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JUNE 2011

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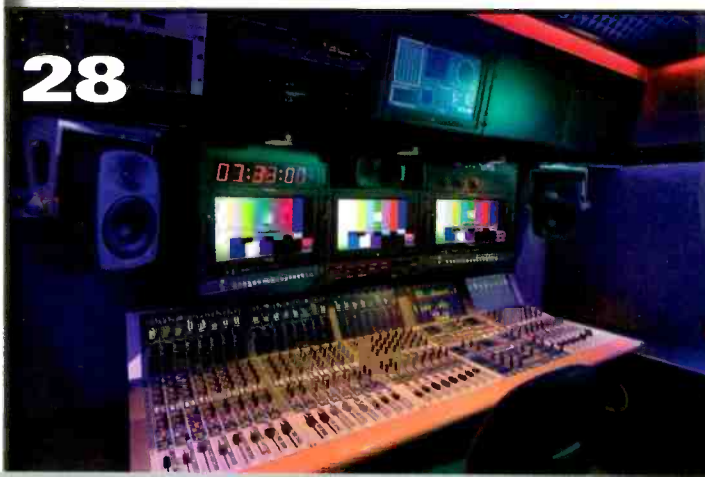
ON THE COVER:

With so many new technologies announced at NAB, it's impossible to see it all. Our Product Jackpot covers the hot new products *Broadcast Engineering* editors discovered at the show, and the Pick Hit Awards honor the top products chosen by an independent panel of your peers.

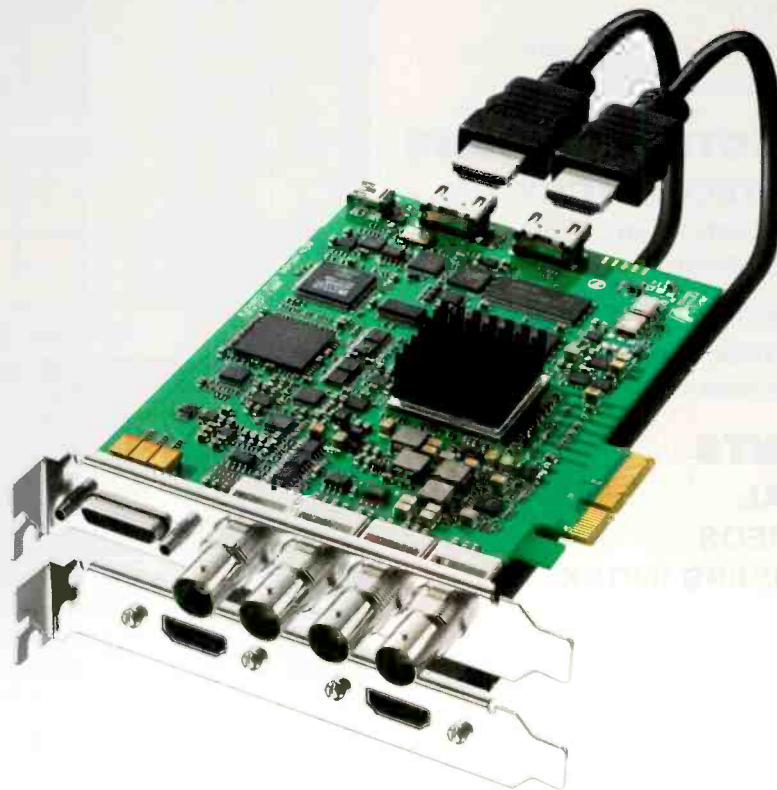
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Blackmagicdesign



New DeckLink HD Extreme has Dual Link 4:4:4/4:2:2 SDI, HDMI and analog connections in SD, HD and 2K!



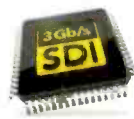
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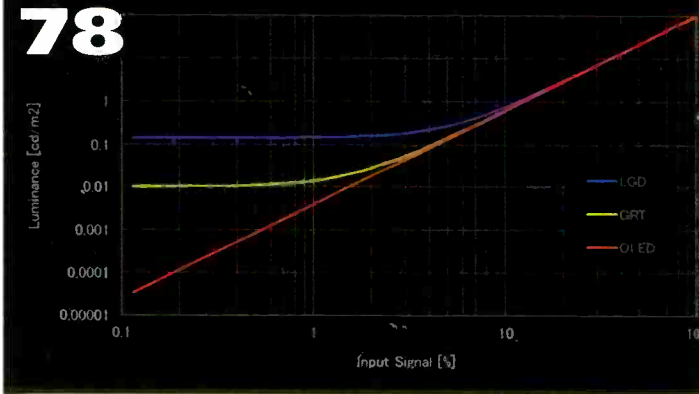
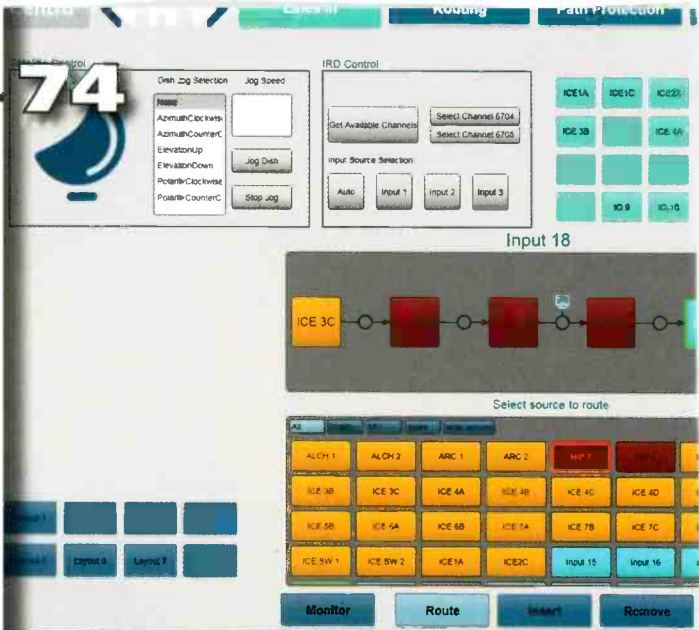
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JUST THE FACTS!

The FCC recently said that the United States remains behind other nations in the download speeds and adoption of broadband technology. The United States ranked ninth out of 29 countries for mobile broadband adoption on a per capita basis, and 12th out of 33 countries for percentage of households with fixed broadband.

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Frequencies for sale

Just over a year ago, the FCC released its long-awaited National Broadband Plan (NBP). For broadcasters, the plan means losing 120MHz, or 20 channels, of UHF spectrum. After all, Genachowski needs two things: billions of dollars and megahertz of spectrum. Without both, his tenure as chairman will be seen as a failure.

While one might think the idea of losing more spectrum would be loudly discussed between broadcasters, that does not appear to be the case.



Sure, the NAB has issued press releases. And, one could argue, it has said a lot of the right things. But overall, broadcasters themselves seem surprisingly quiet on an issue that could require 50 percent of today's UHF stations to either relocate or go off the air!

While pondering my perception of the industry's muted response, my friend Tore Nordahl provided an interesting technical discussion on how the FCC's frequency clawback might work. His excellent treatise on the FCC's spectrum grab is available on the JVC ProHD Executive Report blog (www.usjvc.com/blog/?p=132). Much of what follows is based on Nordahl's paper.

Nordahl says that should the FCC be successful in taking back another 120MHz of spectrum, it means that since 1982 broadcasters will have given up 312MHz or 75 percent of their UHF spectrum. Furthermore, the FCC's plan will require 682 currently operating full-power DTV stations to be relocated or shut down. Says Nordahl, "This is

more than 50 percent of all operating UHF stations."

The report predicts that only about 1100 out of today's approximately 1784 DTV stations will be able to remain on the air after the proposed transition. This is because under current regulations, it is impossible to cram almost 700 TV stations into the remaining spectrum.

For the larger stations, having fewer competitors may be good. However, for those employed at the other stations, the situation may seem not so rosy. Equally important, viewers will have fewer station choices, and Nordahl argues those stations' signals could be of lower visual quality.

Assuming the FCC gets its desired 120MHz of spectrum, the issue then becomes deciding who gets to remain in business. What will be the criteria for selecting winners and losers? Nordahl suggests that one way to select the winners is to measure a station's effect on the local economy.

Under his scenario, survival depends primarily on the station's annual local payroll. The bigger the station payroll, the better. A major-market TV station with what Nordahl calls a "large-scale" HD news operation could contribute as much as \$20 million to the local economy, just in payroll. Conversely, an "infomercial-rerun/non-news" station might have a payroll of one-tenth that amount. Nordahl suggests that "large-scale HD news stations are much more essential in protecting and growing the local economy than the infomercial-rerun/non-news stations."

This is where Nordahl and I depart. No politician or bureaucrat is going to let the noncommercial stations, which typically have smaller staffs, be squeezed out by those big mean and greedy broadcast groups. One can hear the PBS cry now, "Big business is trying to kill Cookie Monster and Big Bird." Genachowski's crew will ensure that taxpayer-funded stations remain on the air, no matter their staff size.

Nordahl's paper is worthy of a read and discussion at your next state broadcast group, SBE or SMPTE meeting. Without an open dialog and a search for reasonable alternatives, we can expect the FCC to impose a solution without our participation.

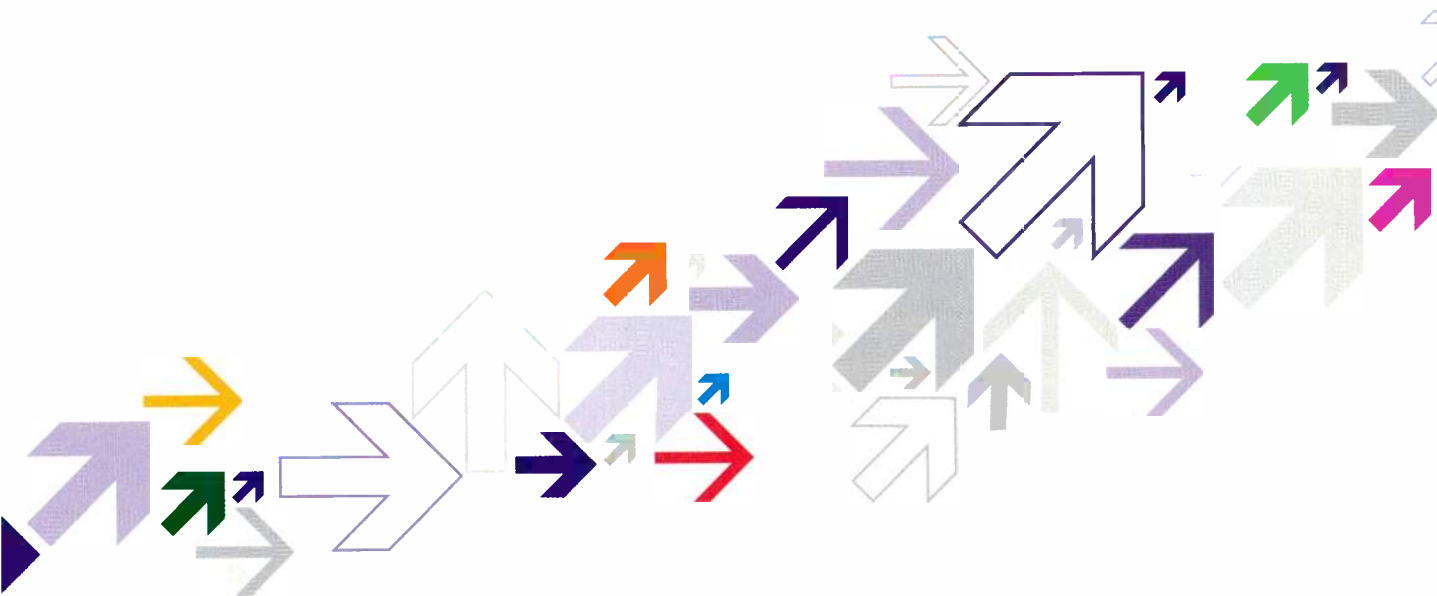
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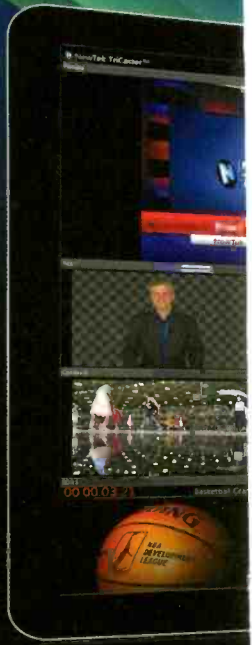


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Multiviewers

System requirements vary across different applications and environments.

BY KEVIN JACKSON

It's hard to think of a broadcast technology that has changed more in the last decade than multi-image display systems. Even several years ago, the most common question was, "What's wrong with my good old CRT stack?"

Within a few short years, the multiviewer became a standard piece of equipment in the broadcast workflow. The multiviewer today has evolved into a platform that comes in varying sizes and capabilities, from simple quad-split systems to large-scale, full-facility systems that consolidate routing and monitoring functions. Making the right choice can quickly become overwhelming.

There are many angles to consider when evaluating the choices. The most popular multiviewer requirement is calculation of the number of monitored sources and the required



The multiviewer today has evolved into a platform that comes in varying sizes and capabilities, from simple quad-split systems to large-scale, full-facility systems that consolidate routing and monitoring functions.

amount of displays. The number of inputs and outputs becomes the key driver. Future I/O expansion, redundancy levels and ease of installation, operation, and maintenance are significant parts of the picture.

Architectural approach

There are two architectural approaches to multiviewer deployments: single frame and distributed. Both approaches are valid, each having specific benefits and challenges.

The integrated single-frame system supports migration to one box associated with routing capabilities that support every input and output. These frames consume less space, offer simplified control and reduce cabling and installation costs. They typically also have fewer points of failure. (See Figure 1 on page 14.)

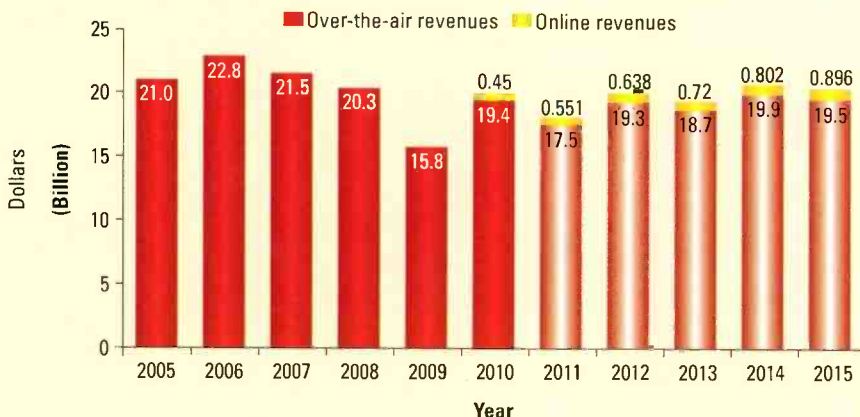
A larger up-front investment in the architecture may be required. This is partially related to the need for discrete I/O stages in the signal flow. This requires additional flexibility to scale for future requirements with an understanding of the cost to add more inputs or outputs.

The distributed architecture is an alternative approach. This system uses discrete multiviewer systems to drive a small number of displays, spreading the load to lessen the possibility of a single point of failure. (See Figure 2 on page 14.)

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

TV station revenues increase in 2010

Last year, local TV station revenues rose 23.2 percent.



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The distributed approach supports the assignments of individual multiviewers to specific control room functions, minimizing interference from other operators. Audio control, for example, might be assigned to the production switcher output or the graphics system. This naturally separates the control and operation of these systems to the controllers in that area.

The addition of more inputs or outputs is normally as simple as adding another unit. However, control challenges may increase with an expanded architecture, and costs may be higher compared with an integrated approach.

Application overview

The intended applications will likely influence the choice of an integrated or distributed architecture. Although use cases vary from site to site, and unique requirements exist for each application, the majority of broadcast applications fall under four categories:

- Production control rooms;
- Outside broadcast vehicles;
- Master control rooms; and
- Transmission/cable headend monitoring facilities.

Production control room

The studio director in the production control room uses the multiviewer to create live content. The director, always the demanding artistic individual, is tasked with split-second decisions on camera angles and shots. There must be confidence that what is seen on the multiviewer will be transmitted correctly to the viewer.

This has a large influence in how the production gallery operates. Picture quality must be pristine enough for obvious recognition of fine detail, and the director will normally insist

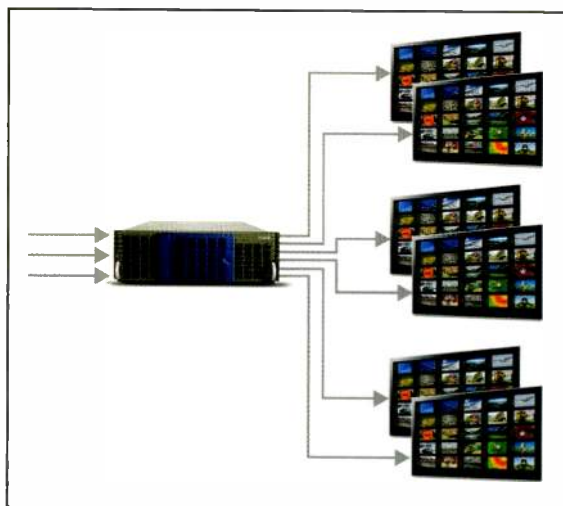


Figure 1. The integrated single-frame system supports migration to one box associated with routing capabilities that support every input and output.

