Special report: DTV Concepts

Where are we going into the future of broadcasting and what do consumers care? DTVcasting or the answer to interactive broadcasting?

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In the transition to High Definition, production facilities including Complete Post, The Tape House, and many more are demanding more. They chose Advanced Digital Television & Video (ADTV) solutions from Panasonic like the new Millennium™ Switcher Series. When your need is for cost effective, compact, high performance switchers for your telecine, production and other HD work, you should look to the Millennium Series. Designed for the U.S. HDTV market, the new AV-HS3110 switcher offers basic HD functionality with minimum cost and space requirements while still delivering full bandwidth HDTV performance.

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ON THE COVER: This month's cover focuses on the launch of DTV and depicts the many choices of formats and standards facing the engineers in the design of master control systems. The cover art is a tongue-in-cheek concept for the ideal master control switcher, courtesy of Tektronix Grass Valley Products.

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A look at the technology that shaped this industry.

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Is interlace dead?

When I told a well-known manufacturer of professional monitors that I was doing an editorial on the death of interlace scanning, he replied, “So who’s going to be your bodyguard?” He thinks going public with the position that interlace is dead is tantamount to suicide. “Only Bill Gates could save your neck,” he said. When I broached the subject with a fellow BE editor, he responded that discussing religion would be less dangerous.

But let’s look at some facts:

- The use of interlace is historical. Interlace was initially developed as a way to squeeze enough information in the limited amount of available bandwidth to produce a picture. In other words, it was the solution to a unique bandwidth problem—not a display problem.
- Interlace results in produces temporal and spatial artifacts. You can argue that these artifacts don’t matter or aren’t serious. But the fact remains that images shift between the time the odd and even lines are scanned. This represents image distortion. Whether or not it’s significant is a different issue altogether.
- Converting to other formats and scan rates is easier from progressive. This year’s SMPTE conference could have been called “The case for progressive.” The number of presenters at SMPTE arguing for progressive capture amazed me. Detailed and well-researched papers documenting the artifacts of interlaced capture and display were presented.
- TV sets will eventually be progressive displays. While some early HDTV displays will be based on interlace scanning, the physics of having to sweep electron beams across large CRTs is complex—and expensive. HDTV will survive only if large displays are available. This means plasma, LCD and other new technologies, which by design are progressive.
- The first HD-like images much of the public sees will come from computers—not HDTV sets. Intel is testing a new DTV computer card and 16:9 display systems. All you’ll need is a new receiver card to receive and display (in a progressive format) HDTV images. Even the consumer industry is promoting new progressive source equipment. Toshiba just released a new DVD player that outputs a progressive signal.

You can transmit any of the FCC-approved scanning formats you want. You can capture content in any format you want. However, if you want your content to be shown in viewers’ homes in its native display format, the format must be progressive.

Broadcasters often forget they aren’t in the DTV driver’s seat. When it comes to implementing HD, the customers are. And the folks at CEMA will determine what they initially see. In that marketplace, maximum image quality isn’t the goal, selling TV sets is. That means price, and price means progressive.

So in answer to my original question, “Is interlace dead?”

No, not dead, just not the future.

Brad Dick, editor
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Doublespeak


It no longer amazes me that the Microsoft folks spend billions on marketing bug-filled software. What amazes me is that people like Robert O. Craig believe this nonsense. “Service pack?” Oh, you mean bug fix. “Beta release?” Oh, you mean it’s the end of the quarter and you must meet a deadline to ship.

Larry Ellison of Oracle summed it up best when he said, “It doesn’t bother me that Microsoft dominates the market. What bothers me is they do it with an inferior product.”

Mike Fox
Director, Engineering & Operations
Conus Communications

Reader question from the Broadcast Engineering website:

Does the percentage of nitrogen in a transmission line matter, as long as the nitrogen is dry? And, is there a performance difference between 95% N₂ and 99% N₂?

Timothy C. Phills

Andrew Corp. was invited to answer the question:

In response to your question concerning the use of 95% N₂ versus 99% N₂, the key is that the nitrogen must be dry. Nitrogen that is commonly available for industrial applications is 98.8% pure (32ppm H₂O or -105° dewpoint). Both of these purity levels will work well for transmission line pressurization. The most important part of selecting a grade of nitrogen is the dewpoint. The dewpoint of the nitrogen must be lower than the lowest expected ambient temperature to prevent condensation inside the transmission line. Condensation will eventually lead to corrosion, and signal degradation. For additional information, see the article in the July 1997 issue, “Nitrogen vs. air pressurization,” by Lloyd Keyser, or contact Andrew Corporation at 800-255-1479 extension 396. Ask for a copy of the White Paper, “Pressurizing Transmission Lines: Air vs. Nitrogen,” bulletin number 10220.

Brian Cross
Pressurization Systems
Andrew Corporation

Despite all the wonderful technological advances in broadcasting, I notice that one thing seems to have become a low priority. I am referring to lip sync.

I have in recent months several times seen statements made by the President from the White House lawn in which the video lagged the sound. The same effect is sometimes noticeable when several different studios are linked between the two coasts.

This effect is presumably due to sound and video taking different routes, or passing through equipment with different delays; but knowing this does not make it any less irritating!

David Pickett
Director of Recording Arts
Indiana University School of Music

Dear David:

As far as the White House feeds, the answer, of course, lies in what “is” is! I mean, if we’re talking about what is the problem with lip sync, then it depends upon when is is. If truth is relative, as the current resident seems to believe, then maybe time is too. Maybe the audio didn’t match the video so they could claim that the statement was/this condition dependent. I’d just classify it as another example of where the lies in the video are out of sync with the lies in the audio. No amount of digital processing can fix that.

However, if you’re talking about other feeds, that’s a different issue.

Lip-sync errors are primarily caused by the extra time it takes to encode the video versus the audio. This matter was discussed in detail in “Audio-to-video delay systems for DTV” by Tom Tucker (November, p. 82). The problem can be solved, but like you, I’m surprised by the number of times it occurs in network feeds.

The most obtrusive type of lip-sync error, as you noted, occurs when the audio precedes the video. We’re conditioned to believe that we can see lips move before we hear the sound. We attribute that to distance and the speed of sound. However, when the inverse occurs, we find it objectionable because there’s no basis for belief on our part.

I saw this happen with the recent space launch. The audio was several frames ahead of the video on CBS’ morning feed, as shown on a Pasadena, CA, affiliate. It’s going to become a bigger problem, but mostly for those originating satellite feeds. Encoding for local DTV programming won’t be as big a problem because the encoders compensate for the extra video delay with audio buffering.

Brad Dick, editor
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Some HDTV receivers to display low pixel counts

BY LARRY BLOOMFIELD

The HDTV that ends up in front of viewers may be significantly less HD than what leaves the antennas of local stations.

A recent meeting of the Chirchill Club, a group from in and around Palo Alto, CA, featured speaker Lou Lenzi, vice president of New Media for Thompson Consumer Electronics. At the meeting, Lenzi told the audience that his company’s sets would only display one million pixels, less than half the number of pixels HDTV will broadcast.

Not all manufacturers are skimping on picture quality. Fellow broadcast engineer Jim Mendrala and I did an informal survey, and the results follow. Though pricing varies depending on where the set is purchased and the number of features, here’s what I learned about the sets surveyed.

Hitachi has an HDTV set, model 61HDX98B, using a projection display, which will receive all 18 ATSC formats and display them on a 61” diagonal 16:9 screen. It will downconvert the 1080i and 720p HDTV and will display that at 480p. It can also receive DirecTV if the DirecTV card is plugged into the Smart Card slot. It is scheduled to be available in the first quarter of 1999 with a suggested retail price will of $7,999.

Philips/Magnavox has a HDTV set, model 64PP9901, which uses a rear-screen projection in the 16:9 aspect ratio with a 64” diagonal. It will decode all 18 ATSC formats. It will also accept component video as well as VGA from your PC or laptop. It is not clear what the actual native display resolution is. It is available now for a suggested list price of $9,999; if dealers do not yet have any in stock, they can order it. More information on various aspect-ratio formats: www.flat-tv.com/indexprod2.html.

Samsung has an HDTV set, model SVP-555JHD, that uses a rear-screen projection in the 16:9 aspect ratio with a 55” diagonal. It will receive and decode all 18 ATSC formats. It has front-mounted component and S-video inputs. The native resolution is 800 horizontal lines. It also is available now at the suggested retail price of $7,999. Stores should be able to order the set. More information: www.samsung.com/products/hdtv.html.

Sony has an HDTV set, model KW-34HD1, which uses a flat-face FD Trinitron Wega CRT display, not a flat Plasma display, with a 34” diagonal. It will decode all 18 ATSC formats. It features Wega circuitry that greatly enhances 601-type pictures by converting all DTV formats to 1080i by upconverting an SDTV to the native display by a proprietary technology called “digital reality creation.” This technology doubles the horizontal and vertical line structure to provide four times as many pixels. The set incorporates variable size PIP and can display HD or WebTV with 480p resolution. The audio on this set is full 5.1-channel surround sound in Dolby Digital. It went on sale at the end of September and will retail for $8,999. More information: www.sel.sony.com/SEL/consumer/wega/index.html.
Winds of change are blowing through the broadcast industry.
The transition to Digital TV requires an unprecedented reconstruction of your broadcast facility. And, considering the huge investment involved, you simply have to make the right decisions.

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Don't let the digital revolution blow you away... contact your nearest Odetics Broadcast representative today.
Proscan/Thompson has an HDTV set, model PS6100, which uses a rear-screen projection in the 16:9 format with a 61" diagonal. It will decode all 18 ATSC formats and will accept component video. It will be available after the first of the year and will retail for $6,999.

RCA/Thompson has an HDTV set, model RCA P55000, that uses a rear projection screen in the 16:9 format and a 55" diagonal. In addition to decoding all 18 ATSC formats, it displays them on a 1080i screen. More information: www.rca.com/ or www.nipper.com/default.asp.

ProjectaVision has a 4:3 60" diagonal rear-screen projection unit with a native resolution of 800x600 pixels. It uses a single Texas Instruments (TI) digital micromirror device (DMD) and is HDTV ready. The projector uses two DMD chips. One is for the green and one is for the red and blue. The red and blue DMD projection device uses a color wheel to get the colors with out any flicker. This idea keeps the cost down and looks good. The projector can be taken out of the set and used as a regular front-screen digital projector for boardroom and other applications. More information: www.projectavision.com.

Mitsubishi will have two 16:9 DTVs, one with a 65" and one with a 73" diagonal 1080i display. The sets will retail between $4,000-$9,000. Mitsubishi will also have 4:3 DTV sets in 50", 60", 70" and 80" diagonal and will offer an HDTV add-on for $3,000. More information: www.mitsubishi-tv.com.

Texas Instruments (TI), Digital Micromirror Device (DMD) is almost 20 years old now and is starting to catch on. Demonstrations with TI’s DMD and motion picture film side-by-side on a 47-foot screen show that the DMD can hold its own with more than 10,000 Lumens from a 5000W Xenon arc lamp. New HDTV sets using TI’s DMD with digital light processing (DLP) will be able to display the picture digitally at about 50,000 times per second. Currently, the three DMDs available will resolve 600x800, 1024x750 and 1280x1024 pixels. Because the chip operates at more than 50,000 times per second the digital bits for each pixel can be displayed digitally on the screen and the eye will convert the bits to an analog interpretation for a near-perfect gray-scale. ProjectaVision’s model DHT-2 also uses this technique. As a side note, Daewoo Television is supposedly experimenting with the Aura Systems Articulated Mirror Array (AMA). At this time, the date of release and the native display format are unknown.

There are flat-panel plasma sets at

Panasonic designs, builds and equips ABC’s HDTV Release Center

On November 1, when ABC aired the first regularly scheduled network broadcast of HDTV programming (the 1996 version of Disney’s 101 Dalmatians), the broadcast originated from the ABC HDTV Release Center. The Center was designed, built and equipped by Panasonic System Solutions Company (PSSC).

Located at the network’s headquarters in New York City, the HDTV Release Center serves as the hub for the release and distribution of progressive scan programming to ABC’s digital-ready affiliated and owned stations. The Panasonic AJ-HD2700 D-5 HD recording system, provided by Panasonic Broadcast & Digital Systems Company (PBDSC), is a key component of the equipment in the Center.

The ABC HDTV Release Center project allowed PSSC to demonstrate its capabilities — requiring the integration of leading-edge technologies from a diverse group of manufacturers on a challenging timeline.

The HDTV Release Center consists of two fully redundant edit/ control rooms. Each room will serve as a standalone facility, providing the collective capability to originate two separate program streams or one stream with full backup.

Panasonic’s AJ-HD2700, the only commercially available digital component VTR with the capability of recording 1080i and 720p images, is based on Panasonic’s industry-standard, Emmy-winning D-5 HD format.

In addition to the AJ-HD2700s, ABC also purchased a variety of Panasonic HD and DTV 16:9 and 4:3 monitors from PBDSC and is evaluating additional progressive equipment for use in future HD program origination by the network.

PSSC is offering ABC-owned and affiliated stations turnkey HD station system packages consisting of prepackaged master control AJ-HD2700 VTRs. The company will install several in the first half of 1999.
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It’s a scalable, MPEG-2 video file server that lets you navigate the

transition to multi-channel SD and HD programming. Then we have our BDX-Series encoders,

which make it easy for you to begin efficient digital transmission, today.
And Sony provides the most comprehensive line of glue products in the new digital world for format conversion, digital distribution and processing. We also offer digital camcorders and VTRs—including Betacam SX®, Digital Betacam® and HDCAM™ to meet your digital format requirements. In addition, we offer a full line of SD and HD studio and OB cameras to complete your broadcast solution. And we’ve built our solutions on open systems, such as MPEG-2, so you get increased interoperability and easy migration into the future.

They’re all backed by Sony’s service and support programs. So, don’t be afraid to venture into new territory. Embark on a journey and discover the digital advantage Sony can offer. Call us at 1-800-635-SONY, ext. BC or visit www.sony.com/broadcast.

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some stores, but they are not HD. HDTV sets with flat-panel plasma displays are not yet available. The only plasma displays are NTSC-based and have about an 800x450 resolution. They will take in component video, so in theory a DTV receiver can receive all 18 ATSC formats and convert to a 601 output could drive it.

JVC is using a new type of display — the D-ILA. It is being used in JVC’s G-10 series projectors. These will accept HDTV component video and project up to SXGA (1280x1024) from your laptop computer. 1080i or 1080p will be displayed at 1280x720.

With a DTV ATSC receiver plugged into these projectors, the Hughes/JVC model G-1000 and the JVC model G-10 can display HDTV (with its tri-level sync) now on up to a 20-foot wide screen. The suggested retail price is less than $17,000. More information: www.hjt.com/products/north_america/G1000.html

Various DTV Receiver/decoders are available now. The Panasonic model HD-1080 receiver will receive and decode all 18 ATSC formats and upconvert all formats less than 1080i to 1080i. It has a full 1920x1080 output. It features Mitsubishi’s proprietary High-Definition Interface (HDI) (using a DB-15 connector) which is found only on the HD-1080 4:3 and 16:9 series televisions. The receiver itself requires no external controls as it is completely controlled by the HD-1080. Receiver/decoders will be available from at least nine manufacturers by the first quarter of 1999.

Frame rate will be changed to the requirements of the native display. That is, 24 frames/s could be displayed at 24, 30, 48, 60, or 72 frames/s depending on the set.

With all the press about networks and their selected transmission formats, the question really is: Will that same quality be displayed on the home receiver in its “native format?” Probably not. It appears that the weakest link in the HDTV chain will be the home receiver.

ATSC coverage test results released

ATSC’s performance in a recent test performed in the Chicago area by Tribune Broadcasting has been published in the September 1998 IEEE Transactions on Broadcasting, under the title “Tribune/WGN DTV Field Test.”

The tests were conducted across the Chicago area, to a radius of 55 miles, using ATSC and NTSC. Particular attention was given to areas with poor analog NTSC reception due to severe ghosting. According to the report, confirmation was obtained demonstrating that the expected coverage with the ATSC’s 8-VSB transmission system is indeed achievable.

Using an outdoor antenna elevated to 30 feet, “an overall success rate of 96.4% was achieved,” according to the report. The team tested 10 homes with indoor antennas, and all 10 had successful DTV reception. The report qualified the indoor antenna test, stating that the adjustment of the indoor antenna was not always trivial.

