD™



8x8 to 128x128

Adds wideband, digital multi-rate routing to the Integrator™ family in a compact 8RU frame.

Small Routing

Panacea Lite™



12x1

Mixed format, broadcast-quality 12x1 utility routing — all within an affordable, ultra-compact 1RU frame.

Panacea™



8x8 to 32x32; 16x1 to 512x1

Affordable, compact router providing on-air quality in every signal format from analog to HD.

Panacea™ Clean/Quiet



16x2 (with 6 auxiliary outputs)

The industry's most powerful dual-channel clean video with quiet embedded audio routing switcher.

The NUCLEUS™ network control panel is designed to meet the many needs of today's broadcast operations. Providing complete customization, NUCLEUS™ enables users to tailor the control interface to their specific applications. NUCLEUS™ allows the user to navigate to a specific device quickly with the minimum number of keystrokes.



Leitch has always led the way in the industry with practical, real-time control panels, and NUCLEUS™ is no exception. More knobs for parameter adjustments. More buttons to quickly invoke parameter value changes. A better display to improve overall operation, and a higher degree of user customization. NUCLEUS™ allows the user to quickly store and recall device presets and to reset a device to a user-defined "unity" setup.

Offering much more than simply processing control, NUCLEUS™ has been designed to support Harris/Leitch routers, test and measurement tools, and branding and master control systems. Customers will be able to control these products as the drivers become available through software upgrades.

Configuration services: Time is a precious commodity. To help maximize the effectiveness of your CCS NAVIGATOR™ or NUCLEUS™ setup, skilled technical service personnel are available to assist in the planning, design and implementation of your monitoring and control requirements within these platforms.



Network monitoring and control can be accomplished by means of both hardware panels and software applications. Both NUCLEUS™ and CCS NAVIGATOR™ provide customized user interfaces that enable users to quickly identify problems and take corrective action.

CCS NAVIGATOR™ is an innovative, Windows®-based software application that enables users to easily monitor both Leitch and third-party devices within any facility. Operators experience immediate familiarity with Navigator's onscreen GUIs, as they are representations of the user's facility and workflow. Minimal operational training is required, as Navigator supports a simple, point-and-click operation.

Actual system block diagrams can be imported into CCS NAVIGATOR™ to accurately reflect the impact of any alarms within a signal path. Actual JPEG images of rack elevations can be imported to accurately identify the location of any problem. Both Leitch CCS-enabled devices and third-party, SNMP-enabled devices can be linked into these system images — providing a powerful monitoring and control system that allows users to mastermind their operations.

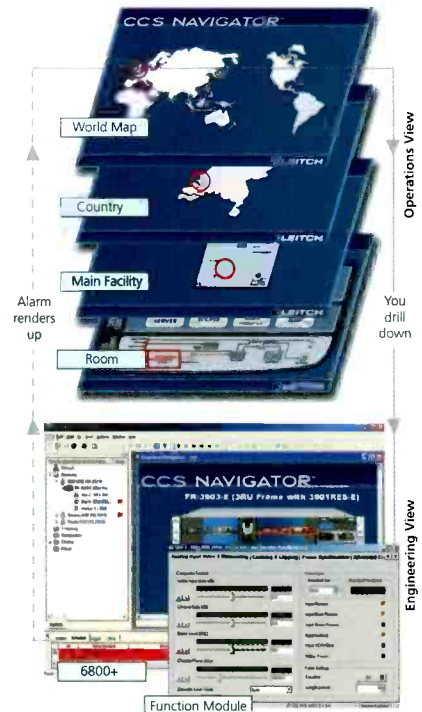
An alarm from any CCS-enabled device within the facility is broadcast over UDP to all clients on the network — multiple workstations are visually alerted simultaneously. An SNMP trap (alarm) from any third-party device within the network is sent to every addressed client on the network. Any operator can manually take charge and address the situation. CCS NAVIGATOR™ also supports automatic responses to

specific, critical alarms. User-defined actions can be triggered by specific criteria for situations when the response must be immediate and accurate.

CCS NAVIGATOR™ provides a set of design wizards that permit users to quickly set up router controls and processing product (6800+™, NEO™) frame views. These wizards are significant time savers during the setup of the GUIs.

Thumbnails and streaming video:

The newest Leitch processing products are able to generate thumbnails from the video signal that passes through them — greatly enhancing the operator experience. Operators are now able to see the state of the signal that is generating the alarm. They can confirm content prior to actually switching a feed live to air. Suddenly, signals from remote



facilities across the country can be seen at a central monitoring facility — just as if they were in the next room. Mistakes are minimized, confidence is gained.

Key Features

- Centralized or distributed monitoring of Leitch and third-party equipment
- Real-time local or remote control with individually configurable control parameters
- Scalable from simple control of one or two devices to the control of large distributed systems with many devices
- Secure access to network resources by user groups and individual settings
- Creation and placement of action/status hotspots over user-supplied images
- Wizards enable quick creation of control panel surfaces to control/monitor routers
- Buttons, images, text and CCS-enabled products symbol gallery
- Browsing (backward & forward) across Navigator pages
- Single button to launch simple or multiple presets
- Single click to launch web-based applications



The Leitch Command Control System, CCS™, encompasses a powerful system of software applications, control panels, protocols and gateways that enable monitoring and control of both Harris/Leitch and third-party products within a network.

Broadcast infrastructures are becoming increasingly complex to design and integrate. With complex infrastructures comes an even greater need for simple, straightforward monitoring and control. Operators need to know — at a glance — where a problem exists, and must be able to take corrective action confidently.

The fundamentals of good system design remain constant: industry-standard IP infrastructures; a system architecture that is scalable from small, compact islands of equipment to large distributed networks; and protocols that are open and documented for straightforward integration into any network client. The CCS™ environment delivers all this and more.

Industry-standard IP infrastructures: broadcast engineers cannot afford to invest in non-standard communications infrastructures. Price points for IP networks continue to drop. Troubleshooting tools quickly locate bottlenecks. More employees possess IP skills. It just makes good business sense.

Scalable system architectures: Network traffic is bursty — increasing during peak production times and falling at night. Whether a broadcast facility's system is small with only a few frames, or large with hundreds of frames from various manufacturers, the infrastructure must be scalable to accommodate the network traffic. CCS™ infrastructures are able to scale with no special customizations to standard network infrastructures required and offer both UDP and TCP/IP communications to ensure the most efficient use of precious networking bandwidth.

Open and documented protocols: Today's broadcaster needs to know what traffic is being carried on his communications networks. Proprietary protocols are a thing of the past! The open and documented CCS™ PROTOCOL brings practical, real-time control across IP networks. And because CCS™ PROTOCOL provides a single broadcast of all product alarms to all clients within the network, overall network traffic is minimized.

Leitch core processing products, Videotek® legalizers, Platinum routers and Harris IconStation™ branding systems support CCS™ PROTOCOL. Implementation plans are underway across our other core product lines — IconMaster™ master control systems, IconLogo™ branding and Videotek® test equipment. A single protocol will allow users to gain access to the majority of the Leitch product portfolio.



SNMP support complements the implementation of CCS™ PROTOCOL. All Leitch processing products (6800+™, NEO™ and X75™) now, optionally, support SNMP. In cases where third-party systems are already in place for system-wide monitoring, SNMP is the common interface to virtually all devices.

Documented device interface descriptions can be accessed via the Leitch website. Whenever possible, both the CCS™ PROTOCOL definition and the SNMP MIBs are posted.



Any product identified with the CCS™ check mark will bring you all the value of the award-winning Leitch Command Control System™

NEO SuiteView Solo™

A compact, high-resolution multi-source display processor supporting up to 12 inputs in 1RU. NEO SuiteView Solo™ provides a very affordable, high-resolution monitoring solution for full-featured applications requiring fewer inputs.



- Compact and cost-effective with up to 12 inputs in 1RU
- 8-input version providing ultimate affordability
- Auto-sensing video inputs for HD-SDI, SDI and composite, plus graphics/streaming video inputs
- High-resolution configurable outputs support up to UXGA (1600x1200) for use with plasma, LCD, computer monitors and projection displays
- Optional local or remote control panel available
- Easy-to-use Layout Manager provides configuration and control capabilities

Smaller High-quality Monitoring Applications

- Mobile trucks
- QA stations, edit suites, tape rooms
- Master control and production control rooms
- Corporate board rooms, schools
- Video conferencing
- Trade shows and kiosks

SuiteView™

A simple yet versatile multi-source display processor offering from 4 to 16 inputs in 1RU. Supporting a wide range of video outputs simultaneously, SuiteView™ provides an extremely cost-effective monitoring solution for use with video-based displays.



- Compact and versatile with from 4 to 16 inputs in 1RU
- Auto-sensing video inputs for SDI and composite video signals
- Multiple video outputs provided simultaneously, including SDI (x2), component and composite video
- Well-suited for use with SDI, composite or component video monitors, smaller plasma displays, or for routing across video networks
- Local control panel provided standard
- Optional user-friendly Layout Editor provides configuration and control capabilities

Simple Monitoring Applications

- Mobile trucks
- Master/production control rooms
- QA stations, edit suites, tape rooms
- Monitoring remote sites
- Cost-effective "as run" confirmation
 - Record multiple feeds simultaneously
 - Interstitial/security/traffic monitoring

SUITEVIEW™

SuiteView™ Multi-Source Display Processors

The SuiteView™ processors are capable of rendering multiple video and computer graphics signals in real time to either high-resolution plasma, LCD, computer monitors and projection displays or video-based displays. See page 43 for ordering information.

NEO SuiteView™

An advanced, modular multi-source display processor scalable up to 44 inputs. Integrated with our award-winning CCS Navigator™ application, NEO SuiteView™ provides fully customizable system-wide monitoring solutions for mission-critical 24/7 operation.

- Highly scalable and modular with up to 44 inputs in 3RU (smaller configurations available in 1RU)
- Auto-sensing inputs support a wide range of signal formats from HD-SDI, SDI and composite to streaming video on VGA/DVI graphics inputs
- High-resolution configurable outputs (main and redundant) support up to UXGA (1600x1200) for use with plasma, LCD, computer monitors and projection displays
- Mix-and-match other NEO™ processing modules within the same frame
- NEO frames support multiple NEO SuiteView™ systems to drive multiple unique displays
- Front-loading, hot-swappable PSU, fans and modules for mission-critical applications
- Peace of mind with optional redundant PSU and controller
- Redundant outputs provided standard with approaches for redundancy/backup in event of display unit failure

Mission-critical Monitoring Applications

- Multi-channel master control rooms
- Production control rooms
- Network control centers
- Satellite transmission sites
- Traffic monitoring
- Security monitoring



LEGALIZATION & COLOR CORRECTION

DL-850HD and DL-860 Serial Digital Legalizers



The multiple-award-winning **DL-850HD** high-definition serial digital legalizer accepts all popular HD formats, with complete flexibility for legalizing high-definition signals. The DL-850HD output format tracks the input format, and the signal can be legalized to HD, SD, RGB, and/or Encoded color space. CRC values are monitored and recalculated to insure proper output values. Input EQ added to the incoming video is displayed on the front panel. The DL-850HD has a selection to pass or blank all ancillary data without any alteration except CRC correction. All legalization limits are variable, allowing for many custom configurations to the HD Clips, SD Clips, Encoded gamut and RGB gamut limits. Direct access and operation of the DL-850HD is straightforward, from the backlit front panel LCD display to the LED status indications, function selection buttons, and knob for easy menu navigation. All operational parameters, including the selectable bypass function are also supported via Ethernet using the embedded Web server interface. The DL-850 also supports the Leitch CCS Navigator™ control and monitoring software, and the NUCLEUS™ user-customizable control panel.



The upcoming HD/SD **DL-860** serial digital legalizer will build on the features of the DL-850HD, expanding upon it with support for standard-definition input as well as HD input signals.

SDC-101 Serial Digital Video Color Corrector



The **SDC-101** digital color corrector accepts a SMPTE 259M-C input and produces an output of the same format. It provides the user with real-time control over common video parameters for the purpose of correcting or enhancing video signals. Familiar and understandable analog terms give the user the traditional look and feel of an analog color corrector, while 10-bit digital processing guarantees optimum signal quality. The SDC-101 lets you inexpensively correct picture errors and alter video levels in component serial digital video. It accurately corrects and enhances more than 40 critical parameters and stores 50 user-defined presets.

DPA-100 Serial Digital Processing Amplifier



The **DPA-100** serial digital processing amplifier provides the controls that are familiar in the analog world while working in a pure component serial digital format. The unique automatic "Broadcast Legal" function monitors the signal and looks for colors which, while legal in the component digital environment, fall outside the limits legal for NTSC or PAL broadcast. The DPA-100 automatically adjusts these values to provide a clean, properly modified signal to feed an encoder, transmission system or storage device. The DPA-100 also provides control, via dedicated knobs, of six video parameters including: Video Gain, Luminance Gain, Chroma Gain, Hue, Black Level and Y/C Delay. Front panel LED's provide constant system status monitoring. The system includes two optional, separate remote control units that operate over an RS-422 interface.

SD/HD Configurable Master Control With Embedded Multi-Layer Branding

IconMaster™ is based on our industry-leading NEO™ modular platform. It is the only Master control that can be combined with other advanced applications to create a complete, self-contained channel release system.

IconMaster™ goes beyond other master control offerings by allowing you the flexibility to choose the best configuration and options you need — when you need them.

IconMaster™ is a cost-effective, modular master control and branding solution beyond the conventional, offering the ability to combine critical master control functions with multi-layer integrated branding — all in a modular card format with room to add and grow as requirements change.

You can also upgrade IconLogo™ to a full IconMaster™, protecting your investments with an easy upgrade path.

IconMaster™ — for today's and tomorrow's master control & branding needs.



Future-proofed

- SD and HD configurable with no hardware changes
- Compact, two-slot solution leaves 10 free NEO™ slots for future growth

Flexible

- Assignable (two-channel) squeezeback position
- Assignable clean output and key priority
- Internal routing and/or external routing

Control

- 12-input desk mount/rack mount control panel
- Industry-standard buttons with LEDs for bus selection & transitions
- Fully configurable LCD buttons
- Optional intelligent audio control panel
- Optional touch-screen configuration and control application

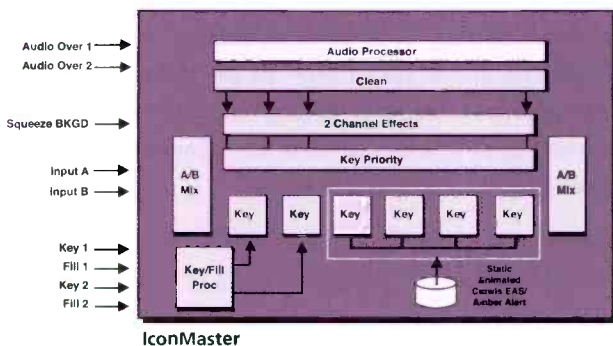
Features

- 12-input HD/SD configurable Master Control with embedded Branding
- Full next-event preview
- 6 Keyers — 2 external (key/fill), 4 internal branding keys
- Flexible audio with 16 channels embedded (HD)

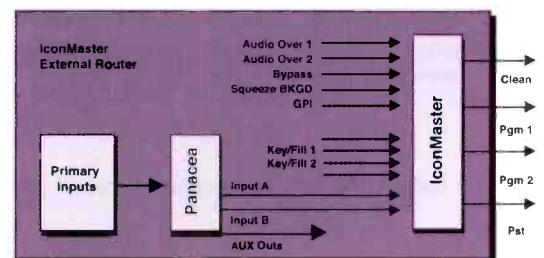
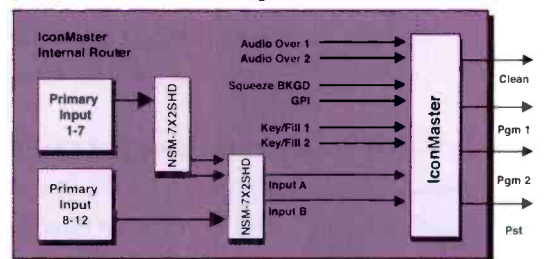
- 2 audio overs with dedicated inputs
- Machine control
- Branding
 - Internal audio playback
 - Static and animated
 - Analog and digital clocks
 - 4-layer branding engine
 - Crawls and EAS/Amber Alert

Options

- Relay bypass with dedicated bypass input
- Discrete AES audio (embedded audio standard)
- 2-channel video squeeze back
- Crawl with dynamic data insertion
- RSS and ODBC connectivity
- EAS and Amber Alert (Emergency Alert System) insertion



IconMaster: Internal Routing



IconMaster: External Routing

Icon™ — A Family of Products and Integrated Applications for Master Control & Branding

When it comes to master control and branding, you want unrivaled choice and flexibility. You also want an advanced, future-proofed set of solutions that allows your businesses to grow as individual needs dictate. Harris' Icon™ family delivers the broadest suite of master control and branding products on the market, from master control switching, to master control graphics and channel presentation, to master control branding. And with the Icon™ family, you can feel confident your investment is truly protected — all the products in our Icon™ family are tightly integrated so your Icon™ master control and branding solution can evolve as your needs evolve.

IconLogo™ — Master Control Channel Branding



IconLogo™ is a modular branding solution based on the Leitch NEO™ platform. Significant IconLogo™ features include support for crawls and EAS as well as a new software graphical user interface (GUI). These features are made possible as software functionality and advanced graphics capabilities are shared across the Icon™ family. IconLogo™ provides an easy upgrade path from SD to HD and even to a full IconMaster™. It is ideal for channel branding applications such as time/temperature, stills/animations, audio clip playback and text crawls for breaking news.

IconMaster™ —SD/HD Configurable Master Control with Embedded Branding



IconMaster™, also based on the industry-leading NEO™ modular platform, combines critical master control functions with multi-layer integrated branding. IconMaster™ is the only master control that can be combined with other advanced applications, such as the Leitch NEO SuiteView™ multi-viewer series or the new Leitch NEO™ XHD up, down, cross and M-Path (multiple) converter series, to create the ultimate plug-and-play system — all in the same frame. IconMaster™ also supports internal routing using NEO™ routing modules and/or external routing with Leitch or third-party routers. IconMaster™ is unique, as it is fully configurable between SD and HD formats without the need for expensive upgrades or replacements.

IconStation™ — Master Control Graphics and Channel Presentation



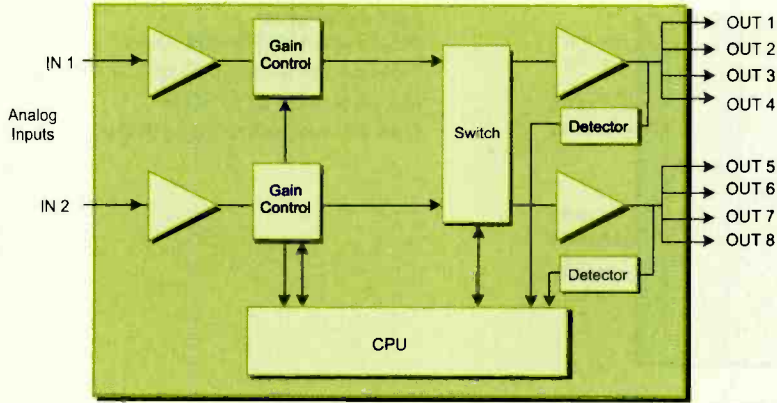
IconStation™ is the first branding solution to combine logo insertion with multiple real-time data crawls and a squeezeback DVE for maximum channel branding impact. Ideally suited to either large or small broadcasters seeking a reliable on-air branding solution, IconStation™ includes Inscribe® award-winning character generation for superior title and graphic creation, and is ideal for enhanced or demanding applications requiring functions such as L-bars effects, template-driven channel layout, unlimited layering and multi-level animation/still insertion. IconStation™ is SD/HD configurable depending upon your requirements.

Icon™ — for today's and tomorrow's master control and branding needs.

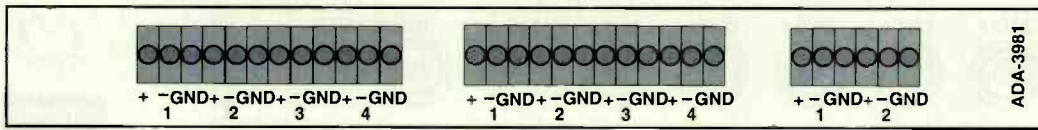


ADA-3981-66, 600 — Analog Audio Distribution Amplifier

NEO DISTRIBUTION

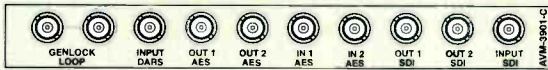


- 1 in, 8 out (mono) or 2 in, 4 out (stereo)
- 20-20kHz bandwidth
- +30Bu (66ohm), +24dBm (600ohm) maximum input level
- Gain range of -6 to +33dB
- Remote gain (.5dB steps), channel swap, mute
- Channel swap and mute
- Left and right inputs can be summed to mono



BACK PANELS

AVM-3901-C



AVM-3901-B4



AVM-3901-C4



MXA-3901-C



DMX-3901-B



DMX-3901-C



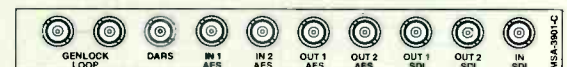
AS-3901-C



AS-3981-DA



MSA-3901-C



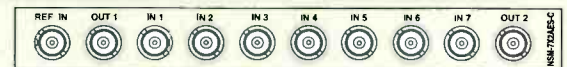
MSA-3901-B4



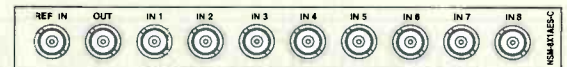
MSA-3901-C4



NSM-7X2AES-C

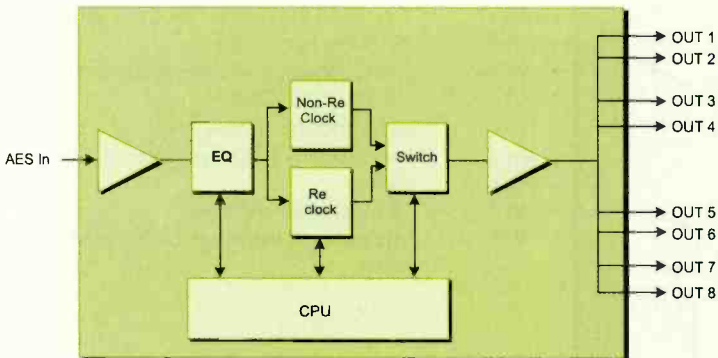


NSM-8X1AES-C

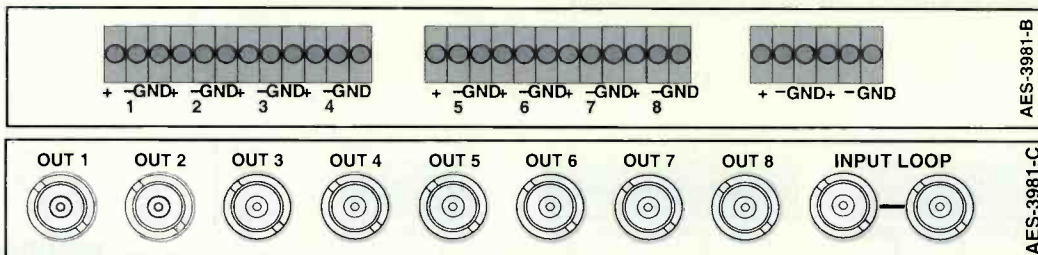


Additional back modules intended to complement product information provided on product pages.

AES-3981 — AES Audio Distribution Amplifier

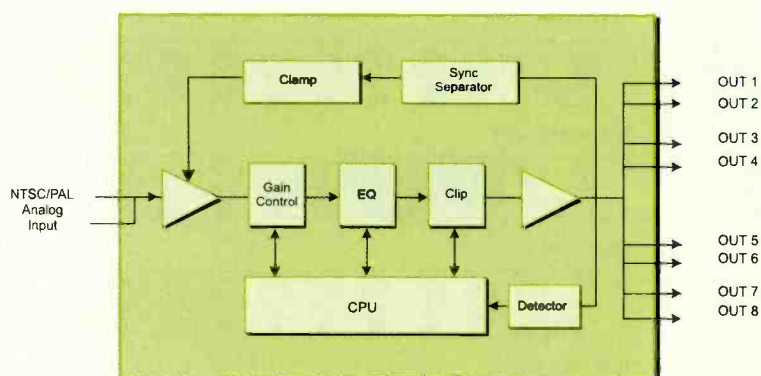


- Input signal types: AES 75 and 110 Ohm interfaces
- Data-only mode for compressed audio signals
- AES frame rates up to 96kHz
- Auto EQ, auto relock up to 96kHz

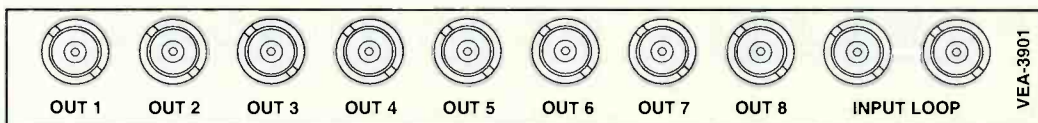


NEO DISTRIBUTION

VEA-3901 — Composite Video Equalizing Distribution Amplifier

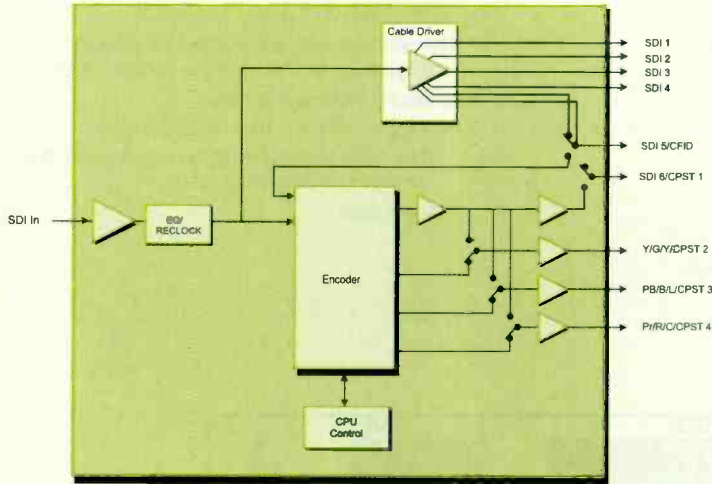


- Input signal type: passive looping 1Vp-p video
- Clamp off/soft /hard
- White clip, hard and soft
- AC/DC coupling (jumper selectable)
- Remote control of gain (-3 to + 3dB)
- Remote control of EQ (300m)

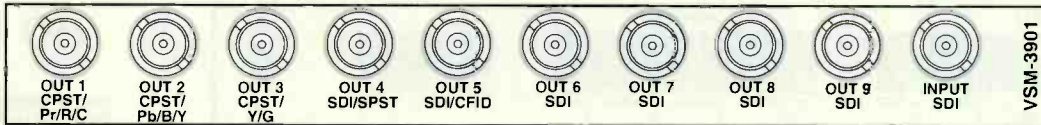


NEO DISTRIBUTION

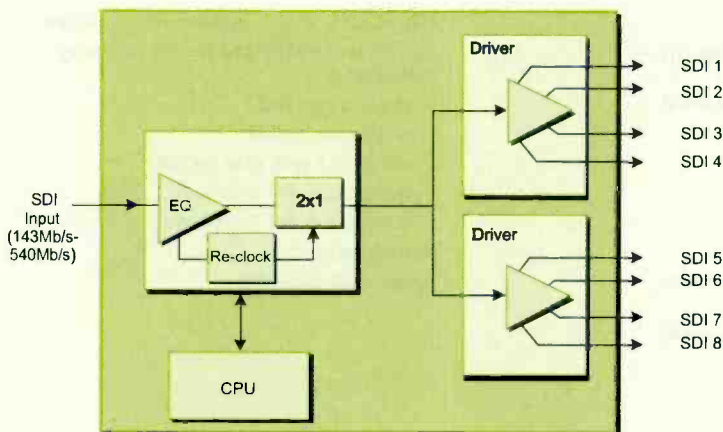
VSM-3901 — SDI Monitoring Distribution Amplifier



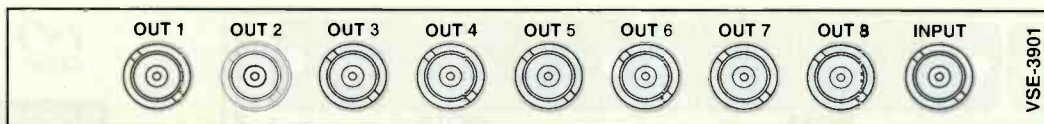
- 10-bit signal processing path
- Up to 6 reclocked, equalized 4:2:2 serial outputs
- Up to 4 NTSC/PAL-B analog composite color outputs or 1 component (GBR / Y, Pb, Pr, / YC)
- Delete, chroma on/off, setup on/off, burst on/off and chroma filter bandwidth select



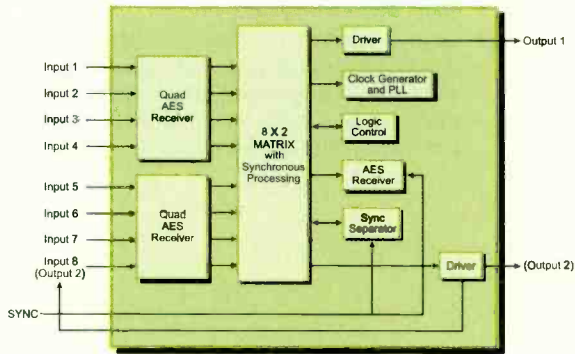
VSE-3901 — SDI and ASI Reclocking Distribution Amplifier



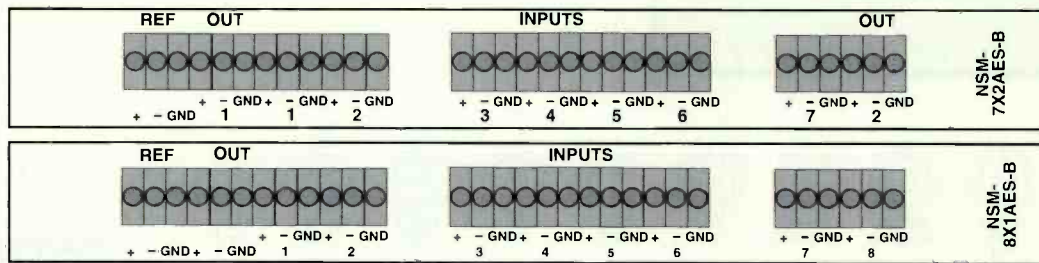
- Input signal types: SMPTE 259M, 344M, DVB-ASI
- Differential input, transformer coupled inputs and outputs
- 8 reclocked and auto-equalized outputs
- Automatic bypass if unable to lock at the above rates
- Forced bypass capability
- ASI compliant