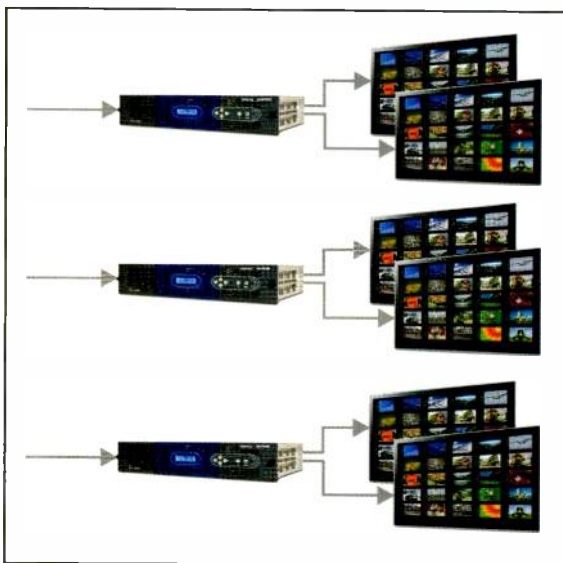


Figure 2. The distributed architecture uses discrete multiviewer systems to drive a small number of displays, spreading the load.

on fewer sources per display to maintain resolution. This is usually accomplished by adding more displays instead of more PiPs to a display. The real-time nature of live production means that the processing delay (or latency) through the multiviewer and display is a key metric.

Picture quality is often assumed and not evaluated, but quality can vary hugely across models. Video sources must endure two main processing stages — scaling and deinterlacing — to become part of a multi-

image display. Both stages will reduce picture quality if not correctly designed.

Scaling decreases the picture size to fit on the multi-image display. This process requires intelligent scaling software to understand what pixels maintain the image quality at any size. It also uses large dynamic horizontal and vertical filters to remove scaling artifacts without reducing picture detail.

Deinterlacing combines the two fields into a single, progressive frame for interlaced sources. If performed incorrectly, artifacts will appear due to interfield motion or a reduction in picture resolution. Side-by-side comparisons of the two techniques will reveal the quality variations.

Simple control and configuration software is a must as different directors and shows require a variety of setups. Engineers will frequently make last-minute changes to the setup. This can include the incorporation of more cameras, size changes to PiPs, and variations in the UMD and tally styles — all to meet an individual's preference.

Outside broadcast vehicles

The outside broadcast environment echoes many of the same requirements as the production control room, while introducing some unique considerations. The most obvious are the space, weight and power limitations of OB trucks.

OB environments benefit greatly from the integrated approach, combining the multiviewer with the router and other signal processing equipment. This translates to enormous reductions in footprint and power use. The single-frame design also reduces



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the number of spare parts and redundancy options within the truck.

Quad-split solutions are a popular choice in the OB environment. The limited number of inputs typically reduces power consumption, and resolution is maintained by requiring four or fewer sources per display. This also easily accommodates the monitoring of just one source at full screen — a common request for outside production events.

Master control rooms

The master control room is the last stop before transmission. Operators here are responsible for monitoring the outgoing signals and ensuring they conform to all regulations, including decency ratings, teletext/captioning requirements and station ID insertion. The process also ensures that audio tracks, aspect ratio data and channel branding are correctly encoded.

Multiviewers in the master control center must offer options to decode and display the relevant data. This includes decoding the closed-caption data and its subsequent display on the video as it would appear to viewers. Automatic display of the source aspect ratio data in its native format is also helpful.

A sophisticated monitoring system will automate much of the monitoring, flagging errors on screen. The same system will likely generate messages over SNMP to control software. Some top-end devices will send e-mail and/or SMS text messages to alert engineers of potential problems.

Transmission and cable headends

Cable and other transmission headend environments typically require monitoring of a large number of sources. The purpose is to ensure that the signals are valid and transmission is taking place without error. It also confirms that audio signals and required metadata are being transmitted.

The multi-image display in this application focuses on high PiP density as presence is more important than picture quality, which is monitored prior to transmission. These facilities are highly automated, so alarming options and rules-based responses are extremely desirable features.

The transmission chain has evolved to mirror the changes in how consumers access content today. IP-based transmission has become as important as traditional RF transmission,

and most broadcasters are dealing with hybrid signal environments for baseband and broadband.

The monitoring of IP signals represents a new shift in multiviewer architecture design. The majority of applications require IP-to-baseband conversion for signal monitoring. This adds cost and introduces unnecessary processing and another potential point of failure. New discrete IP and hybrid monitoring systems have appeared on the market, offering direct IP monitoring, simplifying the workflow, and reducing cost and complexity.

The various requirements and demands in signal monitoring and processing stipulate that different architectures are necessary to match the environment. No single system will cover everything. Therefore, it's pertinent to prioritize requirements when evaluating monitoring options and remain open to different approaches to finding the optimum system. Vendors should offer a range of options to suit the architecture chosen, with an application-tailored system to best match the requirements of today and tomorrow. **BE**

Kevin Jackson is product manager, multiviewers, at Harris Broadcast Communications.

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Broadcast tower rules

New rules would allow a public comment period before construction if there is an environmental issue.

BY HARRY C. MARTIN

The FCC is proposing new processing rules and interim procedures designed to give the public an opportunity to comment on proposed ASR-dependent towers and proposed changes to existing towers.

The new rules and procedures are designed to:

- address a court finding that the commission's existing ASR approval process fails to provide an opportunity for public comment on environmental issues raised by the proposed construction; and
- implement certain provisions of a private agreement reached last year by a number of tower-related and environmental groups. Comments on the FCC's proposals were due May 5.

A look at the proposed tower rules

Under the proposed rules, obtaining approval to construct any new tower subject to registration in the ASR system would become more complicated, particularly for towers over 450ft. (Most towers up to 200ft tall and not in the glide slope of an airport can be built without an ASR.) The proposed new rules would require a period for public comment on tower construction or modifications before a formal proposal is filed with the FCC. After the comment period, the FCC would determine whether an environmental assessment (EA) is required before approving the tower. Until the commission separately completes its underlying Programmatic Environmental Assessment of the entire ASR program, individual EAs will automatically be required for any proposed tower or modification over 450ft.

Anyone intending to register a new or substantially changed tower

subject to ASR requirements would commence the process by providing the commission with the details of the construction. The public notice does not say exactly how the information is to be submitted — by letter, electronically or some other way. It does suggest that proponents might file a “partially completed” Form 854 ASR form.

The information to be submitted must include, “at a minimum,” all of the information required by Form 854 relative to ownership and contact information, geographic location, height, type of structure and anticipated lighting. Applicants also must provide local public notice of the to-be-proposed tower construction, either in a local newspaper or through “other appropriate means.” This local notice must provide the details of the to-be-proposed construction as well as instructions on how to file comments about it with the commission.

Meanwhile, using the information submitted to it, the commission will post on its website a national notice of the to-be-proposed tower construction. That national notice will include the information filed by the prospective proponent, together with the date of the local public notice. If the prospective proponent has already determined that the tower requires an EA (based on the commission's existing rules, or the presumption associated with 450ft-plus towers), that EA must also be submitted to the FCC at this time.

Once the national notice does appear, interested parties will have 30 days to file a Request for Environmental Processing, asking the commission to require the prospective applicant to prepare an EA. Any

party making such a request would have to explain why the to-be-proposed construction would have such a significant environmental impact that an EA should be required. Then the FCC will decide whether an EA is required or, if one already has been submitted, whether the construction will have an environmental impact. Only after the FCC determines that the proposed construction will not have an adverse impact can an applicant file its Form 854 and register its proposed tower. **BE**

Harry C. Martin is a member of Fletcher, Heald and Hildreth, PLC.

? Send questions and comments to: harry.martin@penton.com

Dateline

- Noncommercial TV stations in Illinois and Wisconsin must file their biennial ownership reports by Aug. 1.
- By Aug. 1, TV and Class A TV stations in the following locations must place their 2011 EEO reports in their public files and post them on their websites: California, Illinois, North Carolina, South Carolina and Wisconsin.
- The license renewal cycle begins June 1, 2012, for TV, Class A TV, TV translators and LPTV stations in Maryland; Virginia; Washington, D.C.; and West Virginia. In these states, on April 1, 2012, TV, Class A TV and LPTVs that originate programming must begin their pre-filing renewal announcements. The renewal cycle continues region by region until April 1, 2014, when stations in Delaware and Pennsylvania will be the last to file for renewal.

Media wrappers

Understand the role media wrappers play in extending the life of your content.

BY ALDO CUGNINI

Broadcasting today relies on the ingest, storage and play-out of content involving many different tape- and file-based media. With the migration toward digital media, numerous media container systems are now in use as well. An overview of these different media packaging standards will make repurposing of content to different fixed, mobile and Web-based devices a more manageable task.

Containers facilitate handling of multipurposed content

A media container is essentially a “wrapper” that contains video, audio and data elements, and can function as a file entity or as an encapsulation method for a live stream. Each of the various containers used today is based on a particular specification that describes how the media elements are defined within it. While containers usually do not describe how data or metadata is encoded, specific containers will often constrain

the types of video and audio contained within, often excluding other types. Containers can be assembled offline and then stored as finite computer files. They can also be generated on the fly and transmitted to real-time receiving devices. A real-time container is thus an open-ended stream, not necessarily intended for storage. Receiving devices, however, can capture such a stream and store it as a file.

The most familiar container to digital broadcasters is the MPEG transport stream, which almost always contains an MPEG video stream and some form of audio stream, such as Dolby Digital in ATSC systems and MPEG audio in DVB systems. The MPEG transport stream is comprised of various layers, enabling media players (i.e., TVs, etc.) to quickly parse the stream and select the desired elements. This enables decoders to easily separate out video and audio, and data elements such as EPG. Transport streams are also assembled in such a way that multiple programs

can be easily and separately accessed. Specific elements of the transport stream include packets, containing the elementary data; PIDs (packet IDs), which can address elements such as elementary streams; programs; and program specific information (PSI). Null packets are also inserted into transport streams to satisfy bit rate requirements of the stream.

Alternate containers emerge

When digital video became viable on consumer devices, the rapid availability of sizeable storage on PCs meant that media could be stored locally within files. Various container providers thus emerged in a competitive fashion, each with its own set of compatibilities (or not).

Microsoft Advanced Systems Format (ASF) is an extensible file format comprising one or more digital media streams; the most common file types contained within an ASF file are Windows Media Audio (WMA) and Windows Media Video (WMV). ASF files are logically composed of three types of top-level objects: a header object, a data object and the index object(s). The header object contains a recognizable start sequence identifying the file (or stream) and generally contains metadata about the file. The data object contains all of the digital media data, which can be defined as having a stream property or a file property. The index object can contain time- and/or frame-based content indices pointing to locations within the digital media. Although ASF files may be edited, ASF is specifically designed for streaming and/or local playback.

Apple QuickTime (QT or MOV) is a container format that encapsulates one or more tracks, each of which stores audio, video, effects or text.

FRAME GRAB

A look at tomorrow's technology

Top three mobile video revenue content owners

ESPN is projected to make \$53.6 million from mobile video in 2011.



e = Estimate. Mobile video programming revenue only, excludes graphics, games, ringtones and other nonvideo mobile revenues. Includes upfront fees, per subscriber licensing fees from carriers and aggregators, app download fees, minimum guarantees and video advertising revenue.

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Each track contains either a media stream or a data reference to a media stream located in another file, and these tracks are arranged in a hierarchical data structure consisting of objects called “atoms.” One advantage of this track structure is that it enables in-place editing of the files without requiring rewriting after editing. The various video codecs that can be encapsulated in QuickTime include MPEG-4 Part 2, H.264 (MPEG-4 Part-10/AVC), DivX, 3ivx, H.263 and FLV1 (Sorenson H.263). The MPEG-4 Part 14 (MP4) multimedia container format is essentially an extension of the ISO base media file format (MPEG-4 Part 12), which was based on the QuickTime file format.

Adobe Flash (FLV), which has become popular on the Internet, most often contains video encoded using Sorenson Spark, On2 Technologies’ VP6 compression, or H.264. (On2 claims that VP6 offers better image quality and faster decoding performance than other codecs, including Windows Media Video, Real Media, H.264 and QuickTime MPEG-4.) A different version of the Flash container format is F4V, which is based on MPEG-4 Part 12, and supports H.264.

RealMedia (RM) carries the proprietary RealVideo and RealAudio streams.

RealVideo was originally based on H.263, but is now a proprietary video codec. A RealMedia file consists of a series of chunks, each of which carries information on data type, size, version, and of course, the video and audio payload. Content description and metadata can be carried as well.

The Material eXchange Format (MXF), defined by SMPTE-377M, is a file format that encapsulates video, audio, metadata and other bit streams (“essences”). MXF was initially targeted to production, as a middle-state format for content exchange and archiving; the container format is specifically called MXF_GC, for MXF Generic Container. MXF_GC is “fully streamable,” i.e., A/V content can be continuously decoded through mechanisms such as interleaving essence components with stream-based metadata. The benefits of MXF include interoperability, a high level of sophistication and the use of international standards.

Structurally, MXF is comprised of a file header, file body and file footer. The header contains file identification and metadata, the latter including timing and synchronization parameters. The file body incorporates the data essence, i.e., video, audio and other media. The footer closes out the MXF file.

MXF also shares a common object model with the Advanced Authoring Format (AAF), a sophisticated data model and software toolset that allows post-production devices to share essence data and metadata. MXF can therefore store completed works with metadata, allowing for a viable means of tape replacement. It can also package together a playlist of files and store the synchronization information, as well as store cuts-only EDLs and the material they affect. Another strength of MXF is that it can encapsulate audio and video of any compression format, making it truly universal.

Conclusion

With the continuing evolution of container formats and storage media, content archiving is increasingly susceptible to “data rot,” where an original version of material will eventually require migration to various (newer) storage means. As if efficient workflow wasn’t enough of a challenge, short- and long-term planning (and budgets) must consider the growing issue of content permanence. **BE**

Aldo Cugnini is a consultant in the digital television industry.

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Metadata

As facilities move to file-based workflows, understanding metadata is important.

BY BRAD GILMER

By now, most engineers have heard that metadata refers to data about data. As facilities move from tape to files, and from tight integration to service oriented-media workflows, it becomes critical for engineers to have a solid understanding of this important topic.

The definition of metadata as “data about data” may be accurate, but it is perhaps not entirely useful. Revising the definition a bit, in our industry, metadata typically refers to data about the video and audio — the essence of the program. System designers have found it useful to distinguish between essence and metadata. But just as things are starting to become clear, someone may ask, “What about closed captioning? Surely that is data — right? How about time code?”

When talking about data in relation to video and audio, it is important to ask yourself whether the data you are talking about is part of the program (essence), or whether it is descriptive information about the program (metadata). Using this as a guide,

we can classify different elements of a program as either essence or metadata. (See Table 1.)

Essential metadata vs. descriptive metadata

The types of metadata are practically limitless. Metadata can include identifiers, time code, geospatial data and even free-form user metadata such as field notes entered by a camera person. That said, there are two main classifications of metadata that can

metadata describes the essence. Examples include house number, title, program length, sponsor or advertiser, and ISCI code.

It is useful to divide metadata into these two classifications because, in cases where data storage space is severely limited, it may be that only essential metadata is stored with the content. As we move further away from legacy videotape-oriented systems, storage space for metadata becomes less of a problem.

As facilities move from tape to files, and from tight integration to service-oriented media workflows, it becomes critical for engineers to have a solid understanding of this important topic.

be useful. The first is essential metadata. Essential metadata is data that is critical in order to play the content. Examples include unique identifier, frame rate, compression coding parameters and time code. The second is descriptive metadata. Descriptive

In Table 1, some of these classifications may seem arbitrary. To some extent, this is true. Is AFD essence data or metadata? Is a house number essential metadata or descriptive metadata? It may depend upon the systems involved. While there is no definitive answer to these questions, the concepts of essence, metadata, essential metadata and descriptive metadata can be helpful as you learn more about this topic.

Media identification

One can argue that the most critical metadata component is the identifier assigned to the essence. After all, once the tape is converted to a file, there are only two ways to identify the content — either by the file name or by an identifier that is closely associated with the content. Gone is the trusty label stuck to the cassette.

In many facilities, file names are used to identify the content of a file,

Essence data	Metadata
Video	Identifier
Audio	Time code
Descriptive video	Video frame rate
Captioning	Audio sample rate
Subtitling	Video compression parameters
Graphics overlays	Audio compression parameters
	Title
	Program length
	Sponsor or advertiser

Table 1. This table contrasts essence with metadata. Note that not all essence is video or audio. Closed captioning is considered essence as well.



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and this can work very well. But there are some problems with this approach. First, in many cases, nothing enforces file naming conventions beyond a policy that has been established by the company. This is good because changing your naming convention is as simple as sending a memo or an e-mail. But this is bad because you are tied to the file name limitations of the operating system. Another issue is that the file name can

always 50555. This system worked well until we accidentally promoted last week's Friday night movie because no one had replaced the old promo with the new one. Even though we knew there was a problem with our numbering system, we continued to use it until we accidentally played a national automobile commercial during the wrong week. I do not remember the particulars, but I do remember some very uncomfortable meetings over

As you transition to file-based workflows, it is a good idea to spend time with your vendors, understanding how metadata is treated in a wide variety of scenarios.

be easily changed. Again, this can be a good thing because some workflows may rely on the name of the file being changed once a QC check or some other step has been performed on the file. But this could be a problem because the workflow process relies on humans to correctly type the file name and to correctly change the file name as the work progresses through your system.

Finally, the strongest argument for not using file names for identification is that there is no guarantee that the file name is unique. This can cause some major headaches, which I will get to later.

In many master control operations, content is identified by a house number. House numbers are typically assigned by the traffic or programming departments, they are internally generated, and they are used by various computer systems to identify content in the facility. House numbers may be incorporated into file names, and they may also appear within the metadata of the file itself. Unfortunately, most house number systems suffer from the same limitations as file name systems previously discussed. In fact, a long time ago, a station where I worked used the same house numbers over and over. The promo for the Friday night movie, for example, was

the issue. Finally, we stopped reusing house numbers and went to a different system.