To obtain a copy of this report, e-mail the IEEE at askiee@ieee.org. The cost of the report is $12.95 for members, $22.95 for non-members. For $6 extra, CEMA will fax you the report.

If you have any questions, call IEEE at 800-949-4333.

In light of last month’s story on outdoor antennas (see November’s Beyond the Headlines, “Up with Antennas”), this report should be of particular interest.

Color-coded antennas?

Engineers at most stations get called upon from time to time to help out viewers when it comes to reception. You can bet this will continue in the wonderful world of DTV in its many flavors (such as HDTV, SDTV and multicasting).

The Consumer Electronics Manufacturers Association (CEMA) recently established an antenna subdivision. CEMA plans to teach consumer electronics retail salespeople how to use new, voluntary antenna-specification standards, and a corresponding color-coded local reception map matches antenna characteristics to particular locations. CEMA is in the process of developing maps for 211 U.S. demographic market areas (DMA) as tools to help consumers select the appropriate category of antenna for their reception area. The colors will indicate the kind of antenna, such as medium-size directional, medium-size directional with pre-amp, large-size directional and large-size directional with pre-amp.

Clinton to rob broadcasters

The Clinton administration has proposed an acceleration of the auction process for 36MHz of spectrum so it can comply with the Balanced Budget Act of 1997.

According to Eddie Fritts, NAB President and CEO, “NAB is deeply concerned over the Clinton administration’s proposal to accelerate spectrum auctions reserved for channels 60-69.” Fritts continued, “This plan would harm both broadcasters and taxpayers and would result in inefficient management of spectrum.”

In a letter to Congressman Bliley in support of his opposition to this proposal by the Clinton administration, Fritts wrote that the administration’s plan is likely to have the effect of disrupting a smooth digital transition.” Fritts continued, “It is crucial to proceed with the current schedule for the rollout of digital television.”

The simplest solution to this issue is to keep the politicians hands out of the cookie jar, but that’s not likely.
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I want my local TV

Wouldn’t it be nice for our elected representatives to give us a holiday gift that would allow us to receive television from any market, from wherever we want to receive it? Instead, all we’ll probably get is more nonsensical infighting over who’s going to get see what and where.

On almost a weekly basis, the FCC Daily Digest covers at least one local TV station complaining about one cable company or another not carrying its signal. It seems the issue will never be resolved. Speaking at a Washington conference titled “The New FCC: Agenda for the future,” Mel Karmazin, CEO of CBS, said that broadcasters who push for DTV/cable-TV must-carry while seeking deregulation elsewhere are hypocritical. Desirable shows, according to Karmazin are “our form of must-carry.”

Our industry has the proclivity for speaking out of both sides of its mouth. This phenomenon manifested itself this past summer when a Miami federal District Court issued an injunction that would stop the delivery of CBS and Fox affiliate signals to subscribers of direct-to-home (DTH) satellite subscription service. As a subscriber to DirecTV, I received a letter stating that, although I pay for this service, I would have to request a waiver from the local FOX and CBS affiliates in my area to continue receiving CBS and FOX signals via satellite. The court found that subscribers might be violating some obscure federal law.

It is strange that, in one breath, broadcasters insist that cable companies carry their programming and yet, in another, have problems if satellite providers carry that same programming. Many of us, when we’ve pulled up stakes and moved to other parts of the country, will subscribe to our old hometown newspapers so we can keep in touch with what’s going on back home. Many of these hometown newspapers carry networks, such as the Associated Press, UPI or features from King Syndication, and it doesn’t seem to make much difference where we read their material, be it Los Angeles, Allentown, PA, or Timbuktu.

This matter should come down to supply and demand. If enough subscribers wish to see a particular channel from a particular market — irrespective of where they are — and if these subscribers are willing to pay monthly fees to the carriers, it shouldn’t make any difference how the channel gets to them, be it satellite, microwave, repeaters or smoke signals.

NAB has also been flailing its political arms about this matter for a long time. Though it’s hard to say whose side NAB is on, it’s not on the side of the viewers — that’s what I think.

Senate Commerce Committee Chairman John McCain (R-AZ) introduced a bill in September that would keep DBS/DTH from having to provide a market’s entire broadcast signal until Jan. 1, 2002. The bill also requires the FCC to decide who may receive the signals of distant affiliates by 1999. The Senate let the bill die and probably won’t address it until next year.

House Telecommunications Subcommittee Chairman Billy Tauzin (R-LA) is working on similar legislation that will allow satellite TV companies to offer local signals without full coverage for a set time.

EchoStar Communications Corp. has been trying to provide its subscribers with local-into-local service, but it those efforts have snapped. Once EchoStar has demonstrated that there is a market for those kind of signals, no doubt other DBS providers will follow suit.

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National Mobile takes delivery of HD trucks

A few months ago, Broadcast Engineering published a story on two new 58-foot-long mobile HDTV rigs for National Mobile Television (NMT) (HD-1 & HD-2) by Sony at its San Jose plant.

Both units have been completed, with HD-1 based in and around New York, and HD-2 headquartered out of Los Angeles. HD-1 and HD-2 are now part of NMT’s fleet of broadcast vans digitally equipped by Sony. Besides the five digital trucks already in service, NMT recently took delivery on two more SDTV units from Sony, not to be confused with HD-1 and HD-2.

HD-1 has an interesting journey ahead. Cablevision has committed HD-1 to 200 broadcast events from Madison Square Garden, Yankee Stadium and several other New York venues. After its open house in Southern California, HD-2 will get its shake down doing the Rose Parade in Pasadena, CA, by Tribune’s KTLA.

Southern California’s KTLA-TV 5 has long been known for its ability to write TV history, especially in the early days. As one of the oldest TV stations in the country, first broadcasting with the call letters W6XYZ, KTLA was the first ever to broadcast the Rose Parade. It has done so every year since 1947. The 51st Rose Parade coverage will be in HD.
Extron's VSC 100 scan converter sets the trend for increased performance and sensible pricing. Whether you want to record computer-video onto videotape, display computer graphics on a TV monitor, or transmit computer images across a videoconferencing line, the VSC 100 will deliver that professional quality image.

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The VSC 100 lists for $1,695 and the VSC 100GX lists for $2,195.

Extron's VSC 100 provides the following advantages:
- Autoscanning up to 1024 x 768
- Provides composite, S-Video and RGBHV outputs
- Two, three and four-line vertical filters prevent flicker
- Two-level horizontal filter prevents aliasing
- Sixty memory locations for horizontal and vertical centering with autosave and auto-recall
- 24-bit color sampling provides accurate 16.8 million color reproduction
- Compatible with VGA and Mac computers
- Underscan, overscan and zoom switch (up to 2x)
- Internal power supply (100-240 volt, 50/60 Hz)
- Outputs NTSC or PAL
- Genlock capability (VSC 100GX only)
- Component video output (VSC 100GX only)

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Stations look to multicasting

According to Mel Karmazin, CEO of CBS, desirable shows are broadcasters' form of must-carry. But what if cable operators don't pass on what the broadcasters are sending them? Based on what cable industry leaders such as John Malone of TCI are saying, cable companies may well strip off opportunistic data or convert HDTV to SDTV.

Karmazin said CBS will supply whatever the public wants, whether it's HDTV or multicasting but the latter development is years away. CBS has had a proclivity for making interesting predictions. Remember Joe Flarity and the antimatuer machine being a reality before digital TV?

Last month's survey of local engineering managers asked the question, "What are your plans have you considered multicasting?" The response was almost unanimous. Engineers simply want to get DTV on the air before considering any additional enhancements. This response wasn't surprising considering all the hoops they had jumped through to get towers and equipment ready for this first window.

However, multicast is not something that should be shelved altogether. PBS has stated that they plan to multicast in the daytime and provide HD at night. The Sinclair Broadcast Group has also proposed multicasting as a solution.

The key to successful multicasting is bandwidth management. This means you don't simply put five or six channels of digital bitstream program information in a 6MHz slot, then walk away. The key to compression is taking into account the change and rate of change in each succeeding picture or field on each of the channels, once encoded, at the point where they are to be multiplexed together.

For example, in our multicasting scenario, assume we're going to air a cartoon on one channel and a football game on another. There is little detail in a cartoon and let's say, at this point in time, the picture doesn't have much action. This means little bandwidth is required to transmit that program. On the other hand, a camera on a moving wide shot of a football stadium would require much more bandwidth. Bandwidth management means comparing all of the encoded digital bitstreams we want to put into the 6MHz slot and giving each only the minimal bandwidth it needs, rather than treating them all equally. However, it takes some rather sophisticated software to pull this off.

A recent New York Times article, "Is Television's Future In This Man's Hand?" discussed Dave Smith, head of the Sinclair Broadcast Group, who is a proponent of multicasting rather than HD. The story quotes Salomon Smith Barney analyst Paul Sweeney as saying, "Dave Smith is years ahead of everybody else in the business."

In an exchange in the story between Smith, calling for multicasting, and Jamie Kellner, WB network's chief executive, who favors HD, Smith said, "It makes no sense to want to be a single channel. Why should I continue to allow the cable guys to pick me apart?" Kellner responded: "It will add a dimension
delivering the promise of multi-channel digital broadcasting
to the viewing experience. Our industry needs another jolt in technology.

Consider this. Kellner doesn't control a signal TV station, but Smith controls 14 of the stations in the WB network. Add to Smith's list 22 Fox, eight UPN, seven ABC, six NBC, four independents, and three CBS stations for a total of 64 Sinclair-operated stations. Compare that with none for the WB network (Time Warner owns one) a 10 for Disney/ABC. So who has the practical TV experience?

If you're watching the Fox or WB stations in Baltimore, the ABC or Fox stations in Columbus, OH, ABC or UPN in Winston-Salem, NC, WB or an independent in Las Vegas, you're watching a Sinclair station. The requirement to make the conversion to DTV rests with the stations that are required to do so and to choose HD or not, not networks. Smith is a bottom-line guy. He sees costs but no return with HD. Smith asked how many sets would be able to receive this technology when it first signed on? The answer is essentially none. "You have to go in the hole big time before you are going to see any return," said Smith.

But Smith does see a positive side to HDTV: "The guys who are spending money to get a better-looking single channel are just creating a better chance for Sinclair Broadcast Group."

Set-top boxes

There is much to be learned from the direct-to-home (DTH) satellite services, which have been sending digital-to-home set-top boxes for several years now. We know that electronic program guides are a thing of the future and that conditional access and subscription management systems will play a big role in any pay-per-view or video-on-demand offerings.

Although not much has been said about multicasting, keep your eye on it. As soon as the "bean counters" figure out what we engineers have known for sometime — get more people to watch what you are doing so you can sell more of what you are doing — they'll be beating engineers' doors down. Cable and DTH have been doing multicasting since they began. For the first time in broadcast history, broadcasters can compete with cable and DTH on their level. (Remember, nobody has ever said that you have to do multicasting 24/7. PBS has said that they will do multicasting in the daytime and HD at night.)

Another area to keep your eye on for data exchanges is interactive television. It's surprising that cable hasn't done much in the interactive arena. There are a few isolated cable interactive systems, but nothing on a wide scale. The technology is only now becoming available to make it affordable and viable irrespective of the method of delivery: terrestrial, satellite or cable. Cable is the only method of delivery that doesn't have to assume that you have a telephone line to respond on as you could respond on the cable system itself. In any of these cases, because of the different approaches and services to be offered, you will almost certainly have to interface through or with a set-top box. (The value of the real estate on top of your TV set continues to increase.)
Fujinon is proud to be a part of National Mobile Television's (NMT) groundbreaking HD-1 all-digital, high-definition mobile truck. Ten Fujinon lenses in all were selected for the HD-1...seven 66x lenses (HA66X9.5ESM) and three 20X lenses (HA20X7.5BEVM).

According to the executives at NMT, it was Fujinon's quick turnaround time, the company's past service history, and the lens' superb image quality that convinced them Fujinon was the right lens for the HD-1.

Look for high-definition sports telecasts on MSG and see why Fujinon is the clear choice.
FCC streamlines application processes

BY HARRY MARTIN

In October, the FCC adopted new procedures to simplify radio and TV applications and, starting in the fall of 1999, the agency will require them to be filed electronically. The FCC additionally revised the requirements for selling and extending unbuilt construction permits and decreased the frequency of ownership reports to every two years.

The FCC simplified 15 key broadcast application and reporting forms to make them compatible with electronic filing. In many cases certifications have been substituted for the narrative exhibits currently required. The FCC will conduct random audits of up to 5% of pre-grant and 5% of post-grant applications, with serious penalties for false certification.

Electronic filing will not be available before March 1999, but will become mandatory on a form-by-form basis six months after a form is eligible for electronic filing. The Children’s Television Programming Report (Form 398), available for electronic filing since the spring of 1997, must be filed electronically starting January 10, 1999. The FCC will make available computer software that permits forms to be filled out directly on a computer screen, with the completed form transmitted instantly to the FCC via the Internet. Electronic forms will include fee submission information. Security will be ensured through the use of passwords selected by the applicant or licensee and unique account numbers assigned by the FCC. Applications will be available to the public via the Internet shortly after they are filed.

All initial broadcast construction permits will now be issued for three years, in lieu of the current two years for full-power TV stations and 18 months for other broadcast facilities. In addition, the FCC eliminated the current restrictions on for-profit sales of unbuilt stations, allowing permits to be sold for any price the parties negotiate.

Ownership reports for commercial stations will now be filed every two years instead of annually. In addition, the revised ownership report form will require identification of the race/ethnicity and gender of each individual or entity having an attributable interest in the licensee or permittee.

FCC looking at new EEO rules

On November 20 the FCC proposed revised EEO rules for broadcast and cable.

The proposed rules are similar to those invalidated in the Lutheran Church case, except without the numerical EEO processing guidelines targeted by the court. Rule 73.2080(a), which bans employment discrimination because of race, color, religion, national origin or sex, would be retained, and the “outreach” requirements of Rules 73.2080(b) & (c), such as the following, would be reimposed:

- Utilize media, minority and women’s organizations, educational institutions and other sources of minority and female applicants to supply referrals whenever job vacancies are available.
- Communicate the station’s EEO program and employment needs to sources of qualified minority and female applicants.
- Conduct a continuing review of job structure and employment practices.
- Post notices informing employees and job applicants of their EEO rights.
- Undertake to offer promotions of qualified minorities and women in a non-discriminatory fashion to positions of greater responsibility.
- Analyze efforts to recruit, hire and promote minorities and women and address any difficulties encountered in implementing the EEO program.
- Record keeping on all of these efforts would be required.

To enforce its proposed rules, the FCC would require that job “applicant pools” include minorities and women. The use of applicant pool analysis, which focuses on “efforts” rather than hiring quotas, first was emphasized by the FCC after the Supreme Court’s 1995 decision in Adarand Constructors, Inc. v. Pena, which struck down government-imposed racial classifications in hiring.

The FCC also is proposing to require broadcasters and cable entities to use a minimum number of minority and female-specific recruiting sources (e.g., at least six) to fill each job vacancy.

Compliance would be monitored through review of a new Form 396 to be filed at renewal time and through random audits. TV stations would be subject to mid-license term EEO reviews, and cable systems’ EEO performance would be monitored as part of the annual certification process.

Harry C. Martin is an attorney with Fletcher, Heald & Hildreth, P.C., Rosslyn, VA.

Dateline

Children’s TV Program Reports (Form 398) must be filed electronically on or before January 10, 1999.

On or before February 1, 1999, TV, LPTV and TV translators in New Jersey and New York must file their renewal applications. Wyoming LPTVs and TV translators also must file renewals on February 1. Commercial stations in the following states must submit their annual ownership reports by February 1: Arkansas, Louisiana, Mississippi, Kansas, Nebraska, Oklahoma, New Jersey and New York.
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Do your station a favor: Teach the DTV basics

BY LOUIS LIBIN

It's important that personnel, from the technician to management and everyone in between, understand some of the primary DTV issues and language. It is not enough that the chief engineer understands coverage and interference: Others within the station need to be able to talk to your audience and community about DTV and its advantages, as well as the station's plans.

Understanding the language

The term "maximization" means that all stations, particularly ones with smaller NTSC service areas, should be able to expand DTV coverage beyond the bounds of their current NTSC service area provided that the increase in service does not cause new interference to NTSC service.

DTV service areas are defined as the Grade B service minus the interference from other NTSC stations. Service areas do not include the coverage provided by translators.