NSM-8X1AES-B, C, NSM-7X2AES-B, C — AES Audio Switches



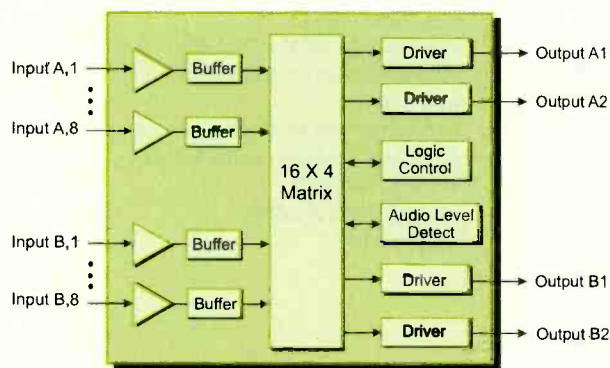
- High-quality AES audio routing switcher
- 8x1 switcher with auto-detect switchover configuration or 7x2 switcher configuration
- Supports these signal types:
 - AES3 – 30kHz – 100kHz frame rates
 - Any 50% duty cycle digital signal within the voltage and frequency range
- Relay bypass



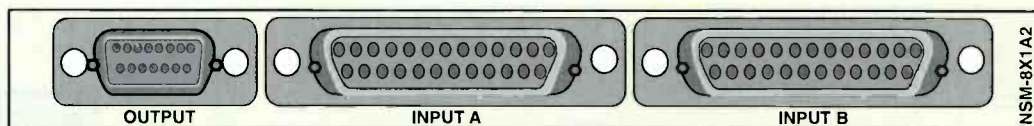
See page 65 for other back panels: NSM-7x2AES-C and NSM-8x1AES-C



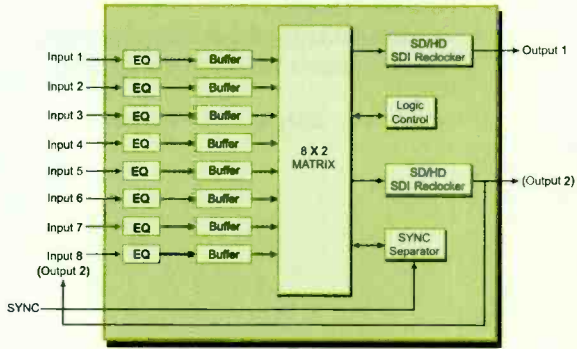
NSM-8X1-A2 — Analog Audio Switches



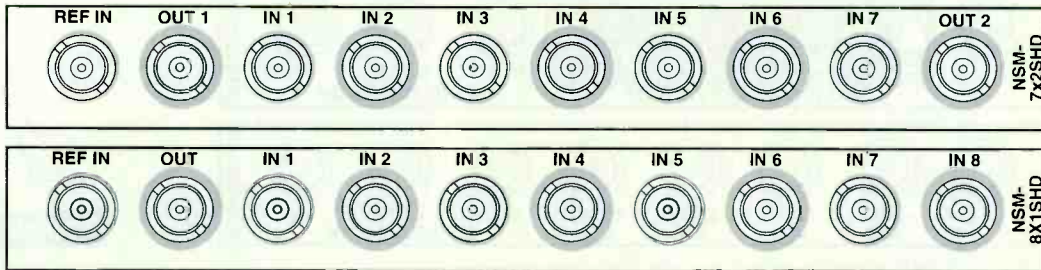
- High-quality analog audio routing switcher
- Can be user-configured for the following matrix sizes:
 - single stereo 8x2
 - single mono 16x4
 - stereo 8x1 with dual outputs
 - quad mono 4x1 (married)
 - quad mono 4x1 (breakaway)
- Relay bypass
- Swap / sum capability



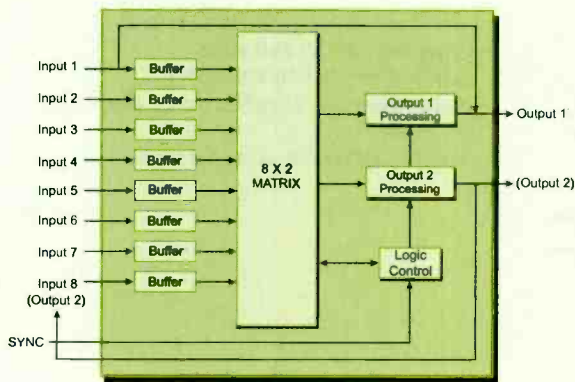
NSM-8X1SHD, NSM-7X2SHD — HDTV and SDI Video Switches



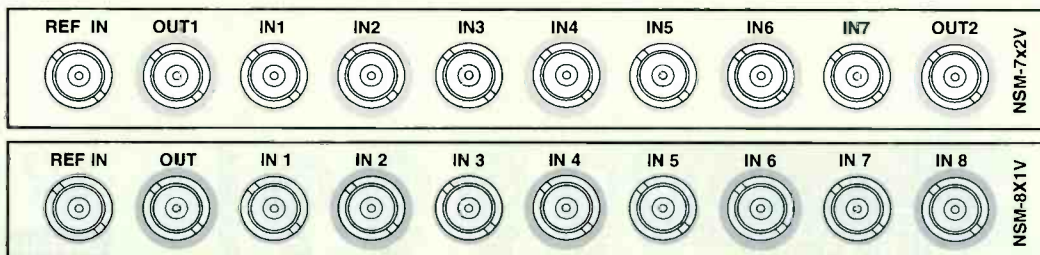
- High-quality HD/SDI wideband video routing
- 8x1 switcher with auto-detect switchover configuration or 7x2 switcher configuration
- Supported signal types (10Mb/s to 1.5 Gb/s):
 - SMPTE 259 — 143, 177, 270, 360, and 540 Mb/s
 - SMPTE 292 — 1.485 Gb/s
- Deterministic, line-accurate switching
- Relay bypass
- Reclock 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



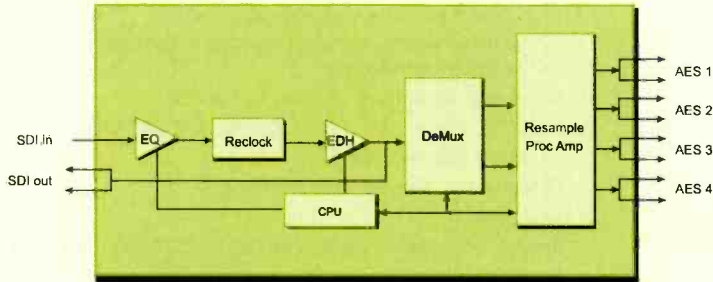
NSM-8X1V, NSM-7X2V — Composite Video Switches



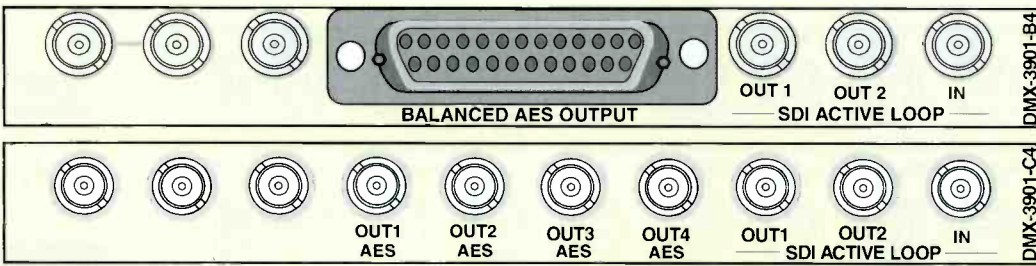
- High-quality analog video routing switcher
- 8x1 switcher with auto-detect switchover configuration or 7x2 switcher configuration
- Deterministic, line-accurate switching
- NTSC/PAL analog reference
- Relay bypass
- Bypass operation for signals at nontraditional video rates



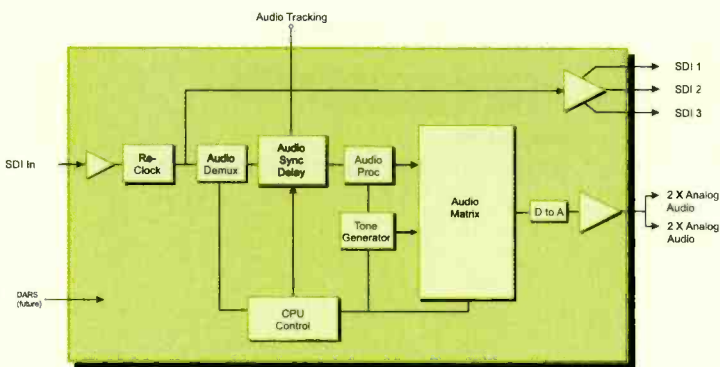
DMX-3901-B4, C4 — SDI De-multiplexer to 4 AES Audio



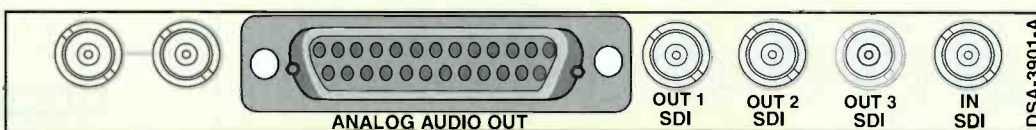
- 4-channel AES output
- Selectable 16/20/24-bit audio delay/processing
- Passes compressed audio data, ie., Dolby® E, AC-3™
- Variable audio delay up to 1.3 seconds



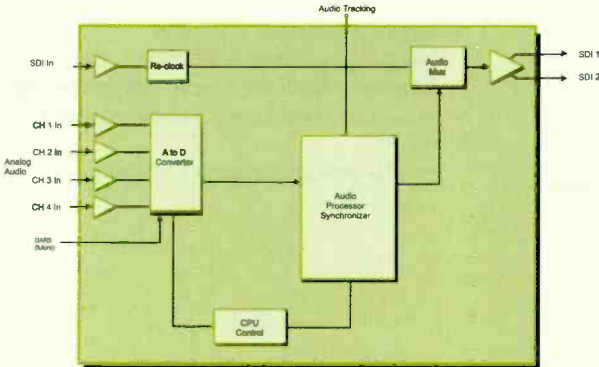
DSA-3901-A — Analog Audio Synchronizer/Delay Processor and De-multiplexer



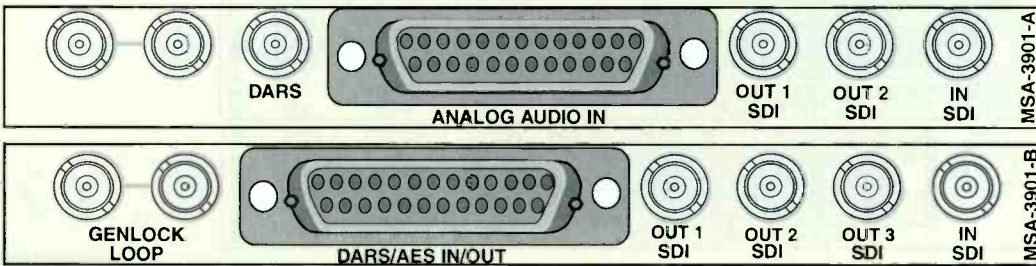
- 4-channel analog audio demultiplexer
- Selectable 16/20/24-bit audio synchronization/delay/processing
- Audio processing amplifier: gain, swap, invert, summing
- Variable audio delay up to 1.3 seconds



MSA-3901-A, B, C, B4, C4 — Audio Synchronizer/Delay Processor and Multiplexer



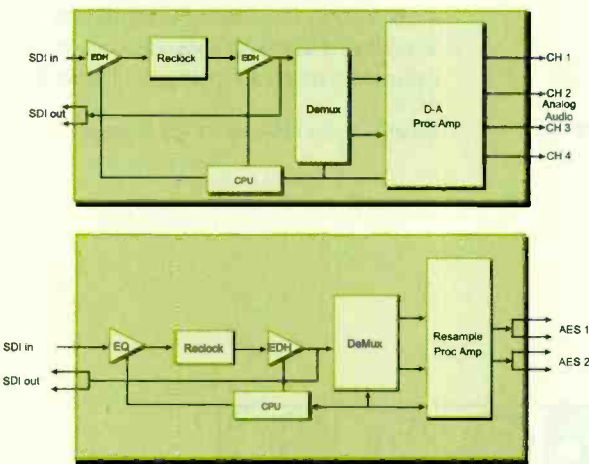
- SDI video input, 2 or 3 processed outputs
- Analog and digital audio versions
- Selectable 16/20/24-bit audio synchronization/delay/processing
- Audio re-sampling for 32-108kHz AES inputs, with bypass for data over AES operation
- C, U & V bit transparency for AES versions
- Variable audio delay up to 1.3 seconds



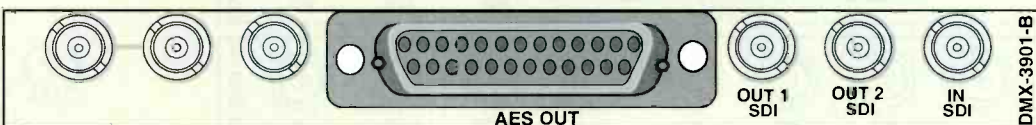
See page 65 for other back panels: MSA-3901-C, B4, C4



DMX-3901-A, B, C — SDI De-multiplexer to 4-Channel Analog or 2 AES Audio



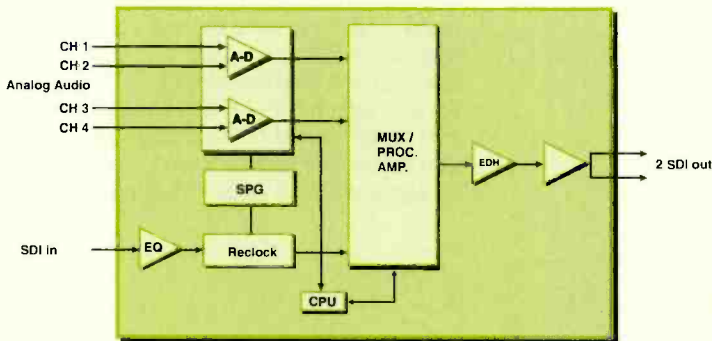
- Versions for analog or 2-channel AES audio outputs
- Selectable 16/20/24-bit audio delay/processing
- Passes compressed audio data, ie., Dolby® E, AC-3™
- Variable audio delay up to 1.3 seconds



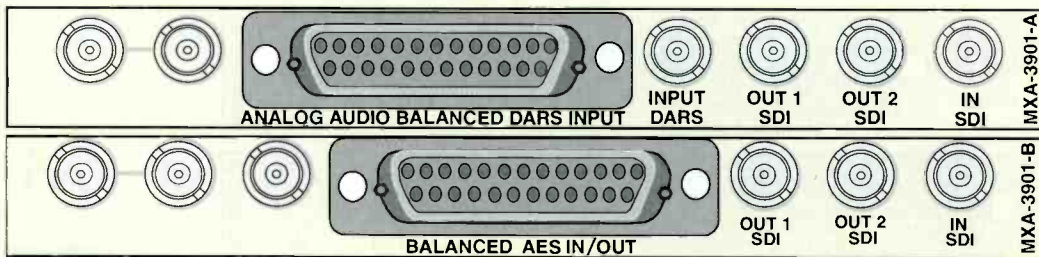
See page 65 for other back panel: DMX-3901-C



MXA-3901-A, B, C — 4-Channel Analog or 2 AES Audio to SDI Multiplexer



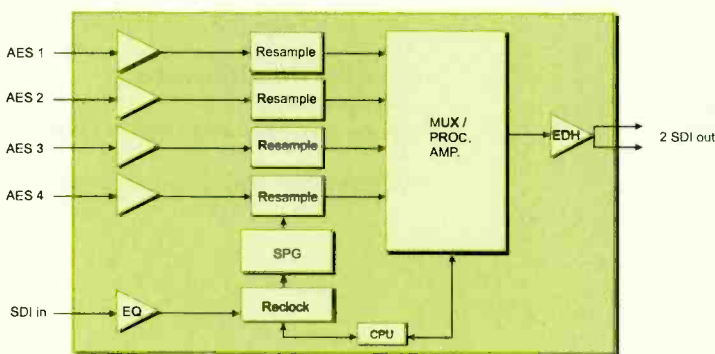
- 4-channel analog or 2-channel AES audio multiplexing into SDI
- Selectable 16/20/24-bit audio delay/processing
- Passes compressed audio data, i.e., Dolby® E, AC-3™
- Variable audio delay up to 1.3 seconds



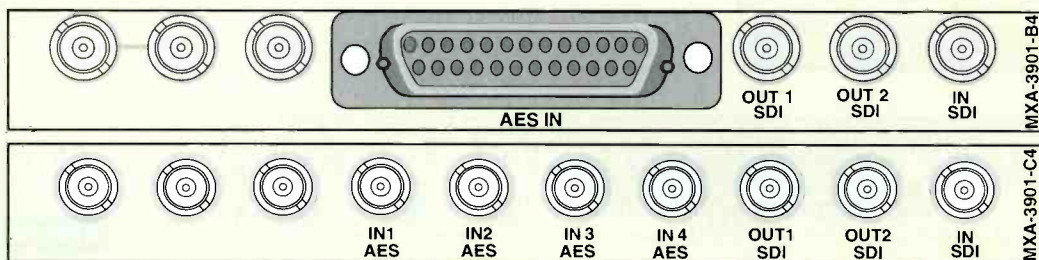
See page 65 for other back panel: MXA-3901-C



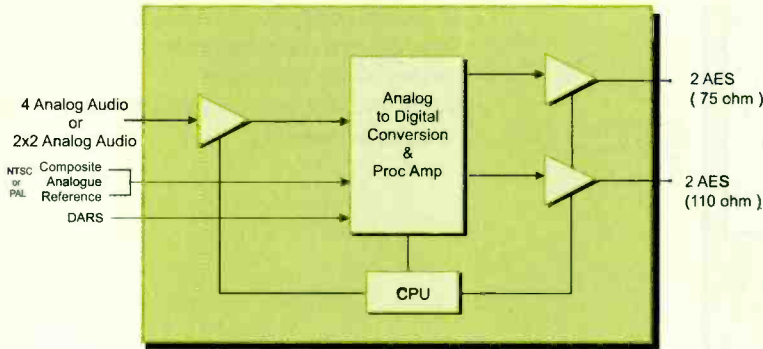
MXA-3901-B4, C4 — 4 AES Audio to SDI Multiplexer



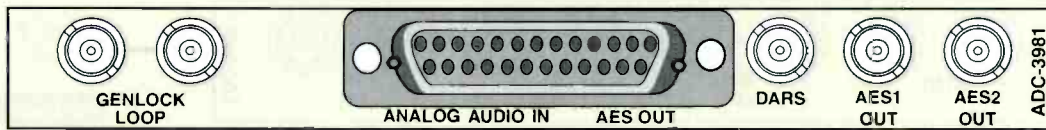
- 4-channel AES audio multiplexing into SDI
- Selectable 16/20/24-bit audio delay/processing
- Passes compressed audio data, i.e., Dolby® E, AC-3™
- Variable audio delay up to 1.3 seconds



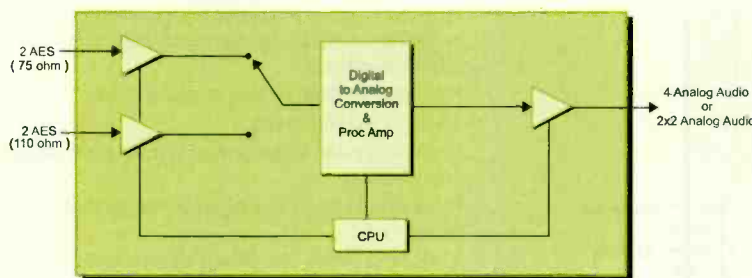
ADC-3981 — 4-Channel Analog to 2 AES Audio Converter



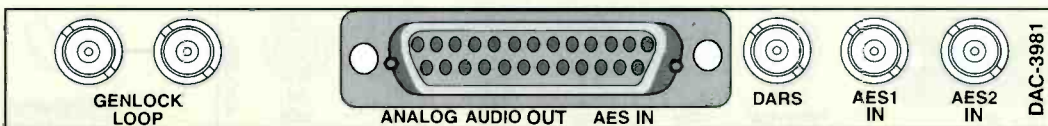
- Simultaneous balanced and unbalanced AES outputs
- 32/44.1/48/96 kHz output sampling rate
- 16/20/24-bit quantization
- Audio processing amplifier with: channel invert, channel swap, gain, delay
- Variable audio delay up to 1.3 seconds



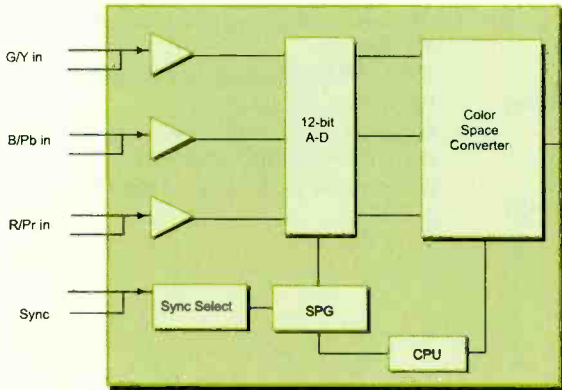
DAC-3981 (-600) — 2 AES 4-Channel Analog Audio Converter



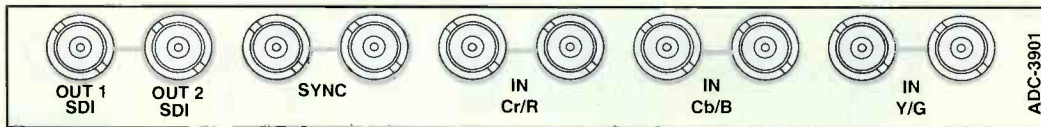
- Input signal types: 2 AES-75 or 2 AES-110 (selectable)
- 4 balanced analog audio outputs (4-channel or 2 x 2 channel)
- Audio processing amplifier with: channel invert, channel swap, gain, delay
- Variable audio delay up to 1.3 seconds
- 32/44.1/48/96 kHz sampling rate support



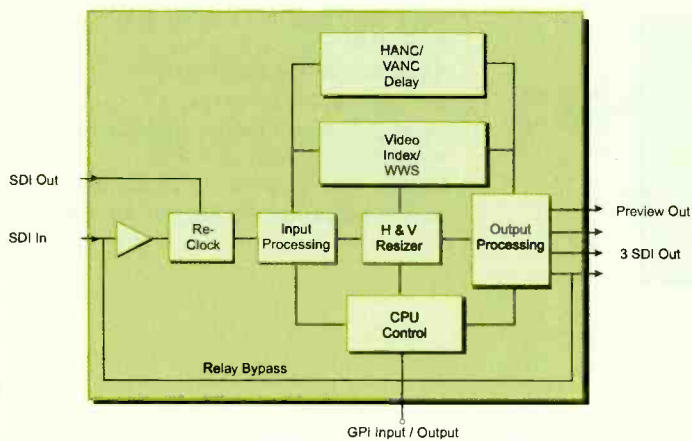
ADC-3901 — Analog Component Video to SDI Converter



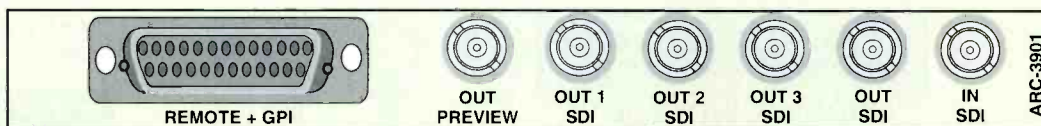
- 12-bit high-quality video conversion to SDI
- Smart clip to prevent output errors
- Looping inputs: YPbPr, RGBS
- SMPTE, EBU, MII, Betacam standard levels
- 12-bit video processing



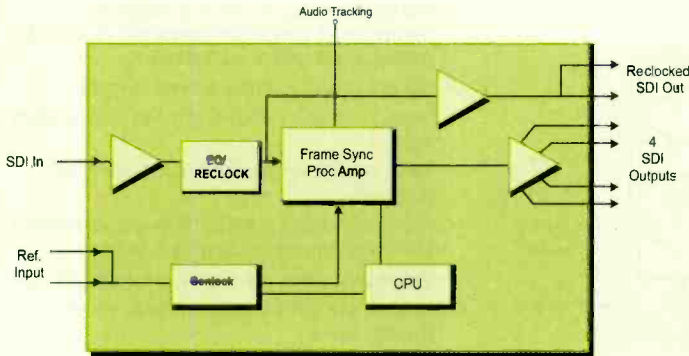
ARC-3901 — Aspect Ratio Converter



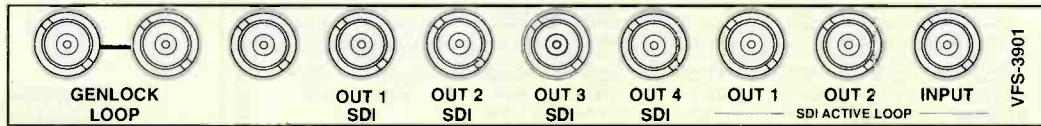
- Motion-adaptive, 4-field, 4-line conversion for enhanced vertical resolution with minimal interlace artifacts
- Fixed and variable picture re-sizing ratios
- 10-bit video processing
- Video Index and Wide Screen Signaling handling and insertion
- Relay bypass upon loss of power or module failure
- VANC and HANC are passed transparently
- Monitor BNC output with selectable "used area" overlay or key output



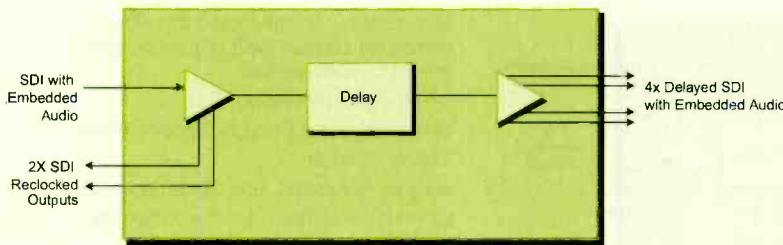
VFS-3901 — SDI Frame Synchronizer/Processor



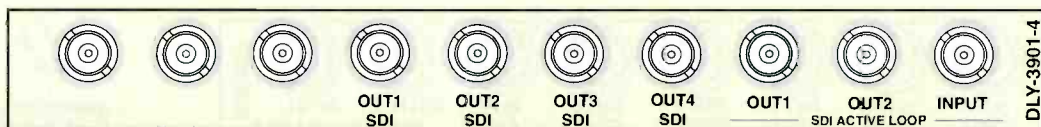
- Frame sync with infinite timing
- Video Processing Amplifier: black level, luminance level, chrominance level, black/white clip, hue (525 only)
- Video delay mode – up to 1 frame delay
- Provides internal audio tracking to audio synchronizers



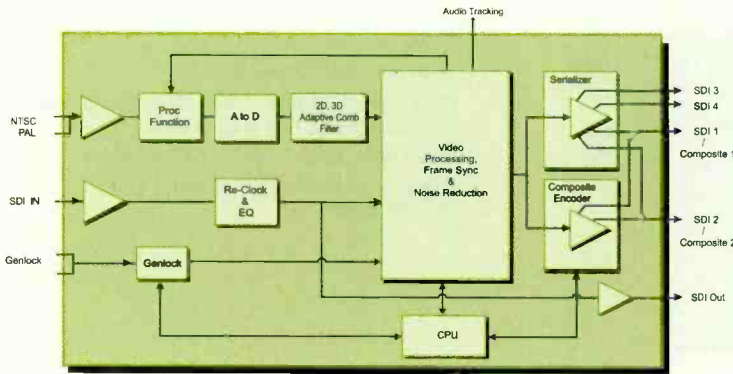
DLY-3901-4 — SDI Delay Processor



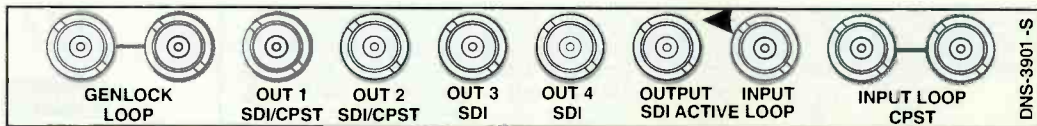
- Up to 4 seconds of video delay
- 525/625 SDI input
- 4 delayed SDI outputs
- 2 reclocked, non-delayed SDI outputs
- HANC and VANC passed transparently
- Auto-detect or user-selectable input video standard
- EDH status monitoring of SDI input (presence, error count)
- NeoScope™ video signal monitoring at card edge



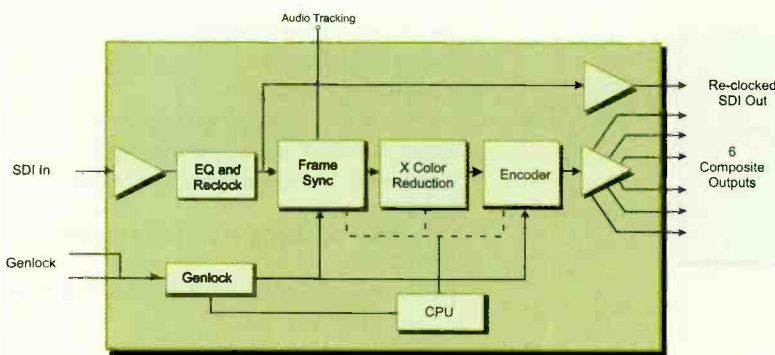
DNS-3901-S — Composite Video to SDI Decoder/Synchronizer/Noise Reducer with SDI Input