The MXF standard specifies that unique media identifiers (UMIDs) be used as labels within the MXF file to uniquely identify the content. UMIDs are computer-generated 16-byte strings that can be locally generated, meaning that you do not need any outside references to create the UMID. Statistically, UMIDs are almost guaranteed to be unique. This means that it is possible to uniquely identify a piece of media no matter where that content came from. One rub is that UMIDs are not meant to convey any information at all in and of themselves. For many media companies, it can be challenging to stop relying on the media ID as a way to convey information about the content. But file-based workflows rely on unique identifiers. In fact, it is a key assumption that the identifiers are unique.

The topic of media identification in metadata is an important one, and I expect you will see more on this topic as more companies move to file-based workflows.

Metadata synchronization

Recently, the industry has spent a lot of time focusing on metadata

contained in file wrappers. This is great, because without some consistency in how we treat metadata, interoperability at the file level is impossible. But one question facing system architects is how we can ensure metadata synchronization. Remember that metadata is not only contained in file wrappers, but it is also contained in databases that are used in many places in our facility. What should we do when metadata is modified? Should we always strive to ensure that the metadata in the file header matches what is contained in the database? Since it takes time to modify metadata in file headers, should we only modify the file header metadata to match the database when we export the file? Perhaps the best approach would be to write the minimum metadata to the file header and keep all the rest of the nonessential metadata in the database. This is fine, but some media facilities want to be able to rebuild metadata contained in databases from the metadata contained in the files in the case of a database failure.

There are no easy answers. Metadata is a complex topic, and thinking on this topic is evolving. As you transition to file-based workflows, it is a good idea to spend time with your vendors, understanding how metadata is treated in a wide variety of scenarios. **BE**

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

Send questions and comments to: brad.gilmer@penton.com

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Audio in post

As the audio post industry moves toward all-digital 5.1, sync issues still exist.

BY GARY ESKOW

Audio post has gone through some significant changes over the years. Once upon a time, the technologies used to create video and audio were separate and distinct, and the process of marrying audio to a finished picture involved synchronization and format problems that could be harrowing. The maturation of digital recording and the market domination of ProTools have made the process more routine. But have the problems disappeared? Or, have they morphed into issues that make audio post production in 2011 as pressured an industry as it ever was?

The home studio revolution

For starters, let's consider the home studio revolution that fundamentally altered the way records — at least most of them, including major studio releases — are produced and recorded. The Alesis ADAT brought high-quality digital recording equipment into the price range of every working musician on the planet, or so it seemed. One by one, studios that relied on soup to nuts tracking and mixing to meet payroll began to struggle. Many, including a number of the most highly regarded facilities in the business, went under.

Audio post remained largely unaffected at first because multiple analog and digital formats (high priced for the most part) kept fighting with one another. When Avid purchased DigiDesign, the deal was essentially sealed, but it took another decade or so for things to shake out and for Pro Tools to climb the throne and declare itself the king of all recording formats for all applications, including audio post. Assured that the equipment they invested in would allow for

seamless transitions from homes to major post facilities, audio post specialists began beefing up their project studios, just as their recording brethren had done a few years earlier.

Skills that don't come in a box

According to Ren Klyce, who mixed the music to "The Social Network" (for which composers Trent Reznor and Atticus Ross won Oscars), major recording studios, like Plant Studios

the still developing state of digital recording technologies. Manchester has engineered scores for three Academy Award-winning films ("The Departed," "Frida" and "The Red Violin"). He's also a music mixer for NBC's "Late Night with Jimmy Fallon."

He says the line between the prosumer and pro markets has muddied things up, and budget-conscious producers often hire inexperienced audio engineers, causing quality control to suffer.



This Touring Video entertainment truck features a Stagetec 32-fader, 110-channel CRESCENDO digital audio mixing console.

where Stevie Wonder once recorded, are closing down. He says the danger is that the next generation won't be aware of the possibilities that high-end recording studios bring.

Looking to work on the cheap can force producers into a corner as well. Klyce says some aspects of the process have gotten easier as the technology has developed, but that turning out a quality product involves a certain skill level that can't be put into a box.

Lawrence Manchester seconds what Klyce has to say about the relationship between budgetary pressure and

It's one thing for a picture editor to use the audio tools that are packaged with Avid, Final Cut Pro or several of the other prominent picture editing software packages. Some of these products are very good, and high-quality music libraries are available on CDs and as downloads that make it very easy to match sound to picture. Some products — Sonicfire Pro 5 comes to mind — are available as plug-ins, and the best of them make it remarkably easy to tailor prerecorded music tracks to the needs of your video.

If your picture editor is picking music beds and cutting them to picture but by default becomes the final stop on the train, be careful. According to Manchester, the layback process has become a huge issue. For example, channels are misassigned or discarded altogether, particularly when a project has been mixed in 5.1.

As the industry moves down the road to an all-digital, 5.1 pathway, producers have to make some key choices. It's not much more expensive to mix in 5.1 than stereo. All of the major DAWs have routing matrices that handle the task routinely. The larger question involves the operator and how skilled he or she is at handling the creative and technical issues that multichannel formats present.

Sync issues still thrive

With the ascension of a single audio format (for the most part), you might have thought that synchronization issues were a thing of the past. They're not.

Klyce says filmmakers used to shoot on film, and audio was tracked on a separate tape machine. There were slates that let everyone throughout the process know the details of a scene. Today, people believe that digital solves all problems, and it doesn't. Sync issues can occur due to satellite, cable broadcasting and plasma screens, which introduce latency differently than other digital screens.

"Many young filmmakers are unaware of the fact that drift occurs in digital media. And there is what I call the 'ProTools dilemma' — the various pull up and pull down menus, sample rate conversions — all designed to fix problems that should have been sorted out prior to production," Klyce says.

Today, people believe that digital solves all problems, and it doesn't. Sync issues can occur due to satellite, cable broadcasting and plasma screens.

According to Manchester, sync problems are not going away. "Things get hairy in post production," he says.

For example, a singer will perform over a prerecorded track, which is then played back on set during a film shoot. It's critical that the picture editor understands how to sync that audio to video. The editor should know the sample rate of the recording and at what speed it was played back on set. A major source of difficulty stems from the fact that post production is all done in video formats even if the original material was shot on film.

Automation is a blessing, but it can be a curse for both video and audio editors. Along with the digitization of

source material, it's led producers to believe that changes can be made up to the last minute. Young assistants are often tasked with conforming work 'prints' (what an antiquated term!) and delivering them to audio specialists. This is often where sync problems arise.

The audio apprentice

The apprentice phase used to last longer, in large part because the technology was expensive and not many people had access to it at any one point. The democratization of audio and video technology has been a mixed bag; it's allowed more people to experience the creative process, but they climb into the arena with less training than ever before.

The lesson? If you're thinking about entering the audio post industry, do your homework. If you're a producer in the process of selecting an audio post house or independent professional to work with, make sure that person is on top of his game. **BE**

Gary Eskow is a composer and journalist who reports on the audio post industry.




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LTFS and LTO-5

The open file standard supports workflows for broadcast organizations.

BY HOWARD TWINE

LTFO-5 is the fifth generation of LTO tape, a tape format developed over the last decade by the LTO Program, a consortium of manufacturers consisting of HP, IBM and Quantum. Since its inception, LTO has grown to become one of the de facto tape formats installed in tape libraries by broadcast-centric organizations implementing tape- and disk-based archives. LTO-5 media can store 1.5TB of uncompressed material and write at a speed of up to 140MB/s.

What is the Linear Tape File System (LTFS)?

Is LTFS yet another file format that broadcasters should try to understand, or is it genuinely going to add value to the way we work in the industry? Perhaps the first consideration is that LTFS is truly not a file format, nor even a wrapper. It's a new way of writing data to standard, off-the-peg IT storage media. More importantly, for the first time it presents an open standard for broadcasters that can provide real interoperability between systems.

Open standard interoperability

LTFS is an open standard. Any tape written according to the LTFS specification can be read by any other system using the same specification. (See Figures 1 and 2 on page 32.) This enables true interoperability and presents several implications. Not only does this suggest the evolution of new workflows, but once-proprietary data is now opened up to be available across different vendors. This eliminates issues surrounding material viability in the event of irretrievable system damage, or even business-level,

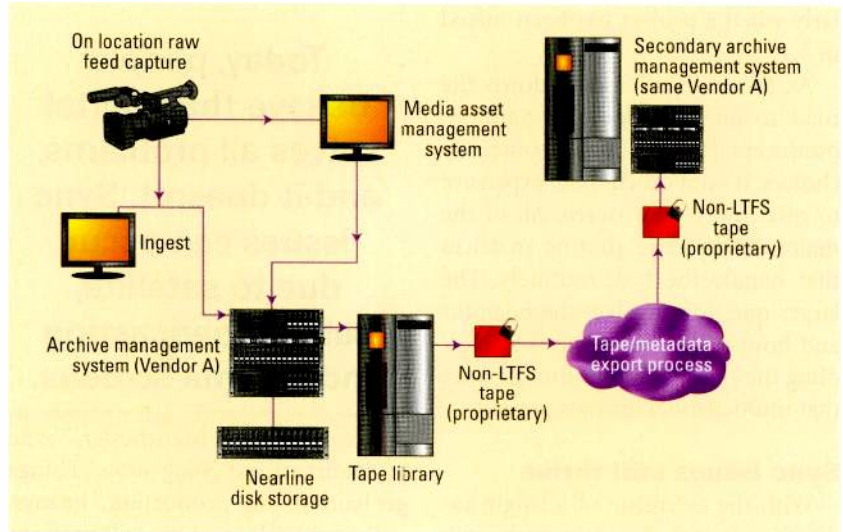


Figure 1. In non-LTFS workflows, media can only be exported to same-vendor proprietary systems, often using an additional export process that may be chargeable.

vendor-specific failures. This interoperability was demonstrated by multiple vendors at the 2011 NAB Show.

Simple transfers using standard device drivers

Those in the business of managing LTO drives can download the LTFS specification and develop their code to that standard at a base level. However, not everyone is in a position or

to be directly connected to PCs, Macs and Linux machines, operating at a much higher level than base-level SCSI commands.

The simplicity of this means that users (and not developers) can add a single tape drive to a small-scale system in the same way they would add a USB hard drive, for example. Simply buy the drive, download the appropriate drivers, install them and connect

Any tape written according to the LTFS specification can be read by any other system using the same specification. This enables true interoperability and presents several implications.

has a requirement to deal with low-level SCSI commands to write a few media files to backup tape. One of the real advantages of LTFS is that the major drive manufacturers (HP and IBM) also provide operating system drivers that allow LTO-5 tape drives

the drive. This then provides the user with the ability to use any operating system file management tool to move content into previously locked-down, high-capacity LTO storage. Using Windows Explorer, for example, files can be simply dragged and dropped

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from the server to the tape. The long-term gain for this is the ability to store large amounts of data (1.5TB per cartridge) for long periods of time without the power considerations of disk. Tracking tapes on the shelf with the content they contain becomes a consideration, but it's no more an issue than it was with videotape.

Structure of LTFS-formatted tapes

Traditionally, data tape formats have not suited the stand-alone applications as described above very well because of the distributed nature of data on the physical tape. For the first time, LTFS provides an area on tape that is specifically designed to describe the contents. This is achieved by dividing, or partitioning, the tape into two areas: the data partition for the raw data and the index partition for this descriptive data. The function of the index partition is to provide faster access to the raw data; think of it as a lookup table that points to the data.

Before the advent of this on-tape index information, any controlling system would need to scan the whole tape at read speed to extract the position of the raw data into its own index format. For an entire LTO-5 tape, this could take about three hours. However, time taken for data cataloguing is not the only issue. Once the positioning information has been extracted, it has to be stored somewhere. Traditionally, this would be a database that forms the heart of a content management system. Of course, the addition of a content management system increases the price and complexity of the system considerably. LTFS negates the requirement for this complexity.

LTFS and content management systems

LTFS clearly has a place for small-scale applications, but what about enterprise-level systems that have complex workflows, media asset management platforms and cavernous tape libraries with thousands of tapes?

Perhaps the most obvious application for LTFS here is the ability to protect the assets over a long period of time. The open standard approach of LTFS means that the intellectual property required to access media can now be handed back to the content owner. This raises the question: Why would anyone need a content management system to control an archive?

types of systems and the archive still have to be used, along with a database at the core to track assets.

Content delivery

Where LTFS really comes into its own is the ability to deliver content directly into the archive, bypassing the need to ingest from videotape, etc. Intelligent archive systems can

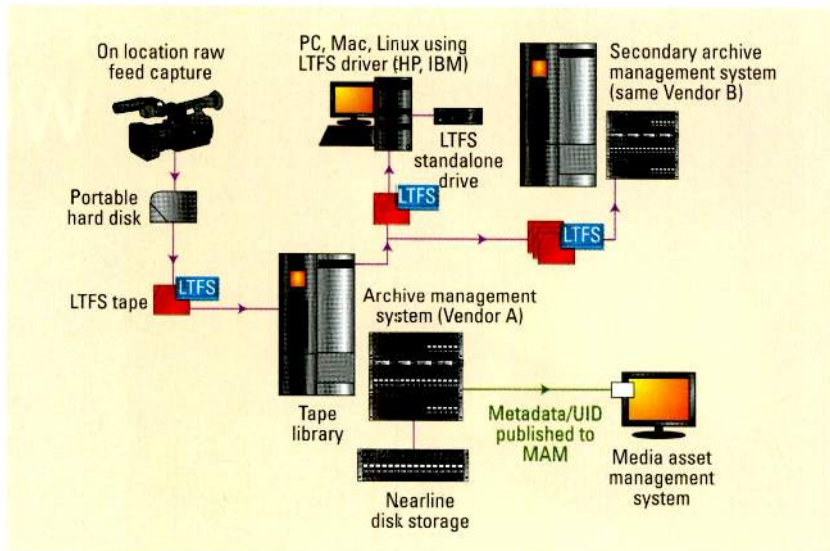


Figure 2. LTFS enables new workflows, making full use of the interoperability that is key to the technology, allowing free exchange of material between disparate systems.

The answer lies in the integration to other essential business systems (sales, billing, playout and asset management, for example). There is,

quickly read the index information from an LTFS-formatted tape (that may, for example, have been used on location to capture material directly

Where LTFS really comes into its own is the ability to deliver content directly into the archive, bypassing the need to ingest from videotape, etc.

however, a technical disadvantage to LTFS in these larger-scale environments, and that lies with its inability to track and identify content. Any MAM, billing or automation system uses a unique identifier (UID) and a database to track and identify individual clips and content. LTFS does not support this concept of UIDs, nor does it have the ability to hold a UID in its native metadata structure. Therefore, the existing interfaces between these

from HD cameras or intermediate disks) and directly assign UIDs to the content, populate the archive database and generate a low-resolution proxy (used for editing). Once the material is safely held in the archive, the management system can publish notification back to any external system to begin the synchronization process.

A master MAM system that would normally push content into the archive may use place holders for this

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newly arrived material. In this scenario, the filename may have to be the same as the UID (or temporary UID) from the archive management system, assigned and either adopted by the MAM system or changed in the archive to match. Either way, only minor changes to connecting APIs need to be made to adopt this approach.

An additional application for LTFS with a larger archive repository is the export of content for other external systems. It is quite likely that we're going to see the adoption of videotape-like workflows with LTO data tapes, and files replacing conventional videotape.

LTFS vs. AXF?

The interoperability of LTFS has already drawn comparison with the Archive Exchange Format (AXF), which is under design by SMPTE in collaboration with major broadcast

archive vendors. It's designed to offer an archive format that can be freely written and interpreted by multiple vendors, thereby providing interoperability between previously disparate systems. The open standard nature of LTFS also allows this interoperability: Tapes written in LTFS format can be exchanged between systems and the data populated into the outlying departments. However, where AXF is a broadcast-only format, the IT nature of LTFS presents a format that operates within the broadcast arena while being accessible to nonbroadcast departments. Additionally, AXF may not become a ratified standard until later in 2012.

Conclusion

Some of the benefits of LTFS include:

- Tape content can be written to an LTFS archive group and exported to other systems;

- The exported tape, containing up to 1.5TB of data, can be transported to another LTFS-compatible system and imported, populating MAM or other systems;
- LTFS enables a single tape drive to be connected to a workstation (running Windows, Linux or Mac), with data accessible in a Windows-style drag-and-drop interface;
- LTFS provides an index partition allowing the archive to write file metadata, including positional information for rapid access.

LTFS is not simply another solution looking for a problem. There are certainly several genuine applications in the broadcast, media and entertainment industry, and as the technology is adopted, more are likely to become apparent. **BE**

Howard Twine is a product manager at SGL.



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NAB REPLAY: PRODUCT JACKPOT

The NAB Show is the place to see product launches. If you didn't make the show, here is a roundup of some of the new products that were on demonstration. And for even more NAB product coverage, check out our *NAB Special Report*, which is polybagged with this issue.

FIBER-OPTIC CONVERTERS

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Converts HD/SD-SDI for transport over single-mode 1310 nm ST-style FO cable to drive HDMI monitors; supports embedded eight-channel audio in the HDMI output, enabling convenient single-cable A/V connections; provides two-channel RCA-style audio outputs for separate audio monitoring; HDMI v1.2 capability is standard and requires no user configuration.

800-251-4224; www.aja.com

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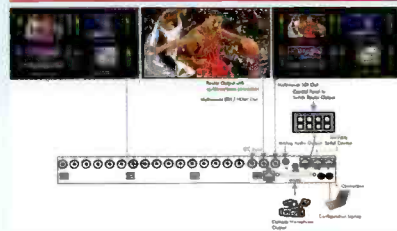
Sony XDCAM Station

Becomes core of XDCAM workflows in networked environments, providing an effective bridge between XDCAM optical media and SxS memory card media; enables multitask and multi-access capabilities; enhances the functionality and the performance of a media network; available in several versions; XDS-PD2000 has an internal storage of 0.5TB SSD, SxS and Professional Disc; XDS-PD1000 has an internal storage of 1TB HDD, SxS and Professional Disc; XDS-1000, has an internal storage of 1TB HDD, SxS only.