Full replication represents a 100% match between a station's NTSC and DTV coverage. Some stations may achieve more than 100% replication because their DTV service area extends beyond the NTSC service area. In other cases, a station may achieve only 98% replication. However, this doesn't necessarily translate to a smaller potential audience. The smaller area may reach a larger audience because of the directionality of the DTV pattern. Stations should focus on where they are getting coverage, not just replication figures.

Power levels

Remember that for any station the authorized power levels were developed for planning purposes and to protect the contour of DTV coverage. DTV transmission can be started without going to full power. If certain power levels are unattainable or unaffordable at the time construction begins, stations can operate with less power and still be able to modify facilities later. In addition, it's a good idea to consider higher towers in order to reduce power requirements. While the initial cost of a higher tower may be greater, cutting the cost of transmitter operation saves money every month. Run the numbers to see if the costs of putting up a taller tower would be offset by utility costs.

There are no easy answers. Recently, the FCC issued a Public Notice providing additional information for those stations whose DTV service facilities will not exactly meet the FCC's allotment plan. The Notice, Additional Application Processing Guidelines for Digital Television, is available from the Commission's website: www.fcc.gov/Bureaus/Mass_Media/Public_Notices/TV_Notices/nnm8116.txt.

Louis Libin is a broadcast/FCC consultant in New York and Washington.

Getting a grip on network audio

What's the easiest way to handle the multichannel audio coming down from my network? How do I handle break-ins and audio-over announcements on network feeds? What if I don't plan on generating a 5.1-channel stream for local production?

In the beginning stages of DTV, some different versions of digital audio from the network to the affiliate are possible.

Channel-stereo-compatible, matrixed surround

In many cases, the network will be sending an uncompressed, PCM AES, digital-stereo pair that is matrix-surround encoded containing a left (LT) and a right (RT). This is the same type of stereo-compatible audio program that's been in use in analog form since the mid/late '80s. If your station receives AES LT RT from the satellite decoder, treat it as you would have in the past. Special decoding to do local cut ins or voice-overs is not necessary. Route the program on a stereo AES digital router (one AES channel is necessary; two are desirable for expansion) and mix in the added local material. If your audio console is analog, D/A and A/D conversions are necessary. Send the edited/mixed AES program to the AC-3 encoder (Dolby DP 567 two-channel or Dolby DP 569 six-channel running in two-channel mode or the AC-3 encoder built into the station's ATSC encoder).

Correct for any latency issues, and monitor the audio with a decoder.

This process is also appropriate for local two-channel production in lieu of sending a 5.1. Set the metadata in the audio service menu of the AC-3 encoder to the following settings:

• Channel Mode: 2/0
• Data Rate: 384Kb
Look into the quality of DIGITAL-S and join some pretty impressive company.

Decision makers from DTV pioneers like KITV (the nation's first fully-licensed digital television station) and FOX, as well as a variety of commercial and in-house production companies, have chosen the video tape format that delivers the quality they demand today and the technology they'll need tomorrow.

These are just a few of the reasons why thousands of DIGITAL-S units are in operation today:

**EXTRAORDINARY IMAGE QUALITY**—made possible by 4:2:2 color sampling and a 50 Mbps data rate, resulting in perceptually lossless 3.3:1 compression.

**INCREDIBLE VALUE**—image quality indistinguishable from even the highest priced digital systems, at a price that's comparable to many analog systems.

**RELIABILITY**—exceptionally durable construction and long-wearing heads have exceeded the expectations of even the most demanding users.

**PRACTICALITY**—the format's robust half-inch metal particle tape provides up to two hours of recording time, and has the data capacity necessary for DTV today and HDTV tomorrow.

The reasons are clearer than ever. And the list of satisfied users is growing rapidly. Look into DIGITAL-S, and it will become your format of choice, too.
Expert

- Bit-Stream Mode: Main complete
- Dialogue Level: -27 (default)
- LFE: Automatically disabled in 2/0 mode
- Dolby Surround mode: Dolby Surround (override the default)
- Dynamic Range: Film Standard

Important: Don’t attempt to decode the LT RT to four-channel and build a new 5.1 program for the encoder. This type of program will not be downmix-compatible for those DTV audiences limited to Dolby Surround or two-channel by their receivers.

Compressed 5.1 channel

If your network is sending a compressed multichannel feed, the fun starts here. One to six channels of compression are possible from a standard AC-3 encoder for the satellite feed if the satellite encoder can pass unprocessed AES audio. If the bit rate is set to 640Kb, a couple of cascades of the audio are possible without noticeable degradation. This will allow you to baseband process the signal later. This compressed audio is not frame-coincident with the video and can’t be cleanly switched until decoded, but can be routed on one of a router’s AES pair. After decoding, the audio can be treated as six discrete channels (three AES pairs) switched/edited and mixed with voiceover on a digital board. Send the edited/mixed AES program to the AC-3 six-channel encoder, correct for any latency issues and monitor the audio with a decoder.

Set the metadata to the following:
- Channel Mode: 3/2
- Data Rate: 384 Kb
- Bit-Stream Mode: Main complete
- Dialogue Level: -27 (default)
- LFE: Enabled
- Dolby Surround Mode: Not Dolby Surround (default)
- Dynamic Range: Film Standard

Discrete 5.1 channel

It’s not likely the network will send six discrete channels (three AES pairs) on the satellite. However, the process is the same as above without the AC-3 decoding of the satellite feed and a new requirement for three AES-pair routing in the station.

Vendor

Tom Daly, marketing manager, Broadcast Products, Dolby Laboratories.

While there is a lot of excitement generated by the capability of broadcasting 5.1-channel digital audio in the form of Dolby Digital (AC-3), multichannel audio is already a common broadcast delivery format. By matrix-encoding four audio channels into a two-channel audio format, Dolby Surround has become a popular method for getting the multichannel audio experience to customers. While the creation and delivery of 5.1-channel audio is a reality for some today and for everyone soon, most facilities are not ready to handle it. To accommodate all affiliates, networks will continue to deliver surround-encoded tracks to affiliates along with 5.1-channel audio. As a first step, broadcasters should consider upgrading facilities to create and handle Dolby Surround while keeping in mind the requirements of Dolby Digital 5.1-channel audio.

With almost 100 prime-time network series, plus special events and sports now being produced with surround sound, and with more than 15 million surround consumer systems in use in the U.S., surround technology has reached a penetration level that warrants consideration by any facility involved in the creation or broadcast of TV programming. The best news is that, except for producing and monitoring, the broadcast distribution chain is the same for surround-encoded material as for stereo material.

When LT-RT signals are fed into a Dolby Digital encoder, the presence of surround can be communicated through an audio metadata parameter in the bitstream. The metadata can be preset in the Dolby Digital encoder. When the consumer’s Dolby Digital system receives the metadata parameter, it automatically activates the Dolby Surround processor and presents a decoded four-channel program to the consumer.

To ensure quality and make this system work, broadcasters need to consider several issues when mixing and monitoring in Dolby Surround. In the production suites and master control, it is important to monitor the quality of the soundtracks in Dolby Surround, stereo and mono. Broadcasters need to assure themselves that they can hear what consumers at home are hearing. Additional speakers, amplifiers and metering are required to accommodate the multichannel signal. When mixing for a multichannel signal, the console must have additional bus outputs. With these and any another plan-ahead equipment purchases, be forward thinking. The same equipment will soon be used to create a 5.1-channel signal. When it comes time to implement multichannel audio into a broadcast facility, consultants are available to assist in the setup and use of Dolby equipment and the use of trademarked logos.
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visit us on the web at www.vela.com.

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The chosen ATSC format for delivery of multichannel audio to the consumer is Dolby Digital (AC3). This compression format is an efficient way to transport up to 5.1 audio channels. Once multiple channels have been mixed for surround and AC3 encoded, there is likely to be serious generation loss if they are decoded and then re-encoded after editing. The audio you are receiving from the network in a DTV broadcast is likely to be a stereo pair at present, as no reasonable way to record six baseband audio channels exists, outside of slave-locked multitrack audio recorders. The stereo pair could be encoded for Dolby Pro Logic Surround, which can also be delivered via the AC3 system.

Mezzanine compression formats will provide a method of receiving and distributing multiple audio channels. Dolby E and APTX will allow up to eight channels transported in a single AES stream. These formats allow recovery of all channels in baseband form. You will be able to edit for commercial insertion and mix in a voice-over before sending the audio feed to the AC3 encoder for transmission. There are two advantages in these new formats: The first is the ability to recover the baseband audio channels to do the processing required in your facility and still deliver the original multichannel mix received from the network. Second, all channels are transported together, ensuring that the original audio phasing is accurately maintained. These compression formats allow editing on videotape, provided that the edit machine is surrounded by an appropriate audio codec. The disadvantages include additional equipment costs and edit-point latency.

Audio for DTV delivery represents one of the most serious challenges, due to the current limitation of four audio channels per VTR. As usual, the most straightforward way to handle audio is in its baseband form. Compression formats will change, and you will probably have to deal with several formats at a time. If VTR manufacturers can add more channels to new machines, life will get easier. Remember that the common denominator will always be the full-bandwidth signal. As long as you can get back to baseband, you will always be able to get the job done.

If you'd like to respond to the expert's and vendors' viewpoints, leave a message at the Broadcast Engineering website: www.broadcastengineering.com.
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Panasonic: the company with the most firsts in digital video continues to set the pace.

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The preferred way to distribute standard-definition digital signals throughout facilities is the bit-serial distribution concept. The data rates, as detailed in SMPTE 259M, are:

- 143.2 Mb/s (NTSC composite video, 525/60);
- 177 Mb/s (PAL composite video, 625/50);
- 270 Mb/s (CCIR 601 component video, 525/60 or 625/50);
- 360 Mb/s (component video, 525/60 16:9 aspect ratio)

At the 270 Mb/s data rate, copper cable of 200- to 300-meter lengths can be reliably used. Slightly longer cable lengths are possible with 143 Mb/s and slightly shorter cables are possible with 360 Mb/s rates. This, of course, assumes that a reclocker with adaptive, cable-loss equalization is in use by the receiver.

For those unfamiliar with it, the 360 Mb/s data rate was born of the idea for generating a digital signal with a 16:9 aspect ratio that maintains the same analog horizontal resolution as obtained with 270 Mb/s, 4:3 aspect ratio signals. To do this requires increasing the Y sampling frequency from 13.5 MHz to 18 MHz. This increase is based on the following formula:

\[
\text{Aspect Sampling R}t \rightarrow \text{New Rate} \\
\frac{(16:9)}{(4:3)} \times 13.5 \text{ MHz} = 18 \text{MHz}
\]

The Cb and Cr sampling frequency is also increased in the same ratio, resulting in 9 MHz instead of 6.75 MHz. This concept was not always favored by the broadcasting industry, which preferred the use of an SD 16:9 format using CCIR 601 sampling frequencies and a slightly reduced horizontal resolution. The 360 Mb/s 16:9 format has been forgotten. However, the 360 Mb/s bit rate has been targeted by all bit-serial distribution equipment manufacturers.

**Routing switcher types**

Three bit-serial routing switcher concepts coexist on the market as follows:

- **Wideband analog switchers**: As the name implies, this routing switcher concept circulates the bit-serial signal as if it were a wideband analog signal. These switchers usually incorporate analog high-frequency equalizers for every input. In most cases, signals available at the output suffer from degradations due to the added noise and the limited switcher bandwidth. Most have difficulty meeting the specifications of SMPTE 259M. On the positive side, these switchers pass any type of bit-serial signal of compatible bandwidth because they are indifferent to the data rate. Figure 1 shows a simplified block diagram.

- **Digital switchers with reclockers at every output**: These switchers are an improvement over the analog approach. Reclocking the digital signal at the switcher's output removes all traces of noise and regenerates the original SMPTE 259M waveform. Depending on the design, the output reclocker locks automatically to the datastream or has to be programmed to operate with the selected data rate.

- **Digital switchers with reclockers at every input and every output**: These switchers regenerate the input signal to the original waveform. The output re-
clocker eliminates any waveform distortions and noise generated by the internal high-frequency losses of the switcher. Again, depending on the design, the input and the output reclockers can lock automatically to the input signal or will need to be programmed to operate at the selected data rate. Figure 2 shows a simplified block diagram of this type of digital routing switcher.

**DTV scenarios**

It is expected that network-originating studios will operate in HDTV for a given number of hours per day, gradually increasing, as we advance toward the NTSC shut-off date of 2006. The rest of the day, they are likely to operate using a 16:9 SD format. This will likely require the generation and distribution of digital signals with a variety of bit rates.

Initially, network affiliates are expected to pass the network-originated signals in their original format. Locally generated programs will be inserted in either SDTV or in an upconverted HD format. In the future, increasing numbers of HDTV local inserts will be generated. This type of operation will also require the generation and distribution of digital signals with a variety of bit rates.

Analog HD signals (not exceeding the 19201080/30i format) generate digital bit rates of the order of 1.5Gb/s. As a consequence, the HD signal distribution choices inside the studio are as follows:

- **Distribute HD signals in the native component-analog format as wideband Gb/s or YPbPr:** This approach is obsolete and undesirable.
- **Distribute HD signals in a 1.5Gb/s bit-serial format:** Given the contemporary and continuously developing technologies conforming to the SMPTE 292M standard, this choice is becoming cost-competitive and will undoubtedly be favored by newcomers to the DTV field.

- **Distribute HD signals in a mildly compressed (<360Mb/s) bit-serial format and use a bit-serial digital switcher with I/O reclocking capabilities capable of operating at a bit rate of 360Mb/s:** This approach will be favored by studios with a significant investment in a CCIR 601 bit-serial signal distribution facility. It is assumed that network-originating headends have an installed CCIR 601 bit-serial distribution system with a 360Mb/s capability.

This choice would be further justified, since there are currently no HD 1.5Gb/s noncompressed VTRs available on the market. The state-of-the-art choice would be using a D5-type digital VTR operating at 360Mb/s for recording mildly compressed HD signals.

**SMPTE standardization activity**

Recognizing the need for standardization, SMPTE is in the process of putting the finishing touches on a standard (305M) specifying the manner in which...
non-CCIR 601 bit-serial digital signals can be formatted for distribution using a 270/360Mb/s routing switcher. This standard introduces the concept of serial data transport interface (SDTI). SDTI can be used to transport MPEG-2 packetized data within a studio/production center environment. The data packets and the synchronizing signals are compatible with the SMPTE 259M standard.

The proposed datastream is intended to transport over the active lines any packetized data with a maximum data rate up to 200Mb/s (approximately) for the 270Mb/s system or 270Mb/s (approximately) for a 360Mb/s system. The signal levels and specifications are as per SMPTE 259M. The preliminary specifications are as follows:

- The word clock-rate is 27MHz or 36MHz;
- The data word length is 10 bits, which results in a nominal bit-serial data rate of 270Mb/s or 360Mb/s;
- A header-forming SDTI ancillary data packet is placed between the EAV (end-of-active-video) and the SAV (start-of-active-video) timing-reference signals;
- The data payload is placed between SAV and EAV; and
- The space after the header data but before the SAV is available for ancillary data.

Figure 3 shows the relationship between the horizontal line interval of signals conforming to SMPTE 259M (270Mb/s) and SMPTE 305M. At 270Mb/s mezzanine or intermediate level (IL), switchers offer a solution for distributing compressed HD signals as well as a variety of compressed and non-compressed digital signals within facilities. Given the multiplicity of DTV formats that will be encountered within facilities, the IL routing switcher is likely to become the internal signal-distribution medium of the future.

Michael Robin, former engineer with the Canadian Broadcasting Corporation engineering headquarters, is an independent broadcast consultant located in Montreal, Canada. He is the co-author of Digital Television Fundamentals, published by McGraw-Hill.

Q. **My budget doesn’t allow an HD video format. Can I squeeze good quality upconversions from Betacam SP or DV?**

A. They can be better than you might expect!

- Betacam SP is analog, but its advantage is that, like DV, it is component, so it doesn’t suffer from composite encoding and decoding artifacts. It also has quite a reasonable bandwidth and low noise. The main thing is to shoot well on a good quality camera. Component makes a far better job than composite of reproducing the image the camera saw – enabling the upconverter to do the best job.
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Circle (26) on Free Info Card
Building with fiber

BY BRAD GILMER

Building your first fiber network, whether for broadcast or computer applications, can be somewhat daunting. However, by observing a few simple guidelines, the task can be an enjoyable learning experience.

Choosing fiber optic cable

For broadcast use, cable options are divided into two camps — cable designed for indoor distribution and multifiber cable optimized for outdoor use.