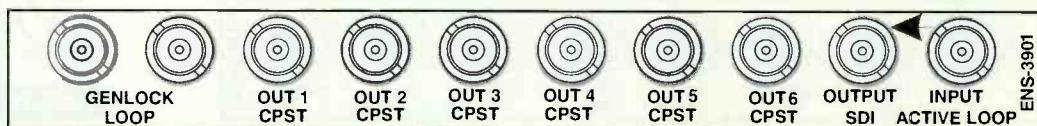
- Industry leading, 12-bit fully adaptive frame/field/3-line/notch composite decoding, processing amplifier with clipping
- SDI input with internal decoder bypass
- Noise reduction removes impulse and random noise
- Input noise immunity and input video soft clipping
- 2 user-selectable outputs (SDI with 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



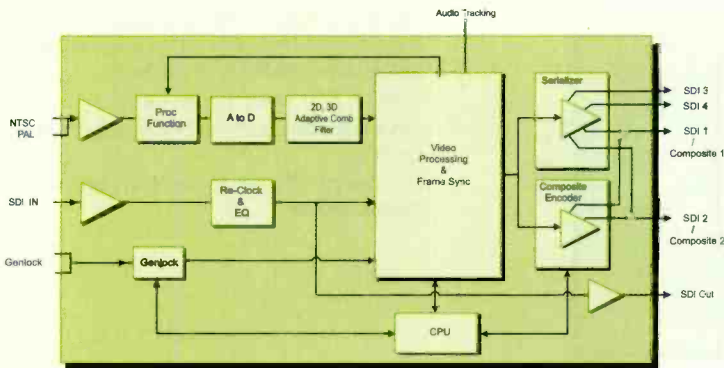
- High-quality, chroma-locked broadcast composite encoder with processing amplifier and frame synchronizer
- 12-bit signal processing
- Vertical Blanking Field/Line/Mode Control
- Timing Controls: Vertical, Horizontal, Fine SC (from Genlock)
- IQ or UV modulation for the composite output
- Cross Color Reduction (525) and Aperture control (2 dimensional)
- Frame sync or delay mode
- Provides internal audio tracking to audio synchronizers



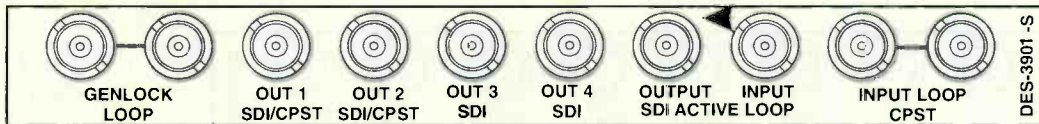
NEO VIDEO

NEO VIDEO

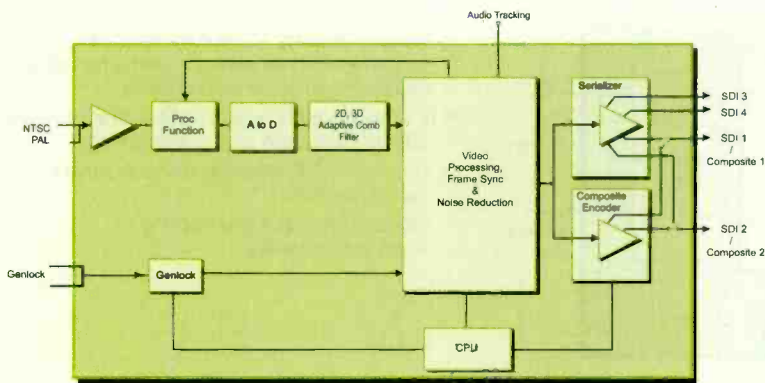
DES-3901-S — Composite Video to SDI Decoder/Synchronizer with SDI Input



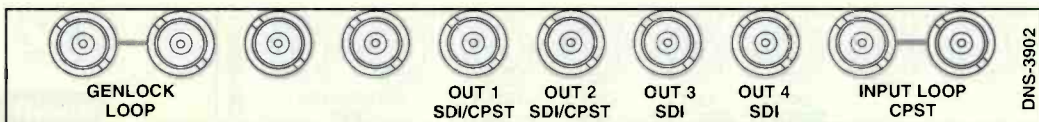
- Industry leading, 12-bit fully adaptive frame/field/3-line/notch composite decoding, processing amplifier with clipping
- SDI input with internal decoder bypass
- A to D 12-bit input processing
- Video proc amps for analog and digital inputs
- Input noise immunity and input video soft clipping
- 2 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



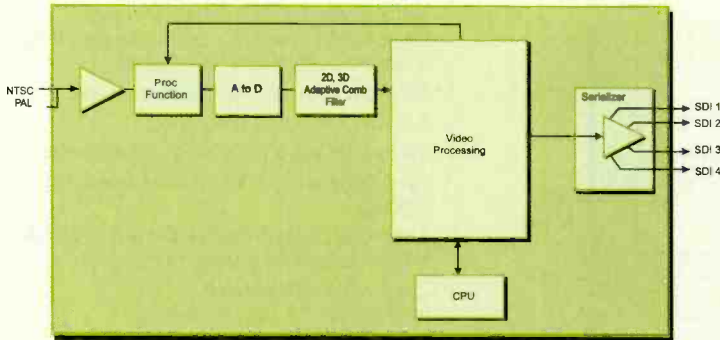
DNS-3902 — Composite Video to SDI Decoder/Synchronizer/Noise Reducer



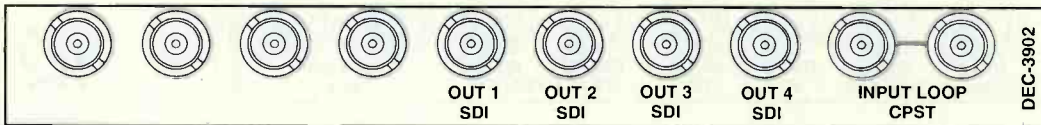
- Industry leading, 12-bit fully adaptive frame/field/3-line/notch composite decoding, processing amplifier with clipping
- Noise reduction removes impulse and random noise
- Input noise immunity and input video soft clipping
- 2 user-selectable outputs (SDI with embedded EDH or composite analog monitoring)
- Line-by-line VBI selection (normal, simple, bypass, delete)
- Provides internal audio tracking to audio synchronizers



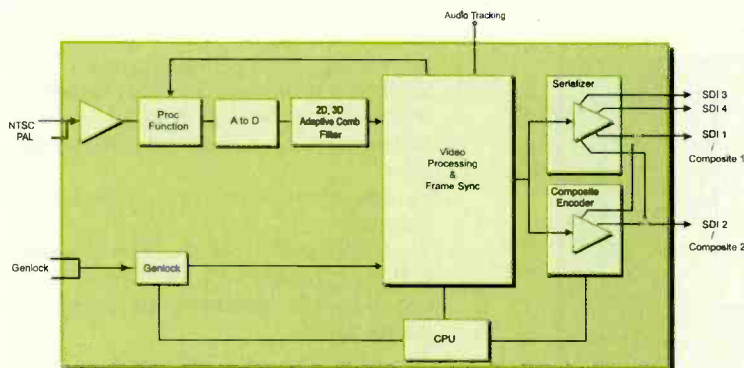
DEC-3902 — Composite Video to SDI Decoder



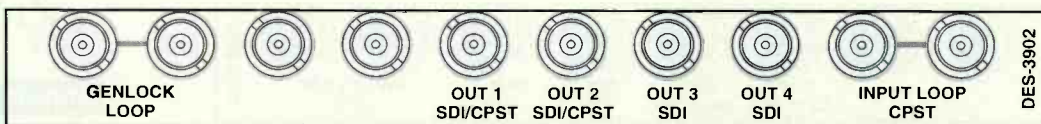
- Industry leading, 12-bit fully adaptive frame/field/3-line/notch composite decoding, processing amplifier with clipping
- A to D 12-bit input processing
- Input noise immunity and input video soft clipping
- Line-by-line VBI selection (normal, simple, bypass, delete)



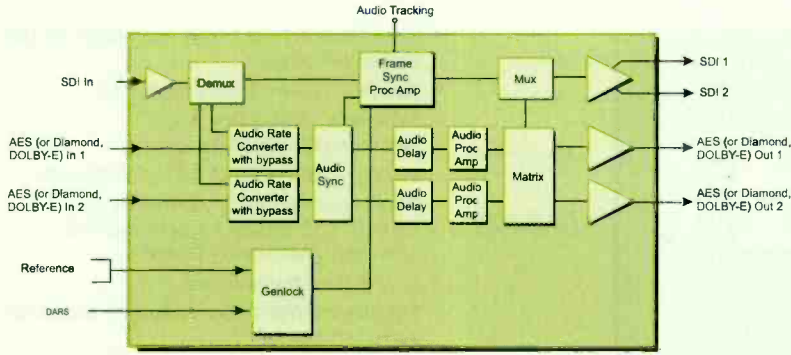
DES-3902 — Composite Video to SDI Decoder/Synchronizer



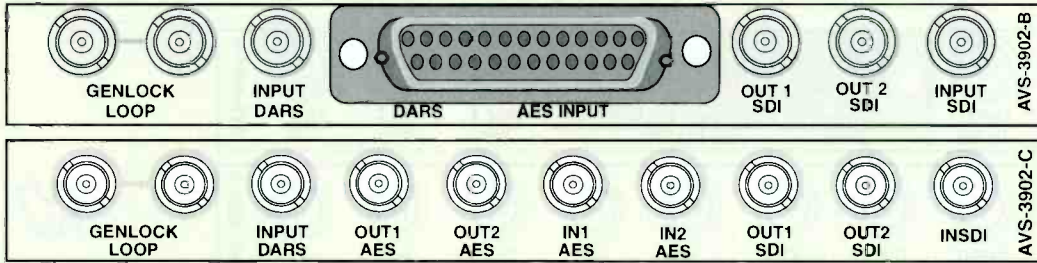
- Industry leading, 12-bit fully adaptive frame/field/3-line/notch composite decoding, processing amplifier with clipping
- 2 user-selectable outputs (SDI with embedded EDH or composite analog monitoring)
- Line-by-line VBI selection (normal, simple, bypass, delete)
- Provides internal audio tracking to audio synchronizers



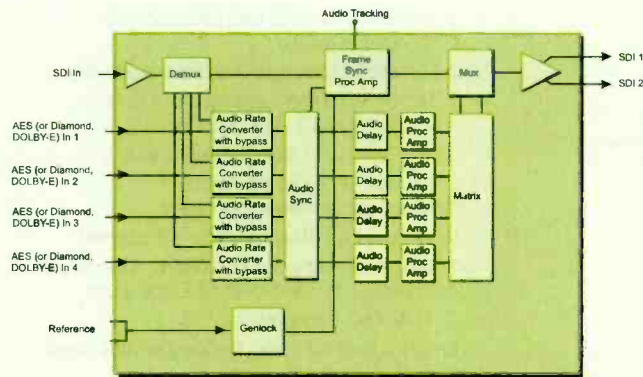
AVS-3902-B, C — SDI/AES and Embedded Audio Synchronizer/Processor



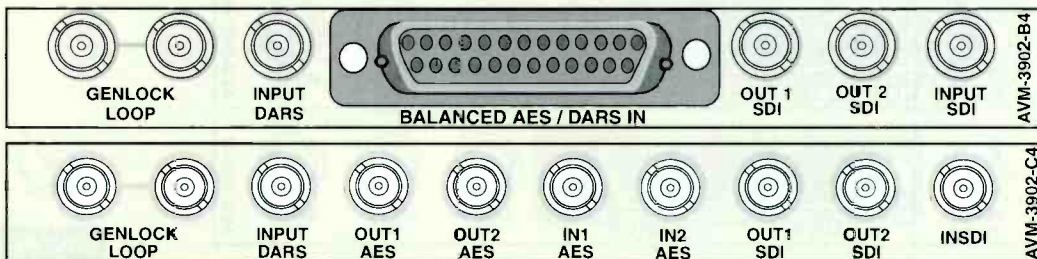
- Cleanly handles hot switch on input for video AES and embedded audio
- Embedded audio is demultiplexed and subsequently remultiplexed to avoid audio distortion during frame drop/repeat
- 3-color space video processing amplifier (YPrPb/composite/GBR)
- 16/20/24-bit AES and embedded audio synchronization/delay/processing
- Variable audio delay up to 1.3 seconds
- Passes compressed audio data, i.e., Dolby® E, AC-3™
- Up to 30 frames video delay in delay mode
- Provides internal audio tracking to additional audio synchronizer



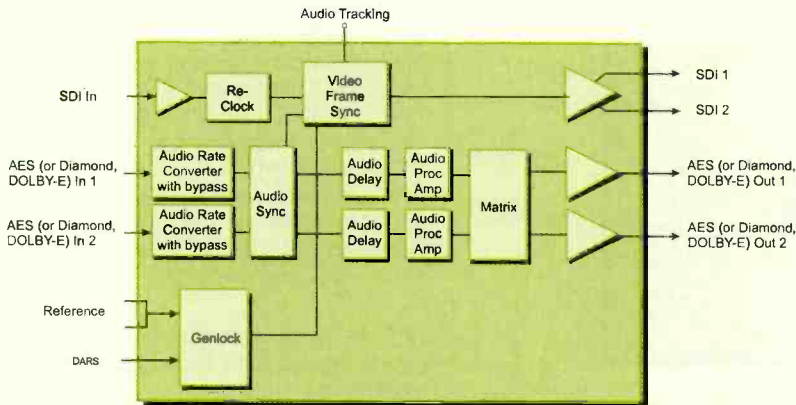
AVM-3902-B4, C4 — SDI/AES and Embedded Audio Synchronizer/Processor and Multiplexer



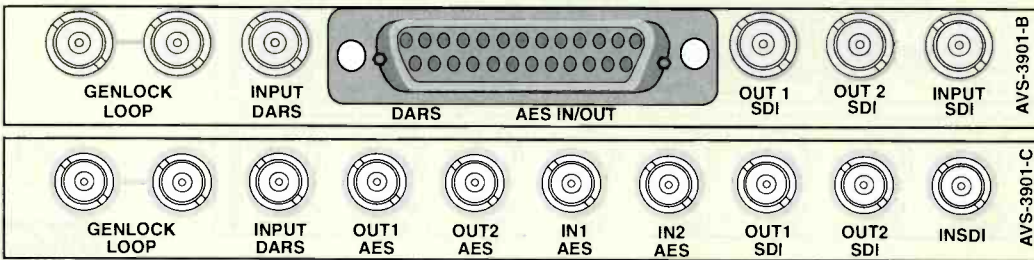
- Cleanly handles hot switch on input for video AES and embedded audio
- Embedded audio is demultiplexed and subsequently remultiplexed to avoid audio distortion during frame drop/repeat
- 3-color space video processing amplifier (YPrPb/composite/GBR)
- 16/20/24-bit AES and embedded audio synchronization/delay/processing
- 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



AVS-3901-B, C — SDI/AES Synchronizer/Processor

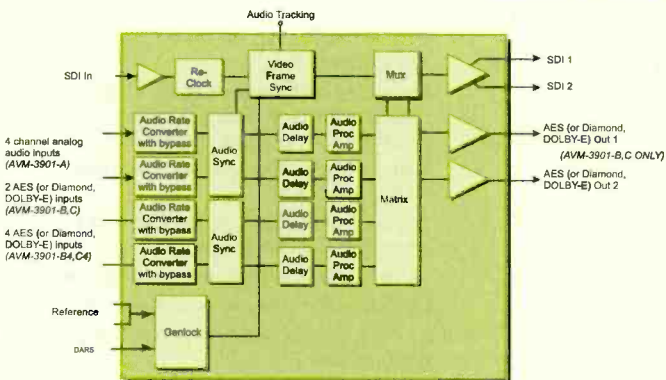


- SDI embedded input with two processed SDI embedded outputs
- Two AES streams input and output
- Selectable 16/20/24-bit audio synchronization/delay/processing
- Variable audio delay of up to 1.3 seconds
- Audio re-sampling for 32-108kHz AES outputs, with bypass for data over AES operation, Diamond or Dolby® E
- C, U & V bit transparency
- Provides internal audio tracking to additional audio synchronizer

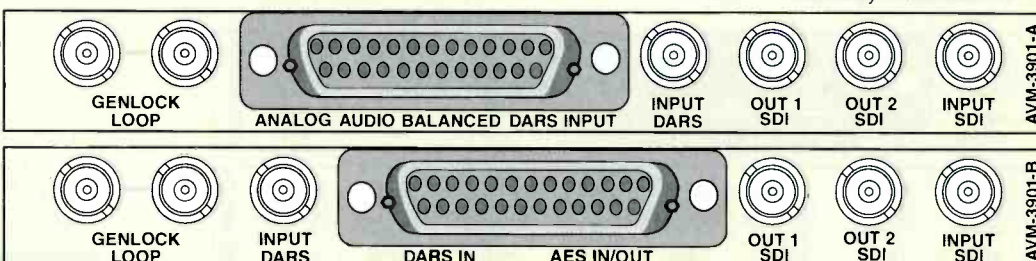


NEO SIMPLICITY

AVM-3901-A, B, C, B4, C4 — SDI/Audio Synchronizer/Processor and Multiplexer



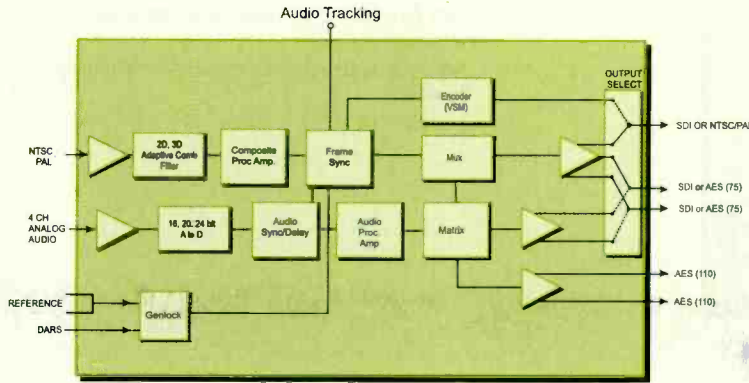
- SDI video input with two processed SDI embedded outputs
- 2 SDI video outputs with embedded audio
- 2 AES or 4 channels analog input with multiplexed and 2 AES outputs
- 4 AES input with multiplexed output
- Selectable 16/20/24-bit audio synchronization/delay/processing
- Variable audio delay of up 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



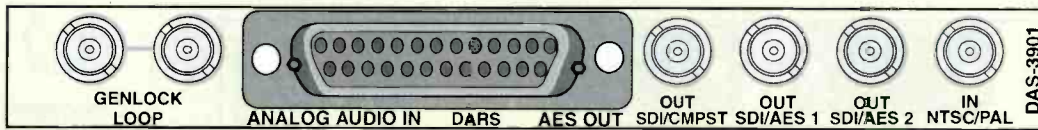
See page 65 for other back panels: AVM-3901-C, B4, C4

NEO SIMPLICITY

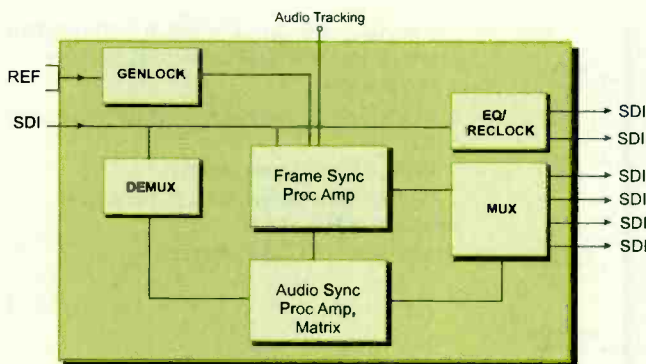
DAS-3901 — Composite Video/Analog Audio Synchronizer/Processor/Multiplexer



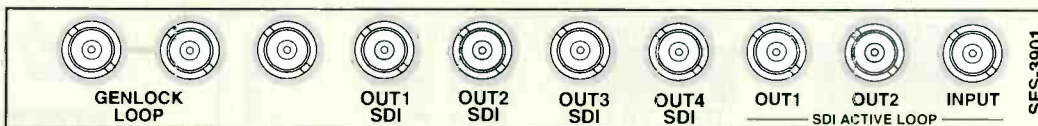
- 12-bit fully adaptive frame/field/3-line/notch composite decoding, synchronization, processing amplifier with clipping (hue, chroma, video, setup controls)
- Line-by-line VBI handling and processing
- Selectable 16/20/24-bit A to D, synchronization, delay and processing amplifier (gain, swap, delay, invert, mix) for audio input
- Variable audio delay of up to 1.3 seconds
- Audio multiplexer
- Provides internal audio tracking to additional audio synchronizer



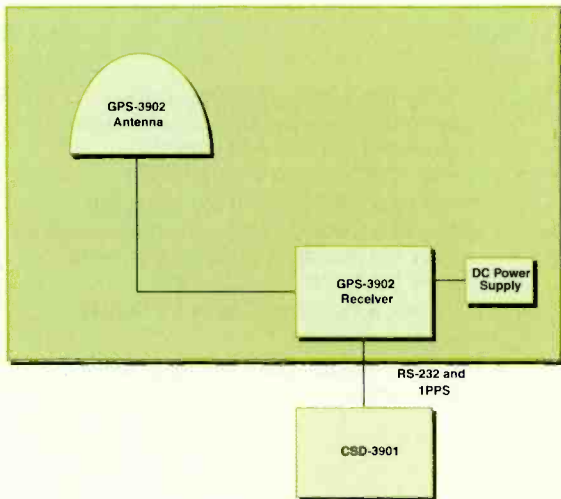
SFS-3901 — SDI and Embedded Audio Synchronizer/Processor



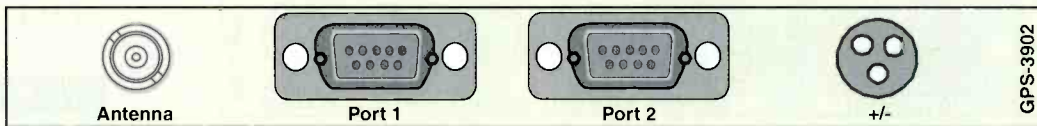
- Cleanly handles hot switch on input for video and embedded audio
- 3-color space video processing amplifier (YPrPb/ Composite/GBR)
- Up to 30 frames video delay in delay mode
- Embedded audio is demultiplexed and subsequently remultiplexed to avoid audio distortion during frame drop/repeat
- 16/20/24-bit embedded audio synchronization/delay/processing
- Variable audio delay of up to 1.3 seconds
- Passes compressed audio data, i.e., Dolby® E, AC-3™
- Provides internal audio tracking to additional audio synchronizer



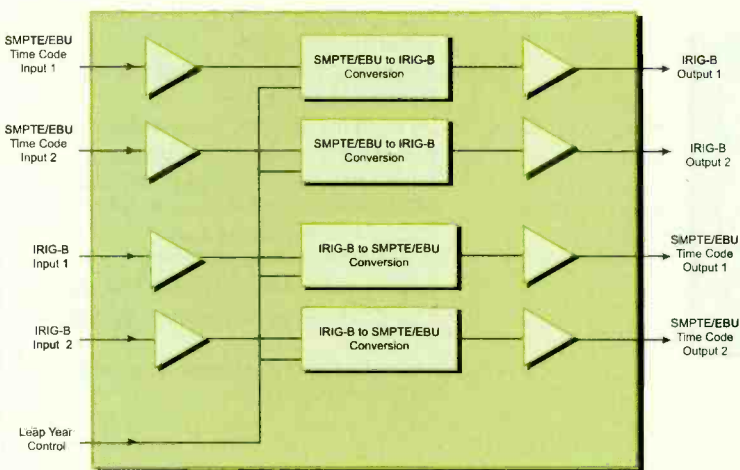
GPS-3902 — GPS Receiver and Antenna



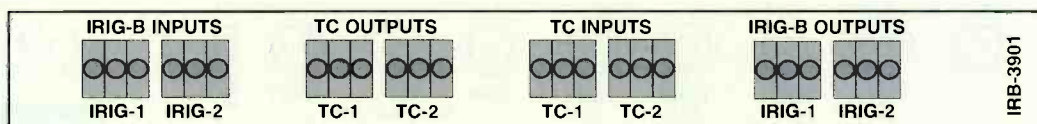
- Compatible with CSD-3902, MTG-3901 and CSD-5300
- GPS provides an accurate time reference available globally
- Separate antenna and receiver for mounting flexibility
- Accurate to 10ms



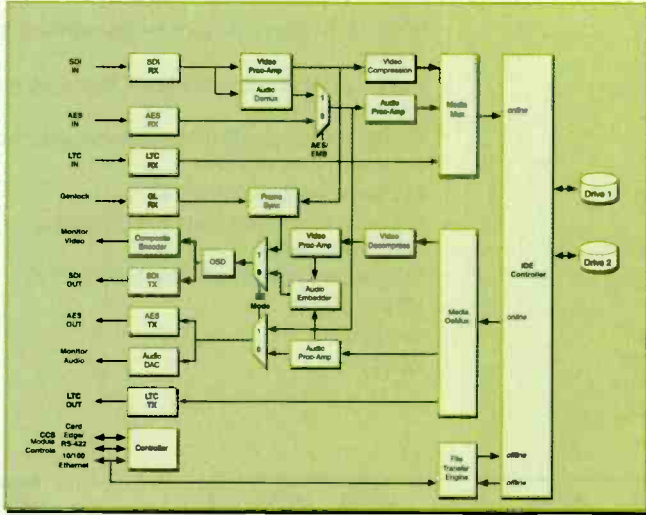
IRB-3901 — IRIG-B to/from SMPTE/EBU Timecode Converter



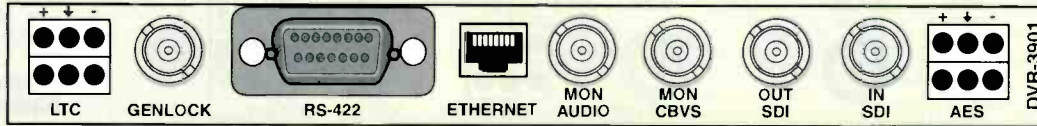
- Simultaneous conversion of IRIG-B to SMPTE/EBU timecode and SMPTE/EBU timecode to IRIG-B
- 2 IRIG-B inputs
- 2 IRIG-B outputs, each with selectable timecode inputs
- 2 SMPTE/EBU timecode inputs
- 2 SMPTE/EBU timecode outputs, each with selectable IRIG-B inputs
- Output locked to input timecode



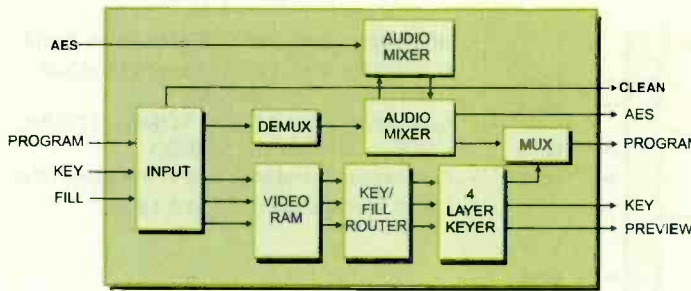
DVR-3901 — Digital Video Recorder



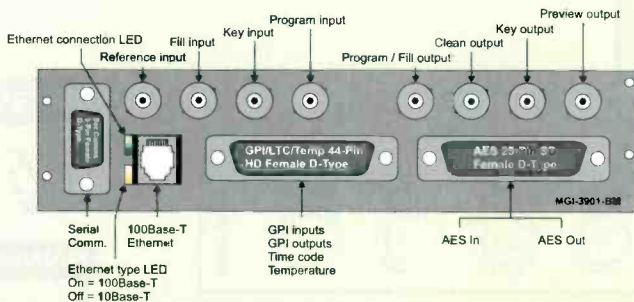
- Enhanced functionality including record and playback, variable speed playback, and jog and shuttle
- Supports RS-422 control link
- Dual onboard 2.5" IDE hard drives, 40GB each
- Motion JPEG compression ranges from 4:1 to 10:1
- Record time per drive: 2-8 hours, depending on selected bit rate
- 1 channel video and 1 stereo audio being recorded/played
- LTC input and output
- FTP file transfer of content via Ethernet connector



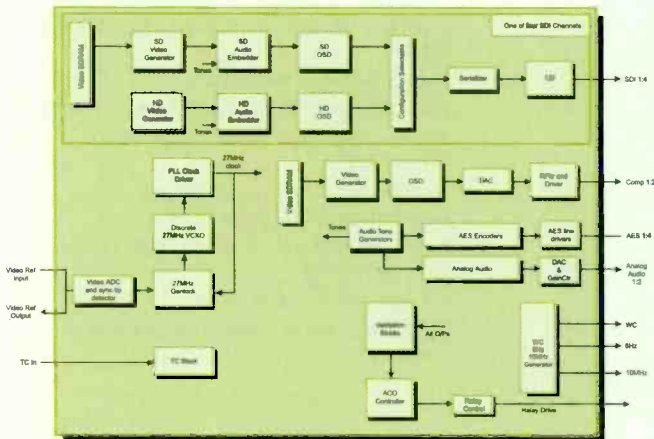
MGI-3901 — SDI IconLogo™



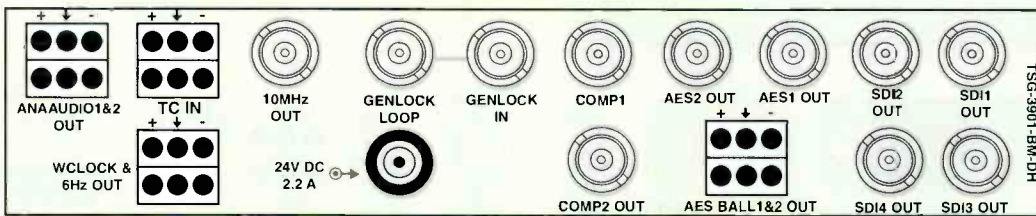
- Mix SD and HDTV modules in one NEO™ frame
- Bypass relay equipped as standard
- Front hot-swappable PSUs and modules
- User-configurable "apology/trouble slide" airs automatically if loss or errors in program or reference inputs
- Up to four logos in SDI; each layer (logo) can be:
 - Static logo, animated 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
- 4-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
- Upgrade path to IconMaster™