201-930-1000; <http://pro.sony.com>

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www.alterantechologies.com

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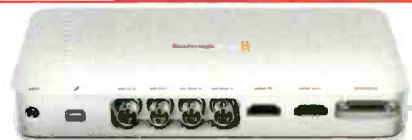
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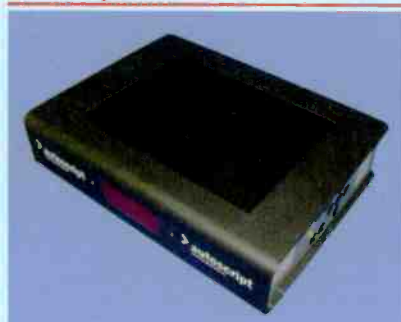
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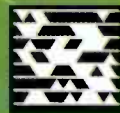
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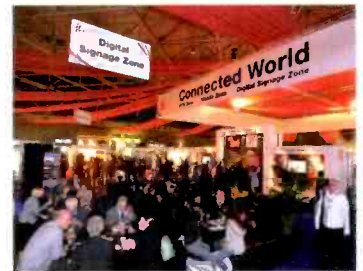
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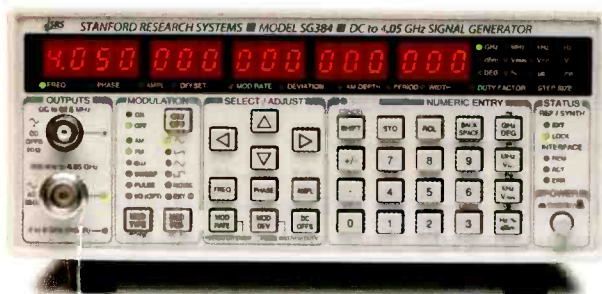


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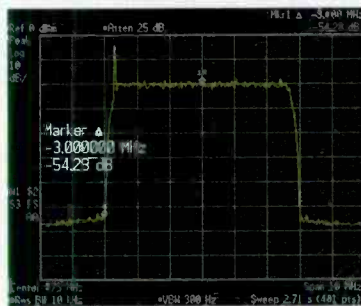
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Linear's new 8001 series of Exciters are feature-rich with options based key code programming that puts you in the driver's seat to deploy what you want—when you want it. Its unparalleled Non-Linear Pre-Correction capabilities deliver Memory Effects Compensation and Crest Factor Reduction, providing maximum amplifier efficiency and more Watts per Dollar.



FEATURE AND OPTION HIGHLIGHTS

- ▲ Linear pre-correction with 4 μ s peak-peak group delay capability
- ▲ Scheduler software to run corrections/measurements at scheduled times
- ▲ Internal GPS receiver
- ▲ Internal OCXO with +50 ppb frequency stability
- ▲ Selectable Timebase reference: Free run, Internal GPS, External 10 MHz, External 1 PPS, or Incoming Transport Stream.
- ▲ Proprietary Bandwidth Reduction Technology
- ▲ Use of Non-linear Pre-correction with Crest Factor Reduction leads to a 1.9dB analog peak sync/8VSB average power ratio
- ▲ Operates in VHF (BI-BIII) & UHF



Linear Industries, Inc. 2531 Technology Dr., Suite 310 ▲ Elgin, IL 60124, USA ▲ 1.847.428.5793 ▲ www.linear-tv.com

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Not just digital. Better digital.™

PRODUCT JACKPOT

PRODUCTION SWITCHER Broadcast Pix Granite



1M/E control panel provides faster access to Granite's video and file-based content; features 16 input buttons, six keyer buttons and key priority controls with mnemonics for output assignments; when combined with Granite's Fluent file-based workflow software, a single operator can easily create highly compelling live video.

978-600-1100
www.broadcastpix.com

TELEPROMPTER Autocue Master Series

LED-backlit, 12in teleprompter monitor delivers significant weight and volume reductions; features in-board cable management and a dimmable tally light; packaged with a robust bracket set, flexible mounting plate and a new version of the wide-angle hood as standard; hood holds the glass in a separate hinged frame to allow instant access for maintenance and replacement, as well as a hidden compartment for cleaning cloth and solution.

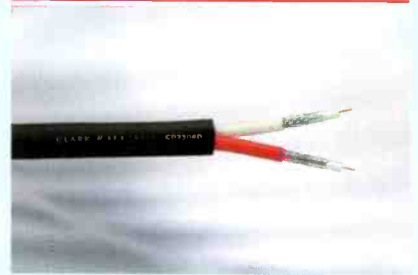
212-929-7755; www.autocue.com

NETWORK MEDIA PROCESSOR Envivio Halo

Distributed content packaging and delivery solution encrypts, packages and distributes video streams for TV everywhere services; supports Smooth Streaming and HTTP Live streaming; can process up to 50 live multirate channels in Genesis format; interfaces to leading DRM vendors; can be installed centrally or distributed in the network.

650-243-2700; www.envivio.com

3-D/HD-SDI COAX CABLE Clark Wire & Cable CD7506D



Core comprises two RG6 HD-SDI coaxial elements, each of which meets or exceeds SMPTE 292M and 424M specifications; features a durable, round construction that can be easily flexed, coiled or stored on cable reels; outer jacket is extruded from a low-temperature, abrasion-resistant TPE compound that is flexible in studio environments and rugged in hostile environments.

847-949-9944; www.clarkwire.com

High-Speed Recording in HD Format

Variable Frame Rate Camera: VFC-7000 Flash EYE



FOR-A
INNOVATIONS IN VIDEO
and AUDIO TECHNOLOGY



- Variable frame rate camera capable of high-speed recording in HD format
- Recording speed: High-Speed Shooting in HD full frame at 700 fps
- Recording speed can be varied from 24 to 700 fps
- High-sensitivity CMOS color sensor
- Lens mount: ∞ mount (PL mount option will be available)
- Electronic high-speed shutter: Up to 1/200,000 second for recording fast subjects without blur
- Recording time: Standard 9.8 sec., Maximum 39.2 sec.
- Recording method: Endless recording with built-in memory, saved video can be linked to an external trigger (start, center or end trigger style can be selected)
- Video output: Equipped with 2 channels of HD-SDI output (720p or 1080i) Simultaneous output of live and recorded video
- Genlock capability (BB or Tri-level sync)
- Camera head, main body and recording component all in one integrated structure
- Also supports DC drive, making it optimal for shooting outdoors and in other environments with no power source



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Continuous Innovation

BRANDING FEATURE
Chyron Channel Box²



Channel branding system featuring 2D/3D design with a complete data acquisition toolset; with Lyric technology, users can access any data — such as RSS feeds, traffic, financial, weather, elections, closing tickets, promos and snipes — and publish it on-air anywhere; has two SDI video inputs, one SDI video output plus one key; supports up to 32 channels of embedded SDI.

631-845-2000; www.chyron.com

VIDEO ENCODER
Evertz 9782ENC



High-quality professional 8-bit 4:2:0/4:2:2 and 10-bit 4:2:2 H.264 and MPEG-2 encoder provides HD/SD encoding in a 1RU frame; also available in multichannel encoding models that provide up to four channels of HD MPEG-2 or SD H.264 encoding; feature-rich platform includes low latency, noise reduction and scene cut detection, eight pairs of MPEG-1 Layer II encoding, VANC extraction and dual IP/ASI outputs.

905-335-3700; www.evertz.com

HD MIGRATION SOLUTION
Front Porch Digital SAMMASolo HD

Enables users to customize output migration templates by specifying storage formats and usage goals, as well as the quality-control requirements of their tape library; output files are stored locally on the SAMMASolo cache disk or can be passed to any destination using the FTP gateway, or transferred to Front Porch Digital's DIVArchive content storage management system.

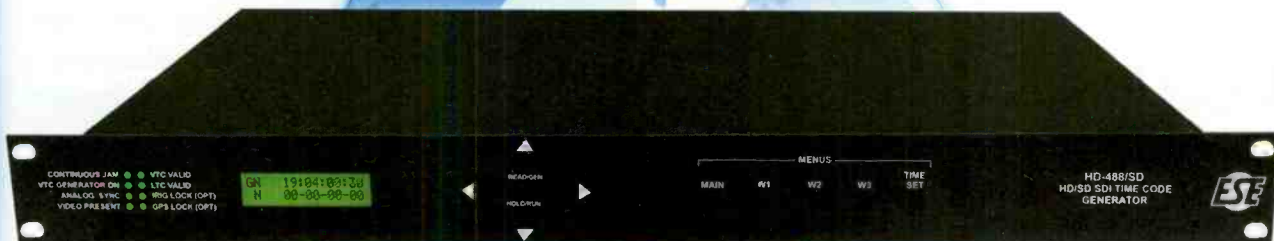
303-440-7930; www.fpdigital.com

EAS SOFTWARE
Grass Valley Maestro

New software option for the Maestro system helps operators generate EAS text crawls in either SD or HD; simple software (v2.4) upgrade for existing users with the Grass Valley Maestro Enhanced Branding option; tightly interfaces with a facility's existing EAS system while providing HD text crawl capabilities; interfaces with all types of SAGE, TFT and DASDEC EAS alerting systems.

503-526-8100; www.grassvalley.com

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www.es-web.com

NAB REPLAY
PRODUCT JACKPOT

WIRELESS LENS SERVO CONTROL
Fujinon WL-325A DigiPower servo



Servo provides wireless control over Select and Premier Series 2-D and 3-D lenses; features improved space for finger placement, a wider hand strap for increased support, and reduced backlash for precise and steady zoom movement; servo designed for Fujinon's Select Series of 2/3in and 1/2in lenses and Premier Series of 2/3in and 1/2in HDTV lenses.

973-633-5600; www.fujinon.com

TRI-AMPLIFIED DSP MONITORING SYSTEM
Genelec 1238CF



Compact three-way DSP monitoring loudspeaker includes a slim speaker enclosure, two 8in long-throw bass drivers, a 5in Genelec midrange driver and a 1in metal dome tweeter, multiple power amplifiers, digital signal processing circuitry, and active low-level crossovers; designed for medium-size control rooms; capable of delivering sound pressure levels of up to 117dB maximum peak acoustic output per pair, at a distance of 39.37in.

508-652-0900; www.genelecusa.com

SLOW-MOTION SYSTEM
NewTek 3Play 820



10-channel slow-motion system (8x2); supports simultaneous display, recording and instant replay of up to eight video streams, each with up to four audio channels; interpolated slow motion delivers smooth playback; easily imports and exports a wide variety of media file types; supports multiple playlists, including transitions and sound tracks along with linear time code.

210-370-8220; www.newtek.com

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www.RUSHWORKS.tv 888.894.7874

SOLID-STATE P2 RECORDER

Panasonic AG-HPD24 P2 deck

Features 3-D synchronized record/playback; provides native 24p recording with variable frame rates; has a super-fast USB 3.0 interface; features 24-bit, four-channel audio recording in AVC-Intra 100/50; enables playback and review of P2 cards on 3.5in, 16:9 LCD screen; offers an HD-SDI input; can be synchronized for master-quality, full-resolution isolated left/right channel 3-D recording.



877-803-8492

www.panasonic.com/business-solutions

TEST AND MEASUREMENT PLATFORM

Hamlet DigiScope DS900

Allows users to monitor multiple simultaneous tests on up to four signals on the same display; includes an optional built-in test signal generator and space for up to four input modules, which can be of mixed formats: analog and digital, composite or component, SD, HD or 3G; embedded audio can be decoded from any input; an option is available for surround-sound monitoring; housed in a compact, half-width 1U cabinet.



866-442-6538; www.hamlet.co.uk

H.264 ENCODER

Haivision Makito 1.5



Supports constant bit-rate encoding to assure transport and systemwide compatibilities, and optionally real-time metadata capabilities; metadata option allows users to incorporate KLV metadata into the compressed video stream with the data obtained from the serial port, from auxiliary data fields within the digital video stream, or from UDP network sources; provides H.264 encoding at up to 1080p60 with low end-to-end latencies.

514-334-5445; www.haivision.com

AUDIO PROCESSOR

Jünger T*AP



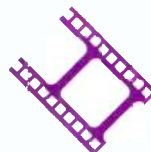
A wide-band eight-channel processor (8x1, 4x2, or 5.1+2) for TV payout, studio and ingest facilities; provides two levels of audio processing; features Jünger Audio's LEVEL MAGIC algorithm (ITU compliant), which is designed to adjust the level from any source without pumping, breathing or distortion; also features Spectral Signature, which offers dynamic filters so that the sound can be colored as desired.

+49 30 677 7210; www.junger-audio.com

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NAB REPLAY
PRODUCT JACKPOT

MULTIVIEWERS

Harris HView



An IP multiviewer built for networked environments; supports compressed video and audio feeds, as well as multiple compression formats and resolutions; includes support for virtual network control with RSS display and multiformat IP stream decoding with visual alarming; also available as an HView Hybrid SX multiviewer, which combines baseband and broadband monitoring with integrated test and measurement and VNC remote desktop control.

800-231-9673

www.broadcast.harris.com

MOBILE WORKSTATION

HP EliteBook 8760W

Options include choice of Intel i5 and i7 processors; offers up to 32GB of RAM on quad-core models; features a 17.3in screen and various hard disk options, including SSD; ATI and NVIDIA ISV-certified workstation graphics available; supports up to five displays simultaneously with certain ATI graphics cards; weight starts at 7.66lb.

866-625-0242; www.hp.com

AUDIO PROCESSOR

Linear Acoustic AERO.0ne



Designed to provide a simple, cost-effective solution to manage loudness, upmixing, metadata, signal routing and audio coding; ideal for affiliate stations that need to match local and network content and provide a seamless surround-sound experience for viewers; available in three versions: dual stereo (2+2), surround sound (5.1) and both (5.1+2); HD/SD-SDI I/O and dual-power supplies are standard.

717-735-3611

www.linearacoustic.com

SYSTEM MANAGEMENT

Telestream Vantage Enterprise

Workflow products unify video capture, transcoding, analysis, metadata processing, delivery and notification into a single, managed, futureproof, workflow framework; available in two configurations: Vantage Enterprise Control and Vantage Master Control; Vantage Enterprise Control is a workflow management layer and suite of tools that maximizes workflow capacity, resiliency, throughput and reliability for large-scale or mission-critical applications; Vantage Master Control is a higher-tier workflow management layer that adds visibility and management of complex video workflows and allows a unified ecosystem for multivendor products with centralized process control and monitoring.

530-470-1300; www.telestream.net

HD STUDIO CAMERA

Ikegami HDK-97A



16-bit portable companion-camera employs new AIT CCD imagers and an all-new digital video processing system for high-quality picture detail and accurate rendition of color gradations; delivers a choice of 1080/60p 4:2:2 or 1080/60i 4:4:4 color sampling; features a 3G fiber transmission system from the camera head to its CCU; transmission options include an HD-SDI QTV signal for teleprompter use and an HD-SDI trunk channel, which allows for connection of a second camera that doesn't have its own built-in fiber transmission system.

201-368-9171; www.ikegami.com

SCALABLE STORAGE

Isilon X-200 series

Powerful yet simple scale-out storage architecture designed to speed access to massive amounts of data; uses SSD technology; scales from a few terabytes to multiple petabytes and over 30Gb/s of throughput, all within a single file system; system cluster provides a single pool of storage with a global namespace, eliminating the need to support multiple volumes and file systems.

206-315-7500; www.isilon.com

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The Sequoia 4H.

Four HDMI inputs with mouse/keyboard control and touchscreen functionality.

<http://avitechvideo.com>

PROHD CAMCORDER
JVC GY-HM750U



Compact shoulder-mount camcorder, ideal for ENG news and sports; has three 1920 x 1080 CCD imagers; includes Canon 14:1 zoom lens; accommodates 1/3in bayonet-mount lenses; records at up to 35Mb/s; supports HD in 720p, 1080p and 1080i; native file recording for Apple Final Cut Pro, Adobe Premiere and other major NLE systems; records Sony XDCAM EX files.

800-582-5825; <http://pro.jvc.com>

SOFTWARE UPDATE
Lawo V4.12 software



Adds support for Lawo's Remote App for Apple's iPhone, iPod touch and iPad; adds AMBIT, a new upmix algorithm that offers automatic high-quality stereo-to-5.1 conversion; adds support for a new 3G-SDI card and a new GUI page for control of the mxDSP card 64x64 summing matrix.

+49 7222 1002 0; www.lawo.de

FRESNELS
Litepanels Sola 6, Sola ENG



Capable of focusing output from a 70° to 10° beam and dimming from 100 percent to zero with no color shift; Sola 6 has a 6in Fresnel lens and draws 75W while providing light output equivalent to a 650W tungsten Fresnel; Sola ENG has a 3in Fresnel lens, and is small and lightweight enough (just over 1lb) for on-camera use in an ENG or remote application.

818-752-7009; www.litepanels.com



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NAB REPLAY
PRODUCT JACKPOT

CAMERA-TOP MONITOR

Marshall Electronics OR-901-3GSDI



Portable field/camera-top monitor; has nine user-assignable function keys and a rotary menu system; video can be displayed in three different aspect ratios; has a built-in vectorscope; offers auto-sensing 3G-SDI inputs and relocked output; will de-embed and display up to 16 channels of audio and allow the user to monitor any two channels at once.

310-333-0606; www.lcdracks.com

REMOTE PLAYOUT SYSTEM

PlayBox Technology Remote Playout

Provides a tapeless, file-based operation that has two parts: one integrated with the broadcast center and the other at the remote site; at the broadcast center, it is fully integrated into the current or preferred systems including traffic, storage, MAM, ingest, transcoding and file transfer systems; connects to the remote site's playout equipment via the public Internet.