Additional cable types are available for intercity and longer applications, but broadcasters typically do not install and maintain this type of fiber optic network.

Looking at the cross sections of indoor and outdoor fiber optic cables reveals a great deal about their construction and intended use.

Figure 1 shows a single-fiber cable suitable for indoor use. Note that it contains a single-fiber strand with a tight buffer surrounding it. The result is a robust cable that can be terminated directly without any special considerations. Broadcasters may choose to employ a cable like this as a jumper between a desktop graphics device and a wall plate or behind equipment racks in a point-to-point application. These cables can also be obtained in siamese zip-cord pairs. A multiple-fiber indoor-use cable is shown in Figure 2. Cables such as this contain two or more tight-buffer cables surrounded by a common outer jacket. An important difference between this cable and cables intended for outdoor use is that once the outer jacket is stripped away, termination-ready fiber cables are found inside. Cables such as this may be larger in a multifiber configuration than their outdoor counterparts, but they do not require breakout kits for termination. (More on breakout kits later.)

Figure 3 shows the cross section of a cable designed for outdoor use. There are several significant differences between this cable and the one in Figure 2. First, the outdoor cable contains several fibers separated by a loose-buffer tube. The tube, lubricated by a gel, slides over the fibers. Several fibers are contained in each buffer tube. Note also that the individual fiber strands are not surrounded by a protective jacket. This saves space in the cable, but means that a breakout kit must be used to terminate it. Last, the jacket on the cable is much thicker than the jacket used on indoor cable. The added bulk is due to its fortifications against water and ultraviolet radiation.

Going from outdoors to indoors usually requires a transition. This involves breaking out the loose-tube individual-fiber strands and connecting them to a panel. The other side of the panel is then connected using indoor cable.

A typical breakout kit is shown in Figure 4. Breakout kits are used to convert the loose-tube multifiber cable to a number of tight-buffer individual-fiber cables. These tight-buffer fibers can be terminated with the appropriate connector. The tight-buffer cables are more rugged and will withstand the environment of a broadcast facility much better than the individual strands of a loose-tube cable.

Connector selection

If you are concerned about terminating fiber cables yourself, there is good news. Terminating cables is much easier than it used to be.

If you have ever tried terminating fiber cables in the past, you probably still have nightmares about epoxy ovens and sanding little figure eights while repeating some magic incantation. Well, all that has changed. 3M, Siecor and others now make crimp connectors and splices that allow you to terminate fiber easily and at low cost.

Your losses will be in the range of 0.5-1dB per connector. Connector kits cost about $350, and connectors are about $6 each.

Gone are the days of the old, biconic fiber connectors in which alignment was a problem. The new FC connectors always mate correctly. With a little practice, you should be able to terminate a fiber in under a minute.

Ducting

If you have the opportunity, take a tour of a large fiber installation. When you look at the equipment racks, one of the first things you will notice is a large number of yellow ducts running all over the building. Fiber optic ducts are designed to carry fiber optic cables and protect them from damage. They have carefully designed curves and openings.
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that protect the cable from stress and excessive bending that can degrade performance or possibly break the fiber. The decision to use ducting is usually based on the amount of fiber being installed and whether the fiber is concentrated in a central area. Be aware that in the not-too-distant future, broadcasters will most likely use significantly more fiber throughout their facilities. For example, fiber may be used to interconnect router frames, thereby eliminating the huge wire bundles currently used.

Guidelines for fiber

Finally, here are some guidelines to consider as you build your fiber network:

- Use the right cable. Broadcast installations are not typical telco or cable-system installations. Our needs are specific. For example, using a loose-tube cable when a tight-buffer cable is required can cause maintenance headaches down the road.
- Use breakout kits and termination panels to avoid cable damage and downtime.
- Keep clean. Dirt is a serious problem in fiber installations. If you are building a network and the termination equipment is not yet installed, use dust caps to cover the ends of the cables.
- Avoid unnecessary transitions. Each transition introduces 0.5- to 1dB of loss. If the application requires numerous indoor/outdoor transitions, investigate hybrid indoor/outdoor products that will alleviate transitions at each building entry point.
- Run more fiber than you need. The labor costs associated with installing fiber are much more than the fiber itself. Figure out how many fibers you need, then multiply by three. (I used to recommend multiplying by two, but experience has proved this figure inadequate.)
- Run multiple fiber types. If your equipment uses multimode fiber, pull in some single-mode fiber along with it — use of multimode fiber is on the decline. You may avoid a costly cable pull later if you install cable now. If there is extra money in the budget, consider running some 50-micron cable along with the 62.5-micron just in case.
- Talk to your equipment manufacturer. You can learn a lot about fiber optic technology from these experts.

Brad Gilmer is president of Gilmer & Associates, a management and technology consulting firm – (770) 414-9952.

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We’re in a dilemma.
Our business plan for the year includes new camera purchases, and we were leaning toward the Sony DSR130 or perhaps even the new DSR300, both of which record in DVCAM format. We bought into DVCAM to handle both of the other DV formats, so we figured, “no problem.” We also thought to equip some staff with miniDV format palmcorders.

However now we hear this may pose a “problem” which may very well encompass miniDV also (i.e., that ME tapes — both miniDV and DVCAM — will clog the heads of the DVCAM equipment).

Care to dig into this?

John J. Beech
GM (and janitor)

Dr. Digital responds:
John included two responses he had received from Panasonic. He felt neither were satisfactory.

For those not familiar with the DV consumer format and its professional derivatives DVCAM and DVCAM (50), DV and DVCAM use metal-evaporated tape while DVCAM(50) uses metal-particle tape. DVCAM decks can play back consumer DV tapes but not DVCAM(50) tapes. DVCAM decks can play back both DV and DVCAM tapes.

I sent the entire exchange back to Panasonic hoping for a more substantive answer. Here is the response:

Panasonic Responds:
Panasonic’s DVCAM technology was developed as a system of hardware, software, and selected media to respond to broadcasters’ needs after an international agreement was reached regarding DV standards. Broadcaster needs were paramount when design parameters for quality, integrity, robustness and longevity were determined.

Based upon its overall strength relative to other media, metal-particle tape was selected for the DVCAM system. A consideration in DVCAM’s design was the possible use of other compatible media such as metal-evaporated tape. The characteristics of Panasonic’s metal-evaporated DV tapes were included in this consideration. Numerous tests were conducted using Panasonic metal-evaporated DV tapes, which proved reliable with DVCAM hardware. However, there were limitations inherent in metal-evaporated tape construction, including increased oxide shedding relative to metal-particle tape. The shedding associated with metal-evaporated tape is one of the reasons metal-particle tape was selected for DVCAM systems.

Dr. Digital

For the benefit of end users, our designers included the widest track width in the DVCAM system to accommodate Panasonic metal-evaporated DV media. Extensive tests of DVCAM hardware with DVCAM metal-particle tape and Panasonic metal-evaporated DV tape have been conducted with successful results. Panasonic DVCAM hardware has proven to be compatible with DVCAM metal-particle and Panasonic metal-evaporated DV media under varied and diverse physical conditions and environments. However, when Panasonic metal-evaporated DV tape is used in DVCAM systems, the requirements for cleaning are increased due to the increased shedding of oxide within the transport.

Cleaning requirements for any tape transport are dependent upon a variety of factors, including physical environments, media involved, media quality, care and handling, and manner of use (e.g., straight playback vs. multipass editing). In an average editing environment, when DVCAM metal-particle tape is used, we recommend cleaning once or twice per week. In the same environment, when using Panasonic metal-evaporated DV tape, cleaning may be required every third day. Within this same environment, when non-Panasonic metal-evaporated tape is used, cleaning may be required every day. These recommendations and requirements are heavily dependent upon the environment, how the tape is handled and the manner of editing.

Panasonic’s DVCAM systems of hardware, software and media remain a field-proven, award-winning system of choice for broadcasters worldwide. If DVCAM end users accept any media other than Panasonic media into their system, the media’s source, characteristics and condition should be verified (this should be true of any out-of-house tapes). DVCAM systems and media are not a closed system, but rather an intentionally designed open system based upon tests using Panasonic media — metal-particle DVCAM and metal-evaporated DV. The use of other media is up to the end user. Panasonic Broadcast and Digital Systems representatives are just a phone call or website visit away from customers needing additional information.

Tom Weems
Manager, Product Marketing,
DVCAM

Well, there you have it. The main point is if you use Panasonic’s metal-evaporated DV tape, expect to clean the decks more often, but you shouldn’t see any other problems. Using other metal-evaporated products may mean you will be cleaning the decks more frequently.

Need help? Drop me a note at drdigital@compuserve.com.
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www.americanradiohistory.com
The advent of DTV is upon us. Several stations are on the air broadcasting everything from simple test signals to real HDTV offerings. A handful of sets capable of receiving the signals have been purchased. As for the extent to which these signals are being used on a full-time basis, maybe the late Carl Sagan’s novel is applicable, and the residents of some distant planet are now preparing to watch our signals in DTV.

For we earthbound mortals, some TV stations are already starting to taste the fruits, however bitter they may be, of the start of the DTV era. Without being truly specific, one Midwestern station, lets call it “A,” recently signed its DTV facility on from a new antenna on a community tower. Everything was done correctly with the best of equipment. Station A is rightfully proud of its system and of the fact that, by implementing DTV, it is among the leaders in our industry. At least one other station does not share A’s glee.

The second station is on the same channel as the newly instigated DTV operation. For years, that second station, lets call it station “B,” has been happily serving a large area in its part of the state. Like many stations, its service has not been confined to the calculated Grade-B contour, whether computed by the FCC curves or by Longley-Rice. Numerous cable systems have been using Station B’s signal with rather generic antennas mounted on tall towers. Station B is not a little facility with shoddy equipment but, like Station A, is a first-class operation operated in accordance with the best of standards. Likewise, the cable systems involved are well-built and belong to major operators with modern, well-maintained equipment. This arrangement would appear to sound good for all parties involved, including the viewing public. Now the dragon enters.

**NTSC/DTV interference**

When Station A signed on with its DTV signal, the cable systems, including one located within Station B’s grade-B contour, suddenly started receiving interference. The interference was such that the received NTSC signal was unusable. Viewer complaints skyrocketed. Calls flooded the station as though a major contest were underway.

In this situation, Station B did what every red-blooded station would do. It immediately, and correctly, decided the cause of the interference was Station A’s DTV operation. The question then became: “Was Station A was doing something wrong?” That started the computers whirring at several engineers’ desks. Several hours of analysis by at least two engineering firms proved that Station B’s assumption was correct. Those involved appeared to be operating correctly and within the rules. In the FCC DTV allocation data, it was predicted that Station B would receive interference from Station A’s DTV signal. It should be noted here that the calcula-
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Transporting Digital Video via Fiber Optic Links

Fiber Optic technology has been successfully employed by Tektronix for many years. However, its use as a transport layer for digital video has been limited and viewed as an expensive technology for all but long haul applications. Most of the electrical-to-optical (E/O) and optical-to-electrical (O/E) converters offered for digital video applications are modified versions of telco designs. Although these products provide adequate performance, they often carry a high cost and do not always handle all possible signal patterns found in the video format.

With the advent of digital television and the requirement to convert many analog broadcast facilities, fiber optic transports will probably become a standard requirement to ensure that SDI (270/360 Mbit) signals can be easily distributed at distances in excess of 250 meters. An additional motivation to employ fiber will come from any installation that will generate, distribute or redistribute programming in HD-SDI (1.5Gbit); in this case, receivable signal distance via coax will be limited to 150 meters at best and nominally 100 meters.

NVISION... has a reputation for delivering high quality products at reasonable prices, and carrying this image over to the fiber designs was paramount.

NVISION, a manufacturer of routing and distribution equipment for digital video and audio signals, based in Grass Valley, CA, has taken a new approach to the design of products for fiber optic conversion. Inspired by their design, new routing products for HD-SDI and SDI signals, NVISION now offers a comprehensive range of O/E and transceivers for SDI and HD-SDI signals. These modules have been designed from the ground up.

Before the NVISION design engineers set pen to paper (or mouse to pad), the company conducted extensive research to understand user requirements and their difficulties with available equipment. This research uncovered several problems that required attention:

1. The purchase costs for the E/Os and O/E were too high.
2. Available fiber E/Os were often very sensitive and required that SDI signals performed well within the SMPTE specifications for signal level and jitter.
3. Most fiber products would not handle pathological signal content (long strings of Os or Is).
4. Adoption of fiber often presented technical problems for system engineers unfamiliar with the nuances of fiber termination and management.

NVISION started by designing fiber converters for HD-SDI, as this was technically the most difficult task. They utilized their 4000 Series equipment frames as the host for the new modules. This allows purchasers to include fiber optics with standard DAs, A to Ds, embedders etc. The company has a reputation for delivering high quality products at reasonable prices and carrying this image over to the fiber designs was paramount.

As a result of their efforts, they now offer six fiber optic products: An SDI transceiver (SD4170), an SDI O/E (SD4171), an SDI E/O (SD4172), an HD-SDI transceiver (HD4270), an HD-SDI O/E (HD4271) and an HD-SDI E/O (HD4272). All of these products meet the following criteria:

1. The new products are inexpensive.
2. They will perform well with any input signal that meets SMPTE specifications.
3. They will receive all signals without bit error, including pathological content.
4. NVISION offers a technical support line to help system engineers with fiber installation (530) 265 1059.

Other additions to the 4000 product line include 4 to 16 channel audio embedders/decoders. When used in combination with fiber optics, these products allow a video channel and up to 16 phase aligned AES channels to be transmitted over tremendous distances for an affordable price.

Also, these products provide the only current method to transport accurately phased groups of six audio channels at base band. This provides a reasonable way to manage surround sound mixes (5.1 channels) prior to compression for delivery to the home.

NVISION can be contacted at 1 800 719 1900 or by fax at 530 265 1021. You can visit their website at www.NVISION1.com.
These are the exploits of the daring NV Force, a brave group of pioneering professionals. Their mission: to explore strange new standards, to seek out new technology, and create new solutions; to boldly lead where no company has led before.
simply that Station A was operating properly and Station B had to deal with the problem.

So, now what? The obvious first fix is to replace the receive antennas at the cable head ends with ones with better directivity. Additionally, it is possible to pair receive antennas such that deep nulls can be created in their pattern at a specific bearing. This can effectively reduce the undesired signal's strength by several additional decibels. Such approaches are presently underway. The results will be reported in a later column.

**Moving forward**

Now for the real purpose of this warning. Stations should take a look at the cable systems that use their signals, especially near or beyond their grade-B contours. Those systems should be evaluated in terms of DTV allocations to determine whether interfering signals might be anticipated when future stations come on the air. DTV studies can provide stations with not only the percentage of their service area that will receive interference, but also with the locations. That data then can be combined with cable system receive site locations to predict possible problems. If such interference can be anticipated, it is in both the station's and the viewing public's interests to start work on replacing receive antennas before the interference exists. This will greatly reduce the number of calls that will occur, especially from those folks who have the little books to mail after they record their viewing habits.

The problem of new interference has already been considered in detail. However, it seems to be like flu warnings: Everybody ignores them, believing that they will be immune. The fact is that another 1500 or so stations are coming on the air. Existing stations will experience some interference problems. Some of that interference can be anticipated. Taking the proper precautions now can minimize its effects. It's a little bit like trying to squeeze 20 pounds of manure into a 10-pound bag. Some of it is going to escape. It would help to have tissue on hand prior to being struck.

*Don Markley is president of D.L. Markley and Associates, Peoria, IL.*
we now uninterrupt this program....

Don't stop now. Go to www.louth.com to download the single whitepaper that will redefine success in multichannel broadcasting. With GMT™ you can automatically exchange video and control devices across the hall or around the world. Available today - fully integrated with robust features and excellent reliability.
In this business, it can be assumed that if you do something once, you will probably want to do it again — only bigger or better. If you connect two studios with five video trunks, you will probably want 10 trunks tomorrow. You are constantly asked to do more with your facility, and to do it over a greater distance.

Historically, whenever you needed to connect with someone outside your station, you had to deal with the telephone company. Now, thanks to deregulation and competing technologies, you have different — but related — options.

Audio signals

For audio signals, telephone jargon such as switched-56, ISDN and T1 have become part of the interconnection strategy for many broadcasters. For video signals, DS-3 service has been adopted and expanded. DS-3 and other data-modulation techniques have been applied to station-owned STLs, TSLs and studio-to-studio links over private terrestrial microwave and satellite links. Advances in data reduction (more commonly referred to as video compression) have enabled video signals to be sent as data over alternate in-house and out-of-house communications networks. Many of the new interconnection strategies use lasers to create links between “remote” station facilities.