TSG-3901 — Test Signal Generator

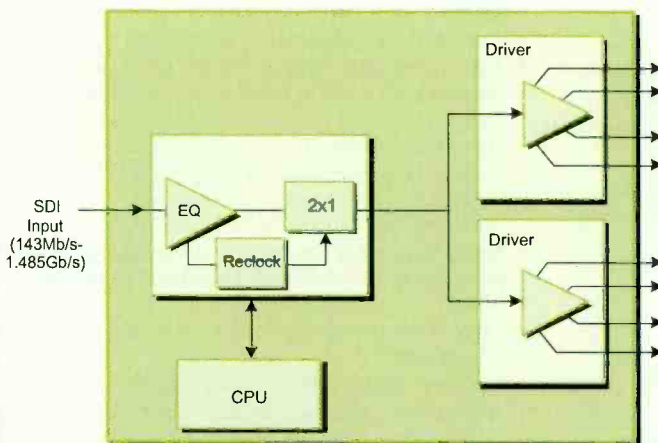


- HDTV, SDTV analog video test signal generator module
- Integrated automatic changeover (optional) for maximum reliability
- SDI/HD-SDI independent test signal outputs x4 with embedded tone or silence
- AES balanced tone outputs x2
- AES unbalanced tone outputs x2 (linked to balanced outputs)
- Independent analog audio tone channels x2
- 10MHz output
- 6Hz output
- Word Clock

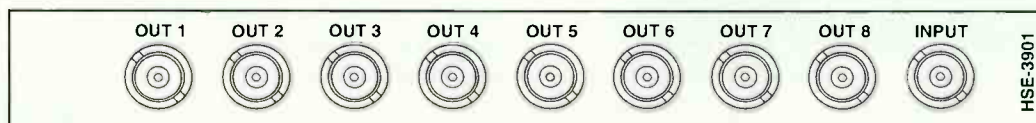


NEO HDTV ADVANCED APPLICATIONS

HSE-3901 — HDTV and SDI Reclocking Distribution Amplifier

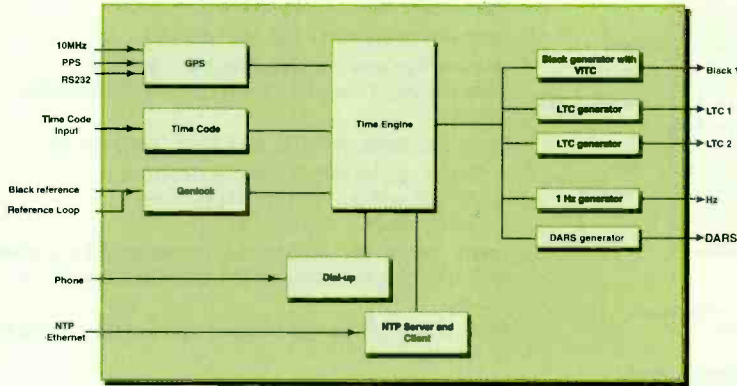


- Input signal types: SMPTE 259M, 292M, 344M
- Auto EQ for 300m (983ft.) for 270 Mb/s and 159m (483 ft.) for 1.485Gb/s
- Auto reclocking at 1.5Gb/s, 143Mb/s, 177Mb/s, 270Mb/s, 360Mb/s and 540Mb/s
- Auto bypass if unable to lock at the above rates
- DVB-ASI compatible (outputs 2,4,6,8)

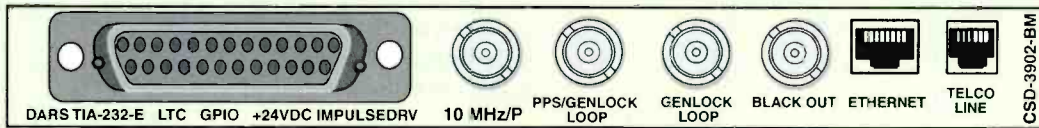


NEO HDTV DISTRIBUTION

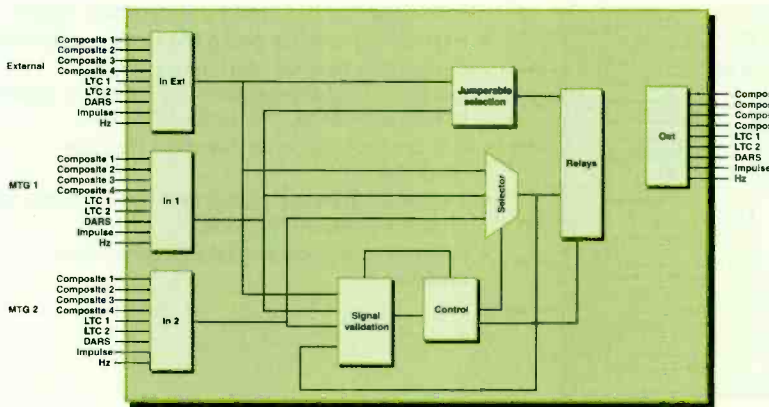
CSD-3902 — Master Clock Driver



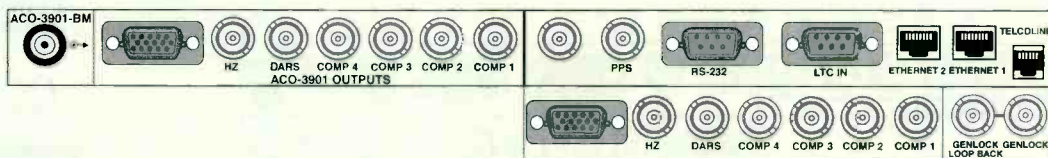
- GPS Interface for time reference (standard)
- Timecode input
- SMPTE/EBU drop-frame or non-drop timecode (Time/Date)
- Programmable DST settings
- Built-in modem for dial in/out
- Dual timecode configurable for offsets and drop-frame and non-drop frame timecode
- Ethernet port for supplying NTP (Network Time Protocol)
- Impulse drive output
- Compatible with ACO-3901 automatic changeover



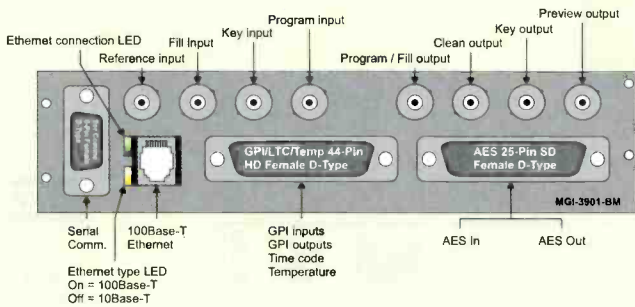
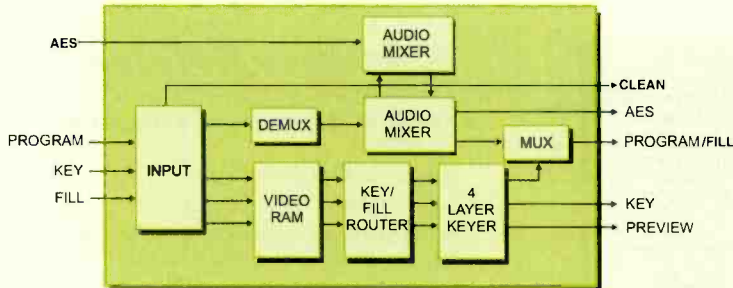
ACO-3901 — Automatic Changeover Module



- Compatible with MTG-3901 and CSD-3902
- Redundant switching of up to 2 MTG-3901s / CSD-3902 internally and a third reference source externally for enhanced reliability
- Optional standalone power supply for enhanced reliability (power modules only, not frame)



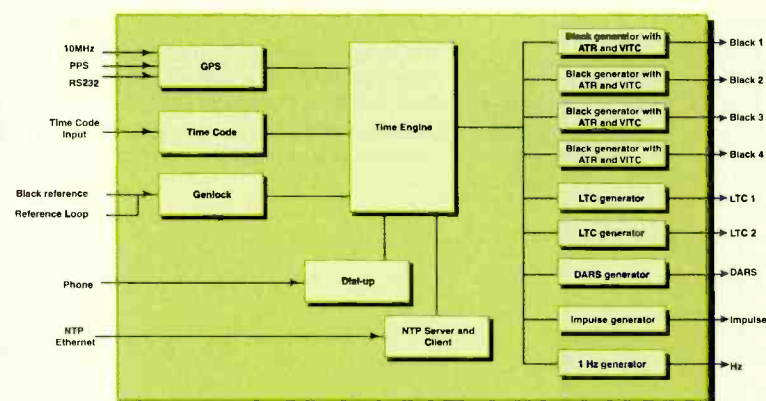
MGI-3901H — HDTV IconLogo™



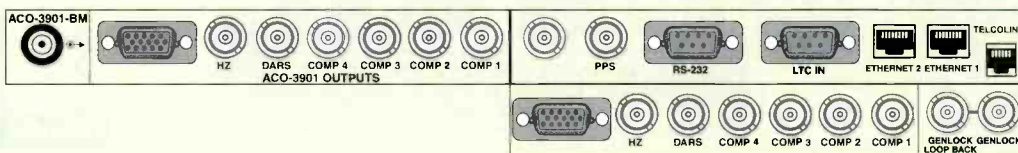
- Mix SD and HDTV modules in one NEO frame
- Bypass relay equipped as standard
- Front hot-swappable PSUs and modules
- User-configurable "apology/trouble slide" airs automatically if loss or errors in program or reference inputs
- Up to two logos in HDTV; each layer (logo) can be:
 - Static logo, animated 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
- 4-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
- Upgrade path to IconMaster™



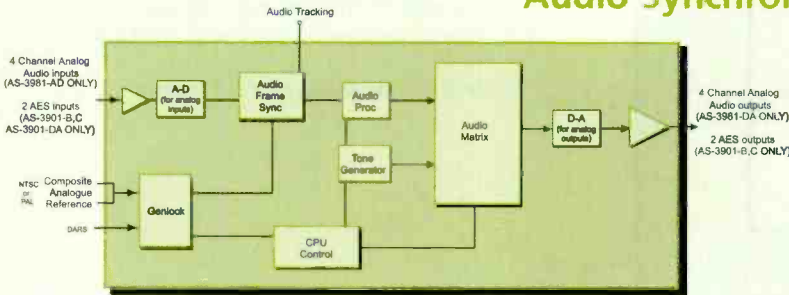
MTG-3901 — Master Timing Generator



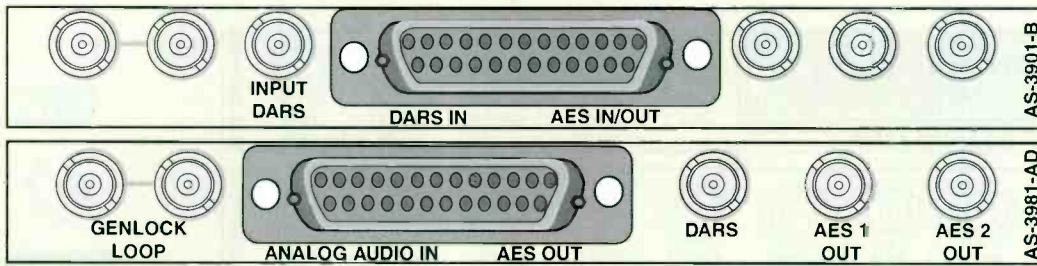
- Fully integrated reference signal generator system
- High-density modular packaging for any application
- Comprehensive array of reference signals for maximum flexibility and economy (reference signals include Black Burst, LTC, DARS, VITC, NTP)
- GPS synchronization for maximum precision (Optional)
- Integrated automatic changeover unit for enhanced reliability (Optional ACO-3901)
- Fully redundant and standalone configurations available



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 65 for other back panels: AS-3901-C, AS-3981-DA



NSV-xxxx — NEO SuiteView™ Multi-Source Display Processors

Highly scalable, modular, multi-source display processor renders 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
- Future-proof auto-format detecting HD-SDI, SDI & composite inputs
- NTSC, PAL, PAL-M, VGA & DVI inputs supported
- Outputs configurable up to UXGA
- Redundant outputs standard
- Separate external graphics input
- Reliable flexibility with NEO™
 - Ideal for mission-critical applications (24/7 operation)
 - Redundant PSU & controllers (in 3RU)
 - Front-loading, hot-swappable modules and PSUs
 - Mix-and-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

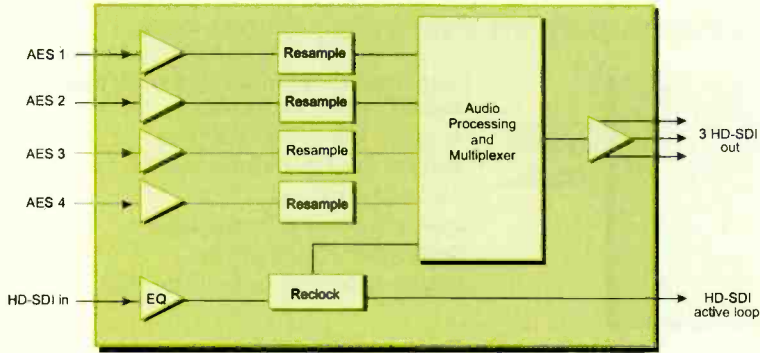
NEO SuiteView™ Related Modules

- NSV-H4 Quad auto-detecting HD/SDI/composite video input module
- NSV-S4 Quad auto-detecting SDI/composite video input module
- NSV-V4 Quad analog composite video input module (also supports fewer YUV, Y/C) inputs
- NSV-G3 Triple VGA/DVI graphics input module
- NSV-OUT Output module with redundant outputs
- NSV-EAxx Embedded audio option, per video input (xx)
- NSV-AUD16 16 channel stereo analog audio input module
- NSV-AES16 16 AES channel audio input module

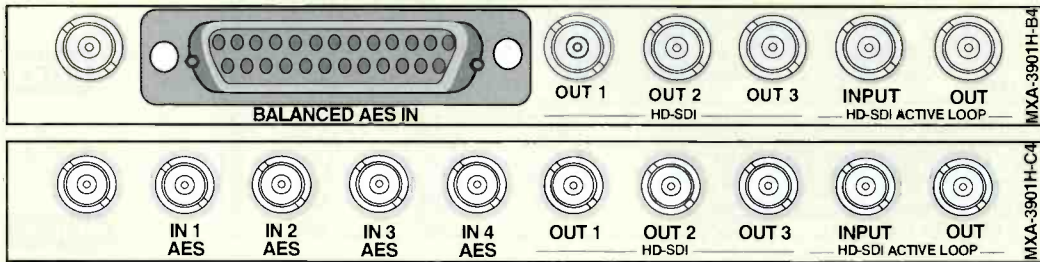
See page 69, 70 for more information.



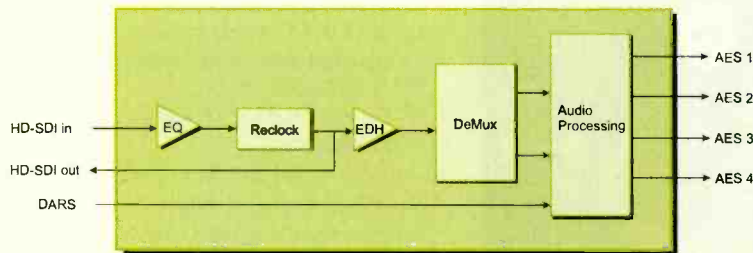
MXA-3901H-B4, C4 — HDTV 4 AES Audio Multiplexer



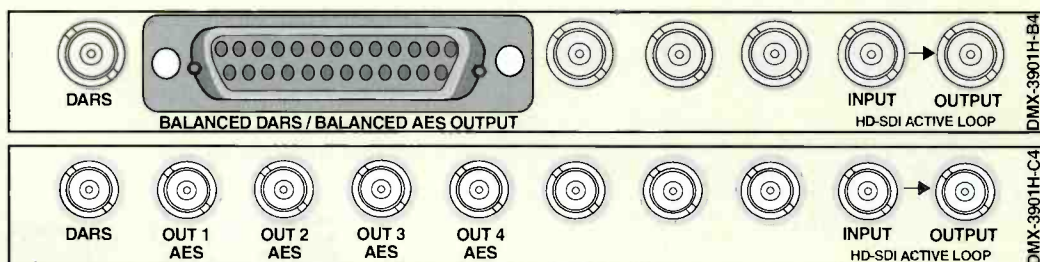
- 4 AES audio multiplexing into HDTV
- Selectable 16/20/24-bit audio delay/processing
- Passes compressed audio data, i.e., Dolby® E, AC-3™
- Variable audio delay up to 1.3 seconds



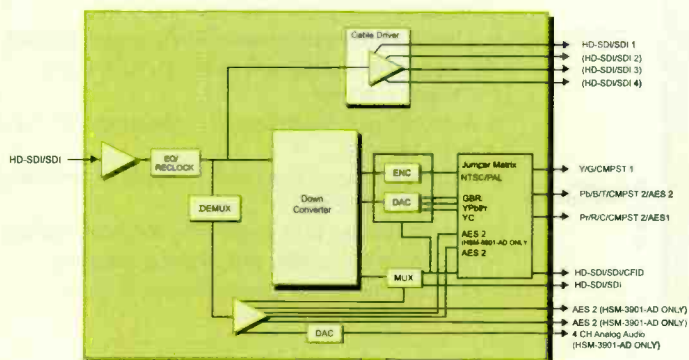
DMX-3901H-B4, C4 — HDTV 4 AES Audio De-multiplexer



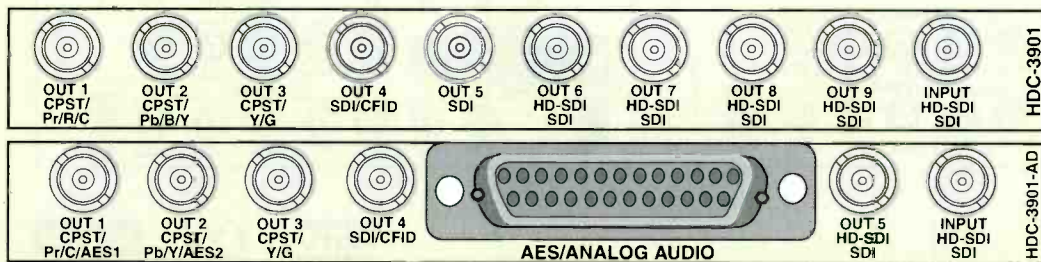
- 4 AES audio demultiplexing from HDTV
- Selectable 16/20/24-bit audio delay/processing
- Passes compressed audio data, i.e., Dolby® E, AC-3™
- Variable audio delay up to 1.3 seconds



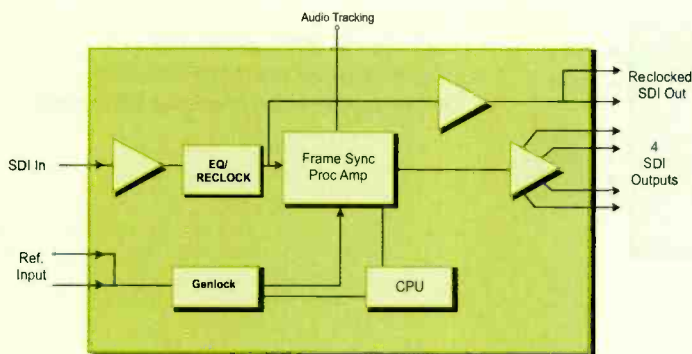
HDC-3901 — HDTV Down-converter HDC-3901-AD — HDTV Down-converter with De-multiplexer



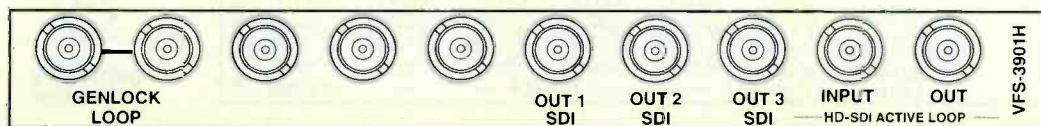
- Supports HDTV signals for 1080i/59.94, 1080i/50, 720p/59.94, 720p/50, 1080p/25 for down-conversion
- SD and HD input capability
- NTSC/PAL (3) or GBR, YPbPr (1) converted video monitoring outputs
- Supports five display types for downconverted HDTV signal: Anamorphic, Letter Box, Crop, 14:9 and Zoom 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



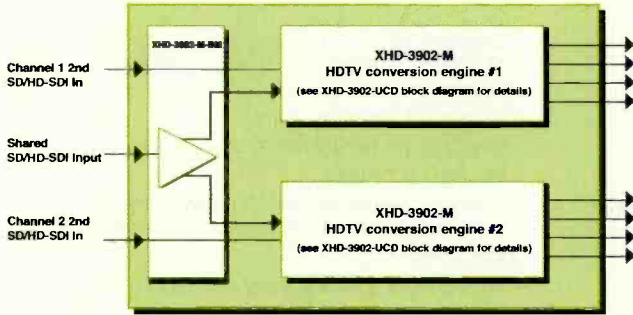
VFS-3901H-1 — HDTV Video Frame Synchronizer/Processor



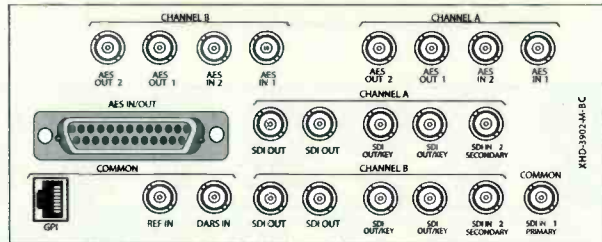
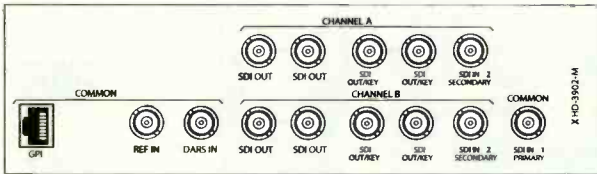
- HDTV video frame sync for 1080i-50/59.94 and 720p-59.94
- Passes entire VANC and HANC
- Provides audio tracking and hot-switching internally to a companion audio synchronizer
- Color, black or tri-level sync reference input
- Built-in video processing amplifier
- Cleanly handles hot switch on input
- Provides internal audio tracking to audio synchronizers
- Up to 16 frames of delay



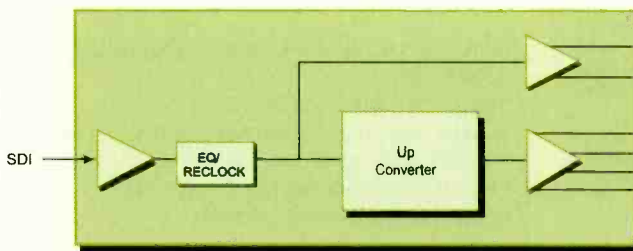
XHD-3902-M — Advanced Broadcast-quality Multi-Path HDTV Converter



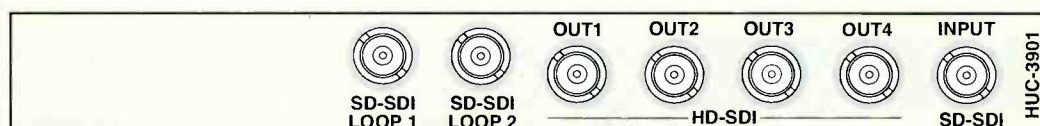
- Dual channel motion adaptive HDTV up/down/cross converter
- 2 X independent up/down/cross-conversion engines
- Dual SDI input protection switch for each HDTV conversion engine
- Transcoding of closed captioning between SDTV and HDTV formats
- AES audio support (optional), 2 groups of embedded audio proc standard
- Integrated video proc, audio proc and noise reducer
- User configurable ARC and picture positioning
- Separate sidebar key channel output to feed downstream keyer



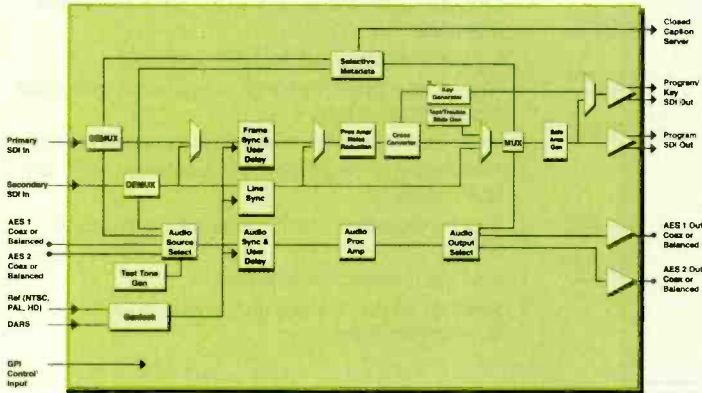
HUC-3901 — HDTV Up-converter



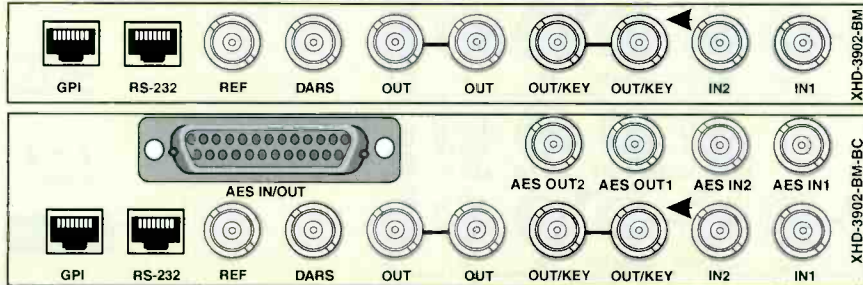
- Single-channel HDTV up-converter
- Supports 480i, 720p and 1080i formats
- Ideal for up-conversion of existing SDI content



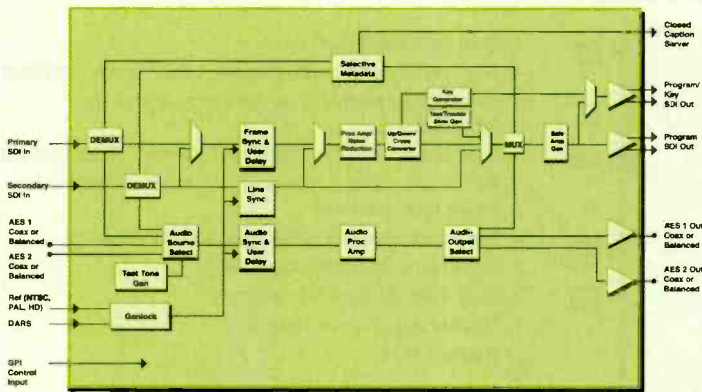
XHD-3902-C — Advanced Broadcast-quality HDTV Cross-converter and Frame/Audio Synchronizer



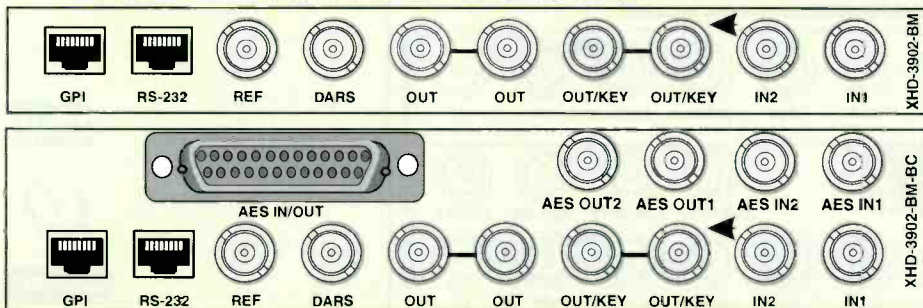
- Dual switchable SDI inputs
- Single-channel motion-adaptive HDTV cross converter
- Software-upgradeable up- and down-conversion (optional)
- Supports cross-conversion between all 720p and 1080i HDTV formats
- AES audio support (optional), 2 groups of embedded audio proc standard
- Integrated video proc, audio proc and noise reduction
- Dual input protection switching
- Separate sidebar key channel output to feed downstream keyer



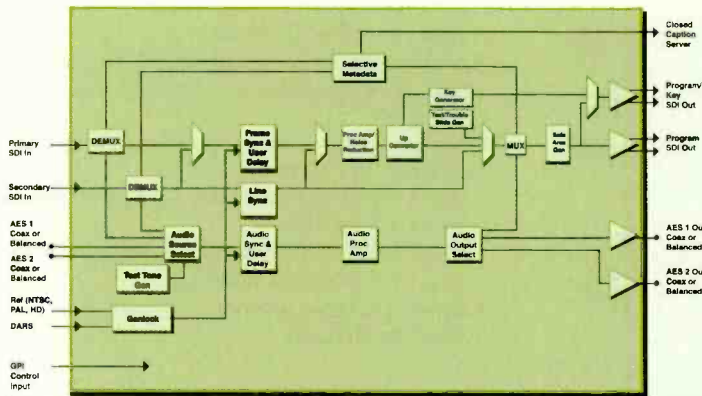
XHD-3902-UCD — Advanced Broadcast-quality HDTV Converter



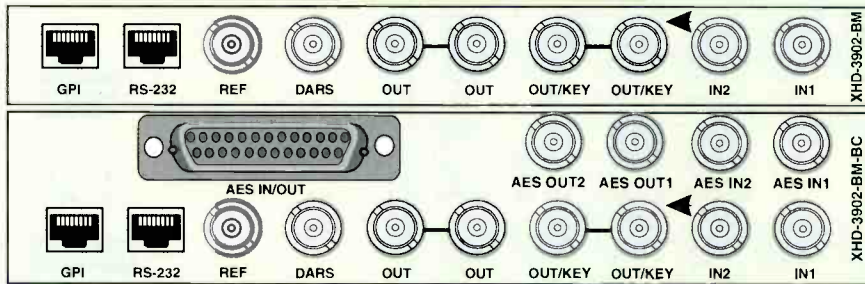
- Dual switchable SDI inputs
- Single-channel motion-adaptive HDTV up/down/cross converter
- Supports conversion between 720p, 1080i and 525 and 625 formats
- AES audio support (optional), 2 groups of embedded audio proc standard
- Integrated video proc, audio proc and noise reduction
- Separate sidebar key channel output to feed downstream keyer
- Remapping of closed captioning
- Dual input protection switching



XHD-3902-U — Advanced Broadcast-quality HDTV Up-converter with Audio Processing

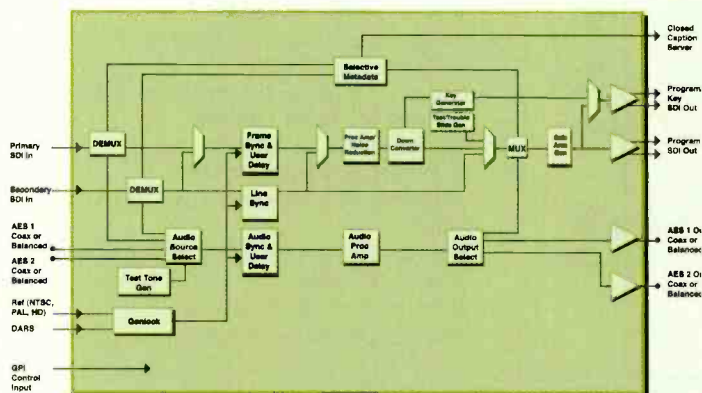


- Single-channel motion-adaptive HDTV up-converter
- Software-upgradeable down- and cross-conversion (optional)
- Supports upconversion to 1080i and 720P
- AES audio support (optional), 2 groups of embedded audio proc standard
- Integrated video proc, audio proc and noise reducer
- Transcoding of closed captioning between SDTV and HDTV formats
- User-configurable output image ARC and picture position
- Dual input protection switching
- Separate sidebar key channel output to feed downstream keyer

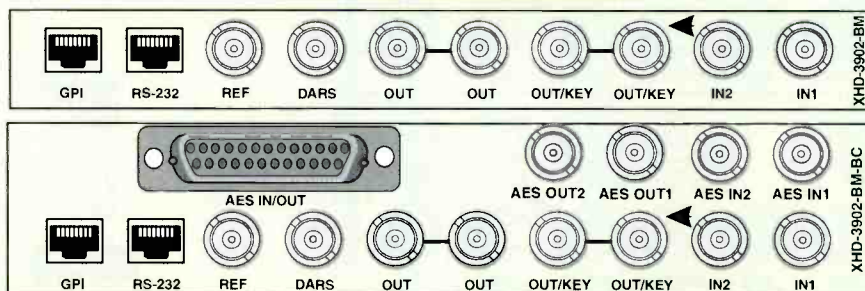


NEO HDTV VIDEO

XHD-3902-D — Advanced Broadcast-quality HDTV Down-converter with Audio Processing



- Dual switchable SDI inputs
- Single-channel motion-adaptive HDTV down-converter
- Software-upgradeable up- and cross-conversion (optional)
- Supports down-conversion of 720P and 1080i formats
- AES audio support (optional), 2 groups of embedded audio proc standard
- Integrated video proc, audio proc and noise reducer
- Remapping of closed captioning
- Dual input protection switching
- Sidebar key channel output
- Provides SD arc



NEO HDTV VIDEO

NEO™ For Advanced Applications — NEO™ frames have been designed with the future in mind, offering flexibility for multiple applications of use and housing any combination of video/audio analog/digital conversion and distribution modules. The frames offer an easy upgrade path of video and audio from analog to SDI and HD for 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 necessary, 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™ provides rapid automatic restoration of last known valid parameter settings from a failed module into newly inserted spare module, significantly reducing downtime
- NEOSCOPE™ provides a visual display of the video passing through the module on the card edge display, allowing for quick confirmation of signal presence from input to output

NUCLEUS™ Network Control Panel

NUCLEUS™ streamlines the control and monitoring of NEO™ and other Leitch processing products. NUCLEUS™ is completely user programmable (by means of an intuitive panel wizard), ensuring that each network control panel can be tailored to meet the exacting demands of every user.