404-424-9283; www.playbox.tv

SATCOM TERMINAL

**VISLINK News and Entertainment
Advent NewsLite**



Designed for use with current and new lightweight antenna systems; combines the performance of high-bandwidth broadcast contribution feeds with the flexibility of BGAN-type newsgathering; creates new remote connectivity applications; features ergonomic, IATA weight-compliant design for airport baggage handling; modular electronics support a broad range of satellite antennas; uses traditional satellite technology, WiFi and 3G/4G networks, with the option of VISLINK's gateway functionality.

978-671-5700; www.vislink.com

DIGITAL BROADCAST CONSOLE

Solid State Logic C100 HDS v4



Update enhances compatibility with external studio systems, integration with Mosart Medialab, support for Sony ELC and Ross OverDrive, and full-duplex connectivity with Riedel RockNet; features C-Play, which integrates a professional audio playout system into the console surface, delivering superior ergonomics for the operator and integrated recall of playlists with console projects; loop redundancy mode reduces the number of cables required for redundant fiber system installation and doubles the amount of audio signals that can be passed between the console and the modular B-RIO I/O unit; additionally features several surround production enhancements.

212-315-1111

www.solidstatellogic.com

MODULAR PROCESSORS

Snell IQ Modular 3G series

Provide flexible solutions for multiformat and HD facilities; processing IQUAV10 engine doubles as audio processor; fiber-optic interface modules support both coax and fiber; individual cards include format conversion, synchronization, audio embedding, de-embedding, aspect ratio conversion, video enhancement, legalization, audio gain, delay, mixing and channel routing.

818-556-2616; www.snellgroup.com



MADI-8

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There are a lot of MADI products out there. Only one actually lets you monitor your MADI, right in the rack. Introducing the MADI-8.

Monitor any 8 channels at a time from coax or optical inputs «
Name channels and save presets for instant recall «



ON-CAMERA MONTIOR

TVLogic LVM-074W

Features a 1024 x 600 7in LED-backlit LCD panel housed in lightweight magnesium alloy case; ideal for latest compact cinema cameras; offers waveform/vector-scope, built-in HDMI-to-SDI conversion output, horizontal and vertical image flip, focus assist, and studio level metering/monitoring; ColorFast Sensor adjusts luminance and color automatically as LCD panel temperature changes so that chroma and luma drift does not occur.

818-567-4900; www.tvlogicusa.com

ROUTER SIGNAL PROCESSING

Utah Scientific UTAH-400



New feature adds embedded audio signal processing to UTAH-400 series routers; uses advanced FPGA technology to perform signal processing; audio channels can be shuffled automatically without an outboard device or manual intervention; virtual control panel provides an easy-to-read display of the video signals and their associated audio positions.

801-575-3770
www.utahscientific.com

AUDIO TESTER

Prism Sound DSA-1



A portable, battery-powered instrument for electrical, timing and data analysis of digital audio signals; has a built-in signal generator for extended analysis and logging functions; features XLR, coaxial or optical inputs with loop-through and switchable termination; displays sample rate, word length, channel status, carrier failure, biphase or parity violation, block errors and more.

+44 1353 648 888
www.prismsound.com

GLOBAL MEDIA WORKFLOW

Quantel Qtube



Links remote studios to headquarters to support frame-accurate editing over the Internet — all with low latency and full security; supports SD and HD; local and remote media can be mixed on the same timeline; includes three key components: QTube Browser for content viewing, QTube Transformer interface for between the sQ system and the QTube Web, and QTube Edit Internet-enabled version of the sQ desktop editor.

212-944-6820; www.quantel.com

3-D TOOLKIT

Teranex VC1-3DTK

3-D software application runs on the company's dual-channel VC100s; can flip the right or left eye horizontally and vertically, adjust for Inter-Axial Distance with separate horizontal and vertical adjustments, change the axial and toe-in rotation angles, and zoom or crop and adjust all video parameters to accurately match right- and left-eye camera streams; includes all the features of the VC1-3D-SYNC with +/- 1 frame synchronizing capability, frame rate conversion and the ability to reference R/L eye signals to an external source or to the left-eye signal.

407-858-6000; www.teranex.com



Presto

GET IN TOUCH WITH YOUR VIDEO

The Presto is a 16x1 3G switcher that ingeniously puts video screens in every button, so you'll never have to cross your fingers again.

Low cost, and shallow depth perfect for all applications <<
Auto-detects and supports 3G/HD/SD formats <<



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AUDIO
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LOUDNESS

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CAPTURE CARD
Matrox MX02 Mini



Provides HD capture, monitor and output functions for Avid's Media Composer 5.5; offers fast H.264 encoding; provides HDMI, analog component, S-Video, and composite output and cross-platform support for Macs and PCs, laptops, and workstations; Vutura Capture application provides quick and easy capture to Avid DNxHD or other Avid-supported codecs.

800-361-4903; www.matrox.com

TRANSCODER
Sencore TXS 3453



Delivers up to 16 channels of high-performance, reliable transcoding and transrating in a high-density 1RU chassis; performs MPEG-2 to H.264 and H.264 to MPEG-2 SD and HD transcoding and transrating of MPEG-2 or H.264 streams; includes ASI and MPEGoIP transport stream inputs and outputs.

605-978-4600; www.sencore.com

VOD PUBLISHING SOLUTION
Miranda iTX



Tightly integrated with Miranda's iTX IT-based automation and playout system; simplifies on-demand content generation significantly by allowing the same assets, workflow and scheduling to be used for both linear playout and VOD file creation; tightly integrates linear television playout with on-demand content creation workflows to streamline operations; linear playout schedules can be quickly converted to produce C3, C7, Premium and other VOD variants; supports Nielsen watermarking, closed captions, AFD and V-chip metadata.

514-333-1772; www.miranda.com

ROBOTIC HEAD
Vinten Radamec Fusion FHR-35

Compact, lightweight robotic pan and tilt head designed to support broadcast camera and lens packages up to 35lb in remote locations where the pan and tilt head needs to be as unobtrusive as possible, including parliaments, legislative buildings, live conferences and houses of worship.

845-268-0100

www.vintenradamec.com

DIGITAL MIXING CONSOLE
Studer Vista 5 M2

Vista 5 digital mixing console now has an upgraded M2 version with the optional addition of a new, integrated TFT metering system introduced on the Vista 9 console; when the TFT meter bridge is fitted, the console's external GC screen becomes an integral part of the chassis; available in two frame sizes, 32 and 42 faders wide; new metering option can display signal levels from mono through to 5.1 channels on each input, with a configurable lower area that can be used to display bus assignments, surround images or the history mode.

818-895-3496; www.studer.ch

NIELSEN WATERMARKS ENCODER
Ross Video NWE-3G



Comprises a 16 audio channel, 3Gb/s processing core incorporating the new Nielsen Watermarks; as an openGear solution, the unit is designed for the transmission path with relay bypass on the rear module, redundant power, remote control with DashBoard, SNMP and datasafe; the openGear platform supports up to five NWE-3G units to support environments where multiple channels are being released.

613-652-4886; www.rossvideo.com

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With a price right for everyone in the production chain, Pandora helps you keep loudness contained before it's ever a problem.

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LOUDNESS

AUDIO CONSOLE

Wheatstone Dimension One

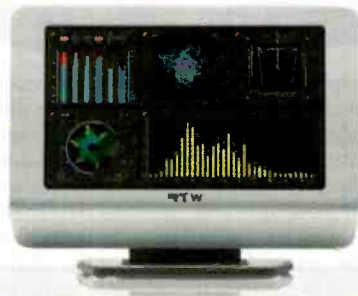


Mixing console supports 1024 channels of digital signal processing; has 72 faders, all 5.1-enabled; motorized faders with layered surface enable each fader to control two sources, each of which can be mono, stereo or full 5.1; faders can be paged together or separately; accepts up to 3072 audio inputs.

252-638-7000
www.wheatstone.com

AUDIO METERING MONITORS

RTW TouchMonitor TM7/TM9 v.1.14



Combine flexibility and modularity with an intuitive user interface; offer built-in, online help function; allow for monitoring separate signal groups using multiple instruments at the same time; up to 16 analog and/or digital signals can be displayed; can be used as desktop units or in flush-mount installation; feature 7in and 9in touch screens, respectively.

+49 221 709 130; www.rtw.de

CAMERA SUPPORT HEAD

Sachtler FSB heads



The FSB family consists of three differently-sized 75mm heads that provide robust, stable mounts for every HDV camera, as well as for DSLR cameras with video function; heads work with the Sachtler Speed-balance technology, enabling a fast and target-oriented counterbalance; offers no-compromise vibration damping, which is extremely subtle and finely graded.

845-268-0100; www.sachtler.us

NONLINEAR EDITOR

Sony Creative Software Vegas Pro 10.0d

Enhanced closed-captioning support provides broadcast editors with the ability to read and write closed captioning embedded in MPEG-2, enabling a unified workflow for EIA-608, EIA-708 and MXF delivery options; incorporates timeline burning to full-frame 3-D Blu-ray Discs.

608-203-2300
www.sonycreativesoftware.com

SERVER

Rushworks StreamSource

Robust 1U server class computer uses solid-state hard drive technology; features a dual GigE interface, allowing users to separate their local networking and streaming domains for enhanced security and quality of service; supports both Windows Media and Flash file creation and management; features virtually no moving parts, protecting from traditional hard-drive failure and ensuring uninterrupted reliability.

888-894-7874; www.rushworks.tv

ATSC PROCESSOR

T-VIPS CP505



Integrates a network adapter with an advanced transport stream processor in a unit designed to be cost-effective and compact; is ATSC-compliant with native support for SMPTE 310 MPEG-2 ATSC transmission streams and ATSC PSIP tables; intended for real-time backhaul, distribution and digital television transmission of MPEG-2 transport streams over SMPTE 310, ASI and IP networks.

973-376-8282; www.t-vips.com



AMP2-16V

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SMPT2020, new I/O and a even easier, more powerful interface are just a few new additions. Because 16 channels, industry awards, audio mixing and routing aren't enough for us.

Use two OLED screens to monitor any combo of video, audio metadata < Hotkeys can recall presets, assign I/O, mix audio, switch to Dolby® analysis < Modular I/O available with SDI, analog, AES, Dolby, and TOSLINK <



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SHOTGUN MICROPHONES
Sennheiser MKH 8060/8070



Use radio-frequency principle to resist the effects of cold and moisture; suppress off-axis sound without coloration; feature extremely low self-noise and low distortion with relatively high output signal voltages; can transform into AES42 digital microphones with the addition of the MZD 8000 digital module; 8060 has lightweight and compact size for camera-mounting and boom pole applications; 8070 is a long shotgun ideal for sports broadcast and nature recording applications that require high sensitivity.

860-434-9190
www.sennheiserusa.com

IMAGE PROCESSOR/CONVERTER
Thinklogical ImageEvolution X3



Equipped with full breadth of video-processing capabilities such as per-pixel motion-adaptive video noise reduction, content-adaptive block and mosquito noise reduction, natural depth expansion, and adaptive scaling; converts and scales SD, HD, dual-link HD and 3G; provides up to 20 user-programmable presets; includes support for eight channels of embedded audio and ancillary data; controllable via front-panel multifunction selector and LCD display or RS-232 port for remote control.

203-647-8725
www.thinklogical.com

IP MEDIA NETWORK
Net Insight Nimbra platform

Channelized IP trunk module provides a transport solution featuring multiservice operation, optional intermediate switching and signal regeneration for enhanced QoS; enables scalable, cost-efficient IP media networks over IP, or in combined IP and SDH/SONET or WDM networks; optimizes the use of the network infrastructure, enabling controlled bandwidth and network management.

973-241-5969; www.netinsight.net

TEST AND MEASUREMENT
Video Clarity RTM Manager

Web server, event logger, archive and player with a Web browser dashboard for instant remote status of one or more RTM units; RTM systems are used in a television network to monitor a channel's outbound A/V quality, lip sync and vertical ancillary data against a distributed signal via return path in a 24/7 operation; RTM also records all events that break user set quality thresholds in uncompressed audio and video; features over-the-network multichannel status dashboard and central playback capabilities.

408-379-6952
www.videoclarity.com

HD₂ line Pro made by **Penta** Stud otechnik

Penta Studiotech, LLC
13050 Wood Harbour
Montgomery, TX 77356
USA
Phone: +1 936 828 6830
Fax: +1 936 582 0341
www.penta-web.com
email: sales@hd2line.com

High Performance Broadcast LCD Monitors

HD2 line PRO represents the newest generation Broadcast LCD Monitors from Penta, utilizing state-of-the-art video/audio processing hardware combined with the most precise LC Display Technology available today.



Displays 17" to 47"

MADI CONVERTER AND ROUTING SWITCHER

Sierra Video MADI-xx



A 128 x 128 MADI routing switcher with integral multichannel audio metering and signal fault alarms for up to 128 channels; ideal for both fixed and mobile environments; allows users to monitor and interact with each audio signal within two 64-channel MADI feeds; designed for live sound, theaters and TV, where MADI signals are increasingly employed; allows users to view and interact independently with each audio channel on a 64-channel MADI feed, moving any input audio channel to any output.

530-478-1000; www.sierravideo.com

CONTENT MANAGEMENT

Signiant Media Exchange

Browser-based application enables IT and non-IT managers and staff to send content bigger than e-mail to where it needs to be faster and more easily than before; users can exchange content with others, regardless of location and size of digital assets; media and project files can be moved across WAN, DSL or cable; new notification features allow users to track workflow benchmarks, confirmations and alerts for other departments.

781-221-4000; www.signiant.com

AUDIO MONITOR

Wohler MADI-8



Enables broadcasters to implement the Multiple Audio Digital Interface (MADI or AES10) in their production workflows; can be connected in series within a 64-channel MADI stream to audibly monitor up to eight channels; has a 16-character by two-line LCD display; features coax and optical MADI I/O, channel presence indicators and eight user-nameable presets.

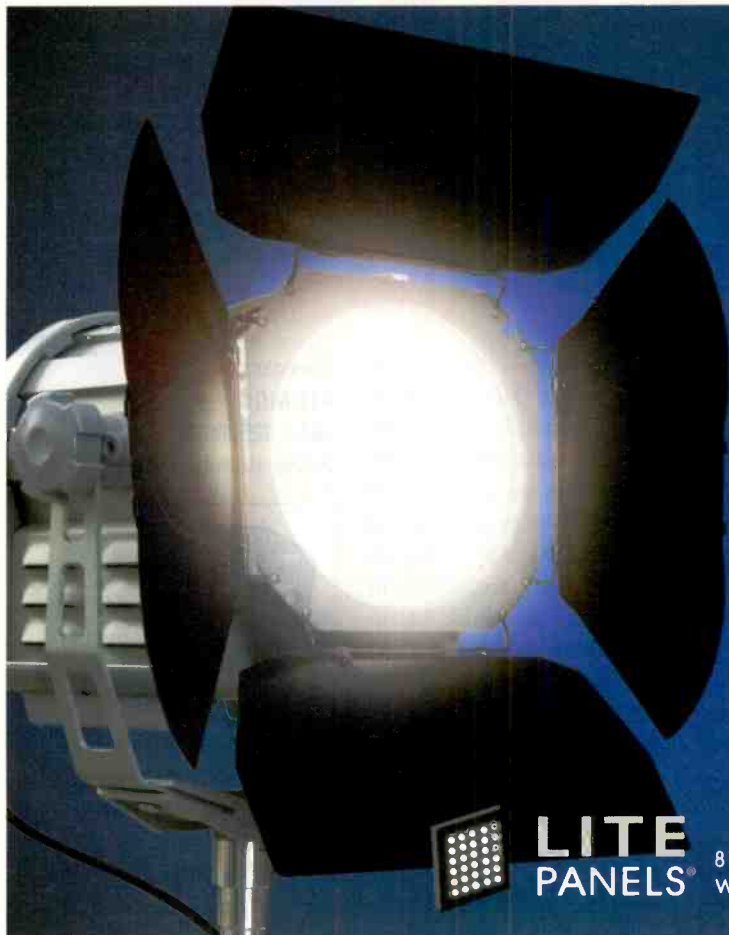
510-870-0210; www.wohler.com

NEURAL LOUDNESS CONTROL

Ward Beck DTS Neural Audio NLC

Allows broadcasters to control loudness problems encountered during program ingest, production, post production and playout; can be used to eliminate excessive audio level jumps that occur between different sources such as program and commercial material; loudness control algorithms operate on a plug-on card that is hosted on the M6205-3G openGear embedded audio processor; includes the NLC4, which provides level control of four independent stereo channels, and the NLC5.1+, which provides level control of 5.1 surround sound and one stereo channel.

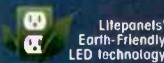
416-335-5999; www.ward-beck.com



Litepanels™ Sola 6™ LED Fresnel Now Shipping

The first LED Fresnel that's ideally suited for today's cutting edge broadcast work. The revolutionary daylight-balanced Sola 6™ provides the controllability and light-shaping properties inherent in a Fresnel light, but utilizes just a fraction of the power of conventional fixtures.

Versatile Sola 6 offers variable beam control from 10° to 70° and full-range dimming. Plus, the lightweight, user-friendly fixture is optimized to light when using digital cameras.



**LITE
PANELS®**

818 752 7009 • info@litepanels.com
www.litepanels.com

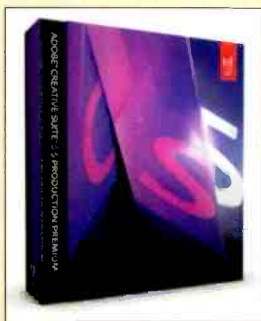


Litepanels
A Vitec Group brand

NAB REPLAY: PICK HITS

Broadcast Engineering's Pick Hit Awards are the industry's longest-running product technology awards for broadcast and production. With a 27-year history, Pick Hits are the most prestigious technical awards given at NAB. Here are the top products selected from the show by our panel of independent judges.