Dark fiber

Dark fiber is a term used to describe excess fiber capacity. Because the excavation of roadbeds and repaving costs are so high (greatly exceeding the cost of the fiber alone), utilities often install more fiber capacity than necessary. This excess fiber is not connected to a laser light source, so it is termed “dark” fiber (notwithstanding that the laser light itself is often invisible, but that is a topic for another day). Occasionally it is possible to lease this dark fiber from your utility for private uses.

The cost of a fiber optic link may not be justified for a single signal on a single fiber. Considering the overall bandwidth of a fiber optic cable, a single signal on such a cable does not fully exploit the capacity of the medium. Many vendors have developed multiplexing schemes that combine several signals and place them all on a single optical fiber. A technique for combining signals that have their own optical transmitters, called wavelength division multiplexing (WDM), has been developed. Using laser light of different wavelengths (free from normal operations, including redundancy. Technologically, there is no reason why such a scheme could not work over much longer links, but this is an area where the tariffs set by the communications carrier will affect the situation more than the underlying technology.

Data hierarchy

Parts of the telecommunications data hierarchy can be used over other delivery methods (such as DS-3 data over a microwave channel). A recent development that has popularized this method of delivery is the transmission of an ATSC datastream plus a compressed NTSC signal over a common link to the transmitter(s). There are no technological barriers to using this scheme for other data uses. The primary implementation obstacle to such a system is spectrum availability, but even this problem has a potential solution.

An infrared optical system has been developed for wireless video and audio over a laser beam of light. This is a bidirectional, point-to-point system that does not require an FCC license to operate. This system can transmit over distances approaching two miles and has a bandwidth of about 500MHz. Line of sight between the two points is required, but if you need to get some signals between two buildings in a crowded downtown location (and are out of microwave channels) this system could be useful.

From radios to fiber optic cables, and from laser beams to Ethernet, techniques exist for delivering multiple channels of video, audio and data over distances greater than what can be reached with baseband signals and/or conventional interconnections. Decisions can now be based on production requirements and not by technical limitations.

Kenneth Hunold is a New York-based technology consultant for Broadcast Engineering.

Production studios no longer operate in a vacuum. It’s often necessary to interconnect more than one studio for live shots. Shown here Studio B at the Fox News Channel in New York built by A.F. Associates. (Copyright Corporate Print Communications. Courtesy A.F. Associates.)
“5 Doctorates, 34 degrees and 32 technical qualifications, combined with over 1500 years of UHF Broadcast experience, have worked to make EEV IOTs the world’s No. 1 choice for high power analog UHF TV transmitters. A purchasing decision made easier for you when considering that analog IOT transmitters are upgradeable to digital operation.

Additionally in preparation for the digital broadcast age, EEV has developed a full range of digital IOTs. Production resources have been increased, ensuring your access to unrivalled products and engineering support. Who better to help you into the digital age than EEV?”

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Photo: WXYZ anchor desk and studio.
(All photos courtesy of Tektronix Inc.)
The staff at WXYZ is no stranger to the challenge of breaking new ground. Located in Detroit, MI, the station is an ABC affiliate and is owned by the Scripps Howard Corporation. It was one of the few that volunteered to be on the air with digital broadcasting by November 1, 1998. Despite unknowns in HDTV technology and the uncertainties of consumer acceptance, station management decided building for broadcasting's HD future was worth the investment. At the time the commitment was made, the staff didn't realize the obstacles that would have to be overcome in a short time frame.
Early on, the staff realized that a totally new infrastructure would be needed to support HD and multichannel operation. Making the step to a totally 601 serial digital infrastructure would provide the basis for initial operations and growth to future multichannel possibilities. Also, a digitally networked system would permit the station to easily adapt to a mix of recording and transmission formats while taking advantage of automation technology to control on-air operations.

Beyond a desire to bring Detroit's viewers the latest technological advances, we identified other factors that justified the move to digital.

One was the desire to increase the station's overall productivity and reduce high maintenance costs. For instance, analog tape machines require constant maintenance. Another was that digital networking and control can reduce ongoing operational costs.

Finally, because much of the station's analog gear was already due for replacement, it was the perfect time to switch to digital. For example, its Grass Valley master control switcher was 12 years old. Adapting it and a lot of other, older equipment to digital at the end of their useful lives simply wasn't an option.

Because the project was so large and the technology needed so complex, the engineering staff sought outside help.

Prior to considering system integrators, the WXYZ engineering team developed a functional block diagram of the desired system. This not only helped define station equipment needs, but also allowed the staff to evaluate potential integrators' suggested solutions and plans.

After considering a number of system integrators, we decided to use the

The WXYZ broadcast automation system encompasses all areas of the station's operation. It relies on OmniBus networking and media management, Grass Valley M2100 master control systems and Profile storage.
The installation of a new all-digital production switcher into an all-analog broadcast facility created a big challenge. The Miranda imaging Series of conversion products have exceeded our expectations with the flexibility and stability that we needed in our transition to digital.

-Bob Sink, Engineering Maintenance Supervisor
UPN44 W70G, St. Petersburg, Florida

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consulting services of Tektronix' Video and Networking Division (VND) to assist with the project. In addition, Tektronix hardware and an OmniBus facility management system were picked as key components in the project.

The first meetings between Tektronix and station staff were held in May 1998. One early task was to examine the proposed equipment list to determine which functional areas could be scheduled and built for delivery in time for a July goal. Tektronix proposed using its Digital Media Foundation (DMF) as the base design for the project. This solution provides on an open-architecture software system, with an open environment for applications ranging from editing and live production to on-air playout. The system is easily interfaced through a distributed network of storage devices linked via audio/video routers and data networks.

A part of the consulting service included on-site training for station staff. The training was targeted to coincide with the delivery and completion of each phase of the project. Specific product information and manuals were provided in advance so we could get a running start in understanding the systems before using the equipment.

**Equipment selection**

The short time frame meant that much of the Tektronix Grass Valley HD production equipment selected by WXYZ was first shown at NAB98. This meant that, with installations scheduled for early July, delivery times were tight. The first installations included two MPEG-2 PDR204D Profile video servers, Grass Valley HD and SD routers, and the OmniBus facility management system. This complement of hardware would ultimately provide the station with a fully automated commercial playback system with mirrored storage of all on-air content.

One early design goal was to move away from videotape as the primary storage for commercials. The two Tektronix PDR204D Profiles provide 576GB, or more than 50 hours, of mirrored storage. The servers are networked with Fibre Channel, which allows us to put any commercial in inventory directly on the air.

To ensure a smooth transition and sufficient time for training, the new equipment was installed in parallel to the current on-air operation. The OmniBus control system is interconnected by an Ethernet network running under TCP/IP protocols, thereby giving the network sufficient bandwidth for future growth.

In addition to the quality benefits digital storage provides, the server-based playback system gives WXYZ more flexibility in handling on-air operations. We will eventually be able to play and record material from satellite feeds or VTRs, or to move programs

---

A pair of Grass Valley M-2100 master control systems and OmniBus automation provide the control needed to direct both HD and multichannel operations.
The Wright Brothers stood in an empty field and saw a runway.
The world told Orville and Wilbur that man couldn’t fly, but they left doubt behind and turned possibility into reality. Today, that kind of determination to leap into the future makes

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and commercials to and from the servers with ease. Then, as the schedule calls for it, we will be able to move that same material directly-to-air or distribute the material in-house via the networked routing systems.

**Facility control**

The OmniBus system is used to control on-air playout of both the HD and SD channels. The programs are switched through the Grass Valley M-2100 master control system. If needed, the two program streams can also be manually directed from the 2100's control panel. The OmniBus system provides full media tracking and resource management functions, which are vital to efficient operations. On-air operation can be controlled from any terminal or workstation connected to the network.

**Almost furnished**

While not yet finished, most of the hardware is now in place. The last bit of software is being configured to provide the necessary control functions for multichannel operation. Fortunately, WXYZ won't need that capability immediately because a start date for multichannel broadcasting has yet to be decided upon.

We're now looking forward to the time when the system is fully functional. Then we'll be able to take pride in knowing that, with the help of Tektronix VND, we've been able to build a fully 601 facility with sufficient bandwidth for 1.5GB HD and multichannel operation. Then, WXYZ will truly be ready for the HD future.

---

**Design Team**

**WXYZ team members**
- Michael Doback, Director of Engineering
- Demetri “Trip” Krania, Technical Support Supervisor/HD Project Supervisor
- Larry Pacific, Studio Operations/Master Control Supervisor

**Tektronix team members**
- Wayne Schrand, Tektronix Senior Account Manager
- Douglas Wynn, Systems Management Group Manager
- Larry Mast, Implementation Manager
- Pablo Esteve, Project Engineer

**Equipment list**

- Two Tektronix MPEG-2 Profile 204Ds with 576GB storage and Fibre Channel option
- Tektronix Fibre Channel Hub
- Grass Valley M-2100 master control system, SD
- Grass Valley M-2100-HD master control system, 1080i/720p
- Grass Valley SMS 7000 digital video switcher — framed 128x128, loaded 64x64
- Grass Valley SMS7000 AES audio switcher — framed 128x128, loaded 64x64
- Grass Valley SMS 7000 AES audio switcher — framed 64x64, loaded 32x32
- Grass Valley SMS 7000HD (1.5 Gb/s) video switcher — framed 32x32, loaded 16x16
- Grass Valley Performer 10x1 HD switcher
- Quartz router control panels
- OmniBus Facility Management System with Conductor and Tornado
- Columbus and Media Manager options
- Tektronix TG 2000, WFM 601M, WFM 1125, 764D, RFA 300-8VSB test and measurement equipment
- Cisco 10 BaseT switch
- Leitch HD 3641FS-ES, 3640 VDA processing and A/D conversion
- Chyron Maxine CG
- Sony video monitors
- Force Fiber Optic SSU link
- Harris CD Transmitter
- Dielectric transmission line and HD antenna
- Miranda SDM 271 A/D conversion
- Snell & Wilcox 5050 720p upconverter
- Snell & Wilcox Golden Gate NTSC decoders and IQ DMSDP processing
- Lighthouse Digital fiber optic system
- Barco HDM 5049 720p monitors
- YEM HD DAC720P and SPC 1125B converters
- Forecast consoles
- Datalux LCD touchscreen monitors
- Andrew satellite receivers
- Panasonic M3050W/TVDST-50 HD VCR and monitors
- California Microwave SDM2020 network demodulator
- Dolby DP 562 decoder
- NDS MPEG-2 ATSC encoder
- Tiernan TDR6 encoder
- Liebert power conditioning

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Michael Doback is director of engineering for WXYZ-TV, Detroit
By the year 2004, there may be several intelligent choices for digital video servers. Today there's one.

We have more MPEG-2 video server systems installed than anyone else in the world. Find out more about this dramatic transformation—this SeaChange.
Launched September 7, 1979, ESPN Inc. delivers sports programming to virtually all countries in 20 languages and reaches more than 75% of American TV households. But when the decision was made to create a new digital production facility at its headquarters in Bristol, CT, in preparation for multifaceted SDTV and HDTV telecasting, ESPN faced a great engineering challenge. The new installation had to be accomplished on time, on budget and while ESPN's existing productions were still on the air.
ESPNEWS Production Control Room 9 featuring Grass Valley Model 4000 production switcher and monitor wall. (All photos courtesy of National TeleConsultants, Inc.)
Race to the digital goal

Kickoff was January 1998, and the goal line was September 1 — just nine months away — and there could be no overtime in this game. National Tele-Consultants (NTC) was chosen to help plan the strategy and provide the back-up for ESPN’s fine team of in-house engineers.

The existing ESPN headquarters had analog Production Control Rooms, Master Control Rooms, high-end edit suites with sophisticated effects capabilities and ENG edit stations. But the top priority was the urgent need for a new digital home for production and transmission of ESPNEWS. That meant both Bristol and Los Angeles. “With the design team separated by a continent, we used the Internet extensively during the project,” Don Phillips, NTC vice president, recalls, “and we found that we could send updated drawings between Los Angeles and Bristol within about eight seconds. You could almost track it as it crossed the Rockies, passed by Chicago and reached the other coast, accelerating our paperwork with the speed of e-mail.”

ESPN provided accelerated design approvals, which allowed cable fabrication to begin three weeks after the project start. This kept the aggressive schedule on-track while existing offices were cleared out of the space that was to become the new central digital distribution equipment room.

Equipment procurement involved close coordination between members of the design team and equipment vendors in the knowledge that equipment deliveries would be critical to the project’s success. As equipment arrived, equipment racks would be ready and pre-wired for immediate installation.

The installation team arrived on site the last week of June with an initial crew to begin interfacility cable pulls. One week later, the balance of the installation team of 15 arrived. Since many interconnections needed to be made into the existing plant, great flexibility in scheduling was needed to accommodate ongoing operations. The on-air date dictated that installation begin well ahead of design completion. This required close communication and coordination between the design engineers and the installation team.

Infrastructure issues

The infrastructure would eventually have to handle 400 digital video sources and 200 dual-stream AES audio sources. ESPN’s operational philosophy of sharing resources throughout the facility required extensive translation of signals between the analog and digital infrastructures. Reclocking video DAs and regenerative AES DAs with 16 outputs were chosen in order to supply sufficient outputs for current and future facilities. The passive looping of inputs between adjacent eight-output DAs was not an option with the component digital video due to problems with high return loss common with the high bandwidth of these signals.

The first challenge they faced was the delay inherent in many conversion products. “We were surprised to find that there were not common answers to these kinds of problems already in existence,” NTC’s Associate project director, Mazen Ghurani admits, “but that is one of the challenges of integrating analog and digital facilities. We were confident, though, that our engineering team could work with the equipment providers to find solutions.” Although component digital video switchers have a fairly wide window for accepting differently timed signals, the 3D adaptive comb filter delays needed for the best A/D conversion put signals originating from analog sources outside of even this tolerance by a line or two. This was unacceptable because all ESPN’s new productions had to be able to mix analog and digital sources instantly.
Nucomm, Inc. has developed an integrated digital STL turnkey solution for every HDTV requirement. System configurations range from a single digital microwave STL for a 19.39 Mbit system to a fully redundant dual channel STL system that can carry both NTSC and HDTV signals over a single STL frequency. This system has been fully proven at the model station. Consult our application engineers for a solution to meet your specific needs.

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"WE'VE WAITED A LONG, LONG TIME FOR AN HD SWITCHER THIS GOOD."
In the past thirty years I've worked with just about every switcher on the market," says David Niles. "The new HD1012 is an extraordinarily smart design, from its ergonomics and human interface to its internal architecture."

With clients like the Walt Disney Company, Cablevision, Sony Entertainment, Macy’s and Madison Square Garden, David has to have 100% confidence in his equipment.

"To produce really great HD images, you need to have control over color," he adds. "The color information is five times that of NTSC. Until now, we've had to rig up all kinds of gizmos, but the HD1012 allows a level of creative color enhancement never available before.

"Its color correction circuitry is really slick, with seven integral RGB color correctors, plus memory capability. To us that's the biggest and most important plus."

The Snell & Wilcox HD1012 (12 input) and HD1024 (24 input) HDTV Production Switchers include three fully-featured keyers, program/preset bus, border generators, two wipe generators, (each with 100 wipes) timeline control and much more. They are upgradeable to future HDTV DVE options.
that produced a high-quality NTSC to SDI separation and conversion with only a seven-microsecond delay. Extensive distribution of AES reference signals was also required to ensure that all digital audio was locked to video.

Many of the existing studio cameras provide analog RGB outputs that are used instead of their NTSC outputs in order to convert to the highest-quality component serial digital signal. Many other sources such as graphics devices, character generators and paint boxes are natively digital so they can be brought to digital distribution directly.

The engineering team next discovered that nobody was making the 16-output audio and video distribution amplifiers ESPN needed. Working closely with a major manufacturer, the team developed a strategy that would lead to the delivery of the required audio and video DAs. Ultimately, 325 digital video DAs were delivered, of which more than 200 were newly created, 16-output models, specially designed to meet ESPN’s requirements. Additionally, nearly 200 newly designed, 16-output AES digital audio DAs were employed.