NUCLEUS Control Panel



FR-3901

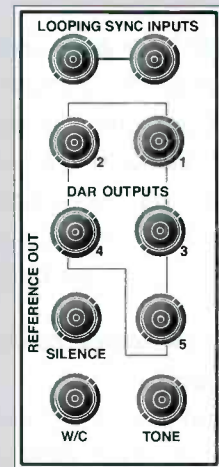
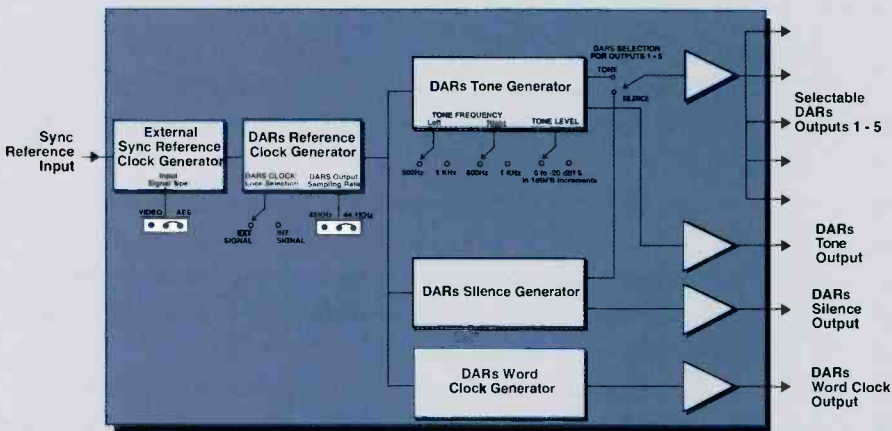


FR-3923



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

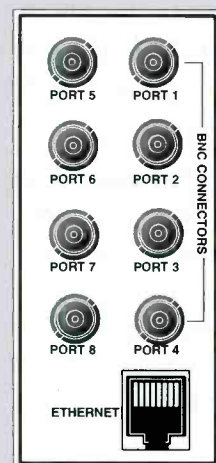
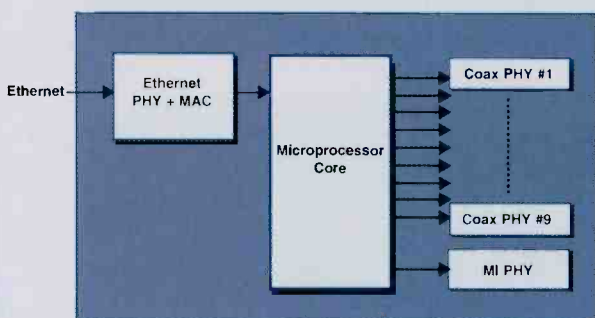


DAR-6880
Back Connector

ICE6800+ — CCS™ Ethernet Communications Card

Each CCS™ Ethernet card provides connectivity of up to nine 6800+ frames to Leitch CCS™ networks.

- Fits in FR6802+X and FR6802+XF frames
- Controls 8 additional frames (FR6802+DM/DMF and/or FR6802+X/XF) via simple coaxial interconnections
- Full CCS client support including Pilot, Navigator, CCS Control Panel, etc.
- Supports real-time 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
- Interface option to external SNMP monitoring systems
- Supports full Leitch External Protocol (EP) with third-party automation capability

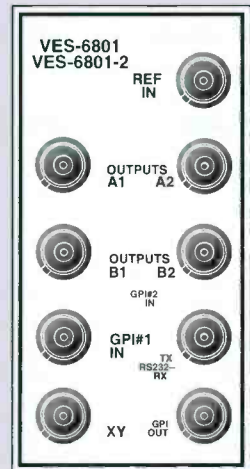
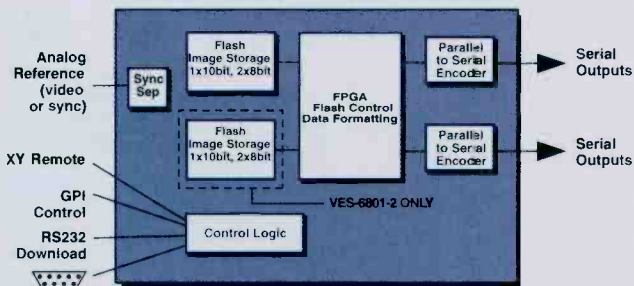


ICE6800+
Back Connector



VES-6801, VES-6801-2 — SDI Video Slide Generators

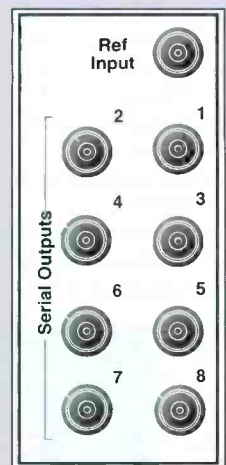
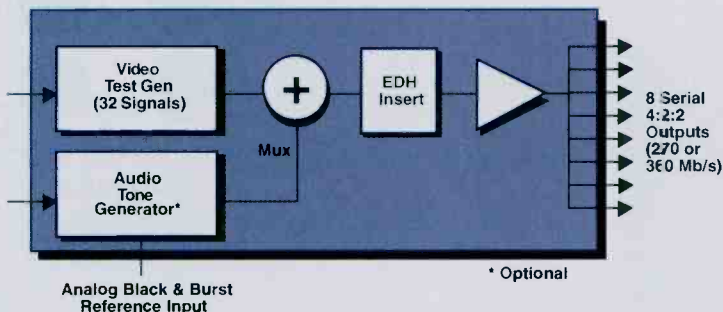
- Single-channel and dual-channel models
- Storage for two 8-bit or single 10-bit images per channel
- 4 serial digital 270Mb/s outputs with embedded EDH
- Analog reference input (black or sync) provides genlock capability
- Infinite phasing relative to reference, s/w controlled V and H adjust
- Supports 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

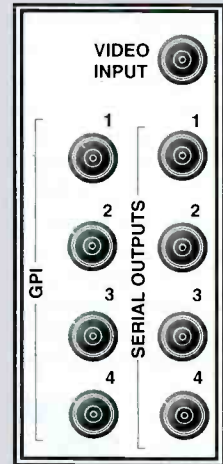
- Up to 32 selectable 4:2:2 digital test signals (1C-bit)
- 8 serial outputs
- Optional embedded digital audio (AES/EBU) test signals
- Optional embedded EDH check words in test signal
- 4:3, 270Mb/s interlaced
- Free run or genlock operation
- Infinite timing range
- **Note:** This is a 6800 series module



VTG-6801-1 Back Connector

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

6800+ SPECIALITY

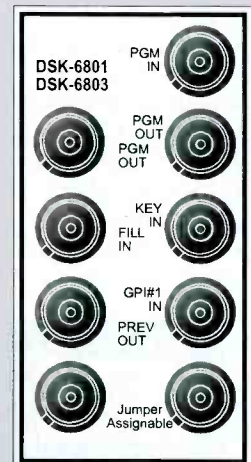
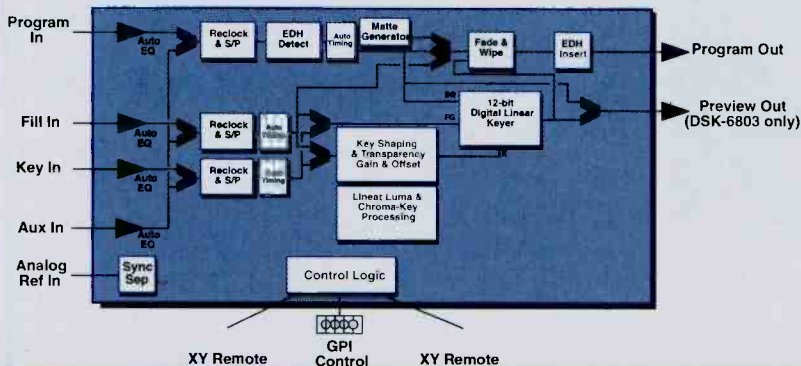
DSK-6801, DSK-6803 — SDI Downstream Keyers

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

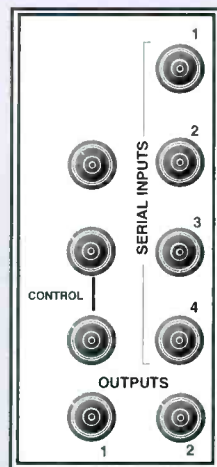
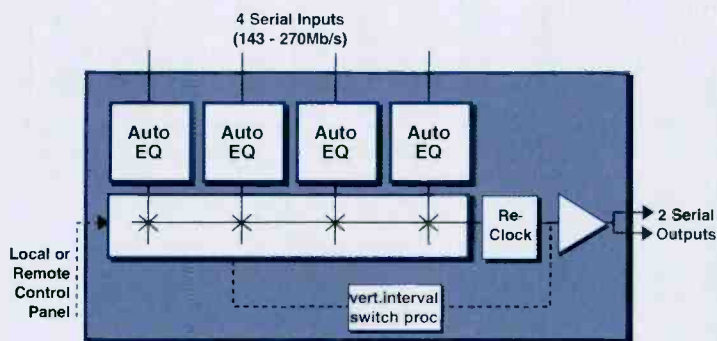


DSK-6800 and
DSK-6803
Back Connector

6800+ SPECIALITY

VSR-4041 — SDI 4x1 Switch

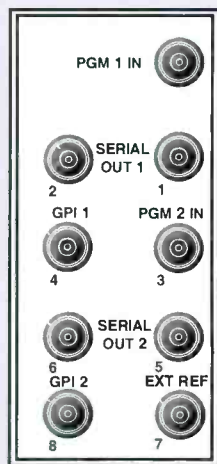
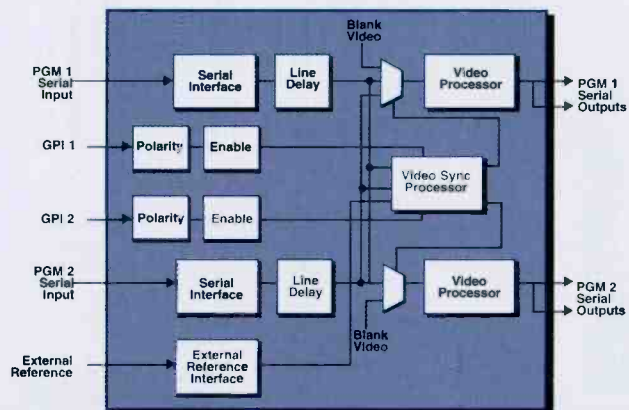
- 4x1 serial digital switcher
- Digital component or composite video
- Two serial outputs
- Local and/or remote operation
- All inputs equalized for up to 200m (675ft)
- Reclocked outputs
- **Note:** This is a 6800 series module



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

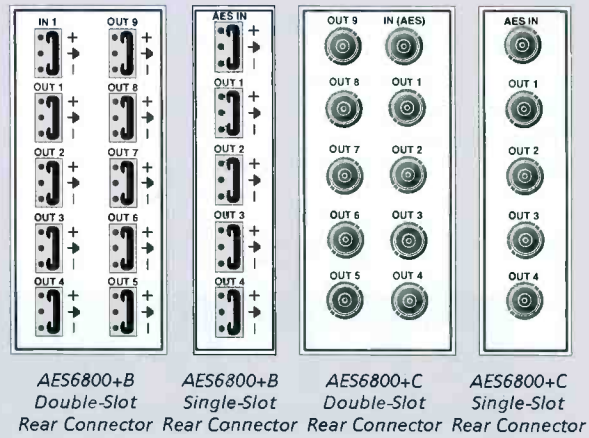
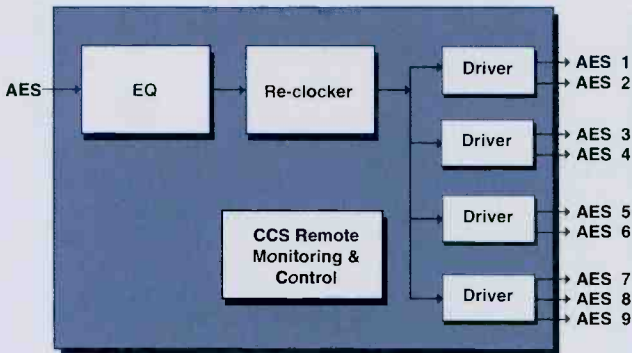


VTS-6801
Double-Slot
Back Connector

AES6800+B, C — AES Audio Distribution Amplifier

The AES6800+ B/C is a differential input, nine outputs AES/EBU digital audio distribution amplifier for use in balanced or unbalanced installations.

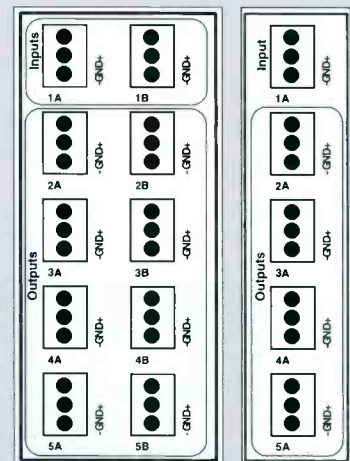
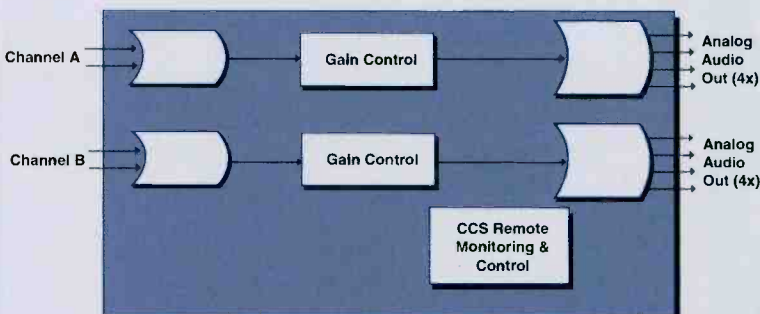
- Manual or automatic equalization modes
- Bypass mode for non-AES (non bi-phase encoded) signals up to 30MHz 50% duty cycle
- Data reclocking provides jitter reduction
- LED indication of input lock and other important errors



6800+ DISTRIBUTION

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:
 - 8 outputs designated to 1 channel (1x8)
 - 4 outputs designated to channel A, 4 outputs designated to channel B (dual 1x4)
 - 8 outputs designated to the combined stream of both channels (2x8 sum)



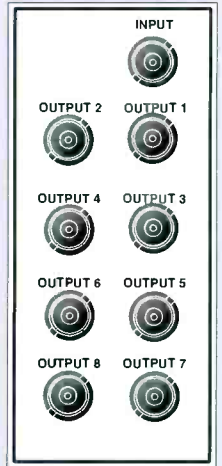
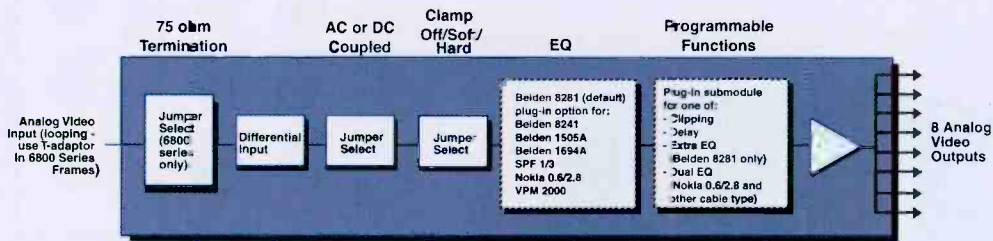
ARG6800+ Double-Slot Back Connector ARG6800+ Single-Slot Back Connector



6800+ DISTRIBUTION

VPD-6830 — Composite Video Programmable Distribution Amplifier

- Differential input, 8 outputs
- 30 MHz bandwidth (-3dB)
- Jumper-selectable soft back porch clamp
- Jumper-selectable AC or DC coupling
- **Note:** This is a 6800 series module

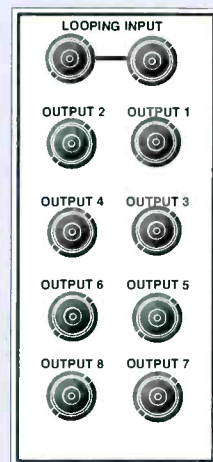
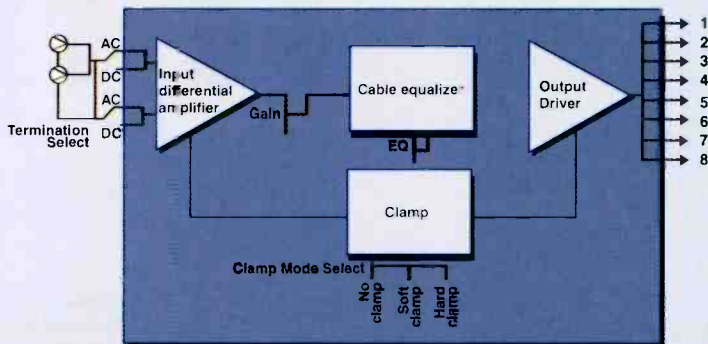


VPD-6830
Back Connector

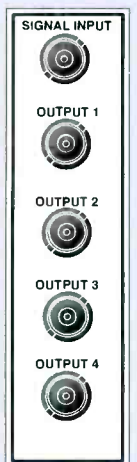
VCA6800+ — Composite Video Equalizing and Clamping Distribution Amplifier

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



VDA6800+ — Composite Video Distribution Amplifier

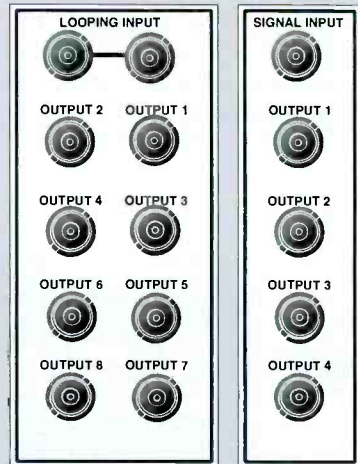
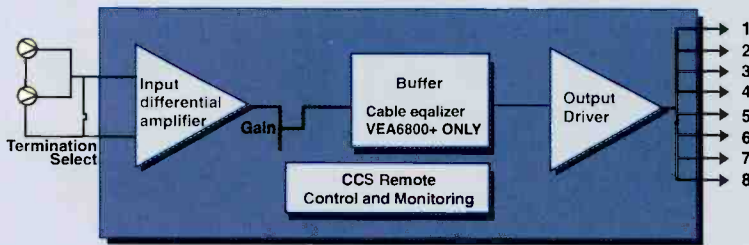
VEA6800+ — Composite Video Equalizing Distribution Amplifier

The VDA6800+ is a high-performance, high-reliability, cost-efficient general purpose analog video distribution amplifier. The VEA6800+ adds input video equalization.

- DC input coupling
- Looping and internal terminating selectable with double-slot back module, internal terminating with single-slot back module
- $\pm 3\text{dB}$ gain adjustable range, $> 50\text{ MHz}$ bandwidth

VEA6800+ Adds:

- Continuous Cable Equalizing up to 984 ft (300 m) Belden 8281 cable, or equivalent



VDA6800+ and VEA6800+ Double-Slot Back Connector

VDA6800+ and VEA6800+ Single-Slot Back Connector

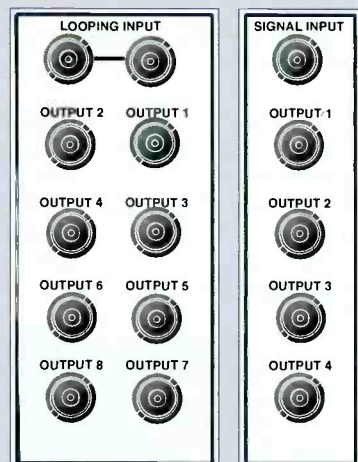
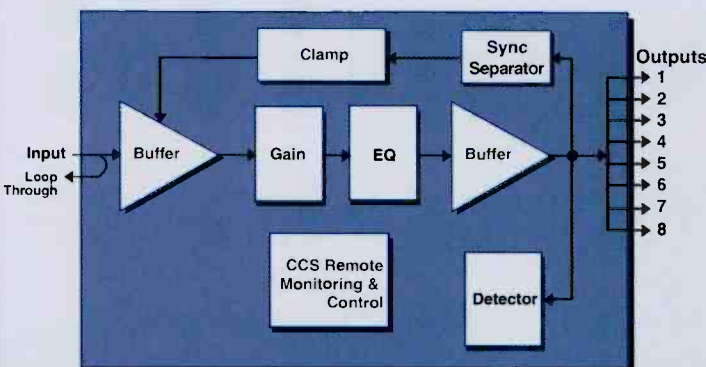


6800+ DISTRIBUTION

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

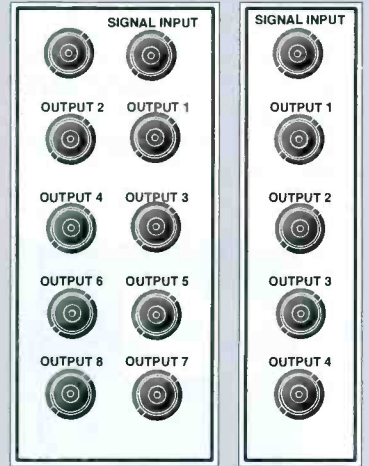
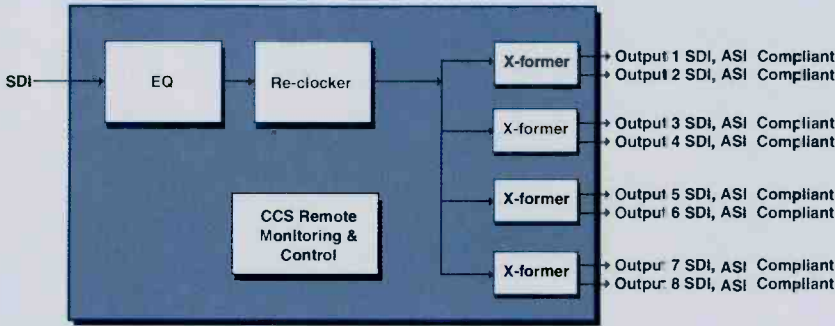


6800+ DISTRIBUTION

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



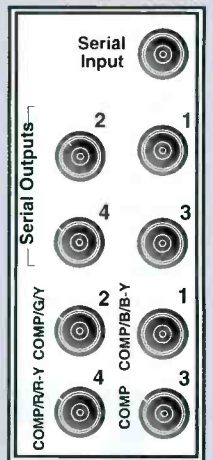
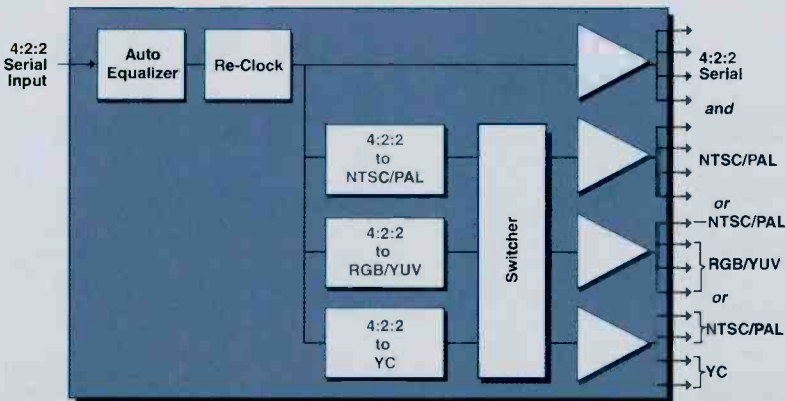
VSI6800+
Double-Slot
Back Connector

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 reclocking of 143, 177, 270 & 360 Mb/s
- 525/625 line auto-switching/4 equalized, reclocked serial outputs
- **Note:** This is a 6800 series module

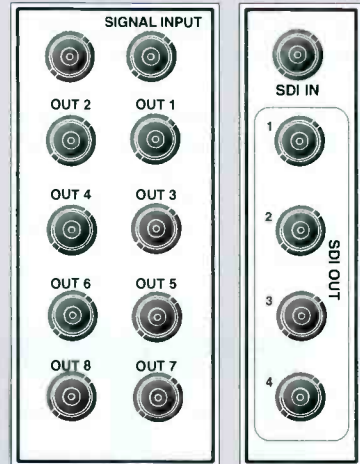
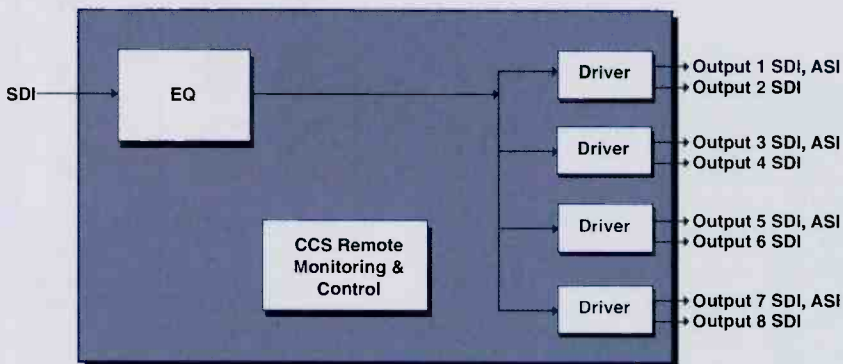


USM-6800
Double-Slot
Back Connector

VSD6800+ — SDI Video Equalizing 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
- Input signal presence detect
- Automatic cable equalization
- Alarm output



VSD6800+
Double-Slot
Back Connector

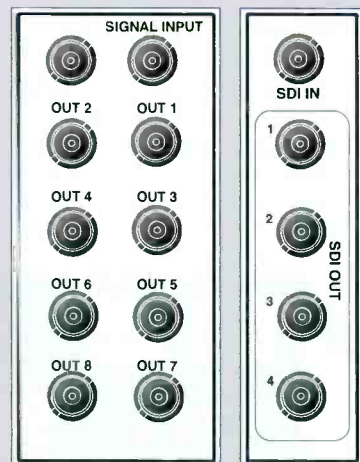
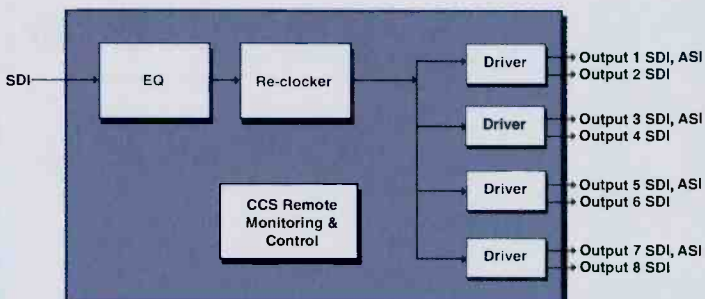
VSD6800+
Single-Slot
Back Connector



VSE6800+ — SDI Video Equalizing and Reclocking 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)
- 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