PICK HIT
BroadcastEngineering
2011



**Creative Suite
5.5 Production
Premium**
Adobe Systems
408-536-6000
www.adobe.com

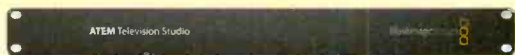
Software solution for video and post production features productivity enhancements that accelerate workflow; the Adobe

Mercury Playback Engine broadens its graphics processing unit hardware support to include laptops and more supported cards, and allows users to open projects faster, get real-time feedback with more GPU-accelerated features and work more smoothly at 4K and higher resolutions; new trimming and editing tools provide more precision and control; now includes Adobe Audition for both Mac and Windows platform, as well as expanded After Effects capabilities.

Portable touchscreen 10-bit HD recorder, monitor and playback device captures video and audio directly from any camera with HD/SD-SDI; encodes in real time to the Apple ProRes format and records onto low-cost, removable 2.5in hard disks; features a high-resolution 5in HD/SD-SDI monitor; provides all of the features of the company's Ninja 10-bit field recorder, monitor and playback device, as well as time code, genlock, screen flipping, 3-D support (with two genlocked Samurais), 14.4V compatibility and the ability to work with multiple synchronized units; offers 24psf support with 24/60i 3:2 pull-down removal on capture and SDI loop through.

**Samurai
ATOMOS**
+61 3 92520605
www.atomos.com





ATEM Television Studio

Blackmagic Design

408-954-0500

www.blackmagic-design.com

Live production switcher combines a professional switcher with a broadcast-quality H.264 encoder so users can perform

live multicamera production and broadcast encoding for the Internet in one product; includes six video inputs with both broadcast SDI and consumer HDMI inputs for cameras and computers; all inputs feature auto resync; is a 1RU chassis with software-based control panel for Mac OS X or Windows; features include upstream chroma keyer, two media player frame stores, downstream keyers, full transitions and fade to black; built-in Multi View allows 10 channels of video with custom labels and tally indicators to be displayed on a single HDMI television or monitor.



Uncompressed 10-bit broadcast recorder

HyperDeck Studio

Blackmagic Design

408-954-0500

www.blackmagic-design.com

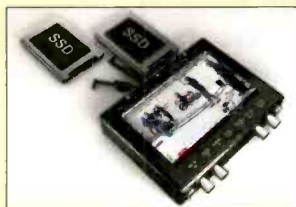
features dual slots to allow automatic recording onto the next disk when one record disk fills, allowing unlimited duration recording; features a VTR-style design with function buttons, a jog wheel for jog and shuttle, and external RS-422 control; high-resolution LCD screen displays time code and transport information as well as a full-color thumbnail preview of the current clip in record and playback; fits easily into an OB truck or master control room; with 3Gb/s SDI and HDMI inputs and outputs, the unit works with most cameras, decks and monitors; comes standard with a USB connection for software updates and settings.

Gemini 4:4:4

Convergent Design

720-221-3861

www.convergent-design.com



Video recorder records 10-bit uncompressed 4:4:4/4:2:2 video

in most popular HD/2K/3G formats, including 1080p24 and 1080p50/60, with up to 16 channels of embedded audio and time code; has slots for two removable 1.8in solid-state drives, enabling recording in either parallel mode (instant backup) or spanning mode (longer record times); includes recording, playback, image processing, dual HD/3G SDI I/Os, HDMI-out and consumer-level audio I/O; consumes 8W to 15W of power; features S-Log support, with user-programmable viewing LUTs that can be enabled selectively for either HD-SDI output.

Multidefinition down/up/crossconverter

is designed to be a low-cost solution to convert any video format/frame rate to any video format/frame rate; auto detects 3G, HD or SD (26 formats in total); features include 10-bit data path and multipoint interpolation, motion-adaptive deinterlacing, text overlays and adjustable graticules generator; provides 16:9, 14:9 and 4:3 aspect ratio conversion support, with individual selection for HD to HD, HD to SD, SD to HD and SD to SD conversions; offers 16-channel audio metering, with any of the four audio groups individually selectable; includes power supply, HDMI cable, USB cable and mounting bracket.

MD-DUCC

Decimator Design

+61 2 9011 1035

www.decimator.com



Compact Audio Loudness Meter (CALM)

is no bigger than a smartphone; designed to meet increasing demands from the market for cost-effective stereo and 5.1 metering, including loudness; two versions are available: the DK1, which is ideal for users working in stereo, and the DK2, which is aimed at the burgeoning 5.1 surround-sound market; comes with its own desk mount; digital audio inputs; is supplied with ITU, EBU and ATSC loudness measurement recommendations, as well as the standard DK-Technologies meter scales; is USB-powered; features selectable reference frequencies, adjustable reference level and variable gate settings.



DK Meter

DK-Technologies

602-748-4299

www.dk-technologies.com

Router is made of a highly flexible matrix

that allows users to configure the number of inputs and outputs that are needed for the installation; the basic size is 8 x 2; user-configurable input or output ports can be added;

Avenue

Ensemble Designs

530-478-1830

www.ensembledesigns.com

any size from 8 x 2 up to 28 x 2 or 8 x 22, or any sizes in between, such as 10 x 5 or 15 x 15, can be configured; supports SD, HD and 3Gb/s SDI, DVB-ASI and 310M signals; includes a real-time, thumbnail display for use in broadcast television and post-production applications; optional Clean Switch provides full frame synchronization, allowing the router to switch cleanly between asynchronous sources.





OvertureRT LIVE

Evertz
905-335-3700
www.evertz.com

Channel-in-a-box is an HD/SD multi-input switching device that offers advanced branding capabilities, including character generation for real-time updating of text; features an internal H.264/MPEG-2 video playout server, DVE effects for squeezeback and reveals, partitioned storage for on-line video playout and animated graphics playout, simultaneous playout of HD and SD content with internal conversion; redundant power supplies; provides hot-swappable 1TB of local storage for video and graphics content, upgradable to 2TB.



MediaFUSE 2.0
Grass Valley
530-478-3000
www.grassvalley.com

Automated content repurposing and multi-distribution system is a hardware and software platform that enables TV broadcasters and all multiplatform content providers to automatically convert linear content and stream it live using Flash, HLS-5 (for HTML-5) and Windows Media formats; each format can feed multiple streams that can contain unique ads and content, replaced automatically, on the fly; devices such as the Apple iPad, iPhone and Google Android can all have their own customized stream; MediaFUSE ShowBUILDER feature enables users to assemble individual clips or files into highlight montage shows with pre- and post-rolls, interstitial ads and other content.

Ruggedized, steel-plated, SDHC card line is designed to withstand the rigors of the professional photography/videography environment; based on the company's chip on board technology, which provides extra room for a reinforced internal housing structure and protects sensitive flash components from harm; offers Class 10 speed; an Epoxy assembly adds strength while making the enclosure waterproof; available in four models: 4GB, 8GB, 16GB and 32GB capacities.

RAW Steel
Hoodman
310-220-8608
www.HoodmanUSA.com



File system directly accesses and manages LTO Ultrium 5 tape drives, tape libraries and their data; enables tagging of files with any text, allowing for more intuitive searches of cartridge and library content; built on the LTO-5 tape format standard; features 1:1 mapping of tape cartridges to file folders and tape libraries; provides the ability to create a single file system mount point for a logical library managed by a single instance of LTF5, running on a single computer system; provides for caching of tape indices.

Linear Tape File System
IBM
914-499-1900
www.ibm.com/media



Nucomm
Newscoder 4
Integrated Microwave Technologies
908-852-3700
www.imt-broadcast.com



Compact, low-power, HD/SD video/audio encoder; delivers MPEG-4 H.264 SD and HD encoding, enabling broadcasters to transmit HD content efficiently over the same infrastructure used to transmit SD content; can attach to a broadcaster's legacy BAS equipment, whether in an ENG/OB truck, helicopter or camera back transmitter; accepts either SD-SDI or HD-SDI inputs, plus embedded audio; features two RS-232 ports, one for remote control and a second for user data; employs AES encryption, preventing unauthorized viewing of the signal; includes a video test pattern generator.

RF Central
microLite HD Elite
Integrated Microwave Technologies
908-852-3700
www.imt-broadcast.com



Complete video RF link in a portable package; includes the company's microLite HD transmitter and microLite HD receiver; receiver and transmitter are available in both the 5.8GHz unlicensed or 2GHz licensed bands; features ergonomic mounting; a configurable DC power cabling system and AC power supply gives users many options when connecting the system in the field; adapters and cables can be mixed and matched between the receiver and transmitter for flexibility; is packaged in a waterproof Pelican case that is custom-fitted for all the accessories.



LV5770
Leader
714-527-9300
www.LeaderAmerica.com



Multimonitor simultaneously monitors two 3G/HD/SD-SDI sources and displays picture, waveform, vector, 5-Bar, Cinelite and status individually or in various screen combinations; features include a built-in XGA display, as well as autonomous monitoring and error detection; a USB connector allows the use of a jump-drive for storing captured screens, presets and software/firmware updates; Ethernet connectivity enables remote control over the Web; optional digital and analog I/O provides for built-in de-embed and digital-to-analog audio conversion.

Touch-screen hardware uses an advanced multi-touch sensing display that can sense up to 32 points of simultaneous touches with accuracy and precision; applications include news, sports, maps, traffic, elections, newspaper review, business or any interactive TV show; for election coverage, the system receives real-time polling results from leading news agencies and is fully customizable to work with any country's map and election system; brings graphics and animation control into the studio, with real-time updates from indexes such as NASDAQ and Dow Jones.

LiveTouch
LiveTouch Broadcast Solutions
732-560-3928
www.livetouch.tv



AG-AF100
Panasonic
877-803-8492
www.panasonic.com/broadcast



VCCAM video camera incorporates a 4/3in, 16:9 MOS imager; records 1080/60i, 50i, 30p, 25p and 24p (native) and 720/60p, 50p, 30p, 25p and 24p (native) in AVCHD's highest-quality PH mode (maximum 24Mb/s); is 60Hz and 50Hz switchable; maximizes the potential of its high-resolution image with built-in ND filtering and dramatically reduced video aliasing; standard professional interfaces include HD-SDI out, HDMI, time code recording, built-in stereo microphone and USB 2.0; features two XLR inputs with +48V Phantom Power capability and 48kHz/16-bit two-channel digital audio recording; supports LPCM/Dolby-AC3; offers SDXC media card compatibility.

Multiformat HDTV/SDTV LCD monitor is part of the HD2line Pro line; 24in monitor is based on the company's high-precision 16-bit display engine and 10-bit full HD panels; uses a modular slot design; inputs and outputs can be configured according to individual needs; three board slots are available; optional input/output boards can be installed in any board slot, and in almost any combination; uses a unique 1-D and 3-D LUT to reproduce precise color gamuts to conform to SMPTE and ITU standards; features include multi-format signal support, split-screen display, time code display and a 16-channel audio level meter.

PDP 24W
Penta Studiotech
936-828-6830
www.penta-web.com



Product range includes the Rx2000 2U dual screen test and measurement system, Rx1000 1U rasterizer and Rx500 1U half-rack rasterizer; allows engineers to add different modules to personalize the company's new technology to suit different broadcast environments; modules can include analyzers with physical functions (eye and jitter), separate generator modules and Dolby; each module has its own FPGA, so it's not slowed down by needing a separate motherboard; the Rx chassis itself defines the standard of either SD/HD or 3G-SDI; any modules added later assume the supported standard.

Rx range
Phabrix
+44 1635 276302
www.phabrix.com



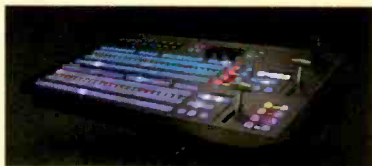
New media automation platform addresses the growing demand for file-based workflow in automation and distribution; platform now links NLE systems, archive servers, and playout servers and other content distribution servers; integrates with business systems such as broadcast trafficking systems; integrates critical production and distribution processing components under one simple user interface, which executes workflow requirements in parallel; includes live SDI capture, quality analysis, and video and audio processing.



RadiantGrid
Platform 6.5
RadiantGrid Technologies
877-828-0094
www.radiantgrid.com



Carbonite
Ross Video
 613-652-4886
www.rossvideo.com



Production switcher is based on the same multidefinition production engine used in the company's Vision Octane; series includes two choices of panel size combined with a 16- or 24-input chassis; Carbonite 1 is a 1MLE panel with 16 direct access source buttons, full panel mnemonics and Ross Panelglow RGB buttons; the control surface has direct access to two full MLEs; the switcher's ergonomic panel offers 24 direct access buttons, full mnemonics, PanelGlow, three-axis joystick and Ross faders; also includes a browser-based, multiuser GUI that can be instantly accessed from a Mac, PC or a Apple iPad.

Master monitor employs Sony's Super Top Emission OLED technology to deliver deep black with high dynamic range, quick response with virtually no motion blur, and a wide color gamut and accurate picture reproduction; 24.5in monitor offers full HD 1920 x 1080 resolution, 100cd/m2 brightness and 89/89-degree viewing angle; a dedicated 12-bit output accuracy digital signal processing engine features a nonlinear cubic conversion color-management system designed to provide uniformity, smooth gamma performance and picture quality consistency; inputs include two 3G-SDI one HDMI and DisplayPort, plus four option slots.

BVM-E250
Sony
 201-930-1000
sony.com/professional



ArtiSAN DR-4100
SAN Solutions
 775-745-8734
www.sansolutions.com

Dual-channel digital disk recorder features a video server for post-production, quality control and broadcast environments; offers ingest and playback direct to and from Avid Media Composer and Apple final Cut Pro nonlinear editing systems, high-quality content delivery, simultaneous video capture and playout, video proxy generation on ingest, two independent video channels, closed-capture decoding and playout option, and VTR machine control via RS-422 9-pin or remote user interface application; supports uncompressed file sequences and a multitude of codecs and file formats; offers variable rate play, loop play, clip and playlists; provides up to 20TB 6Gb SAS, RAID 5 protected storage or SAN attached option.

Compact camcorder is equipped with a Super 35mm sensor, which is the same size as Super 35mm film and has been specifically developed for digital cinematography; comes with three lenses: 35mm, 50mm and 85mm, and T2.0; a PL mount adapter provides compatibility with 35mm lenses, including prime, digital cinematography and still lenses; offers native 23.98p recording; can capture images at frame rates from 1fps to 60fps in 720p, in increments of 1fps, onto a single card; features compatibility with SxS PRO and SxS-1A memory cards; includes a 3.5in color 1920 x 480 pixel LCD viewer.

PMW-F3K
Sony
 201-930-1000
sony.com/professional



Signal-RapidFI
Signal Telecommunications
 212-217-1900
www.signal3g.com

Satellite-uplink-truck replacement system enables live electronic newsgathering to be achieved from anywhere a wireless signal is available; the system consists of three devices: a camera mount video-audio encoder with WiFi output antenna, a relay unit and a receiver unit; the relay unit receives the WiFi live feed and forwards it to five cellular GSM/CDMA modems: 2G, 3G and 4G (LTE and WiMAX); the receiver unit stays in the TV headend and outputs the live feeds via SDI/composite ports; features include one-touch operation, forward error correction, jitter cancellation, multilevel redundancy and hot standby.

Storage unit is the first memory-based studio deck from the SRMASTER product family; has four slots for SRMemory cards, which can record at sustained data rates up to 5Gb/s; can be configured with up to four input/output ports, each of which can handle a 3-D feed; provides 4K recording and playback, 16-channel audio, 4TB removable storage, network capability, and format converter and multimonitor output; simultaneous recording and playback of multiple streams from a single SR-R1000 makes it ideal for a range of studio, live and post-production applications.

SR-R1000
Sony
 201-930-1000
sony.com/professional





USBPre 2
Sound Devices
 608-524-0625
www.sounddevices.com



AMP2-16V series
Wohler
 510-870-0810
www.wohler.com



Audio/video workstation offers simultaneous multiformat audio metering and management, quick program listen selection, loudness metering of the selected program, mixing and routing freedom; features such as downmixing provide compatibility with external surround-sound systems; enhancements to the platform include easily customizable displays of SMPTE 2020 metadata, flexible channel phase monitoring and the ability to store 32 complete system configurations for instant recall; enables users to mix, sum and route program audio live without the need for a separate audio console; multiple card slots allow for flexible and cost-effective configuration.

New version of the USBPre; two-channel USBPre 2 is a high-resolution, portable hardware interface for Mac and Windows-based digital audio; interfaces professional microphones, line-level sources, consumer audio electronics and digital sources with Mac OS and Windows computers via USB; features discrete-transistor microphone preamps with 24-bit converters and sampling rates up to 192kHz; peak limiters, high-pass filters and a 15dB pad add overload protection; all analog-to-digital and digital-to-analog conversion is done outside of the computer, in the USBPre 2.

Observer TS
Volicon
 781-221-7400
www.volicon.com



Video switcher accepts up to 16 3G/HD/SD-SDI signals in a compact 1RU frame; displays video on screens that are themselves buttons; pressing one button switches that input, both video and associated audio, to a pair of reclocked outputs for routing and/or monitoring on a larger device; because each button is a mini video screen, users don't have to worry about switching to the wrong source; LED indicators identify currently selected source; high-quality OLED screens enable easy identification of content; features rear-panel inputs to activate front-panel dimming and/or lockout; designed to provide affordable confidence monitoring for server and IT-based playout systems.

MPEG (ASI/IP) transport stream logging system gives broadcasters, networks and cable operators the ability to capture full-resolution MPEG transport streams and generate low-resolution proxy content and accompanying metadata; incorporates complete stream, search, analyze, clip and publish functionality, all from within a Web-based user interface; complements Volicon's existing Observer Enterprise systems; enables networks and broadcasters to increase logging density, accommodate high-resolution content repurposing, directly monitor native MPEG ASI/IP handoffs, and inspect and export transport streams, all while operating over a LAN or WAN.