**Design issues**

Because the new Master Control Room is on-air 24 hours a day/seven days a week, a highly reliable system with redundancy was required. A 16x1 backup switcher was installed with a highly reliable transfer switch, which retains its position even in the event of a power failure, for additional redundancy. That way if the master control switcher fails, the TD can keep the show going by selecting sources on the back-up. The transfer switch allows the operator to quickly change paths so ESPN is protected from the failure of the main or the backup switcher. Of course, if the master control switcher is not functioning, you lose automated machine control as well. So a backup manual machine control console was also designed and custom built to be used in emergencies. The operator can just turn 30° and control the tape decks and other equipment needed to keep the show on the air from the backup console.

In the new Audio Control Room, ESPN chose to use an analog audio mixing console. "There are very spe-
specific requirements an audio mixer must fulfill when doing live news 24 hours a day that made it disadvantageous to convert audio handling to digital," Phillips explains. "And, there are always extensive needs to record live remote inputs and send mix-minus feeds back to the field on multiple shots at the same time. So in the midst of all this new digital technology, it was decided to leave one island of analog audio capability to give us maximum flexibility at a lower cost."

Of course, the new installation needed a machine room for its tape and disk sources. For the first time, ESPN decided to share a single tape room between Production Control and Master Control because they will both be in use at least 15 hours a day and need to be ready for quick turnaround of sporting events. This room contains eight program VTRs and extensive digital file servers for program material, interstitial break material and commercials.

Few people watching any of the ESPN networks last summer realized that the engineering excitement behind the scenes was almost as frenetic as the organized chaos of the sporting events they were watching. Most amazingly, it was all accomplished on budget and on time while ESPN was still on the air. NTC succeeded in its goal of helping ESPN move fully into digital production for ESPNEWS.

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The fact is, old-fashioned coax cable systems can only take digital video signals a few hundred feet reliably. But Fibervision for SDI transmits serial digital video signals — with or without embedded audio — over a mile, with absolutely no signal degradation! Fibervision for SDI supports all levels of SMPTE standards, transmits over standard multimode fiber, and is immune to electrical and environmental interference. It's adjustment-free, easy to operate, and easy to afford — just $995 each for the transmitter and receiver.

Best of all, it comes from the company you already depend on for award-winning video products like our Scan Do® family of scan converters. That same innovative technology enables Fibervision for SDI to help you get the best out of your serial digital video equipment. So take this opportunity to find out more about Fibervision for SDI. Then take your digital video environment all the way to maximum performance.
Digital TV: Where's the consumer?

Studio E at WBIS, Channel 31 in New York was built specifically to accommodate the demands of DTV's 16:9 aspect ratio. Notice the enhanced use of the peripheral areas of the set. (Photo courtesy of IMMAD, Andrea Brizzi)
By James Penhune

Last month marked the official launch of digital television (DTV) broadcasts in the U.S. As mandated last year by the Federal Communications Commission (FCC), TV stations in New York, Los Angeles, Boston and other major metropolitan markets are finally beginning to transmit digitally encoded versions of sports, entertainment and other programming along with the analog transmissions in use for decades. At the same time, consumer electronics manufacturers are unveiling the first generation of TV sets capable of receiving these digital signals at prices more typically associated with compact automobiles.

DTV promises huge potential rewards to a wide range of media and entertainment companies. For broadcasters and programmers it offers the prospect of increased viewership generated by high-definition (HD) programming, as well as new revenues produced by additional channels or data services. For hardware makers, DTV represents the sales opportunity of a lifetime, because it will ultimately require replacing an installed base of some 250 million TV sets in 100 million U.S. homes.

DTV still faces a range of obstacles that are likely to slow its acceptance for years to come. In addition to high hardware prices, the unresolved issue of cable carriage, and a still-undefined path to profitability for broadcasters, little attention has been paid thus far to the expectations of consumers. This article uses data gathered in the Yankee Group's recently-
Digital TV

completed Technologically Advanced Family (TAF) Survey to consider how consumers receive and regard analog TV today and their interest in the various enhancements promised by DTV in the future.

The high cost of hardware
Most broadcasters are using some form of high-definition TV (HDTV) for their first digital program offerings, although their choices on viewing formats and content noticeably vary. No matter what type of digital programs reach the airwaves first, it is safe to say that their audience will be minimal for some time to come. Although many of the best-known names in consumer electronics have made good on promises to have DTV hardware available in time to catch the networks’ maiden broadcasts, the first generation of digital receivers barely qualify as products aimed at real consumers. Most of the digital TVs to reach the market thus far are large-screen rear-projection models available in limited numbers from Panasonic, Sharp, Thomson and others at list prices in the $7000-10,000 range. Many of the same companies are also marketing separate set-top DTV converters designed for use with conventional analog sets. Despite the hope that these set-tops would offer consumers a low-cost alternative to replacing their current TVs, prices for most run between $1000 and $2000.

How soon can we expect to see hardware prices that are more in line with consumer expectations? Consumer electronics vendors are counting on two factors to drive down prices. The first is the competition and economies of scale that have historically driven down the price of all new CE products over time. The first VCRs designed for consumer use in the mid-1970s were prohibitively priced at about $2,000; but once more vendors entered the business and began manufacturing the machines in large quantities, prices quickly tumbled to the under-$200 levels we take for granted today. Second, DTV vendors expect that price erosion will be further accelerated by Moore’s Law, the PC industry golden rule which states that the computing power of microprocessors must increase geometrically even as their prices decline. Since DTVs rely heavily on microprocessors to receive and manage digital transmissions, chips that are more efficient and less expensive should go a long way toward reducing costs overall. Nevertheless, with initial manufacturing costs high and DTV programming options still in the earliest stages of development, few manufacturers expect prices for most DTV sets to fall below the $3,000-5,400 range for the next two to three years.

But high hardware prices and the current dearth of programming aren’t the only factors likely to limit the growth of the DTV audience over the next few years. At least two other major issues involving the role that cable TV will play in enabling broadcast DTV must be resolved before the new service will be easily accessible to prospective viewers. The first of these is the question of how users receiving broadcast channels carried by their local cable TV operator will be able to tune into the new digital versions of these channels. At present, the only way to receive a local station’s DTV transmissions is by using an antenna, because standards for passing the digital signal through cable infrastructure have only recently been finalized. Cable-ready DTV receivers are not expected to reach the market until late next year.

We expect that major cable MSOs will strike agreements to add digital broadcast channels on a case-by-case basis.

The role of cable
A thornier question is whether cable companies — which deliver TV to about two-thirds of all U.S. homes — will be required to carry broadcasters’ new digital channels. Having already won a windfall from the government through its loan of valuable spectrum, the broadcast industry is unlikely to score another regulatory victory with digital must-carry. Instead, we expect that major cable MSOs will strike agreements to add digital broadcast channels on a case-by-case basis as DTV broadcasts gradually become more regular and the installed base of DTV viewers grows. Cable’s ability to carry additional channels will also increase in the next few years as more operators add capacity through their own planned upgrades to digital technology.

What about consumers?
Finally, there are the needs and interests of consumers to consider. Most reporting and analysis of DTV has
Station WLWT-DT, Cincinnati, OH, selected an Itelco T603WN, solid state, liquid-cooled transmitter for its channel 35 DTV needs.

focused exclusively on the technological, regulatory and competitive issues outlined above. But what about the audience of more than 100 million homes that are watching TV today? How many of these consumers are really looking for the benefits that DTV promises, such as a larger, clearer picture and the ability to carry multiple channels of video or other forms of data?

The Yankee Group's analysis of DTV's market potential draws on data gathered directly from consumers through our 1998 TAF Survey of more than 2000 representative U.S. households. The Yankee Group has used the TAF Survey for over a decade to measure consumer adoption, usage and interest in a broad assortment of technology products and services. The survey's segmentation scheme, which classifies about 15% of those sampled as TAFs, or early adopters, based on the types of products they already own, is particularly useful in identifying target customers for new technologies such as DTV.

Consumer awareness

Years of marketing hype, technology and standards controversies and high-profile political wrangling have all helped to produce consistently high levels of unaided awareness of DTV. (See Figure 1) Overall, 69% of the 2000-plus households polled in this year's

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**How many of these consumers are really looking for the benefits that DTV promises?**

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**Figure 2.**

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<thead>
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<th>Quantity and Quality Are Key Selling Points for DTV</th>
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<tbody>
<tr>
<td>% of Respondents Who Are Very Interested in...</td>
</tr>
<tr>
<td>More Free Channels</td>
</tr>
<tr>
<td>Better Picture Quality</td>
</tr>
<tr>
<td>New Pay Channels</td>
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<tr>
<td>Internet Content</td>
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</tbody>
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TOTAL US: 0 10 20 30 40 50 60 70

TAFs: 0 10 20 30 40 50 60 70

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December 1998 Broadcast Engineering 79
Digital TV

TAF Survey said they had heard of digital TV, up four points from the 65% who registered awareness a year ago. Awareness levels were even higher within those segments of the market that are likely to be predisposed toward DTV. These include households using advanced TV services such as premium cable, PPV or DBS, subscribers to online or Internet service providers and TAFs, who tend to learn about and embrace new technologies well in advance of the general population.

The downside to DTV’s high profile is that the term “digital TV” is broad enough to mean different things to different people. While many consumers have begun to associate DTV with the high-definition programming and equipment now being launched by broadcasters and manufacturers, others may be thinking of more established DBS services, which providers like DIRECTV and EchoStar have successfully marketed under digital TV rubric. And cable operators such as TCI, Cox Communications and Comcast are touting the new programming and services made possible by long-awaited network upgrades as “Digital TV” as well.

Which features matter?

Which of the many features and benefits associated with DTV hold the most appeal for consumers? Although the networks and TV makers are betting that the improvements in screen size and picture quality afforded by high-definition broadcasts will be the most persuasive selling point for DTV, our data suggests that for most consumers quantity may be more important than quality. Asked which aspects of DTV they found most interesting, more than half (56%) of the consumers surveyed cited the possibility of receiving more free broadcast channels, which some broadcasters have considered providing through multiplexed digital transmissions (see Figure 2). This same interest in having more choices, channels and control over programming has been a key factor in the adoption of existing enhanced TV services such as premium cable channels, pay-per-view and DBS.

Better picture quality was ranked second in importance, mentioned by 39% of respondents, followed by the ability to receive new pay TV channels (26%). Significantly, DTV’s ability to deliver Internet-based content or information services, a feature expected to become increasingly important over time, received the lowest ratings from our panel, with only 20% of respondents finding it very interesting. As one might expect, enthusiasm for all of the DTV features listed ran considerably higher among more technologically sophisticated TAF households.

How important is high-definition?

Despite the fact that DTV’s most obvious advantage over analog lies in its ability to produce pictures that are larg-

A new revenue model for DTV stations

By Clint Chao

The era of DTV is here, promising consumers everywhere crystal-clear digital video and home-theater surround sound. But, not many people have $5000 to $10,000 to spend on the HDTV receivers required to watch these programs, and the market acceptance for this expensive proposition is a slow ramp at best. So, if there is hardly anyone to watch the programs, what’s in it for the more than 30 TV stations that began investing huge amounts of money in allocating 19Mb/s of spectrum for DTV? Even more, why should the TV stations rush to convert their analog spectrum?

Although the answers aren’t obvious right now, an enormous opportunity exists for broadcasters to become suppliers of multimedia broadcast content as opposed to just video broadcast programs. Broadcast networking suppliers believe they have a solution as clear as the new HDTVs. This solution introduces a new business model that allows the delivery of rich digital data content, as well as video, to consumers and businesses. By creating DTV media channels, broadcasters can turn the Worldwide Web into the “great wide hope” by using the spectrum they already own.

One broadcast networking supplier has developed an end-to-end solution that allows TV broadcasters to blend IP data content with MPEG-2 transport streams. This process maximizes the usage of the 19Mb/s spectrum currently allocated for the transmission of HDTV signals. One alternative is to transmit a 6Mb/s SDTV video signal along with 13Mb/s of high-speed IP data. The data can be set up as separate broadcast channels — anything from a financial channel to a prime-time-equivalent lineup of favorite websites to a premium service that delivers encrypted content to local enterprise. Imagine a travel agent beaming itineraries to clients. Of course, the 13Mb/s stream can also be set up as a Web-caching service to aggregate preselected Web content in local storage or as a turbo Internet service, much like DirecPC in the satellite world. Whatever the service, the broadcasters can set up numerous business models, ranging from pay-per-view services to monthly subscriptions to good old-fashioned advertising.

The system components needed to set up your data business are becoming commercially available. Zenith and Philips, have introduced DTV-receiver PC cards that allow users receive any content they subscribe to (though there may be free services built on advertising business models).

With a DTV media center in place, imagine the new types of services that could be made available with DTV receivers, which can either cache or broadcast information on the fly. A combination DTV receiver and Palm Pilot would make for the perfect travelling companion, providing the user with traffic updates and driving directions. Train and bus commuters could read the Wall Street Journal on their laptop computers without being connected to the Internet. The latest sports scores and stock prices appear on billboards or in sports bars or banks.

Clint Chao is vice president of marketing for SkyStream Corporation, Mountain View, CA.
er, more detailed and less subject to interference, most consumers say they are happy with the picture quality they receive from TV today (see Figure 3). Among households subscribing to cable TV (which currently reaches two-thirds of all U.S. homes), 86% said they were very or somewhat satisfied with their TV's picture quality and reception. These favorable ratings ran even higher among DBS users, where 96% expressed satisfaction with their current picture. The only segment of the viewing audience badly in need of a clearer picture is households that use broadcast TV exclusively, where only about a third (36%) said they were satisfied with their present service. While this data suggests that DTV may fulfill a need to improve the quality of over-the-air programming, it is important to note that broadcast-only viewers are unlikely to be early adopters of the new service, since they tend to watch less TV and spend less money than their counterparts using cable or DBS. (See Figure 3)

These findings also suggest that demonstrating DTV will be crucial in attracting new consumers. For even if the vast majority of today's viewers are happy with analog TV, it also goes without saying that virtually none of these viewers have ever seen a digital picture. Letting consumers look at the improved resolution, wider aspect ratios and distortion-free reception that DTV offers is the most powerful way to let consumers know that a new generation of broadcast TV has arrived. But demonstrating DTV on a wide scale will be a challenge for most retailers, who may be reluctant to invest the floor space, inventory dollars and sales personnel needed to display high-cost DTV equipment in their stores. Others may gamble that the cost of a DTV demonstration will be offset by the increased store traffic and incremental sales — including those of conventional analog TVs — that it is likely to generate.

**But will they pay for it?**

A further obstacle for retailers and manufacturers will be the high prices that most types of DTV hardware are likely to command for some years to come. Thanks to the high production volumes and fierce competition that have characterized the consumer electronics market for decades, consumers have grown accustomed to paying near-commodity prices for most of today's analog TVs. Asked how much they expected to pay for their next TV, our respondents reported an average price of $475: Higher than many of the smaller-screen sets on the market today, but still a far cry from the $7000 to $10,000 commanded by the first DTV receivers (see Figure 4).

As we have noted above, a combination of technical, competitive and economic factors are likely to drive the cost of DTV hardware down sharply over time. However, for the next few years, prices for most receivers are likely to remain in the thousands of dollars, with less-expensive set-top converters an option for more cost-conscious consumers.

**Outlook**

Despite its huge implications for the media and entertainment industries, the launch of DTV will have little impact on consumers in the near term. Our initial forecast for DTV receiver sales anticipates that less than 200,000 units will be sold in the U.S. over the next 12 months, with total penetration rising to only 2.5 percent of households by the end of 2002 (see Figure 5).

While high hardware prices are the most obvious impediment to widespread...
consumer adoption, the lack of DTV programming represents an equally significant obstacle. Even under the optimistic deployment schedule created by the FCC, upgrading all 1600 of the country’s local TV stations for digital is expected to take at least three more years. We believe that this costly and complex conversion process is likely to take at least a decade.

In the mean time, the quantity and quality of DTV programming to be shown by stations making the change remains uncertain. To build word-of-mouth among influential early-adopters and make the best possible case for DTV, the networks will need to act aggressively in producing and marketing high-definition or other types of enhanced programming. However, to do this will require support from the film industry (which has recently raised concerns about copyright issues related to the digital broadcasting of movies) as well as the cable MSOs, which act as gatekeepers to two-thirds of the viewing audience. With the prospect of a digital must-carry ruling growing more dim, the broadcasters will have to rely on voluntary carriage from cable operators, many of whom are just beginning their own plans for digital network upgrades. The Yankee Group believes that only about half of all the cable plants in the U.S. will have the capacity needed to add extra broadcast channels by the year 2002. For MSOs with less room, the broadcasters’ new digital signals will take a back seat to their own array of cable channels until plant upgrades are completed. As a result, many of those consumers who want to receive DTV will need to add separate set-top or rooftop antennas, another stumbling block toward large-scale adoption.