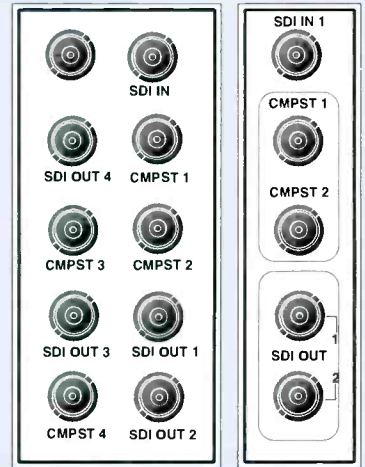
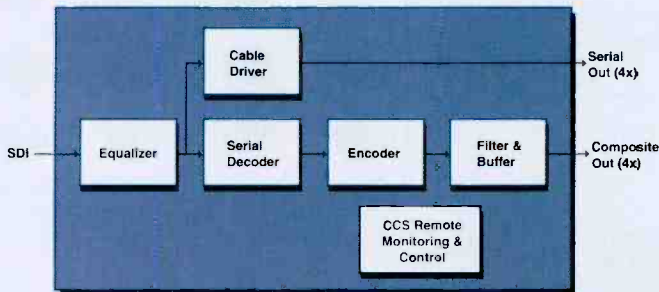
6800+ DISTRIBUTION

6800+ DISTRIBUTION

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

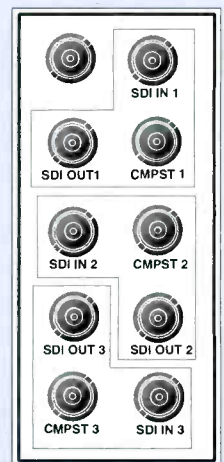
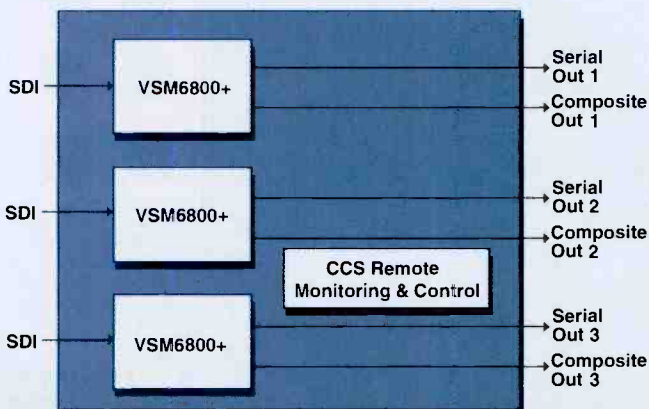
VSM6800+
Single-Slot
Back Connector



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)

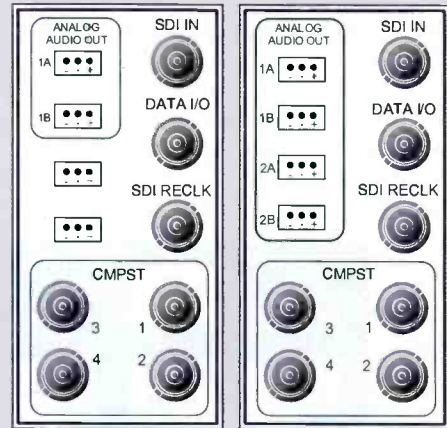


VTM6800+
Double-Slot
Back Connector



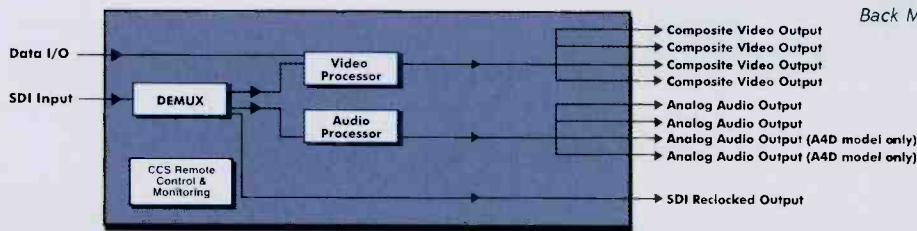
VAM6800+A2, A4 — Digital-to-Analog Video and Audio Monitoring

- SD-SDI input SMPTE 259M-C 270Mbps
- Data inputs (external sync for video and audio)
- 4 composite analog video outputs
- SD-SDI re-clocked output SMPTE 259M-C 270Mbps
- 2 stereo pairs (4 mono channels) for VAM6800+A4 option
- 1 stereo pair (2 mono channels) for VAM6800+A2 option
- Jumper-selectable audio level (0 dBFS) for each channel
- Support for up to 24-bit audio de-embedding
- Composite encoder converts a 4:2:2 digital video into a composite analog signal; supports NTSC, PAL-B and PAL-M output video formats



VAM6800+A2
Back Module

VAM6800+A4
Back Module

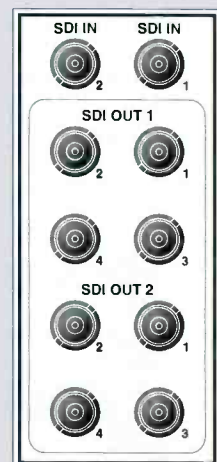
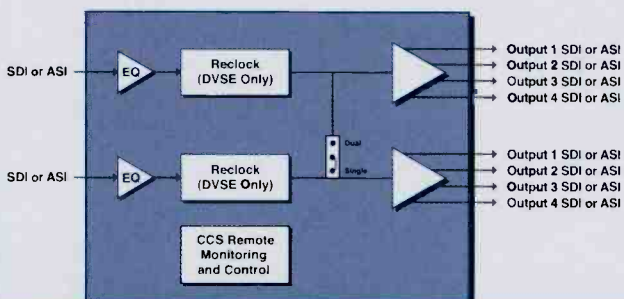


6800+ SIMPLICITY

DVSE6800+ — SDI/ASI Video Equalizing and Reclocking Distribution Amplifier DVSD6800+ — SDI/ASI Video Equalizing Distribution Amplifier

The DVSD6800/DVSE6800+ Dual DAs provide 2 channels of SDI/ASI video distribution with cable equalizing (and reclocking on DVSE only). The DVSD/DVSE6800+ Dual DA will provide 4 outputs for each input (2-1x4) as well as a jumper that provides a method allowing for a single-channel DA with 8 outputs (1x8).

- 2 inputs, 4 outputs per input
- Auto/manual reclock on DVSE only (19.4/143/177/270/360/540 Mb/s)
- Manual (force) reclock bypass option
- Alarm output
- For use in both the FR6802+X(F) and FR6802+DM(F) frames
- Input signal presence detection
- Automatic cable equalization
- Handles MPEG and ASI distribution on all outputs (SMPTE310 - 19.4 Mb/s to 270Mb/s)
- Loss of input switch - guarantees input to all outputs if one of the two inputs is lost



DVSE6800+ and
DVSD6800+
Double-Slot
Back Connector

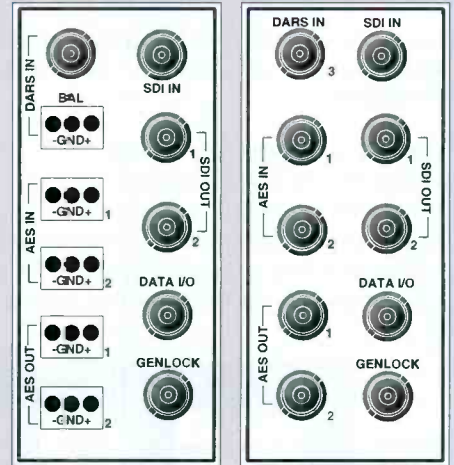
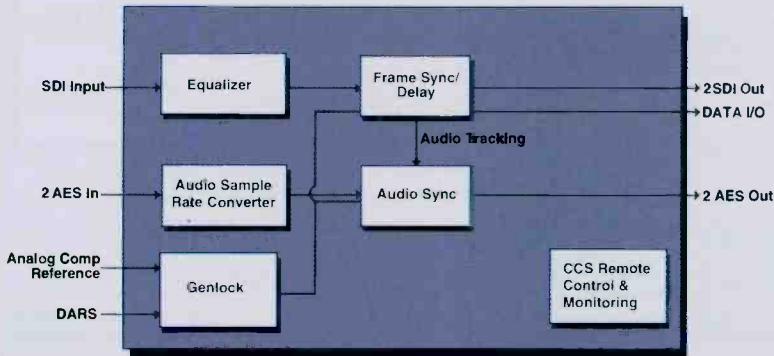


6800+ DISTRIBUTION

AVS6800+B2, C2 — SDI/AES Synchronizer/Processor

The AVS6800+ B2/C2 are single modules that combine SDI frame synchronizer and an audio delay synchronizer functions.

- 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

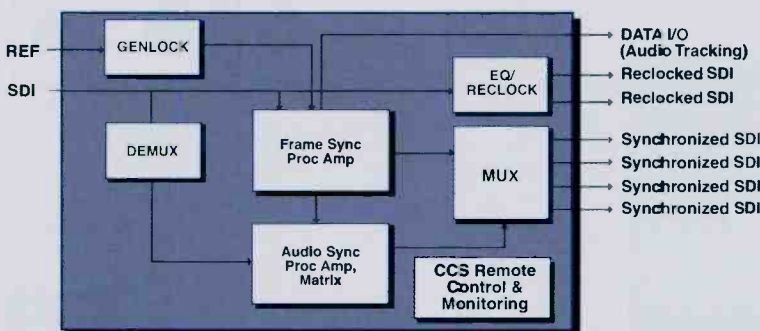


SFS6800+ — Audio/Video Frame Synchronizer and Processor Amp

The SFS6800+ combines embedded audio and SDI video processing functions on a single module.

- Operator control of either GBR, YcbCr or composite domains (no switching between domains)
- One button "return to zero" or unity setting
- Composite domain – adjustment of level, saturation, hue, black level
- GBR, YCbCr domains – adjustment of video levels/offset
- White and Black Soft and Hard Clips (adjustable) for both composite and component domains
- Internal audio processing amplifier.
- Gain, swap, invert, delay, mix (sum) of embedded audio signals
- Data mode for passing compressed audio – APTX, DOLBY-E, AC-3
- 16-, 20- or 24-bit audio processing

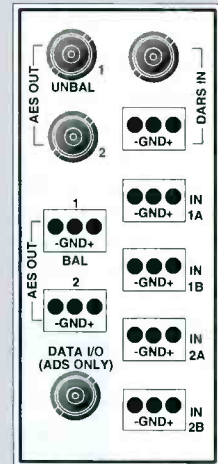
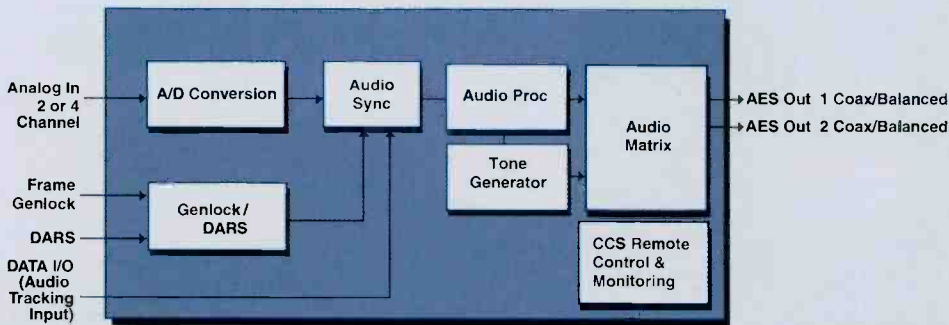
PRELIMINARY
See Page 49 for current SFS-3901



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



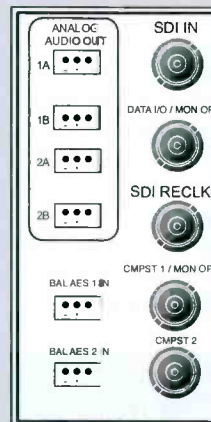
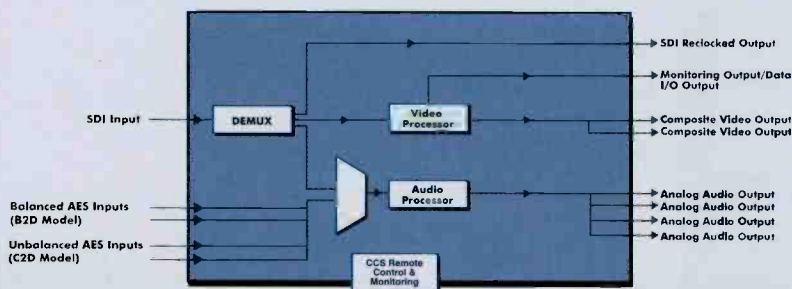
ADS6800+A2BC
and A4BC
Back Connector



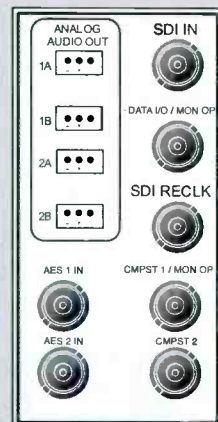
6800+ AUDIO

EAS6800+B2, C2 — Broadcast-quality Digital-to-Analog, Video and Audio Monitoring

- Video processing with controls for: black level, luminance gain, chrominance gain, chrominance phase, and SCH offset
- Frame synchronization to reference video input
- Line synchronization within a 3-line window of input video
- Audio processing amplifier with controls for gain, invert, mute, and channel multiplexing (including summing for mono channel production)
- Jumper-selectable audio level (0 dBFS) for each channel
- Balanced (+B2 model) or unbalanced (+C2 model) AES inputs
- 16-, 20- or 24-bit audio processing (selectable word length in channel pairs)
- Audio test tone generator
- Programmable audio delays (up to 1.32s per input channel)
- Composite encoder converts a 4:2:2 digital video into a composite analog signal; supports NTSC, PAL-B and PAL-M output video formats



EAS6800+B2
Back Module



EAS6800+C2
Back Module

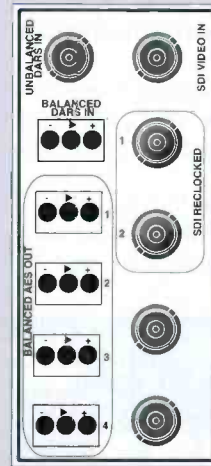
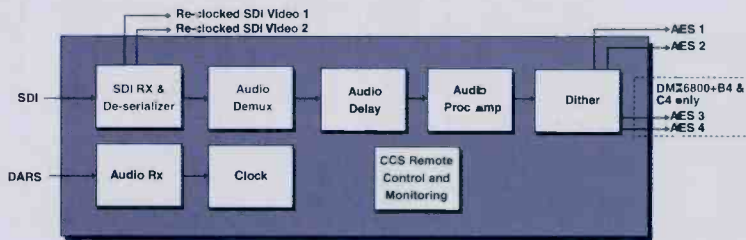


6800+ SIMPLICITY

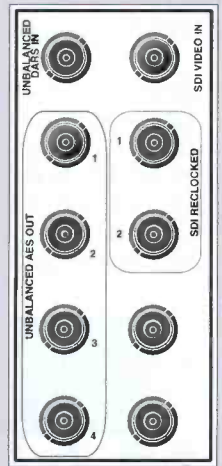
DMX6800+B2, B4, C2, C4 — AES Audio De-multiplexers

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



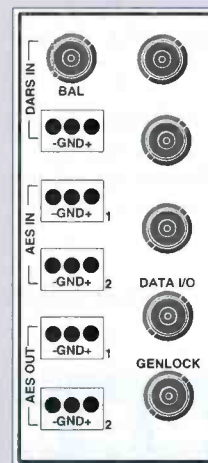
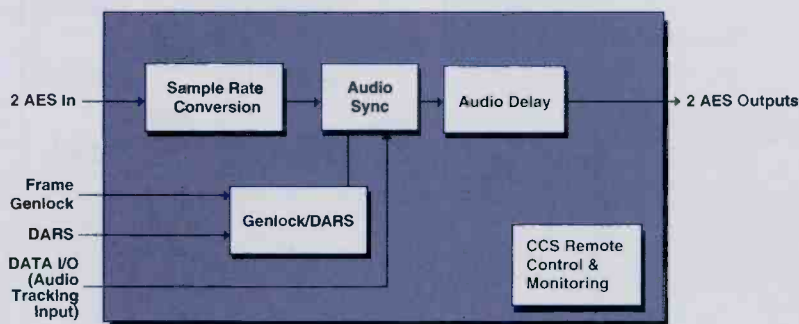
DMX6800+C2
and C4
Back Connector



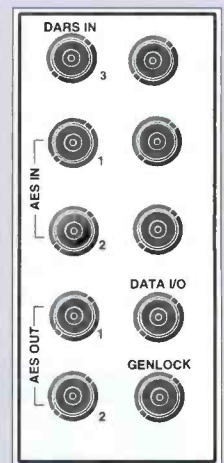
ADS6800+B2, C2 — AES Audio Delay Synchronizer

The ADS6800+ B2/C2 are the audio delay synchronizers used in conjunction with the 6800+ DES, ENS and VFS modules.

- Two 24-bit digital audio inputs
- 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



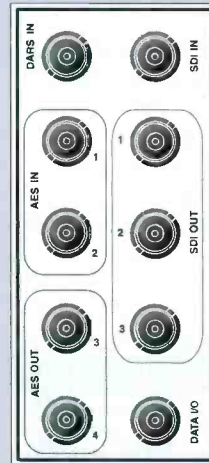
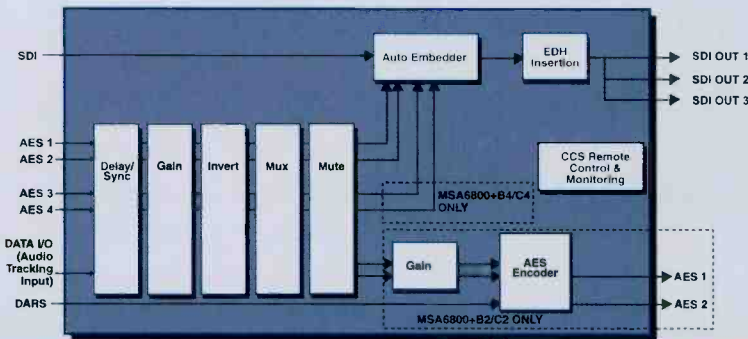
ADS6800+C2
Back Connector



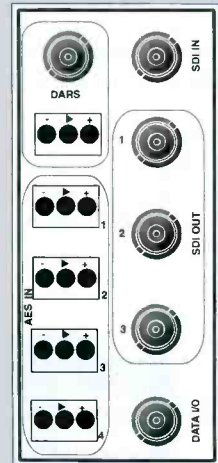
MSA6800+B2, B4, C2, C4 — AES Multiplexers with Synchronizer & Delay

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 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+C2
Back Connector.
Balanced (+B2) version
also available



MSA6800+B4
Back Connector.
Unbalanced (+C4) version
also available

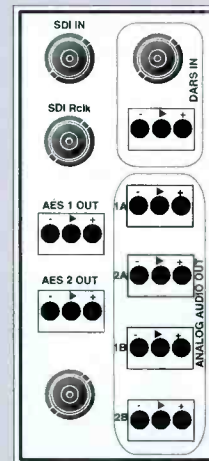
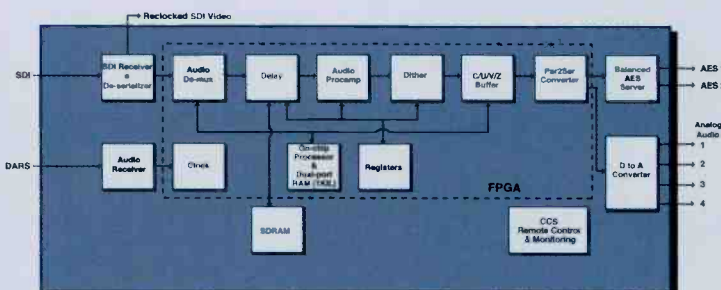


6800+ AUDIO

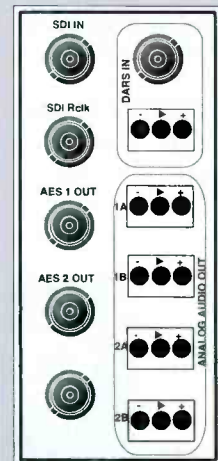
DMX6800+A2B, A2C, A4B2, A4C2 — Analog/AES Audio De-multiplexers

The DMX6800+ A2B/A2C/A4B2/A4C2 analog and AES audio demultiplexers provide audio de-embedding from an SDI input with up to two-channel AES and up to four-channel analog output.

- Selectable 16-, 20- and 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

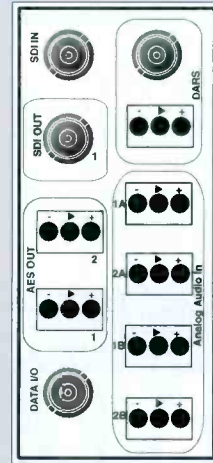
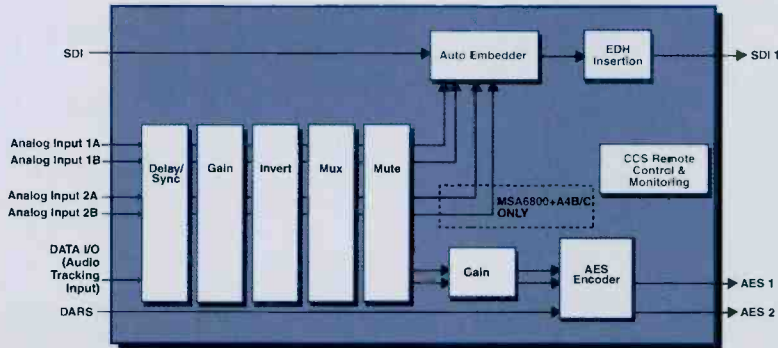


6800+ AUDIO

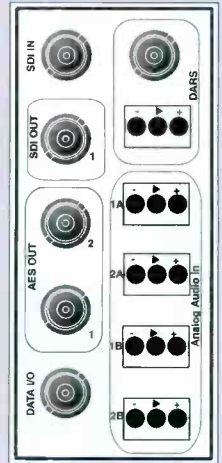
MSA6800+A2B2, A2C2, A4B2, A4C2 — Analog Audio Multiplexers with Synchronizer, Delay & AES Outputs

The MSA6800+ analog audio multiplexers with sync and delay combine the function of embedding one audio group onto a serial digital video stream with video synchronization, delay capabilities and AES outputs all in one module.

- Selectable 16-, 20- and 24-bit resolution during audio processing
- Accepts 32kHz and 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+A2B2
and A4B2
Back Connector



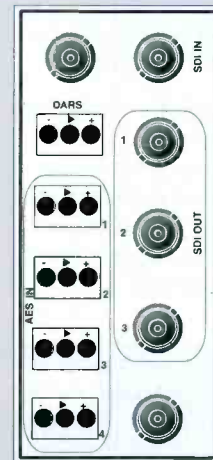
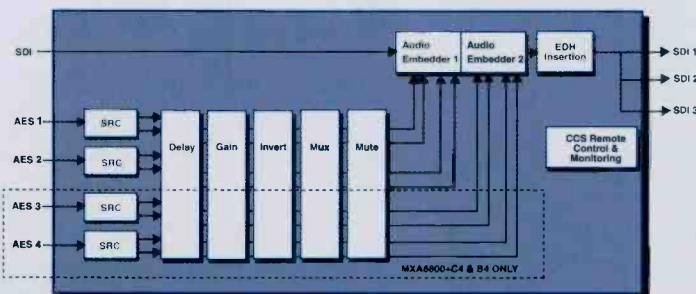
MSA6800+A2C2
and A4C2
Back Connector



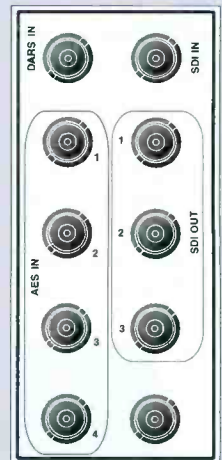
MXA6800+B2, B4, C2, C4 — AES Digital Audio Multiplexers

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



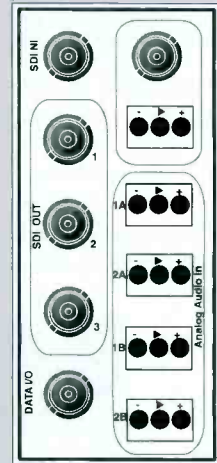
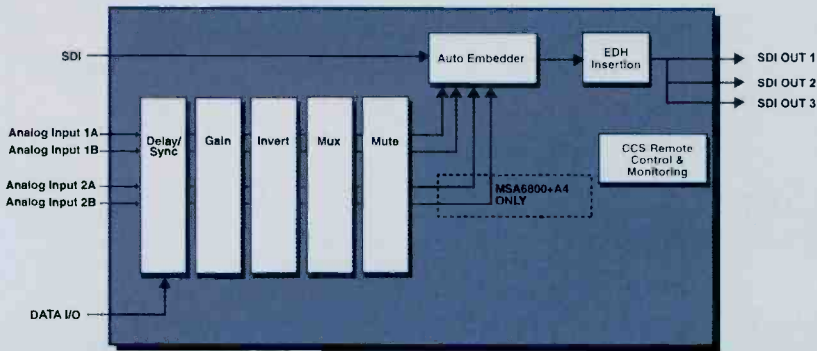
MXA6800+C2
and C4
Back Connectors



MSA6800+A2, A4 — Analog Audio Multiplexers with Synchronizer and 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 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

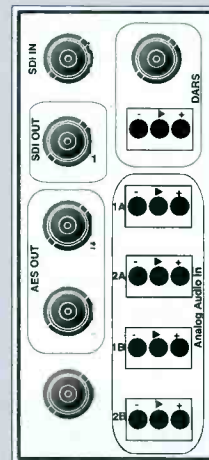
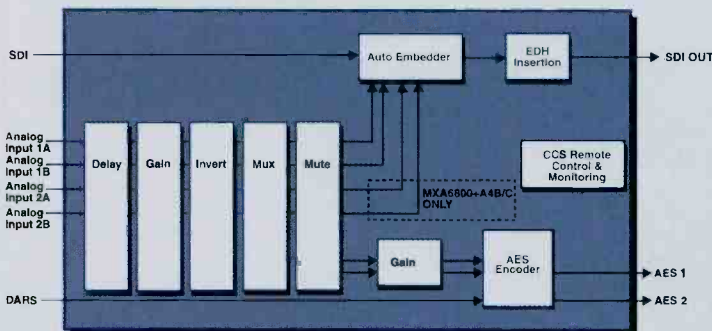


6800+ AUDIO

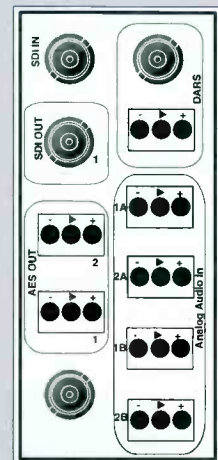
MXA6800+A2B2, A2C2, A4B2, A4C2 — Analog/AES Audio Multiplexers

The MXA6800+ A4B2/A2B2/A4C2/A2C2 audio multiplexers provide audio embedding up to four-channel analog to a serial digital interface (SDI) output, and up to two-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 A2C2
Back Connector



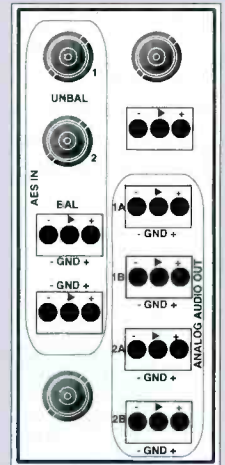
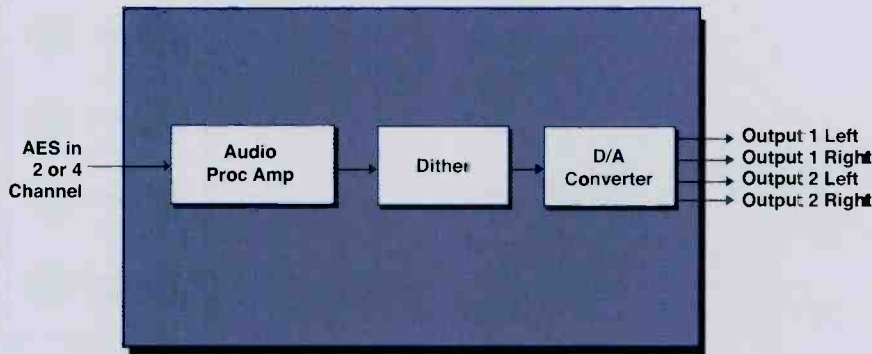
MXA6800+A4B2
and A2B2
Back Connector



6800+ AUDIO

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 (SMPT E-276) AES inputs
- Add "Z" to end of part number for 600ohm output impedance option



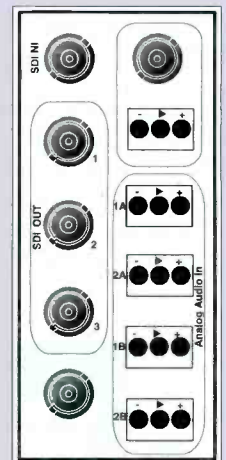
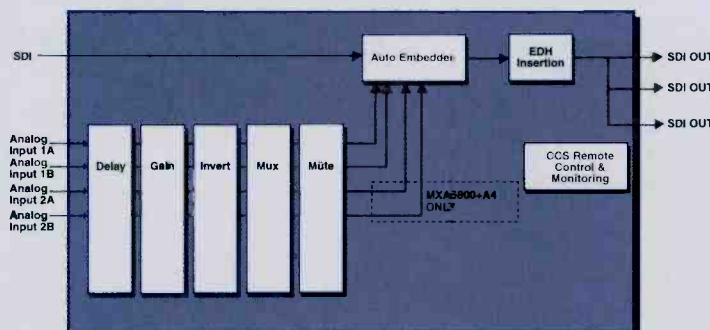
DAC6800+BCA2 and BCA4 Back Connector



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

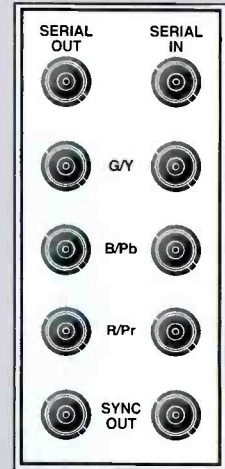
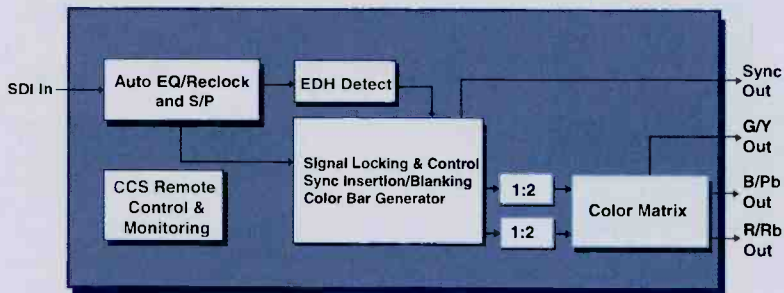