Presto
Wohler
 510-870-0810
www.wohler.com

WO Master Control
WideOrbit
 415-675-6700
www.wideorbit.com



IT-based system offers an alternative to traditional master control equipment; fully integrates IT and DTV hardware and software into a single-rack solution; its streamlined architecture enables the system to feed and control up to four channels per server of HD/SD, including master control switching, graphics and automation per server; each server has automation and content storage onboard along with live master control switching, picture-in-picture and branding graphics; uses low-cost, off-the-shelf servers and provides direct-to-storage file transfer from edge servers with no transcoding required.

Software solution allows broadcasters to transmit video in full HD to multiple end-to-end locations globally over the Internet; enables a limitless spectrum of broadcast applications for content contribution, distribution, playout services, newsgathering, and live and on-demand multimedia delivery; transmits securely and flawlessly while enabling networks to extend their reach and flexibly at anytime from anywhere, by bringing video signals to the headend inception points of any distributor; designed to enable broadcasters to reduce costs by replacing expensive trunk lines and increase revenue by offering new services.

Video delivery cloud
Zixi
 877-494-9426
www.zixi.com



Choosing the right battery



Quality varies, and price shouldn't be the only consideration.

BY JOE MURTHA

Not so long ago, choosing a battery for your camera was a fairly simple process involving a few offerings from a small number of manufacturers. Today, with new technologies, different chemistries and varying price ranges, selecting a power system for your camera is more complex. It takes some research to find the battery that

is not only the best fit for your needs, but also includes the highest quality, reliability and safety features available. Assessing the capacity, load-carrying abilities, charger options and safety mechanisms of today's two main battery varieties, nickel-metal hydride (NiMH) and lithium-ion (Li-ion), will help make this process easier.

Today's batteries vary widely in

quality. Therefore, it's important to understand a bit about the manufacturing process so you can weed out the poorly made batteries early in your research. Ask the manufacturer how it obtains its battery cells and builds the battery itself. If the maker is buying standard cells in bulk from wholesalers, chances are its batteries are not well-made, using inexpensive

fischer UltiMate™

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- Push-pull locking system
- Easy Fischer cable assembly solutions

www.fischerconnectors.com

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Alpharetta, GA 30009
Tel: 800.551.0121
Fax: 678.393.5401
mail@fischerconnectors.com

fischer
CONNECTORS

FEATURE

CHOOSING THE RIGHT BATTERY

Batteries and air travel

Passenger carry-on

Under 100Wh:	Unlimited (attachment on device not required)
Between 101Wh-160Wh:	Limit two batteries uninstalled*; additional batteries must be installed on a device
160Wh or more:	Forbidden

Passenger checked bagged:

Under 160Wh:	Must be installed on device
160Wh or more:	Forbidden

**Batteries not installed on equipment must be individually protected to prevent short circuits by placement in the original packaging or by otherwise insulating terminals (tape over terminals, each battery in a separate plastic bag, etc.)*

Note: These are Anton/Bauer's recommendations based on IATA regulations. It is recommended that travelers consult the IATA and DOT websites. Li-ion carry-on and checked-in are ultimately subject to individual airline and TSA approvals.

housings and rudimentary electronics. The cost of these batteries may be low, but chances are so will the quality. You have to ask yourself if it is worth it to save a few dollars at the risk of the safety and performance issues you may run into with these batteries.

In contrast, there are other manufacturers of batteries that take more care in their creation, purchasing premium cells directly from well-known cell makers. These cells often come pretested and matched for balance, allowing for longer life. The batteries themselves are precisely crafted in clean rooms, with housings developed to spread impact. Their onboard electronics are of considerably greater sophistication and quality. These tend to cost more but are generally of higher quality and last longer, making them the better investment in the long run.

A battery's capacity, or run time, is a major indicator of quality. Though



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IntelliTrac



SmartTrac



ControlTrac

tbconsoles.com

Trac Series is an advanced technical furniture system for control room consoles, edit desks, and flat panel monitor walls. Trac Series products provide your facility with a complete range of highly adaptable solutions from one company.

no battery, even a top one, is immortal, it is fair to say that the better quality the battery, the longer it will last. Look for a battery that includes an indicator depicting remaining run time at a current run load in hours and minutes. The better batteries have these along with access to a test charger, which can cycle the battery and document the results, allowing precise indications of life expectancy.

When reviewing the capacity options of batteries, keep in mind a solid estimate of the average load your equipment and applications draw. For example, if your camera carries 45W and your light 35W, the load will be around 57W. (Fill lights are typically used a third of the time.) Lights feed off power taps, and if your camera cannot regulate this, you should add about 25 percent to your estimate, changing your light load from 35W to 43W. Add into the estimate any other

piece of equipment that will need battery power, such as onboard monitors and wireless transmitters. In general, you'll want an average run time of at least two hours so that you don't have to contend with multiple unplanned battery changes, especially in ENG and production applications.

With batteries, the initial start-up creates a spike in power. If, for example, you run a 45W camcorder, a 35W light and 10W accessories, your continuous load is 90W. Check the specs of the battery you are researching to find the maximum continuous load it will support. If this number is 73W, you'll need a battery that can handle a higher load. Some battery manufacturers do not provide these specifications, leaving your power supply to chance. If this is the case, move on to a manufacturer that does have the specs.

The charger should be among the biggest considerations you make when

choosing a battery. Look for ones that can last up to 20 years, as these tend to be of better design. If the manufacturer of the battery you're considering claims that it can be used with any type of charger, it's unlikely the design is sophisticated enough for long-term professional use. The battery may even pose a safety hazard. Look for a charger that has two-way communications with the battery and the ability to test and calibrate. It should also have temperature channels and the ability to be upgraded with future algorithms as technology develops.

Safety is the ultimate bottom line when it comes to choosing the best battery for your operations. While NiMH batteries are generally safe, Li-ion batteries are another matter. The Li-ion electrolyte has a low flashpoint and a low tolerance to overcharge, and it can become volatile if over-discharged. Poorly made batteries have a greater

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CHOOSING THE RIGHT BATTERY

chance of one bad cell igniting the entire pack. In the United States, from March 1991 to August 2010, there were more than 100 air incidents recorded involving batteries. Those occurrences prompted the government to issue a total ban on transporting Li-ion batteries over 300Wh and limitations on hand luggage and check-in for Li-ion batteries between 100Wh and 300Wh.

A well-designed Li-ion-based battery will have built-in safety mechanisms. One such example is the honeycomb design, where the individual battery cell is contained in its own housing. This prevents cells that are damaged from affecting undamaged cells, as the thermal heat transfer is minimized. It also protects the person handling the battery by preventing fuel leakage. A beneficial side effect of this design is that it also increases the battery life.

In conclusion, don't choose a battery simply because of its lower cost.

As has been noted, manufacturers of low-quality batteries often scrimp on features required for safe and reliable operation. You may end up having to buy more batteries, as poorly designed ones malfunction or don't last nearly as long as their higher-priced, higher-quality counterparts. Also make sure to buy batteries that adequately support your power load. You don't want to lose a crucial shot just because you underestimated the power load.

Choosing a battery for your camera has become a bit more complex due to the wide array of offerings on the market. To take some of the guesswork out of this process, assess the capacity, load-carrying abilities, charger options and safety mechanisms of potential batteries. The more of these features that are present in the battery, the better the battery. **BE**

Joe Murtha is the engineering manager for Anton/Bauer.



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Snell's Centra

The control and monitoring system reduces cost of ownership while increasing productivity.

BY KIRSTY ALDRIDGE

Significant economic pressures to reduce costs and to do more with less have pushed broadcasters to establish centralized multichannel facilities with an increased channel count per operator. To institute control and monitoring that covers the entire workflow and effectively reduces on-air errors, broadcasters traditionally have invested heavily in ongoing customized development. Shrinking budgets, however, are demanding that broadcasters now consider off-the-shelf packages capable of approaching a similar level of integration at a reduced cost.

Ideally, a single control and monitoring system gives operators the highly customized tools they need for scheduling day-to-day tasks — as well as for rapid identification and resolution of unexpected issues — while remaining simple to maintain and configure in house. Snell's Centra control and monitoring system takes advantage of today's technologies to make this possible and offers operators the functionality they need, when they

need it, regardless of where the broadcast systems involved are located.

A comprehensive suite of tools that together comprise a vendor-agnostic control and monitoring system, the system represents many years of development of broadcast system control and network management monitoring systems, covering the full spectrum of broadcast and IT devices. The suite delivers systems covering four critical areas: configuration, system monitoring, system control and content monitoring. (See Figure 1.)

Integration and interoperability

A comprehensive control and monitoring system demands that a full-featured system interface directly with third-party vendor-specific protocols over serial and IP links, as well as allow more traditional monitoring via SNMP and GPI/Os. This approach is critical because, though it has been widely adopted as the way to achieve third-party integration, SNMP was never designed to be a

control protocol. Even for monitoring purposes (as with broadcast), there remain issues in that key types of status extraction are still unique to each manufacturer — and even unique among different product lines from a single manufacturer.

The system solves this challenge through a combination of generic configurable translators that can be scripted to work with a wide range of protocols and full-featured implementations of native protocols. The system's resulting scalability and its ability to integrate with broadcast, IT and other key devices allow it not only to grow incrementally along with the technical and business needs of the broadcaster, but also to present the information in a broadcast-centric way to suit the particular user.

The system can be completely configured and delivered either by Snell staff, a systems integrator or by the user. A combination of an initial deliverable, engineered by Snell or the systems integrator, with ongoing maintenance by the user is often the

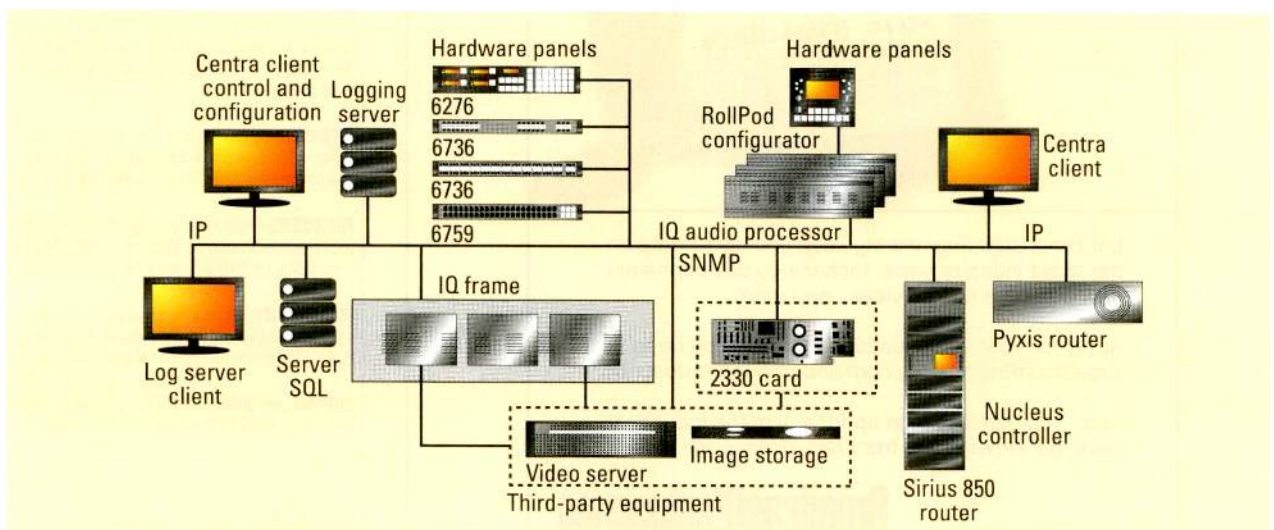


Figure 1. Centra implementation within a broadcast infrastructure

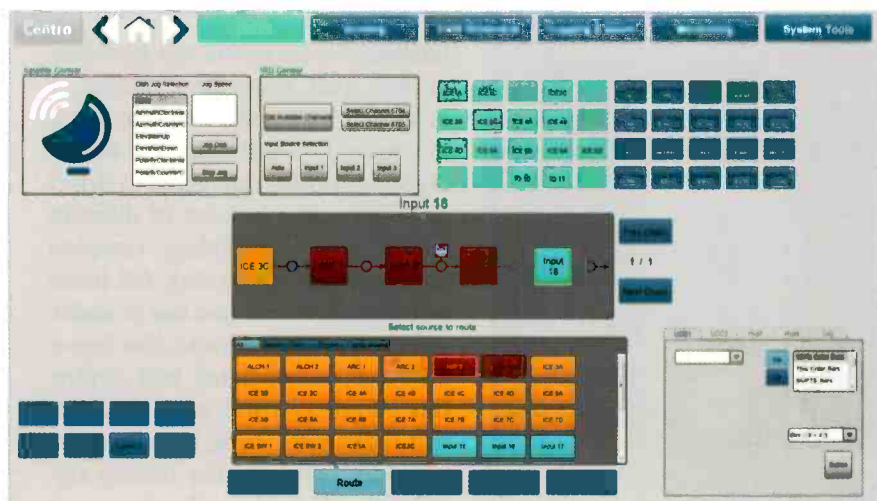


Figure 2. The interface for lines-in management illustrates controls and features that may be used in an MCR.

ideal. This approach provides a balance that offers initial efficiency and the reduction of ongoing customization costs by giving the user the ability to upgrade and modify the system.

Flexible control and monitoring interface

The interface can be configured to show the same information to different users in different ways that are specific to their tasks. Whereas an in-house engineer may be relayed full system information in a physical rack layout with functional connections, playout operators will be provided with just the channels and the parameters (e.g., specific router destinations, aspect ratio converter, etc.) over which they actually have control. The system allows combinations of controls to be grouped onto a single screen. Without this capability, the operator frequently has to switch applications or PCs to achieve the same result.

Through this interface, it is possible to configure the satellite positioning to point the dish to the correct signal, and then process the feed through the correct channels of an IRD before routing the SDI signal through the facility. (See Figure 2.)

One of the features of the system is its ability to hide the complexity of routing from an operator. Typically, a user must know the source and

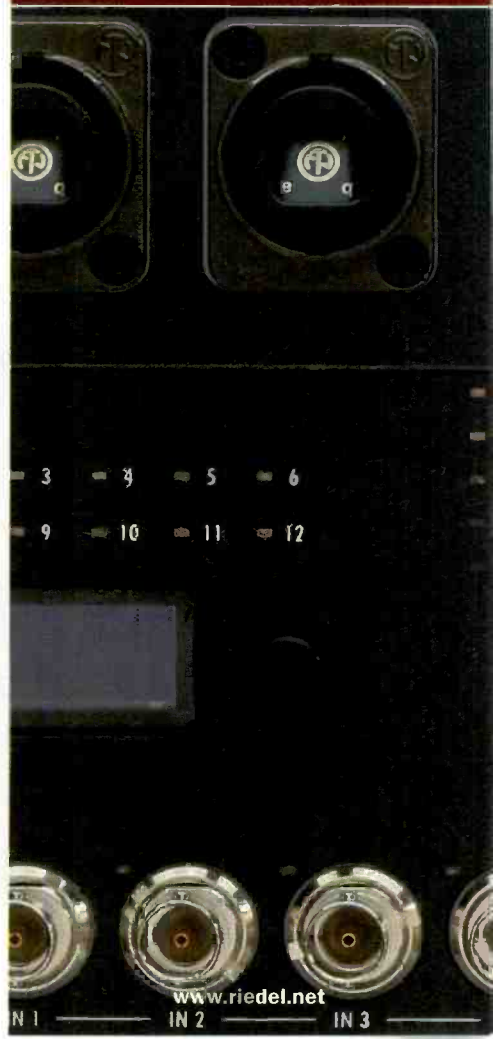
destination numbers of a given device to route it into the signal path. The system, however, allows some back-end configuration of the system to be programmed in at the configuration stage (using a graphical representation of the system). The operator GUI then presents the devices in groupings (e.g., upconversion, ARC, logo insertion) determined at the configuration stage so that the user can quickly search through and find an unused device and complete the routing path in a simple operation. This relies on the devices being connected to the router from both input and output.

Single button presses can replace one device in the chain with another. The same screen can be set up to provide access to a subset of full controls for the actual devices that have been routed, allowing the user to set his or her parameters. Together, the simplicity and functionality of the user interface save time and reduce the risk of error.

Extended control and monitoring capabilities

While many other systems monitor only the health of power supplies or tally information, Centra can look at the actual content of the picture and the metadata, in turn providing the user with much more powerful feedback. By using information available from a playout schedule such as the expected genre of program content,

Fresh



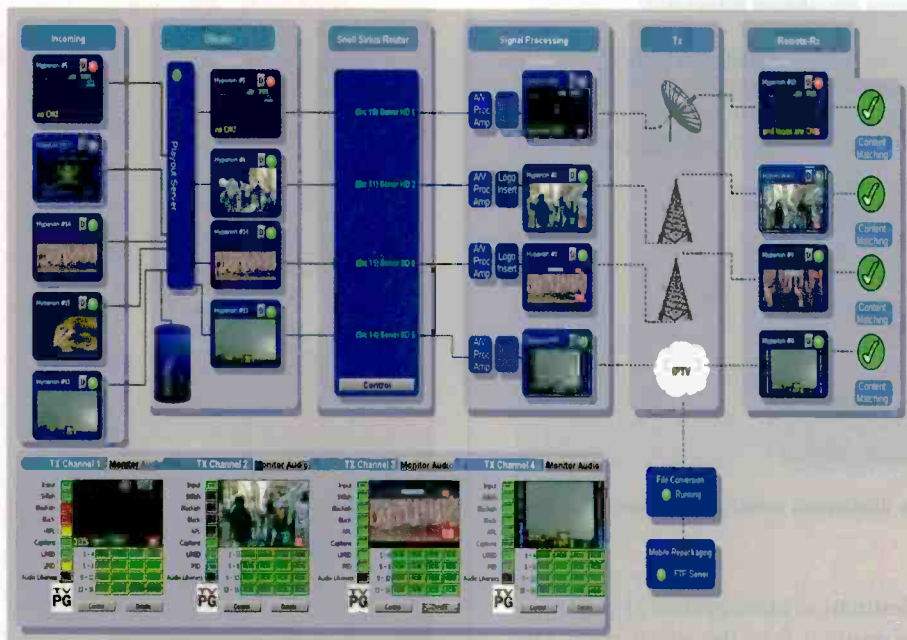


Figure 3. Hyperion cards allow regional selection for dark and still detection. Using these cards in carefully selected positions throughout the signal chain allows for complete confidence monitoring of multiple channels by a single operator.


intelligent rules within the hardware module itself, using the Hyperion or intelligent Snell router inputs to detect the signal content through any device. Hyperion can be configured to detect and alarm on a number of different failure modes, including complete black and picture too dark, full freeze or motion level too low, loss of audio, or wrongly assigned tracks. (See Figure 3.) When incorporated into Centra, this information will not only alarm and indicate the error, but also automatically switch to the backup signal path. This reduces the time spent transmitting corrupted or missing information to viewers, thus minimizing penalties and providing time for resolution of the problem.