Stay tuned...

In light of these obstacles, the fundamental question of how broadcasters will make money from DTV is still unanswered. Will better-looking HDTV programming win back audiences now being lost to cable? Can it command higher rates for advertising? Will DTV’s potential for delivering multiple streams of SDTV allow the networks to mimic cable’s strategy of creating new channels for targeted audiences? Finally, how real are the prospects for combining information and other content from the Internet with more conventional forms of TV programming? All of these issues will soon be revisited by companies in and around the media and entertainment industries as the deployment of DTV slowly moves beyond today’s launch.

James Penhune is program manager, Media & Entertainment Strategies for The Yankee Group, Boston.
Interactivity in TV's digital age

By Joel Zdepski

Throughout its brief history, the TV medium has continuously evolved to enhance the "reality" of the viewing experience. Television has moved from black and white to color, mono to stereo. Soon broadcasters will embark on the next big step, transitioning from analog to digital and from passive receptor to interactive tool. This profound transition will require system-wide changes affecting program creation, storage, broadcasting and reception. Competition to retain customers will force digital broadcasters to offer value-added services in addition to current programming.

Consumer behavior

Consumers will demand that interactivity not dramatically change their viewing experience. Rather, TV viewing must be enhanced by simple-to-use new services. Also, interactive television is not simply a way to provide Internet service via a TV screen.

Surprisingly, consumers seem to be somewhat indifferent about interactive television. A new report from Jupiter Communications found that most people don't care about online, supplemental information for entertainment-based interactive television. TV viewers are already content to surf the Internet using a PC. Jupiter's report also suggests that TV viewers will only exert minimal effort to get added value from DTV services. Therefore, the goal should not be to imitate the PC in the new TV sets. This follows the notion that television is passive and computing is active. When we watch TV, we want to relax, maybe even with a group. When we use the computer we usually are alone and sit in an upright, attentive posture. Moving to interactive must not be a drastic revolution from viewers' decades-old habits.

Generating new broadcast revenue

Interactive television, while still on the horizon in the U.S., is already available in parts of Europe. Jupiter Communications research shows interactive services gaining ground in Europe, and broadcasters and service providers are developing a platform that competes with the Internet for users and advertisers. The research shows that digital TV-based interactive services will reach 19 percent of households in the United Kingdom, 28 percent in Sweden and 12 percent in France by 2002. Jupiter also reported 33 percent of British households and 29 percent of French households expressed a willingness to pay for interactivity on their television sets. Clearly, the interest is high and is gaining momentum.

Broadcasters are now looking at interactive television as a new way of increasing advertising revenue. Jupiter forecasts that by the end of the year 2005 there will be over 12 million DTV subscribers worldwide. They also expect broadcasters to be able to generate up to 20% of their total advertising revenues from interactive services by the same year. With Internet ad spending projected to reach $51 billion in 2000 alone, it is clear why broadcasters are eager to get DTV into homes as soon as possible.

Technical requirements and infrastructure

For interactive television to gain acceptance, software manufacturers must develop a comprehensive and cost-effective end-to-end solution for TV stations, hardware manufacturers and application developers. The product family must include an operating system for the DTV receiver, a set of authoring tools for developing applications, software to inject the data to the broadcast stream. For TV stations, it then comes down to being able to deliver the data. Because the DTV station will already be configured for MPEG-2 video and audio distribution, only minor modifications to the station's infrastructure will be needed. In fact, the procedures are similar to handling a pay-per-view or local ad insertions.

Prior to broadcast, the content to be aired must be stored on the server. For application data, information such as bit rate, synchronization and expiration date is also required. Some applications, such as augmented advertisements, will require usage tracking to fulfill contractual obligations to the content provider. The as-run log can handle this. Because the interactive material will be added to an ongoing video stream, it may be necessary to reduce the video's bitrate (or steal some space from other data streams) in order to fit all of the material within the channel. Dynamic bit-rate allocation can easily handle this task. The interactive data is then inserted into the outgoing bit stream, much like EPG data.

Joel Zdepski is vice president, Applications Group for OpenTV, Mountain View, CA.

Figure 1. Interactive TV can be delivered by a variety of methods. For TV stations, the encoding and transmission process is relatively straightforward and much like other forms of data.
Broadcast Engineering readers are among the most savvy and selective consumers around. That expertise shows up in the facilities they design and build as well as the equipment they select to support those new operations. BE readers face the frontline battles every day, and they know what works best for them. That's why our readers, and not the BE editors, should select winning products.

This year's Readers' Choice Awards encompass a wide variety of products. From cameras to transmission, there are winning products and technology for everybody. The winners represent those products garnering the most reader responses from editorial coverage (not advertisements) in the magazine over the last year.

If you want more information on these products, use the Free Info Card or contact the manufacturers via their websites. Thanks to all the readers who made these awards possible.

By Dana Guthrie, Associate Editor

Porta-Brace photographers vest
The Video Vest, designed for ENG and EFP photographers and sound technicians, is made from durable, waterproof, mid-weight Cordura fabric with a soft inner layer. Multiple pockets provide a place for batteries, tapes, tools and other supplies. Adjustable side tabs allow extra room over clothing. Additional side zippers provide extra freedom.
802-442-8171; fax 802-442-9118
Circle (390) on Free Info Card

Neutrik AES/EBU digital audio adapters
The NADITRNC-F and NADITRNC-M were developed to provide excellent impedance transformer adapters at a reasonable cost for meeting the needs between analog and digital applications. The adapters allow for longer cable runs via unbalanced coaxial lines rather than twisted-pair cables, which present high attenuation values at the relevant frequencies. The criteria for these adapters include impedance matching between 100Ω and 75Ω, transition of balanced/unbalanced circuit (balun), optional electrical isolation, optional attenuation for use of analog video distribution equipment, and reduction of hum and noise. Additional specifications include a frequency band of 0.1- to 15MHz, VSWR/return loss of <1.30/>17.7dB at up to 10MHz, insertion loss of <0.3dB at 0.1- to 10MHz, and a maximum voltage/maximum power of 5Vp-p/250mW.
732-901-9488; fax 732-901-9608; www.neutrikusa.com
Circle (301) on Free Info Card

TV/COM digital set-top boxes
The TVC-3100 and TVC-3200, for direct-to-home satellite services, address the need for low-cost, highly flexible consumer set-tops for receipt of digital video, audio and data services. The set-top boxes are MPEG-2- and DVB-compliant, thus ensuring interoperability between different broadcasters' systems. Video format standards include NTSC and most PAL variants. Features include software downloadability for the addition of new feature sets, a suite of diagnostic capabilities, subscriber messaging, teletext/subtitling/close captioning and virtual channels that allow the service provider to combine programming and offer a suite of programs (e.g., sports) on a given physical channel on the set-top. Optional features include high- and low-speed modems, high- and low-speed data ports, a second set of baseband outputs, branding options (on the set-top boxes, the packaging and the remote control) and high-end features (e.g., analog tuning, S-video output).
619-618-3500; fax 619-816-3650; www.tvcom.com
Circle (302) on Free Info Card
Systems Wireless intercom
The Series 800 wireless intercom system has been upgraded to include optional ISO and stage-announce capabilities from Beltpac remotes. Beltpac users can now communicate in ISO mode, eliminating the talk path to the hardwired intercom with which the Series 800 interfaced. In the stage-announce mode, Beltpac users can make announcements through the Series 800 system to an external paging/speaker system. These options are available on all new systems and can be retrofitted into all previous versions of the system. The intercom system can operate as a stand-alone system or can be interfaced with most hardwired intercom systems. Up to four users per base station can operate hands free at ranges of more than 2000 feet.

800-542-3332; fax 703-437-1107; www.swl.com
Circle (303) on Free Info Card

Sony portable HD camera
The HDC-750, the portable companion to the HDC-700, has a variety of output video interfaces that simultaneously meet the requirements for HDTV and SDTV systems. The camera is designed to meet the needs of broadcasters and production companies for providing high-quality programs in different formats. The HDC-750 features high-HDTV performance, flexible creative video controls and sophisticated dual-format (HDTV and SDTV) video interfaces. Features inherited from the SDTV BVP-700/500 Series include the new contemporary digital-command network system, a user-friendly menu-control system and an automated setup system.

800-686-SONY; fax 201-358-4058; www.sony.com
Circle (304) on Free Info Card

Sennheiser condenser microphone
The MKH 90-80 is a series of RF condenser microphones designed for recording to the most exacting standards. The microphones feature low inherent self-noise for exceptionally accurate sound reproduction, exceptionally flat frequency response and high linearity. The series features a wide range of pick-up patterns, including omnidirectional, cardioid, wide-cardioid, super-cardioid and figure-eight. The microphones' low weight and durable, light metal design make them suitable for outdoor applications. Reliable accessories support an extensive range of applications.

860-434-9190; fax 860-434-9022; www.sennheiserusa.com
Circle (305) on Free info Card

Radamec robotic rail track
The Track Cam system is designed to support the Radamec 421 and 435s pan/tilt heads and is capable of carrying a large range of cameras and lenses. The system can be configured with any of Radamec’s control panels, such as the ARC 2000 Touch Control Panel, and can be easily integrated with existing Radamec systems, which enables broadcasters to enhance their current productions with additional movement.

918-518-0685; fax 908-518-0687; www.radamec.com
Circle (306) on Free Info Card

Panasonic HD switcher
The compact AV-HS3100 Millenium* is a 1080i switcher with 100 wipe patterns. This switcher offers three program outputs (six additional SDI outputs are optional) and an advanced control display panel. A variety of options are available, including a one-channel digital effects generator, frame store, keyer, FDD drive and analog output. The switcher is designed to meet the needs of HDTV production, post-production, editing and telecine operation. The compact control panel is ideal for those environments, such as a telecine, in which space is limited.

323-436-3500; fax 323-436-3660; www.panasonic.com
* This switcher is a replacement for the AV-HS1900 HD switcher.
Circle (307) on Free Info Card
Panasonic post-production solution

POSTBOX Elite is a complete post-production solution that features real-time editing, 2D and 3D keying and transitions, online and offline capabilities, multiple compression modes, real-time audio mixing, a character generator, a built-in paint program, and expandable and removable storage options. Version 4.0 software, now available for POSTBOX, features greater customization of timelines, bins and preferences, one-step editing, direct digitize to timeline, Rock'n'Trim scrubbing of video and audio with JKL keys; networkable media bins, and waveform and vectorscope monitoring. Other features include unlimited layered audio channels, slip-and-slide on the sequence editor, fast audio wave display, and variable speed for audio.

323-436-3500; fax 323-436-3660; www.panasonic.com/PBDS
Circle (308) on Free Info Card

Sony iLink-based editing system

The Windows NT-based ES-3 EditStation nonlinear editing system, is a professional-level editing system with direct iLink (IEEE-1394) interface support for DV and DVCAM acquired digital footage. The ES-3 features ClipLink support and Direct Digital Link for iLink, SDTI and SDI digital interfaces in addition to standard analog I/Os. The editing system relies on 4:1:1, eight-bit component DV-based recording to the ES-3's hard drive for its excellent picture quality, so editing DV and DVCAM-acquired video footage with a Direct Digital Link results in minimal image degradation.

800-686-SONY; fax 201-358-4058; www.sony.com/news
Circle (309) on Free Info Card

Kramer mini tools for video applications

The Kramer Tools line of handy, miniature devices used in many video applications has been expanded. The line includes equipment for almost every need, including distribution amplifiers for video and audio, Y/C line amplifiers, mechanical switches for composite and Y/C, a VGA distribution amplifier and a switcher, a transmitter and a receiver for twisted-pair A/V and a range and port extender (which is also a four-way bidirectional distribution amplifier for the RS-393). Some of the tools have bandwidths of 260MHz and can handle SDI signals with no distortion. Products added to the line this year include a composite Y/C converter, a 1:4 mic DA and more twisted-pair products.

800-557-2637; fax 908-735-0515; www.kramerelectronics.com
Circle (310) on Free Info Card

Communications Specialties line of fiber optic communication products

The line, a result of CSI's recent acquisition of Math Associates, comprises six fiber optic products, each suited to the unique needs of the teleconferencing and communications industries. The Math Fiber Optics FM/Video Transmission System is designed to transmit high-quality NTSC, PAL and SECCAM video signals over standard multimode or single-mode optical fiber. The Math Fiber Optics Video/Stereo Audio Transmission System (on one fiber) uses wideband, low-noise circuitry to ensure excellent transmission of a composite video (NTSC, PAL or SECCAM). The Math Fiber Optics Serial Digital Video Transmission System uses high-speed pulse modulation to transmit wideband, digitally encoded video signals in accordance with SMPTE digital video standards at 143, 177, 270 and 360 Mb/s. The Math Fiber Optics Balanced Audio Transmission System transmits high-fidelity audio line level signals with low distortion, high linearity and wide frequency response, via wideband, low-noise circuitry. The Math Fiber Optics Bidirectional Data Transmission System is a full duplex bidirectional digital transmission system that requires only one optical fiber for the link. The Math Fiber Optics Bidirectional T-1 Data Transmission System is compatible with conventional 1.544 Mb/s T-1 telephone-related signals.

516-273-0404; fax 516-273-1638; www.commspecial.com
Circle (311) on Free Info Card
ParkerVision PVTV automated production system
At the heart of the PVTVNEWS line is CameraManSTUDIO NEWS, a computer-based production system that integrates, coordinates and automates all the production equipment necessary to produce a 30-minute newscast. The dynamic dual-monitor interface allows one person to control multiple robotic cameras, VTRs and servers, switch video, mix audio, key graphics, cue digital video effects, and scroll scripts in the manual, semi-automated, or fully automated mode. The system’s Transition Macro automation technology uses an icon-based drag-and-drop timeline, so directors can pre-program all the effects and transitions, preview, and then go to air having seen the finished product. Up to 16 hotkeys can be pre-programmed to insert an entire series of production events at any point in the Transition Macro. The system has been installed at WVLA, NBC33 in Baton Rouge and at News 12-The Bronx, a 24-hour cable news station in New York.
800-532-8034, fax 904-733-3587; www.parkervision.com
Circle (312) on Free Info Card

Pinnacle Systems image management system
Lightning 1000 is a powerful, easy-to-use, image management system with an integrated stillstore, DVE and a paint program. Lightning 1000 offers one-, two- or three-channel operation and is aimed at the high-end broadcast market, in installations where many systems are likely to be networked together. It is available with digital or analog plus digital I/O. Standard storage capacity is more than 5000 stills, with internal expansion capability beyond 10,000 stills. With the addition of external disk drives, storage is unlimited. The Lightning 1000 is used by broadcasters such as Time-Warner, the BBC, ESPN and Swiss Television.
650-526-1600; fax 650-526-1601; www.pinnaclesys.com
Circle (313) on Free Info Card

PanoramaDTV (a Wohler Technologies company) A/V Monitor
The VAMP-1 SDI offers the ability to monitor four channels of analog or digital audio and video signals, including SDI, from one space-saving 2RU unit. The built-in LCD screen allows simple confidence monitoring, and composite output for viewing video on larger, external video monitors is available. A self-powered speaker system, headphone out, source switch, four level meters and phase indication are also included.
888-5-WOHLER; fax 650-589-1355; www.wohler.com
Circle (314) on Free Info Card

Accom video disk array
The WSD/2Xtreme video disk array offers three minutes uncompressed, plus higher-capacity models of 10, 20 and 34 minutes. 2Xtreme is the latest version of Accom’s Work Station Disk (WSD) product line and is used worldwide in computer graphics, editing and post-production applications. WSD is the original desktop digital disk recorder and is used worldwide in 2D/3D computer graphics and editing applications. WSD provides disk storage and video I/O integrated in a single system. With video storage being network-accessible by virtually any computer, plus fast Ultra SCSI-3 performance, WSD/2Xtreme provides fast image transfers and high-quality uncompressed storage for multiple computer platforms.
650-328-3818; fax 650-327-2511; www.accom.com
Circle (315) on Free Info Card

Ross digital production switchers
The Synergy Series is designed for live news, live sports and live production. Over-the-shoulder boxes, picture freezes, repositioning of keys, pushes and more are available with the innovative Squeeze & Tease feature. Complex switcher and remote-control operations are made simple through the unique custom-control hot buttons. Additional features include preview overlay, 12 aux busses, up to 64 inputs, VTR control, external DVE integration and redundant power. Synergy is packaged in a compact 11RU, 600W frame. Three models are available: Synergy 4 (four MLEs), Synergy 3 (three MLEs) and Synergy 2 (two MLEs).
613-652-4886; fax 613-652-4425; www.rossvideo.com
Circle (316) on Free Info Card
**Dolby multichannel encoder**

The DP569* supports encoded bit rates from 56- to 640Kb/s and channel configurations from mono to 5.1-channel surround sound. It lets broadcasters use time code to trigger configuration changes automatically for smooth program transitions. Disk-authoring facilities can use timecode to encode separate program segments accurately and create single encoded soundtrack files. Other features include fault-monitoring circuits that warn of system failure, bypass connections for hot-standby operation in broadcast installations, and remote control from Windows95/NT-equipped devices.