DAV6800+ — SDI to Analog Component Video Converter

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

PRELIMINARY
See Page 17 for current DAC-6801



DAV6800+
Back Connector

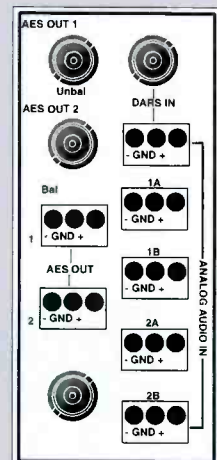
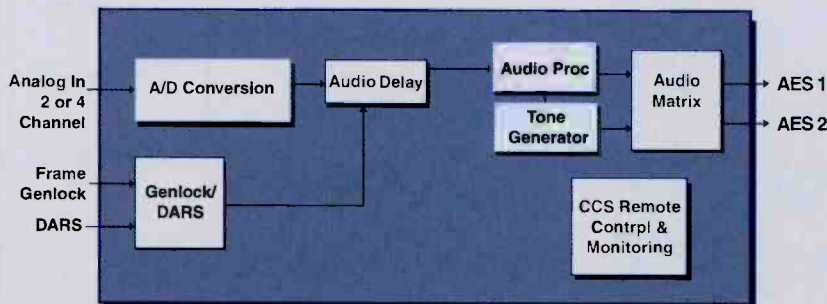


6800+ VIDEO

ADC6800+A2BC, A4BC — Audio Analog to AES Converters

The ADC6800+ A2/A4BC are two-channel or four-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



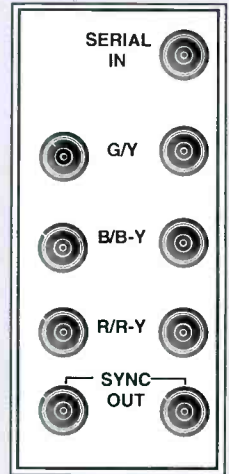
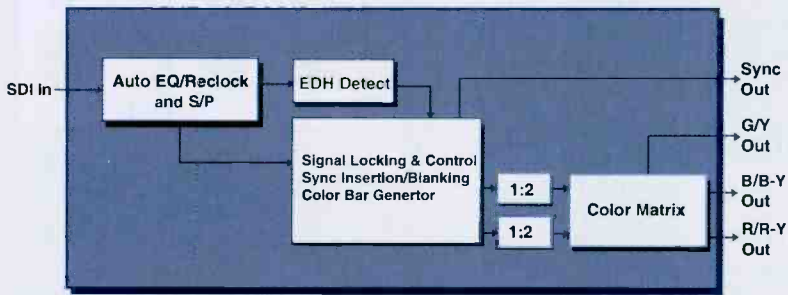
ADC6800+ A2BC
and A4BC
Back Connector



6800+ AUDIO

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

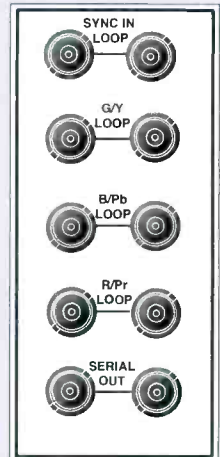
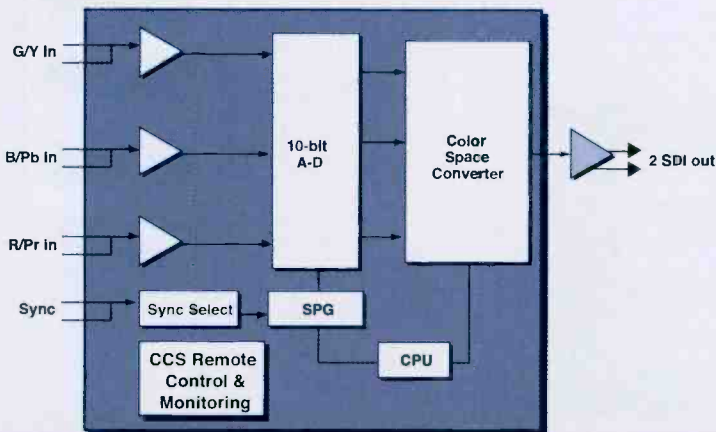


DAC-6801
Back Connector

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

PRELIMINARY
See Page 16 for current ADC-6801



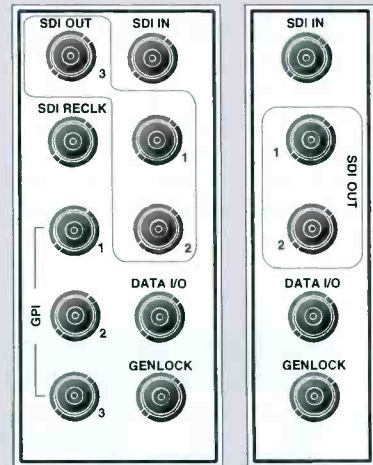
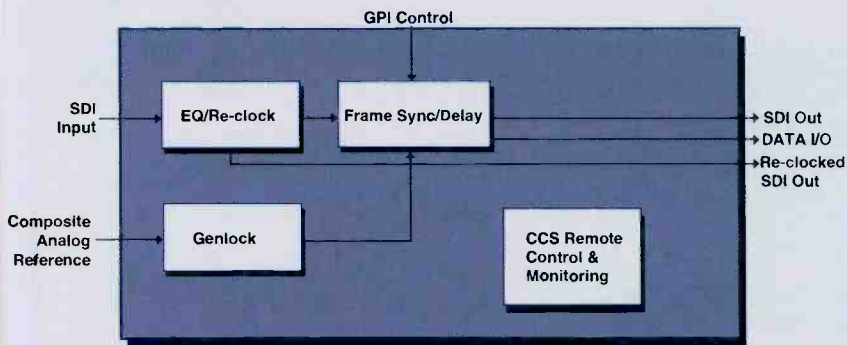
ADV6800+
Back Connector



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

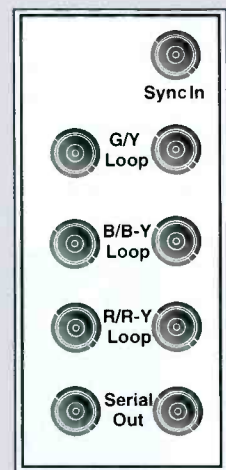
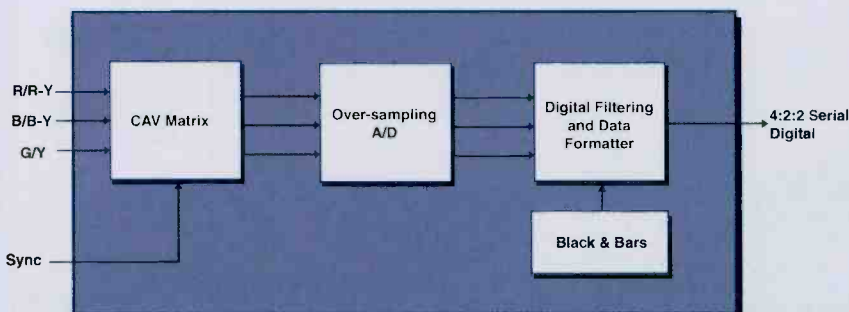
VFS6800+
Single-Slot
Back Connector



6800+ VIDEO

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



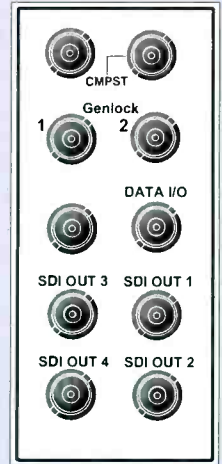
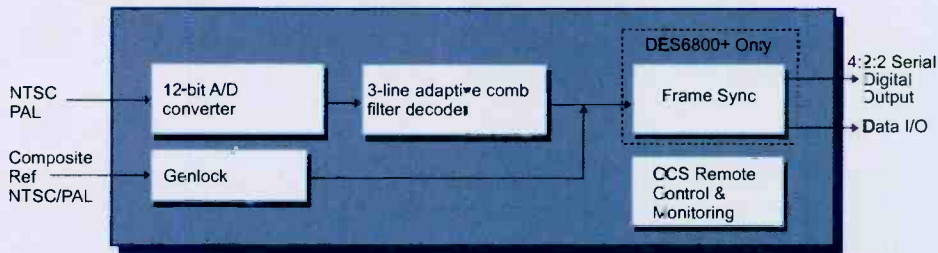
ADC-6801
Back Connector

6800+ VIDEO

DEC6800+ — Composite Video Decoder DES6800+ — Composite Video Decoder/Synchronizer

The DEC6800+ and DES6800+ are compact, high-precision 12-bit decoders 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 Quadrature 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



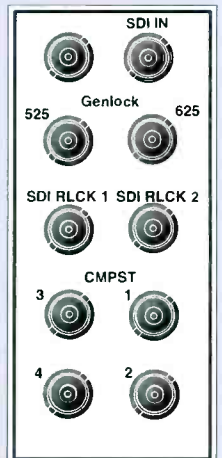
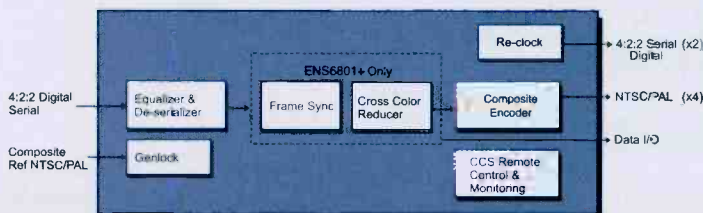
ENC6801+ — SDI Video Encoder ENS6801+ — SDI Video Encoder/Synchronizer

The ENC6801+ and ENS6801+ are high-precision 12-bit digital encoders that convert 4:2:2 digital video into NTSC or PAL composite video.

- NTSC, PAL-M/B with settings shadowed/restored
- 12-bit digital processing, output over-sampled at 54MHz
- Jitter removal; EDH detection
- VB Field/Line/Mode control
- User controls: Luma, chroma, black levels; chroma phase; SCH offset
- Line synchronization within a 3-line window of input video

ENS6801+ Adds:

- Frame sync or delay modes
- Bypassable cross color reduction with 1-line delay
- Fine phase adjustments
- Audio tracking for compatible module (ADS/MSA800+), uses one Reclock out
- Black, Pass or Freeze if loss of input
- Test signal generator



ENC6801+ and ENS6801+ Back Connector

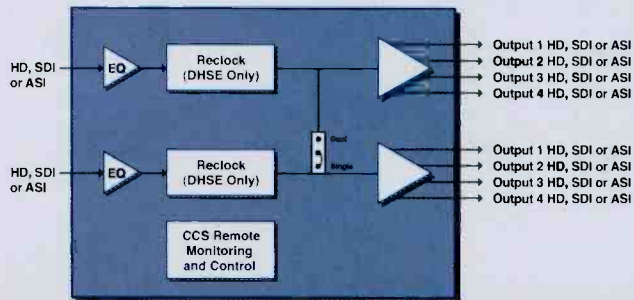


DHSE6800+ — Dual HDTV, ASI, SDI Reclocking Distribution Amplifier

DHSD6800+ — Dual HDTV, ASI, SDI Distribution Amplifier

The DHSE6800+ and DHSD6800+ dual DAs provide 2 channels of HD/SD-SDI video distribution with cable equalizing (and reclocking on DHSE only). The DHSD/DHSE6800+ Dual DA will provide 4 outputs for each input (2-1x4) as well as a jumper that provides a method allowing for a single-channel DA with 8 outputs (1x8).

- 2 inputs, 4 outputs per input
- 1 input to 8 output selection capability
- Automatic cable equalization
- Auto/manual reclock on DHSE only (143/177/270/360/540 and 1.5 Gb/s)
- Manual (force) reclock bypass option
- Input signal presence detection
- Alarm output
- For use in FR6802+X(F)
- Unique LOS (loss of signal) switch provides guaranteed signal output protection and backup



DHSE6800+ and DHSD6800+ Double-Slot Back Connector

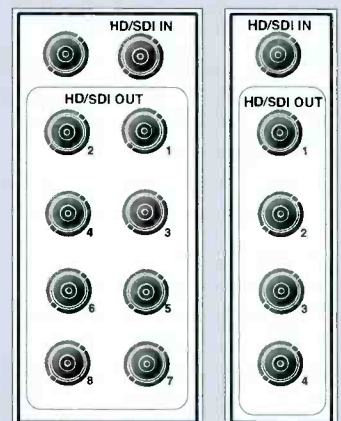
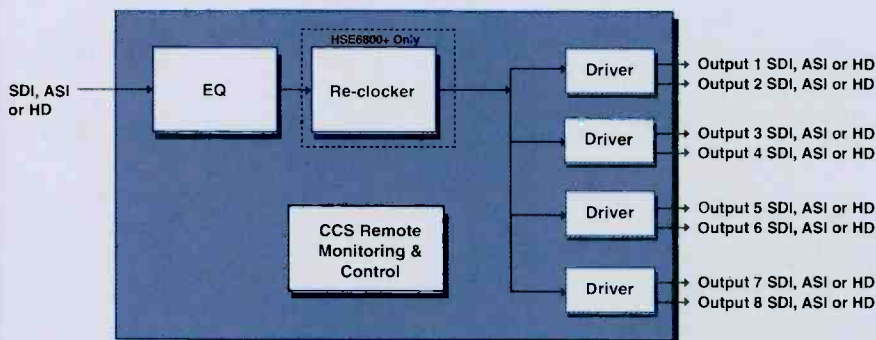


HSD6800+ — HDTV, ASI, SDI Distribution Amplifier

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)
- For use in FR6802+X/XF frame.



HSD6800+ and HSE6800+ Double-Slot Back Connector

HSD6800+ and HSE6800+ Single-Slot Back Connector

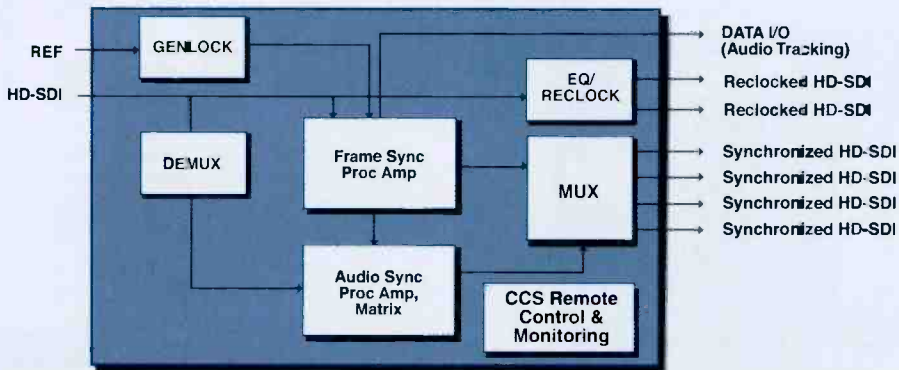


HSFS6800+ — HDTV Audio/Video Frame Synchronizer & Processor Amp

The HSFS6800+ combines embedded audio and HD-SDI video processing functions on a single module.

PRELIMINARY
See Page 41 for current VFS-3901H-1

- Cleanly handles hot switch on input
- Up to 7 frames less 2 lines of video delay
- Loss of video modes: Pass, Black, Freeze
- HD video processing amplifier with controls for luminance gain, luminance offset and chrominance gain
- Internal audio processing amplifier
- Gain, swap, invert, delay, mix (sum) of embedded audio signals
- Data mode for passing compressed audio – APTX, Dolby® E, AC-3
- 16-, 20- or 24-bit audio processing
- Handling of embedded data and audio when a hot switch occurs (de-embed, re-sample, buffer, re-embed)

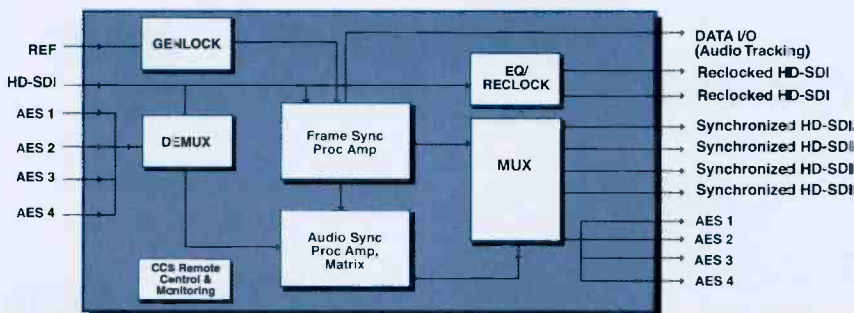


HSFSA6800+ — HDTV Audio/Video Frame Synchronizer & Processor Amp

The HSFSA6800+ combines embedded and discrete audio and HD-SDI video processing functions on a single module.

PRELIMINARY

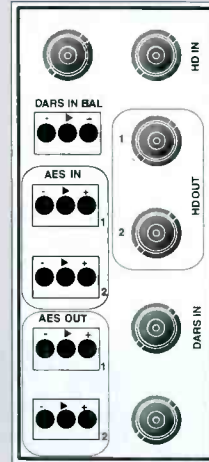
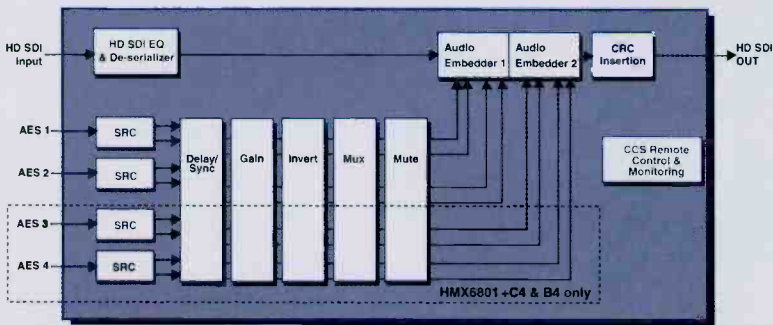
- Cleanly handles hot switch on input
- Up to 7 frames less 2 lines of video delay
- Loss of video modes: Pass, Black, Freeze
- HD video processing amplifier with controls for luminance gain, luminance offset and chrominance gain
- Internal audio processing amplifier
- Gain, swap, invert, delay, mix (sum) of embedded audio signals
- Data mode for passing compressed audio – APTX, Dolby® E, AC-3
- 16, 20 or 24 bit audio processing
- Handling of embedded data and audio when a hot switch occurs (de-embed, re-sample, buffer, re-embed)
- Discrete AES audio I/O



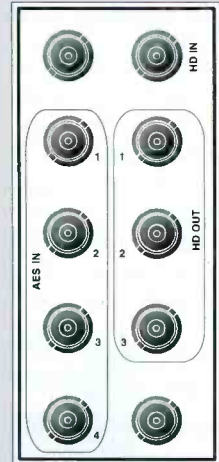
HMX6801+B2, C2, B4, C4 — HDTV AES Audio Multiplexers

The HMX6801+ AES multiplexers embed two to four AES audio signals into a single 1.485Gb/s HD video signal.

- Automatic detection of all SMPTE 292M HD-SDI standards
- Select any mix of audio channel(s) to embed into up to 4 groups, including channel sum or audio tones
- 16-bit, 20-bit, or 24-bit audio processing
- Audio proc for delay, gain, invert, mute, channel multiplexing and dithering
- Programmable audio delay from 0 to 1320 msec
- Disable sample rate conversion to handle compressed data such as Dolby®E
- Four internal audio test tones



HMX6801+B2
Back Connector.
Unbalanced (+C2)
version also available



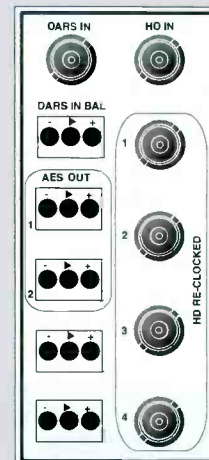
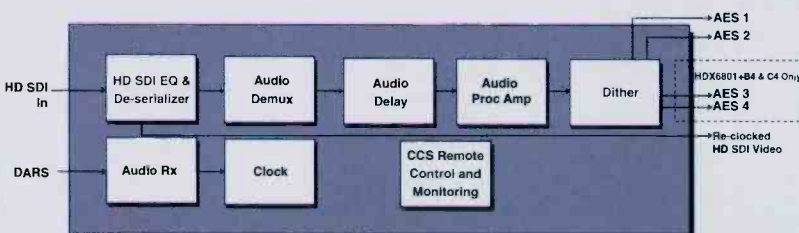
HMX6801+C4
Back Connector.
Balanced (+B4)
version also available



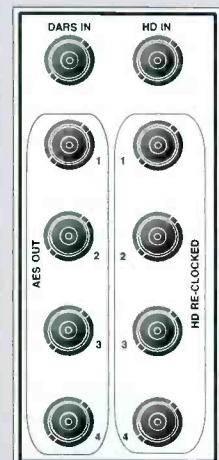
HDX6801+B2, C2, B4, C4 — HDTV AES Audio De-multiplexers

The HDX6801+ audio demultiplexers de-embed two to four AES audio signals from a single 1.485Gb/s HD video signal.

- Automatic detection of all SMPTE 292M HD-SDI standards
- 24-bit AES audio de-embedding
- User assignment of any audio group/channel mix for output, including tones
- Audio proc for delay, gain, invert, mute, channel multiplexing and dithering
- 16-bit, 20-bit, or 24-bit audio processing per channel pairs
- Programmable audio delay from 0 to 1320 msec
- Passes compressed audio such as Dolby® E (by channel pair)
- Four internal test tones: 750Hz, 1.5Hz, 3kHz, 6kHz (all at-20dBFS)



HDX6801+B2
Back Connector.
Unbalanced (+C2)
version also available



HDX6801+C4
Back Connector.
Balanced (+B4)
version also available



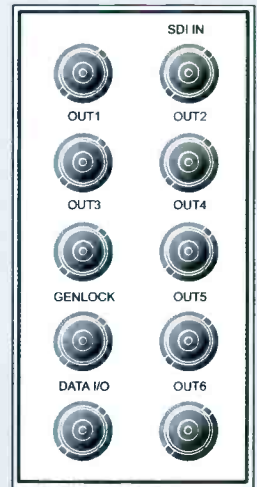
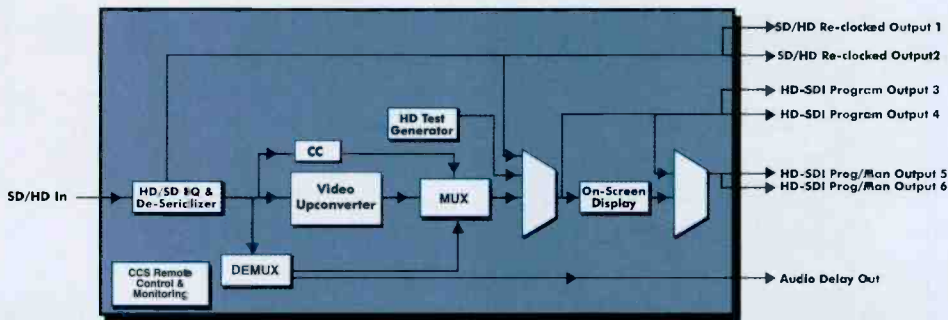
HUC6800+, HUC6800+C — HDTV Utility Up-converter

The HUC6800+ provides 10-bit digital up-conversion of SDI video for use in utility applications in HDTV environments.

- Up-conversion using high-performance 2D de-interlacer/scalar
- 10-bit video de-interlacing with edge interpolation
- Embedded audio processing (de-multiplex from SD-SDI, delay/sync, sample rate conversion, re-multiplex into HD-SDI)
- Auto-sensing or user-selectable 525/625 input 3 relocked SDI outputs
- 4 up-converted HDTV outputs, 1080i, 720p
- Aspect ratios: 16:9 anamorphic; 16:9 middle cut; 14:9; 4:3; Pixel True (1 to 1 mapping)
- User-selectable color and super-black background
- HD video test generator

HUC6800+C adds:

- Support for transcoding of closed captioning between HD and SD



HUC6800+, HUC6800+C
Back Connector



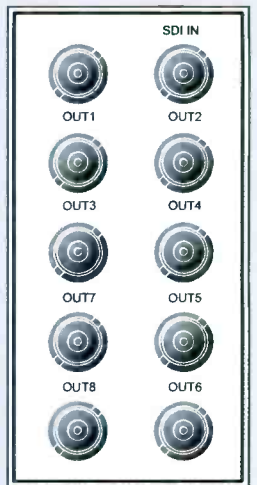
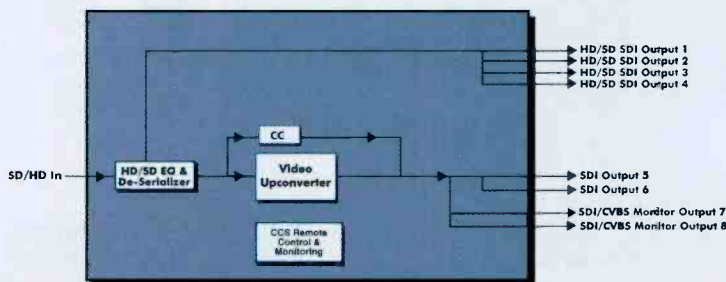
HDC6800+, HDC6800+A — HDTV Utility Down-converter

The HDC6800+ provides 10-bit digital down-conversion with user-selectable choice of outputs for use in utility applications.

- Auto-sensing HD-SDI or SD-SDI input capability
- Support HDTV signals for 1080i/59.94, 1080i/50, 720p/59.94, 720p/50
- 4 equalized and re-locked outputs of the HD or SD input
- 2 SD-SDI Program Outputs
- Preset aspect ratio with 16:9 anamorphic, 16:9 middle cut; 14:9, 4:3, Pixel True (1:1 mapping)
- Variable ARC with five user presets
- Provides variable ARC with 5 user presets.
- SDI output can add on screen display of graticules and safe area markers overlaid on the video
- Processes closed captioning data in both HD and SD

HDC6800+A Adds:

- Passes two groups of embedded audio from HD-SDI to SD-SDI
- 2 of the outputs can be configured as either 2 additional SD-SDI Program or 2 composite outputs



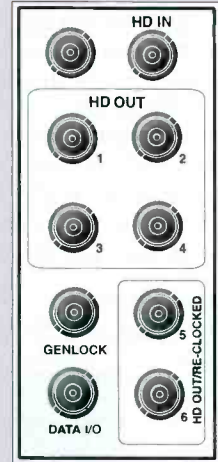
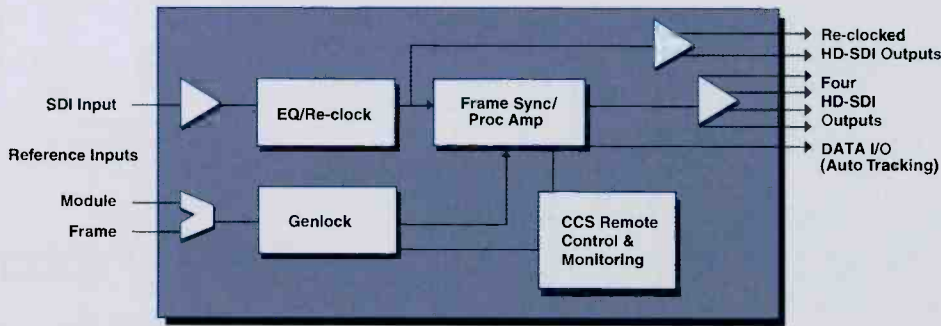
HDC6800+, HDC6800+A
Back Connector



HFS6801+ — HDTV Frame Synchronizer/Processor

The HFS6801+ is an HDTV frame synchronizer.

- Automatic detection of input video standard
- Provides 4 synchronized 1080i/50, 1080i/59.94, or 720p/59.94 outputs
- Add up to 8 frames of delay for 1080i inputs, 16 frames for 720p
- Video proc amplifier for luminance offsets and chrominance gain
- Set pass, black or freeze mode when loss of input video
- In Delay mode passes VANC/HANC data, including compressed data such as Dolby®E
- Data I/O output provides hot switch and I/O delay signals for tracking audio processing
- For use in FR6802+X/XF frame



HFS6801+
Back Connector



6800+ HDTV VIDEO

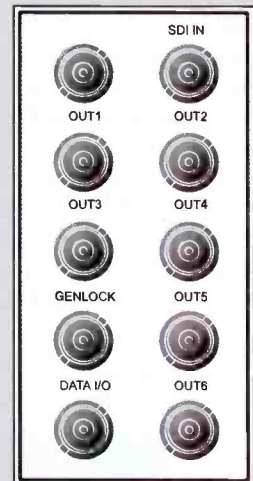
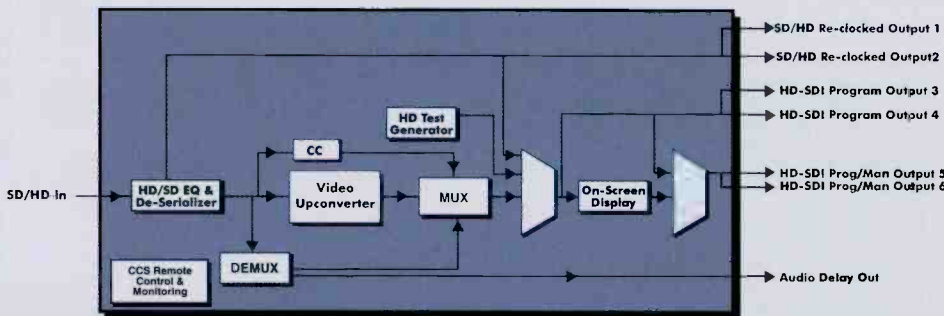
XHD6800+U, UC — Broadcast-quality Up-converter

The XHD6800+ provides advanced, broadcast-quality 10-bit digital up-conversion of SDI video for high-quality applications in HDTV environments.