The rules engine may be configured for any number of simple or more complex operations depending on a combination of conditions. For example, if a router input is required to be HD, but the external modular device (or the router itself) finds the input to be SD, the system — if it is connected to known inputs and outputs of the router — can automatically insert an upconverter into the path and adjust video input parameters to the correct values. This can ensure optimal usage of expensive converters in a system by using them when they are required

number or type of audio channels, aspect ratio, and presence and location of logo, different settings may be applied at different times to ensure the correct settings are applied for processing devices and that optimal monitoring can be enabled at each point in the schedule. This approach can significantly reduce false alarms and improve notification of genuine


problems, preventing costly mistakes from being aired.

The system allows the user to program powerful rules that enable the automatic setting or correction of conditions. In many broadcast chains, the final point of the transmission path consists of a failover 2 x 1 switch. With Centra, there are different ways of ensuring the signal continuity including




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rather than requiring their permanent installation on every chain.

To aid remote and/or centralized analysis, using the combination of Hyperion and Centra allows low-resolution streaming of video and audio proxies — along with the metadata measured from the remote signals — across WANs and LANs. The video with the error status allows the operator to see both the control settings and the impact of those settings within a single view. The system serves as the primary and, ultimately, the only operator interface with equipment. It alerts the operator of any problems across the broadcast chain immediately and provides the interface through which to put things right.

Conclusion

Centra's intelligent control and monitoring capabilities reduce the total cost of ownership and downtime

while increasing productivity. It allows more channels to be monitored, focusing operators' efforts on true areas of concern. The real-time system does so by addressing and simplifying not only configuration of Snell devices across the workflow, but also operational control of the broadcast chain and enterprisewide monitoring of signal paths and all equipment. Providing a comprehensive third-party driver library, the system brings a new unified approach to controlling media technology. **BE**

Kirsty Aldridge is product manager for control and monitoring at Snell.

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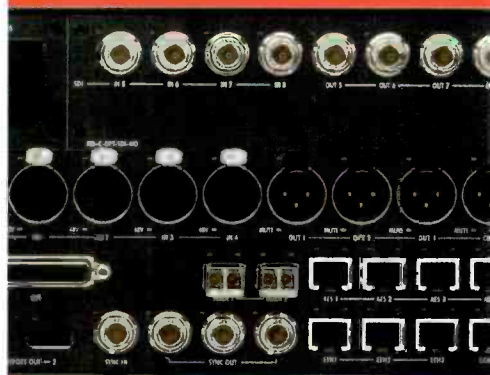


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RIEDEL

from Vegas



Monitoring video in new ways

OLEDs are the future of broadcast monitoring.

BY JOHN LUFF

In the grand scheme of technology, how we monitor television in professional facilities seems like a rather trivial, obvious matter, but it's actually quite the opposite. Our television system was designed around the physics of cathode-ray display tubes, particularly the nonlinear response of the cathode to voltage, which gives rise to gamma correction. The colorimetry of imagery was

the sole purpose of watching moving images, and home displays and studio displays shared much in technology. That's not the case these days. As the computer display market has matured, it has become perhaps more economically important than the market for consumer televisions, but at the least the computer display marketplace is orders of magnitude larger than the professional precision video

for professional use. When HDTV first became a viable market, the natural choice was flat panels, which by the late 1990s were available in sizes that CRTs could not match. Flat-panel monitors provided good performance at steadily dropping prices, fueled not by the professional market, but rather by the consumer market. Studio CRTs were on their last legs.

Those innovative technologies include plasma and other emissive displays, and many variants of LCD transmissive displays. None of the new display technologies inherently need gamma correction, but it is a fact woven into all of our system standards and is hard if not impossible to remove in the short term.

This fact gives us fits. Since flat-panel displays dominate the world market today, we must use sophisticated technology solutions to render video images correctly. From all indications I see we have done a pretty phenomenal job. Pictures are stable, repeatable and of generally good to excellent quality. But the imaging artifacts we fight, notably the lack of true blacks in transmissive displays, make adapting consumer products to the professional market at best problematic unless nearly heroic levels of technology are thrown at the problem.

By using arrays of LED backlights instead of cold cathode light sources, or LED edge-lit displays, we can achieve contrast similar to CRTs. In fact, with sophisticated image processing and wide gamut display/backlight combinations, we can exceed the color gamut of essentially all professional monitors of the past. The trade-off is that LCD "grade one" monitors with complicated backlight strategies are expensive. Transmissive

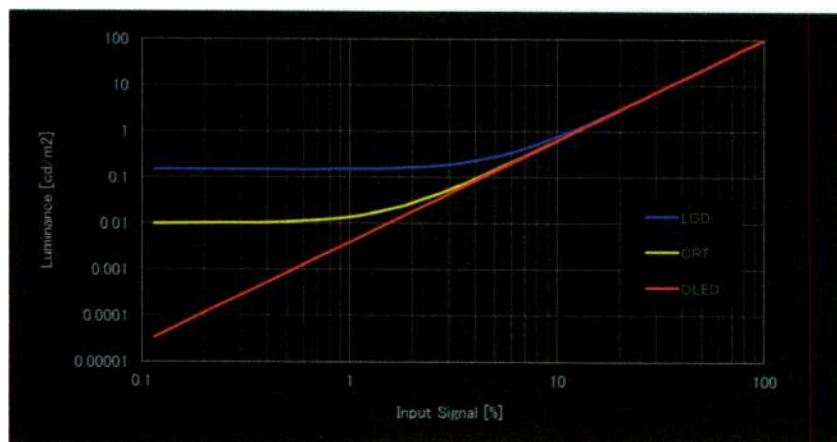


Figure 1. The black level performance of an OLED can be truly black, unlike a plasma display. Courtesy Sony.

controlled by the chemistry of display phosphors for many years, beginning with some of the very earliest successful professional displays. CRTs are a precision device, particularly so when built to tight tolerances needed to act as reference displays for creating and evaluating the quality of video images.

But two factors have conspired to turn the professional monitor marketplace on its head. The first is the same economic motivation manufacturers have always faced, which puts pressure on the development of point source products for our industry alone. When color television was first used commercially, the only markets for television displays were in fact for

monitor industry. Thus, we have little economic clout to drive the development of products that have very small potential numbers.

The second important factor in the changing monitoring landscape is driven by the pace of innovation, pushed by the desire of consumer electronics to sell new products. Two types of CRTs essentially owned the precision market for about two generations: dot triad delta gun models and stripe tube "Trinitron" models. But innovation in flat-panel displays, which initially were made only for laptop displays, has exploded into a rich mix of monitoring choices, many of which can and have been adapted

displays just have different physics at work. It is hard to completely cut off the light unless the source itself can be extinguished by local dimming, as in LED array backlight units. Secondly, small, rack-mountable, high-quality displays are not very profitable due to the low piece count that comes with the video monitoring in our industry. The best LCD monitors are above 40in in size, and they can produce great pictures, though I can't remember seeing a rack big enough for a 42in LCD in a production truck.

The EBU produced a document defining the features and performance that a professional CRT replacement should exhibit if it is to truly supersede the CRT in capability. Some of the stipulated requirements are relatively easy to understand and achieve without designing new physics for the display itself, but some like black level performance and off-axis performance are harder to do nearly as well as a CRT. Some features required in the document seem a bit anachronistic, like blue-only mode (used for NTSC and PAL lineup), and pulse cross (useful in analog transmission, but I think of less relevance with digitally sampled and transmitted pictures).

OLEDs are on the rise

The industry is ripe for a totally different technological approach to monitoring. Many proposed technologies have been shown in small devices that are custom built in labs. Fewer have made it as far as delivery of real products. This year, OLED-based monitors have begun to show up after years of promises about performance rivaling or surpassing CRT. Two manufacturers are delivering products, and the performance is as good or better than any other flat-panel technology. As one might expect, the prices are high since there are not many on the market. OLEDs are not only used for video monitoring, and in fact first showed up in portable devices where their exceptional power efficiency is valuable.

OLED offers several potential advantages. Since it is emissive, not transmissive, like plasma, black can indeed be truly black, even better than CRT performance when properly set up. (See Figure 1.) The OLED triads can be packed into small spaces, making large, exceptionally high-resolution displays possible. One manufacturer has built in a self-correction loop that measures the light output of the panel and continually adjusts the drive to each color to keep colorimetry consistent with little maintenance intervention over the life of the panel. The bad news is that the blue OLEDs age at a different rate than the green and red, and when the self adjustment runs out of range, the panel must be replaced. It is unclear what the panel replacement cost will be, but one manufacturer estimates that its panels should last several years in heavy use before that threshold is passed, comparable to the life of a CRT.

Currently, OLED monitors are available in a small range of sizes for professional use and are priced on the high end. Sizes range from 7in, likely for field monitor use, to 15in and 24in sizes for conventional precision monitor applications. Consumer-scale large OLED displays are rumored to be on track for late 2011 or 2012.

We have arrived at the end of the CRT's useful life in this industry, but unfortunately the options, LCD/plasma/OLED, are just achieving the price and performance we are used to. For the short term, expect CRT replacements in precision monitoring applications to be pricey and limited to a small number of sizes. **BE**

John Luff is a broadcast technology consultant.

Send questions and comments to: john.luff@penton.com

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Threats vs. opportunities

Broadcasters better know the difference!

BY ANTHONY R. GARGANO

The history of entertainment media is rife with portents of gloom upon the advent of the next newest entertainment delivery technology. Sixty years ago, the rise of television gave fodder to the Hollywood doomsayers. The fact that consumers no longer had to leave their homes and could now sit in their living rooms (in front of a 10in screen, no less!) and be entertained by television was going to be the end of the Hollywood movie studios and the entire film theater industry. Except it didn't quite happen that way.

Ultimately, television proved to be a huge new revenue generator for Hollywood. With the discovery that broadcasters would pay for the rights to show movies, television became an important and profitable segment of the Hollywood film release cycle. Later, the studios recognized another business opportunity: marrying television's insatiable appetite for content with Hollywood's own unique production capabilities. What film studio today does not have a television production division?

With the application of MP3 to the digitization of music, the development of portable MP3 players and the viral spread of illegal file sharing, the music industry actually came close to a doomsday scenario. It took Apple to demonstrate that by facilitating ease of purchase with appropriate pricing, there was still a multibillion-dollar music business to be had. By embracing the technology, understanding new concepts of monetization and discontinuing the idiocy of suing its customer base, the music industry survived. But this was a case of coming dangerously close to the doomsayers' prognostication of disaster for the then existing industry.

The broadcast TV industry went from being a threat to being threat-

ened. Initially, cable television was a boon to broadcasters. It delivered additional eyeballs that broadcasters' signals could not reach because of intervening mountains, valleys that were shaded or homes located simply beyond a station's viewable field strength contours. But that boon came in the form of a Trojan horse. Little did broadcasters of the time realize that those heady days of having a captive prime-time viewing audience, essentially a total share of TV households, would quickly end.

The broadcast industry of the time, by pushing to collect fees for carriage and retransmission rights, gave the then nascent cable industry the impetus to develop its own channels and programming. By the end of the 1984-1985 TV season, The Nielson Company reported a 57.1 primetime viewing share for broadcast and a 7.6 share for cable. And, by the end of the 2008-2009 season, those numbers had flipped to a 27.7 share for broadcast and a 42.9 share for cable.

Survival of the fittest

Yet, broadcast has survived. It has a much smaller share but of a much larger revenue pie. In the tradition of "if you can't beat 'em ..." broadcast networks and station groups now own cable networks and cable channels. Lastly, and perhaps most importantly, only broadcast television has time and again demonstrated to advertisers the unique ability to converge truly massive audiences at given points in time. If an advertiser has a mass message that it wants delivered to a huge audience, broadcast television cannot be beaten.

The fractionalization of viewership has continued over the past several years. Online media has begun to impact audience share, particularly as newer television sets and DVD and

Blu-ray players began to sport Ethernet connections, which facilitate the delivery of online content directly to the TV screen.

Recent announcements now have online media taking competition for viewership to the next level. Netflix will now produce its own original content. The star of its new drama will be Academy Award winner Kevin Spacey. Hulu, another Internet media venture, has already launched its own original series, "The Confession," starring Kiefer Sutherland of "24" fame. Yahoo has announced that it too is looking into doing scripted programming. There is speculation in the business community that Dish Network's recent acquisition of the shell that was once Blockbuster will be to use Blockbuster as its vehicle for entry into the battle for online viewers.

So, now the question for broadcasters: Is this newest vehicle for the delivery of entertainment content a threat or an opportunity? At first it is easy to fall into the threat camp. But broadcasters themselves are launching a new entertainment delivery vehicle — mobile DTV. Mobile DTV requires content. Local news and weather will carry it just so far. Some of the new online programming is being developed for Internet-sized appetites, i.e., five-to-10-minute bites — interestingly, the same bite size as some studies have revealed for mobile DTV. So, perhaps it is not a threat but an opportunity. Are augmenting online distribution with dedicated mobile distribution, or agreements with online programmers for mobile content rights farfetched? I don't think so, but we'll see. It's a brave new world out there. **BE**

Anthony R. Gargano is a consultant and former industry executive.

? Send questions and comments to: anthony.gargano@penton.com

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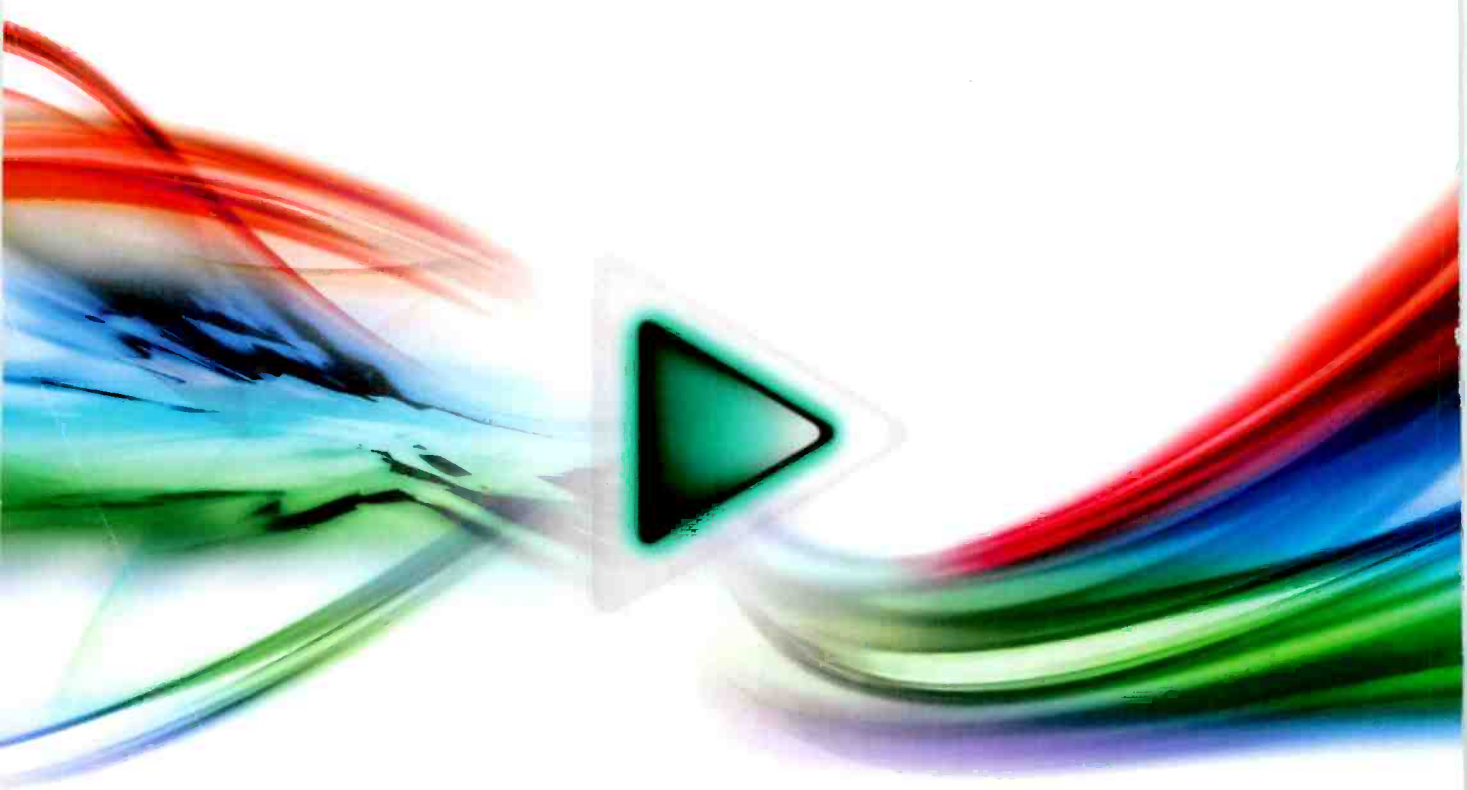
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