- Up-conversion using high-performance 3D de-interlacer/scalar
- 10-bit video de-interlacing with edge interpolation
- 4 up-converted HDTV outputs, 1080i or 720p
- User-configurable picture-resizing Aspect Ratio Conversion (H/V size, H/V position), smooth ARC transition
- Preset aspect ratio with 16:9 anamorphic, 16:9 middle cut, 14:9, 4:3, Pixel True with five user presets
- Embedded audio processing (de-multiplex from SD-SDI, delay/sync, sample rate conversion, re-multiplex into HD-SDI)

XHD6800+UC Adds:

- Support for transcoding of closed captioning between HD and SD



XHD6800+U, UC
Back Connector

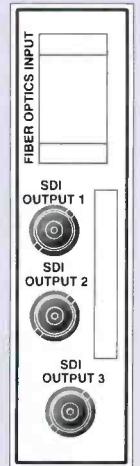
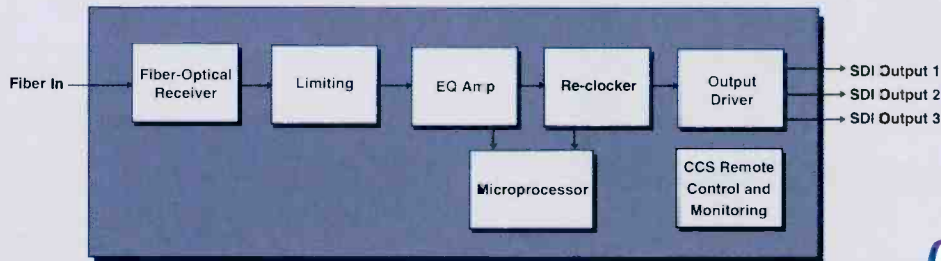


6800+ HDTV VIDEO

OSS6800+ — Single-mode Optical to SDI Receiver OSM6800+ — Multi-mode Optical to SDI Receiver

The OSS6800+ module is suited to reception over longer "metropolitan" distances. The OSM6800+ is best suited for "enterprise" distances.

- Cost-effective solution for reception of SDI and DVB-ASI signals over fiber
- 1310 to 1550nm wavelength input on SC-, ST- or FC-type fiber connector
- Minimum input power better than -29 dBm (27C Mb/s)
- Automatic optical input signal detection
- Alarming of input signal loss and non-locked data rate
- Automatic or fixed reclocking of output at 143, 177, 270, 360 or 540 Mb/s
- Bypass mode for non-reclocked data rates
- Fit up to 20 modules in FR6802+X(F) frame



OSS6800+,
OSM6800+
Back Connector



HSEE6800+, ISEE6800+ — HDTV Thumbnailing/MPEG-4 Streamer

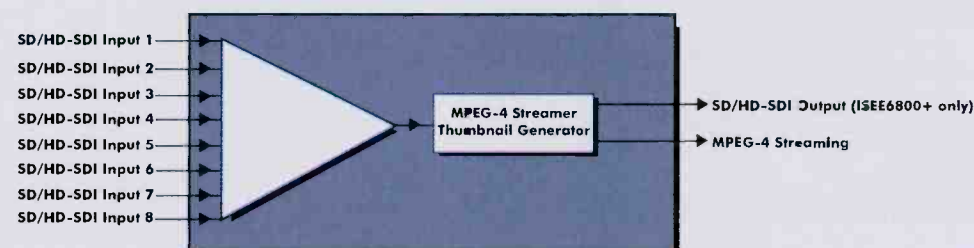
The HSEE6800+ and ISEE6800+ are 8x1 thumbnailing MPEG-4 streamers.

PRELIMINARY

- Up to 8 independent HD/SD-SDI input channels
- Provides thumbnails of the HD/SD-SDI video signal at up to 3 frames per second
- High quality "monitoring" MPEG-4 CIF output at up to 30 frames per second
- Configurable thumbnail size (small, medium, large)
- Real time monitoring/alarms for the primary channel, TDM monitoring/alarms for other channels
- Selectable primary channel for MPEG-4 CIF streaming
- Video level, audio level and data package alarms
- Configurable level/period threshold for audio video alarms

ISEE6800+ Adds:

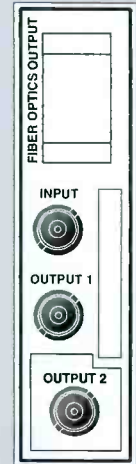
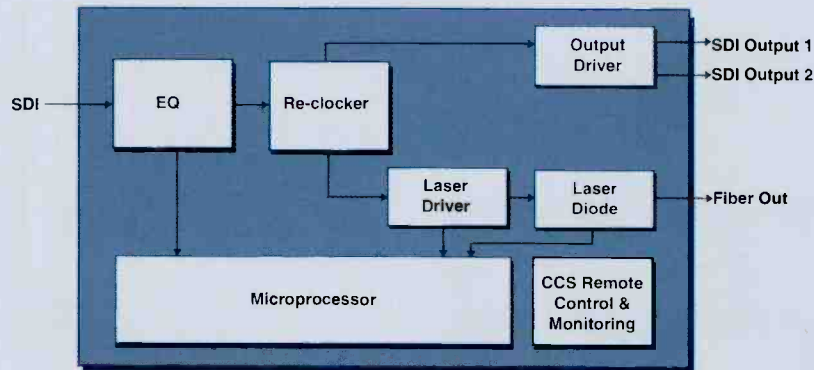
- SDI output



SOS6800+xx — SD Single-mode CWDM Optical Transmitter

The SOS6800+xx is a Coarse Wave Division Multiplexer (CWDM) single-mode transmitter.

- Supports single-mode transmission over long "metropolitan" distances
- Supports 16 CWDM optical frequencies
- Optical power 0dBm
- Fit up 20 modules in the FR6802+XF frame



SOS6800+xx
Single-Slot
Back Connector



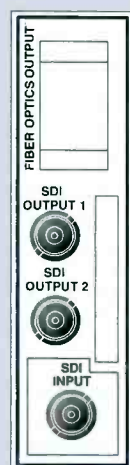
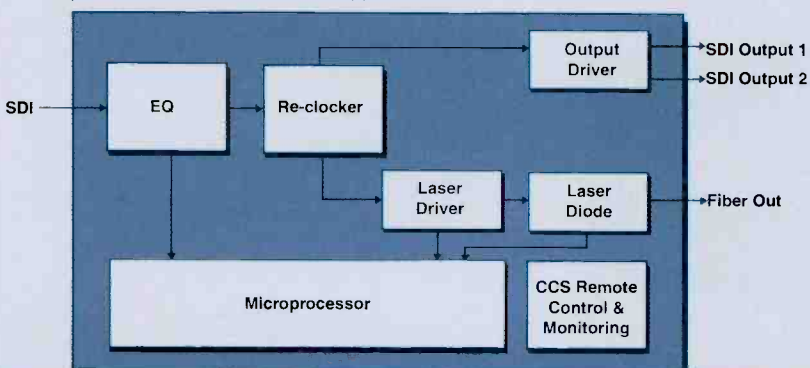
6800+ FIBER OPTICS

SOS6800+ — SDI to Single-mode Optical Transmitter SOM6800+ — SDI to Multi-mode Optical Transmitter

The SOS6800+ is suited to transmitting over longer "metropolitan" distances.

The SOM6800+ is best suited for "enterprise" distances.

- Cost-effective solution for transmitting SDI and DVB-ASI signals over fiber
- Automatic detection or fixed setup for 143, 177, 270, 360 or 540 Mb/s
- Bypass mode for non-reclocked data rates
- Detection and alarming of equalization and video format
- Automatic cable EQ up to 300 meters for Belden 1694A at 270Mb/s
- 1310nm wavelength output on SC-, ST- or FC-type fiber connector
- Optical power better than -7.5dBm
- Fit up to 20 modules in FR6802+X(F) frame



SOS6800+,
SOM6800+
Back Connector

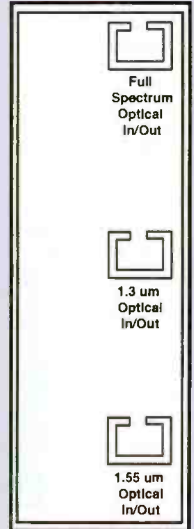


6800+ FIBER OPTICS

OBS6800+C — Passive CWDM Optical Splitter and Combiner

The OBS6800+C is a single-mode optical splitter/combiner.

- Passive design
- Divides or combines 1.310nm band and 1.550nm band with low insertion loss and high isolation
- Bi-directional application on one signal mode fiber



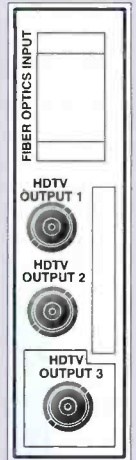
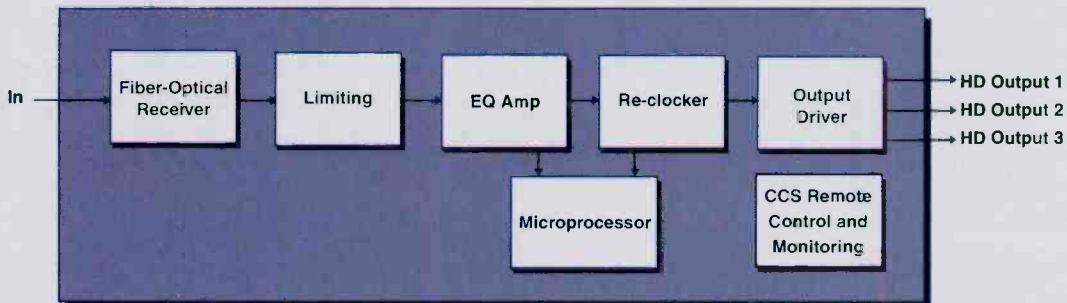
OBS6800+C
Back Module



OHS6800+ — Single-mode Optical to HD-SDI Receiver

The OHS6800+ is a fiber optic to HD-SDI/SDI/DVB-ASI receiver.

- Supports single-mode operation
- 1310nm to 1550nm optical input on choice of SC-, FC- or ST-type fiber connector
- Minimum input power better than: -20 dBm for HD-SDI; -27dBm for SDI/ASI
- Auto-detect and reclocking for 143, 177, 270, 360, 540Mb/s or 1.485Gb/s
- Can bypass reclocker when input signal does not lock
- Fit up to 20 modules in FR6802+X/XF frame



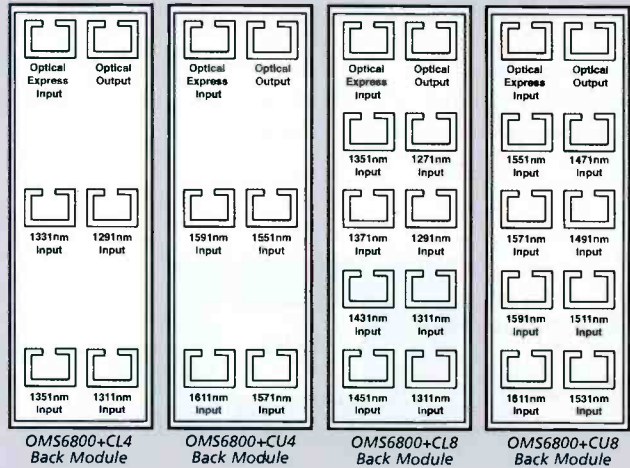
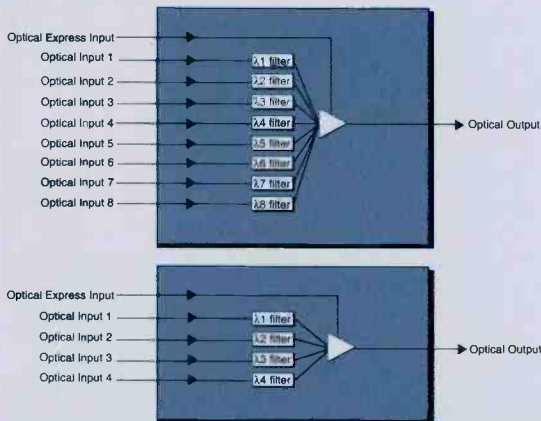
OHS6800+
Single-Slot
Back Connector



OMS6800+CL4, CU4, CL8, CU8 — Passive CWDM Single mode Optical Multiplexers

The OMS6800+ are passive 4 and 8 channel multiplexers for the CWDM system.

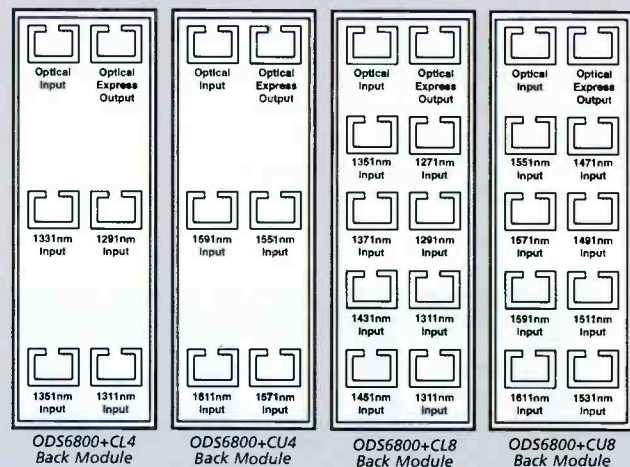
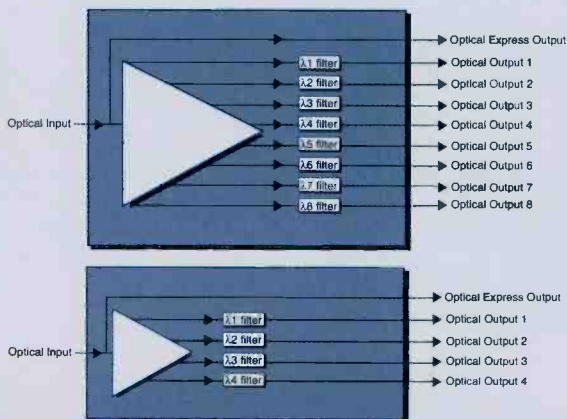
- Passive design
- Provide options for connectors including SC, ST, FC
- CWDM modules comply with ITU-T G.694.2 standards for CWDM wavelengths
- Do not require low "water" peak fiber to utilize all 16 wavelengths and operate over wavelengths between 1271nm and 1611nm



ODS6800+CL4, CU4, CL8, CU8 — Passive CWDM Single mode Optical De-multiplexers

The ODS6800+ are passive 4 and 8 channel de-multiplexers for the CWDM system.

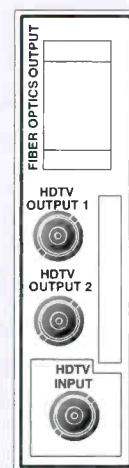
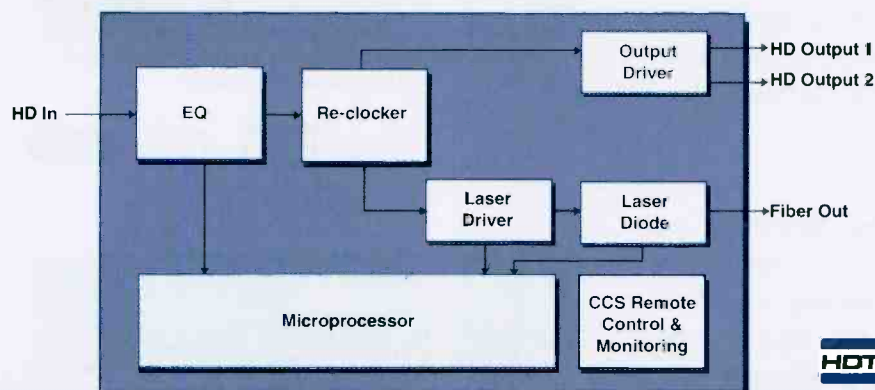
- Passive design
- Provide options for connectors including SC, ST, FC
- CWDM modules comply with ITU-T G.694.2 standards for CWDM wavelengths
- Do not require low "water" peak fiber to utilize all 16 wavelengths and operate over wavelengths between 1271nm and 1611nm



HOS6800+ — HD-SDI to Single-mode Optical Transmitter

The HOS6800+ is an HD-SDI/SDI/DVB-ASI to fiber optic single-mode transmitter.

- Supports single-mode transmission over longer “metropolitan” distances
- Auto-detect and reclocking for 143, 177, 270, 360, 540Mb/s or 1.485Gb/s
- Automatic cable EQ up to 100 meters for 1.485Gb/s, or 300 meters for 270Mb/s with Belden 1694A
- Can bypass reclocker when input signal does not lock
- 1310nm optical output on choice of SC-, FC- or ST-type fiber connector
- Optical power is better than -7.0dBm
- Fit up to 20 modules in FR6802+X/XF frame



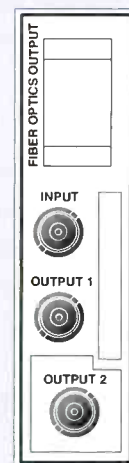
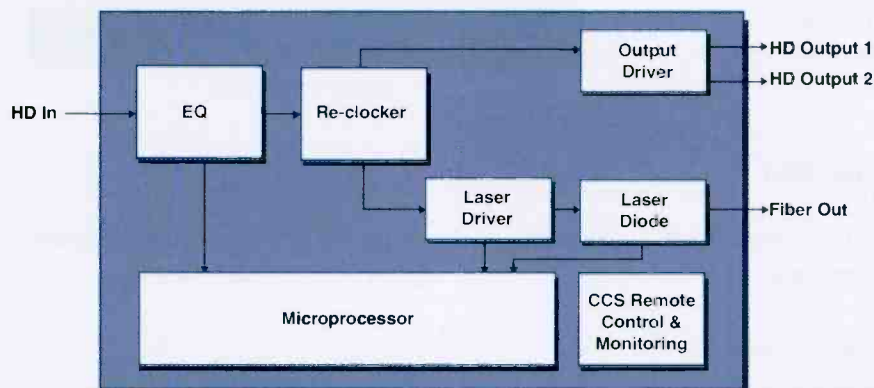
HOS6800+ Single-Slot Back Connector



HOS6800+xx — HD, SD, ASI Single-mode CWDM Optical Transmitter

The HOS6800+ is a Coarse Wave Division Multiplexer (CWDM) single-mode transmitter.

- Auto-sensing HD, SD, ASI input
- Supports single-mode transmission over long “metropolitan” distances
- Supports 16 CWDM optical frequencies
- Optical power 0dBm
- Fit up to 20 modules in the FR6802+XF frame



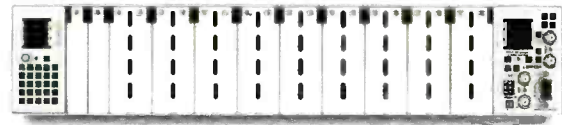
HOS6800+xx Single-Slot Back Connector



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.

- ALL 6800+™ and ALL 6800™ modules can be housed in this frame
- Houses up to 20 modules, in any combination (both single- and 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+X(F) back view with blank plates



FR6802+X(F) back view with blank plates removed to insert back connectors



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).

- Fits coaxial (all-BNCs) 6800+ modules: SDI, composite video, and unbalanced AES
- Fits some older 6800 series coaxial modules (Contact Leitch for specifics)
- Fits up to 10 double-slot modules
- Not suitable for HDTV and non-BNC modules (fiber optics, analog audio, balanced AES, ICE card)



FR6802+DM(F) back view



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



FR6801-1 back view

PRODUCT NUMBER ORDERING DETAILS

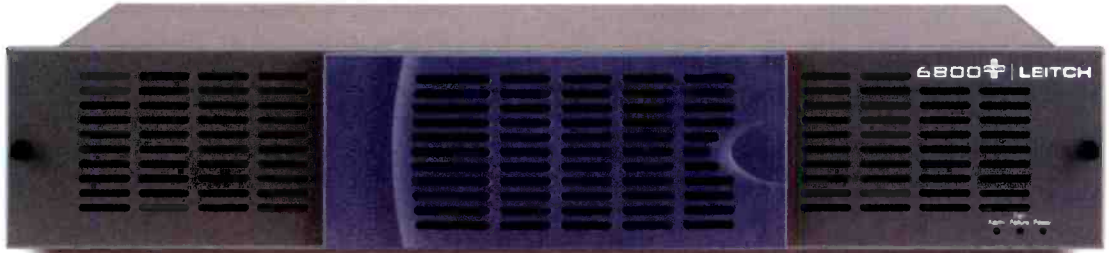
- xxx6800+D** — D implies that the product is delivered with a "2 slot" back-connector for an FR6802+X(F) frame
- xxx6800+S** — S implies that the product is delivered with a "1 slot" back-connector for an FR6802+X(F) frame

- xxx6800+** — Implies that only the module is delivered for an FR6802+DM(F) frame

6800+™ FRAMES

6800+ FRAMES

6800+™ For All Core Processing — 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.



Main Features

General

- Capable of handling HDTV, SDI, analog and 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 and PSUs 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 and Thermal Considerations

- Frame can house two (redundant) power supplies: AC, 48V DC, or one of each
- AC power cord is locked in place (no DC cord provided)
- 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+)
- Each ICE6800+ module enables control and monitoring for up to 9 frames

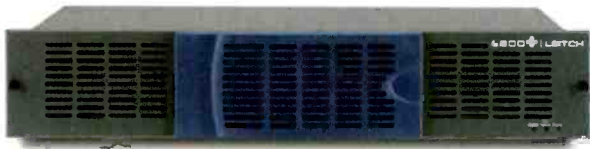


RCP CCS-1U

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.

6800+™ and NEO™ provide unmatched product choice for both Core Processing and Advanced Applications, allowing flexible system designs that reduce both upfront capital and ongoing operational costs. Both platforms support networked integrated control and monitoring and are SNMP-friendly for easy integration within larger facility supervision infrastructures.



6800+™ — High-quality Core Processing modular platform. 6800+™ is an exceptional value and high-quality processing platform that provides all core processing and distribution functions in analog, SD, HD and optical formats. Products are designed with a “core function per module” concept that ensures straightforward system designs with lower costs and higher performance. Based on the renowned 6800™ platform, 6800+™ has been completely redesigned to offer integrated control and monitoring and is SNMP-friendly. 6800+™ offers a modern, future-proofed solution for any core processing infrastructure requirements.

NEW! OPTO+™, a full range of fiber optic products in the Leitch 6800+ platform, delivers top-quality, easy-to-use fiber solutions in a minimal amount of space. The OPTO+™ line includes auto-sensing HD/SD/ASI transmitters and receivers, along with a complete line of Coarse Wave Division Multiplexer (CWDM) modular products.

NEO™ — Premier Advanced Application modular platform. NEO™ hosts a vast array of advanced applications designed to offer high performance, high value, and a compact form factor while simultaneously simplifying integration and operational requirements. NEO™ Advanced Applications include the award-winning NEO™ VR digital video recorder, the IconLogo™ branding tool, the NEO SuiteView™ multisource display processor and the MTG-3901 Master Timing generator, as well as a comprehensive

selection of NEO Simplicity™ integrated video and audio processing modules. These applications extend the practicality of NEO™ beyond traditional modular processing.

NEW! In addition to supporting the open, documented CCS™ Protocol, the NEO™ Advanced Application platform offers optional SNMP support, direct to the frame, with support of both SNMP v1 and SNMP v2c. SNMP support is key for facility-wide monitoring applications and offers an industry-standard interface to address interoperability between multiple vendors.

CCS Navigator™ and NUCLEUS™ – Network monitoring and control can be accomplished through both hardware panels and software applications. Both NUCLEUS™ and CCS Navigator™ provide customizable user interfaces to enable users to quickly identify problems and take corrective action. 6800+™ and NEO™ products are fully CCS™-compliant and can be remotely monitored and controlled by CCS Navigator™ software over industry-standard Ethernet networks. The NUCLEUS™ Network Control Panel allows the user to navigate to a specific device quickly with the minimum number of keystrokes.

Together, NEO™, 6800+™, the X75™ converter/synchronizer/processor, CCS Navigator™ and NUCLEUS™ allow you to build an integrated, cost-effective Total Content Delivery system with unprecedented practical real-time control.

TOTAL CONTENT DELIVERY

TOTAL CONTENT DELIVERY

The ultimate goal of every professional television and video operation is a streamlined process for creating, managing, distributing and delivering content. Harris is the leader in Total Content Delivery, offering the broadest range of hardware, software and services that span every segment of the content delivery chain. Our portfolio delivers solutions that enable broadcasters to achieve greater productivity, reduced costs, new revenue streams and assured communications.

The extensive Leitch offering of HD and SD infrastructure solutions, together with the Harris Videotek® line of test and measurement equipment, forms the critical backbone of an integrated workflow for content management and distribution.

Content Management

The Leitch infrastructure portfolio is the world leader in HD/SD signal processing, offering the widest range of functions in a choice of flexible platforms: the NEO™ advanced applications platform and 6800+™ core processing platform for dedicated applications, and the multiple path, multi-function X75™ for dynamic environments.

Productivity, reliability and performance all benefit from unified content management, control and monitoring with common software controls, configurable interfaces and open standards. From the CCS Navigator™ software application to the customizable NUCLEUS™ network control panel, Leitch monitoring and control products enable advanced local and remote monitoring and control across our broad infrastructure portfolio.

Managing signal quality is an essential element of content management, and the Harris Videotek® line of multi-format, multi-function test and measurement equipment includes a broad range of offerings to deliver the ideal precision instrument for any environment.

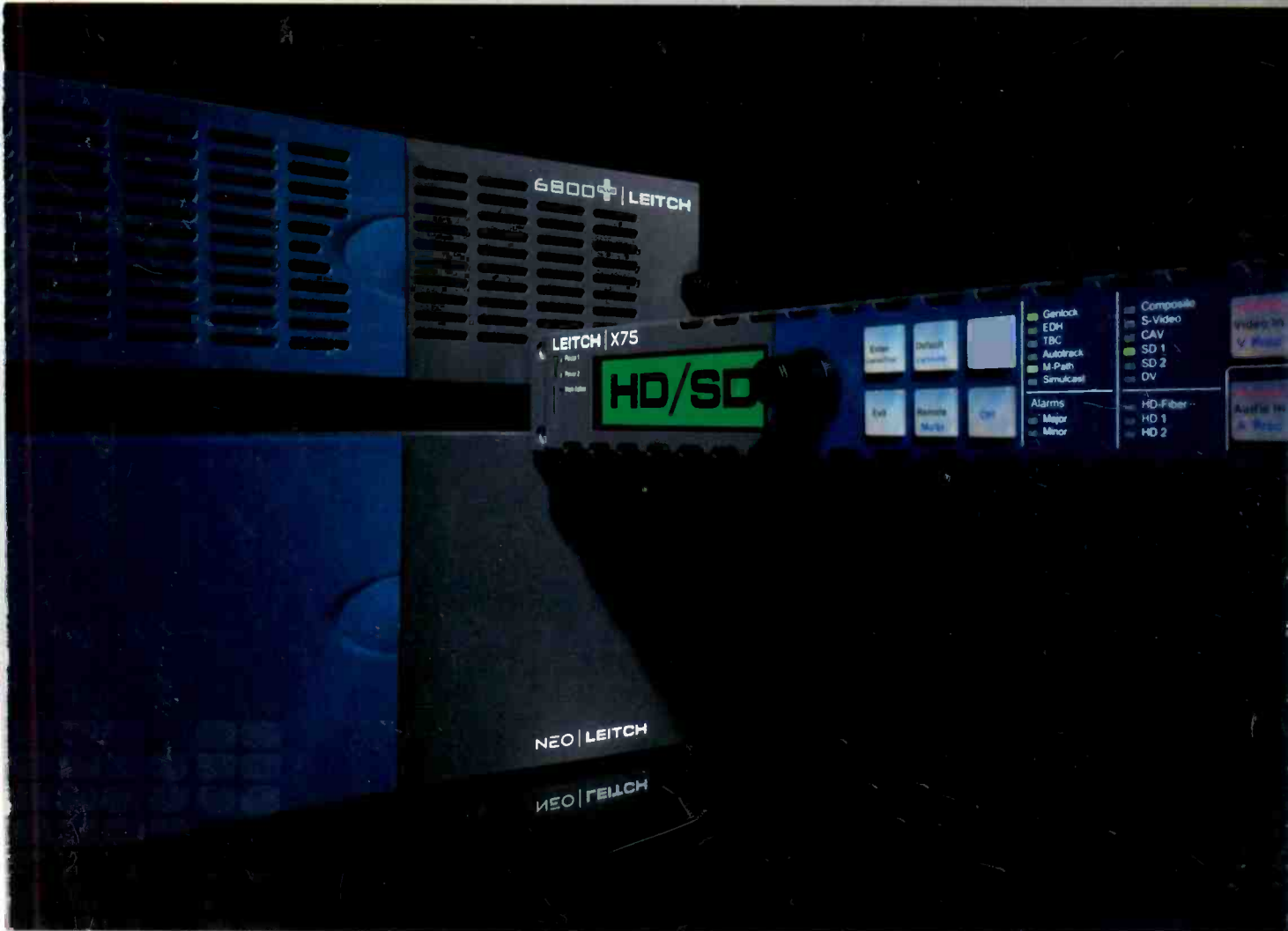
Content Distribution

Our industry-leading routing portfolio allows customers to route high-quality signals of all formats from analog to HD, for any sized application. The new Harris Platinum™ provides mixed signal routing including analog video, SDI, ASI, HD-SDI, AES and analog audio for applications 256x256, 512x512 and larger. The wideband Leitch Integrator GOLD™ provides scalable routing of any broadcast digital signal up to 128x128 in a single 8RU frame, and the Leitch Panacea™ small routing switcher provides affordable, compact routing in sizes from 12X1 to 32X32.

The new Icon™ family features integrated products and applications for master control, branding and channel release. IconStation™ combines logo insertion with multiple real-time data crawls and superior character generation for maximum channel branding impact. Based on the NEO™ platform, IconLogo™ is a modular channel branding system and is fully upgradeable to IconMaster™, our SD/HD configurable master control and channel release solution with integrated multi-layer branding. IconMaster™ can be easily combined with other advanced applications in the same frame, including Leitch NEO SuiteView™ — a highly scalable, modular multi-source display processor that allows users to create a customized, system-wide monitoring solution tailored to their operation.

Managing Content, Delivering Results

To provide its customers with the ultimate Total Content Delivery portfolio, Harris combines its renowned infrastructure offerings with content creation solutions (including Leitch Velocity™ editing systems and Inscribe® broadcast graphics solutions); video servers (Leitch NEXIO™ server system for transmission and news environments); automation and management software systems; video and audio networking; content delivery platforms; and transmission systems. Scaling from individual point products to complete integrated workflows, Harris Total Content Delivery solutions drive our customers' strategic success and deliver business results.



Content Processing, Distribution and Test & Measurement



A brand of Harris Corporation

Advertisement