650-589-1355; fax 415-863-1373; www.dolby.com

*The DP569 Multichannel encoder is a replacement for the DP561B, which is no longer in production.

Circle (317) on Free Info Card

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**Pixel Power nonlinear editing and graphics system**

Collage Edit has more than 50 new features and interface refinements. EDit version "Triple One" is a significant development of the system's capabilities, with recent installations in CityTV (Toronto), Oasis Television (London), Key Editing (Stockholm) and Unilever (UK). Combines the functionality of a high-end, noncompressed, nonlinear editing system, sophisticated real-time character generation and graphics capabilities, eight-channel audio and DVE. The system has uncompressed 4:2:2 quality and standard 36- or 72-minute uncompressed video storage with up to 12 hours audio.

+44 1223 721000; fax +44 1223 721111;
www.pixelpower.co.uk

Circle (318) on Free Info Card

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**Gepco audio cable**

The GEP-FLEX has been reintroduced, now with color-coded pair jackets to the base-10 resistor color code. The cable consists of a flexible outer-jacket compound surrounding the 618 (92 gauge), 724 (94 gauge) and 803 (96 gauge) series multipair audio cable. Because of its extremely high/low temperature characteristics and UL-type CM rating, GEP-FLEX is ideal for remote use and permanent installation in recording studios, radio stations and other facilities. Alphanumeric surface print, inverted every inch, identifies the pair jackets. Each pair is jacketed and shielded with a 100%-bonded foil, allowing for both to be stripped in one operation. Gepco will stock the cable in bulk lengths and cut it to the customer's length requirements.

800-966-0069; fax 312-733-6416; www.gepco.com

Circle (319) on Free Info Card

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**JVC widescreen digital camera**

The KY-D99W digital camera is switchable from its native 16:9 aspect ratio to traditional 4:3, offering flexibility in image capture to broadcasters and high-end producers. The camera achieves widescreen capacity via three 460,000-pixel 16:9 CCDs and boasts a microlens over each pixel for maximum sensitivity and negligible vertical smear. The camera can dock to any format and uses 14-bit digital signal processing and three-dimensional digital noise reduction (3D DNR). It features an S/N ratio of 65dB, 850 lines of horizontal resolution.

800-JVC-5825; fax 973-315-5030; www.jvcpro.com

Circle (320) on Free Info Card
Pana-tek light kit

The Cool-Lux COMBO/SOFT Kit is designed around the Cool-Lux Combo-Light, which accepts 300W, 500W, 750W or 1000W double-ended lamps with a Softlight Hood to prevent projecting heat on the subject. The kit contains three Combo-Lights, barn doors, Softlight Hoods, diffusion accessories and 500W bulbs. It also contains two lightweight AC/DC Mini-Cools with 250W lamps, four-way barn doors and dimmers. For DC applications, the kit contains a 12V, 99W bulb and daylight filter assembly. A 35W, 12V Micro-Lux is included for ENG requirements.

805-482-4820

Circle (321) on Free Info Card

Otari minidisk recorder

The MR-30* is a professional, convenient and cost-effective digital recorder that uses commercially available minidisks. It provides various recording, editing and playback functions for broadcast, post-production and sound reinforcement. Features include 148 track-minutes per minidisk, AES/EBU and SPDIF inputs, basic editing with multiple layers of undo and instant playback of selected tracks.

800-877-0577; fax 818-594-7208; www.otari.com

*This product is no longer supported in the U.S. but is available internationally.

Circle (322) on Free Info Card

Spencer serial digital stillstore

The SS-2000 stillstore was designed specifically for TV-news production. It gives a "super-station" look with an affordable budget. Its clear, intuitive graphical user interface and touchscreen provide a system that is operationally fast and easy to use. A traditional style-control panel is available. The minipix stills on the GUI are so clear that preview and program video monitors are not required at the operator position. The unit has a dual-channel DVE and dual linear and chroma keyers built-in. The DVE and synchronizer take ENG or satellite feeds and resize them for "live, over-the-shoulder" presentations typical in a news program. Bumpers can also be created by "squeezing back" the outgoing show credits. Essential for today's competitive news show, the built-in linear keyer displays graphics that have gradient transparency. It also features a powerful database and a still storage capacity of up to 10,000.

818-840-0907; fax 818-840-8375; www.Spencer-Tech.com

Circle (323) on Free Info Card

CommScope HDTV transmission over coax

The 7538 Miniature Serial Digital Coax Cable provides outstanding performance in digital applications and improves wiring management in high-density areas. With a diameter of less than 0.159 inches and a weight of less than 14.3 pounds per 1000 feet, the cable reduces hardware, clutter and weight. This streamlined cable design delivers extremely low signal loss by incorporating CommScope's exclusive gas-injected foam process. The cable provides 84% velocity of propagation, with exceptional high- and low-frequency shield effectiveness. This cable effectively transmits 601 serial digital video up to 720 feet and HDTV transmission up to 190 feet, and provides improved electrical performance. Sony Systems Integration Center installed the 7538 Cable in the All-Mobile Video Production Truck, which won the NAB '98 Best of Show Award. Because of its low weight and durability, Southwest TV of Phoenix selected the cable for installation in three of the company's 50-foot production trucks.

800-982-1708; fax 828-328-3400; www.commscope.com

Circle (324) on Free Info Card
Cameras: To upgrade or not to upgrade
BY JENNIFER M. LOWE

Probably no product area is more riddled with vastly different claims on performance than cameras.

There is no doubt that many stations will want to replace studio cameras when building new sets. Often, the change results from something as simple as a new lighting system. Yet many stations will delay purchases until they see consumers' reactions to 16:9 format programs. The real interest in new cameras seems to center on ENG and remote-production applications. New technology has resulted in lighter, more efficient, higher-quality cameras. Combined with DVCPRO, SX and DVCAM recording formats, station engineers are faced with a bewildering number of camera/camcorder choices. (For a discussion of some of these format issues, see Dr. Digital, p. 46.)

Instead of merely providing readers with a list of models and specifications, the BE staff contacted each camera manufacturer to see how companies are positioning their products in light of a push by some stations to hold off purchases until prices come down and the HD- and image-format questions shake out.

Each camera manufacturer was sent a survey form, which posed the following question, which our readers have repeatedly asked: "My camera works fine. Why should I buy a new camera today when, in the next few years, camera prices will come down and much of the dust from HD will have settled?" As of December 1, after several follow-up calls and faxes to each manufacturer, the following responses were received.

Sony
The era of DTV is here. Regardless of how HDTV and SDTV ultimately shake out, it is certain that both will have a long-term significant role. Depending upon your client base, you need to decide on a near-term investment in an HDTV camera or, at the very least, a contemporary widescreen SDTV camera. All DTV receivers, without exception, are widescreen. From here on out, major productions will only have a shelf life if they are widescreen. There is a learning curve in shooting widescreen, and you need to be proactively engaged in this right now. The new enhancement of DTV picture quality delivered to the home will demand the highest quality in picture origination.

The dust will NOT settle quickly on DTV signal formats, therefore flexibility in conversion between them is the new imperative. In anticipation of the launch of DTV, prices of both HDTV and SDTV cameras have substantially lowered over the past two years, and are not likely to drop much more.

Sony's HDW-700

Sony Electronics offers HDCAM, a high-definition format incorporating HD Digital Compression technology for high-end production. The HDW-700 digital widescreen high-definition camcorder employs the HDCAM format. The camcorder is a full RGB two million-pixel CCD camera with 10-bit 74.25MHz DSP processing of the RGB video.

Laurence J. Thorpe, vice president, Acquisition Systems, Sony Electronics' broadcast & professional company; www.sony.com/professional
Circle (340) on Free Info Card

JVC Professional Products Company

JVC offers the DY-700Y 4:2:2 component Digital-S camcorder featuring an integrated three CCD camera head and a heavy-duty tape transport mechanism. The camcorder has an SMPTE timecode generator and an externally locking timecode generator, and includes a 48V Phantom Power supplied to the mic inputs.

JVC Professional Products Company; www.jvcpro.com
Circle (341) on Free Info Card

Hitachi Denshi America Ltd

There are two primary reasons for buying a new camera. First, to produce in a 4:3 aspect ratio for immediate use and to archive productions in a 16:9 format to use in the future with DTV. Second, DTV today offers very limited programming, but this programming will slowly, but steadily, increase, and in the next year or two there will be a need to begin limited local origination.

At NAB98, Hitachi introduced the SK-3000, a multistandard studio camera that provides simultaneous HDTV and NTSC outputs. The SK-3000 studio/field camera conforms to today's NTSC standards and at the same time offers total compatibility of future ATSC digital broadcasting. The SK-3000 is also available in a portable version, the SK-3000P. Hitachi also offers a number of digital 4:3/16:9 switchable cameras, including the newly introduced SK-2060P, SK-2700W and Z-3000W.

Tony Delp, product manager, Hitachi Denshi America Ltd; www.hdal.com
Circle (342) on Free Info Card
Your guide through the digital maze.
Fooling ourselves into making decisions

BY KARE ANDERSON

Think back on a decision you have made that has had negative consequences, then consider choices that would have resulted in a better outcome.

Some of our biggest regrets come from faulty decision-making. Often, thinking through decisions leads to wiser choices. Perhaps you rely on your gut instincts but are fooled by the unconscious decision-making traps we all fall into. According to negotiations guru Howard Raiffa, we are destined to repeat the same faulty decision-making process and experience more grief from poor results if we don’t gain insight into decision-making traps.

According to Raiffa, the fault often lies not in the decision-making process but in the mind of the decision maker. The following are insights into the three most common traps we set for ourselves when making decisions.

**Anchoring**

When considering a decision, the mind disproportionately weighs the first information it receives. Initial impressions, estimates or other data overshadow subsequent thoughts and judgments. In business, one of the most frequent anchors is a past event or trend. In attempting to project sales of a product for the coming year, a marketer often begins by looking at the sales volumes for past years. This approach tends to put too much weight on past history and does not give enough weight to other factors.

Reduce the impact of the effects of anchoring by following these important guidelines:

- Be open-minded. Seek information and opinions from a variety of people to widen your frame of reference.
- Offer objective information. In seeking advice from others, relate only the facts so you don’t inadvertently anchor the person with your opinion.
- Don’t let someone anchor you. Remember that the person who characterizes a situation can anchor your perception of it.
- Be especially wary of anchors in negotiations. Think through your position before any negotiation begins, so you can avoid being anchored by someone else’s proposal or position.

**Maintaining the status quo**

We are instinctively drawn to what is familiar. Thus, we look for decisions requiring the least change. For instance, when a new product is introduced, it is made to look like a familiar one. As examples, the first cars looked like horseless carriages, and the first online newspapers and magazines were formatted much like their print counterparts.

Experiments have shown that the more choices someone is given, the more influence the status quo has. Why? Because more choices involve more effort, and selecting the status quo helps us avoid that effort. In broadcast, sins of commission (doing something, i.e. taking a digital leap) tend to be punished more severely than sins of omission (doing nothing, i.e. staying with an analog alternative for a while longer). In all parts of life, people want to avoid rocking the boat.

Although avoiding the status quo trap seems difficult, it is not impossible. Start by thinking of your goals when preparing to make a decision. Review how these goals are served by the status quo as compared to a change. Look at each possible change, one at a time, so as not to overwhelm yourself and instinctively want to stay comfortable and unvarying. Never think of the status quo as the only alternative. Remember that the desirability of the status quo may change over time. When considering a change, look at situations that may arise over time. If several alternatives are superior to the status quo, avoid the natural tendency to fall back on the easy decision. Easy decisions are not always the correct decision.

**Justifying past actions**

The more actions you have already taken on behalf of a choice or direction, the more difficult you will find it to change direction. Whenever you have invested time, money, or even your personal reputation in a choice, you will find it more difficult to change your course of action.

Important decisions call for a conscious effort to set aside past actions and investments and instead concentrate on present factors. Seek out and listen to people who were not involved with the earlier decisions.

Don’t cultivate a failure-fearing culture in employees around you. In such an atmosphere, others will perpetuate mistakes rather than admitting them to you and changing course. When you set an example of admitting and correcting your mistakes, others will believe they can do the same.

Kare Anderson is a speaker and author. Visit her website at www.sayitbetter.com.
Windows to the Web

www.pinnaclesys.com
Pinnacle Systems: Pinnacle Systems' broadcast products give professionals the cutting edge tools needed to create dazzling productions faster and more affordably than ever before. These innovative digital video manipulation tools perform a variety of on-air, production, and post-production functions such as the addition of special effects, image management, capture, storage, and play-out, as well as graphics and title creation.

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www.wg.com

www.nova-sys.com
Nova Systems: A leading manufacturer of signal processing equipment for television broadcast, teleproduction, and industrial video applications. Nova's product line corrects, converts, and distributes video as well as audio signals.

www.broadcastengineering.com
Broadcast Engineering: Broadcast Engineering is the only technology-driven online magazine in the industry. Its editorial environment delivers practical, informative articles on digital technology, systems integration, management, how-to installation, and systems and equipment maintenance. It is a package geared toward TV stations, cable/telecom, production, post-production, business TV, satellite and interactive television.

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New Products

HDTV product line
VAS Group 20 Series: models include two Y Pb Pr/RGB transcoders, a safe-area generator and a blanking generator; models accept analog HDTV 1080i and 720p standards (SMPTE 274M and 296M); the field rate is selectable for 59.94- or 60Hz; available in a standard one-RU chassis; 818-843-4831; fax 818-843-6544; www.vasgroup.com
Circle (251) on Free Info Card

Integrated news/sports production system
Quantel Inspiration: handles all aspects of news or sports operation in a fully integrated system; centered around the Clipbox video server, Inspiration integrates the AP Electronic News Production System with journalist PC video browsing and editing capabilities (supplied by OmniBus Systems); provides complete automated control of loading — the OmniBus Columbus automation system provides playout and asset management; 800-218-0051; fax 203-656-3459; www.quantel.com
Circle (252) on Free Info Card

Digital audio editor software update
360 Systems Short/cut '99 software update: Short/cut is a completely self-contained two-channel digital editor optimized for editing of audio, including speech, music, call-in clips, news, promos and spots; scheduled for introduction early next year; the update will support compatible file interchanges with most common formats, including .WAV, .BWF and .AIFF; other features include the ability to generate fade-in, fade-out and crossfade options and to provide for larger capacity hard-disk storage; 818-991-0360; fax 818-991-1360; www.360systems.com
Circle (254) on Free Info Card

ADAT mastering tape
Quantegy ADAT: uses Quantegy's latest coating technology, by which the front coat of the tape is an optimized high-coercivity, cobalt-doped, gamma-ferric oxide particle and the base film is tensilized for superior handling; the shells and special carbon backcoat are designed to reduce BER and increase performance; 42-plus- and 60-minute program lengths are available in reusable sleeves or in an album configuration; 770-486-2800; fax 770-486-2808; www.quantegy.com
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Media processing platform
Chyron Duet: available as an SD or HD system, this WindowsNT, GL-compliant video machine supports 56 simultaneous, full-bandwidth video streams along with an object-oriented 2D/3D graphics engine scalable to various DTV resolutions and scan rates; Duet is an open platform that includes CAL, the Chyron Abstraction Layer; the CAL library provides full access to all Duet functions and works with third-party applications through Microsoft's COM and DCOM technologies; 516-845-3871; fax 516-845-3888; www.chyron.com
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Digital video switcher
Sony DVS-7150: combines up to 24 inputs with the flexibility of a 1.5 mix/effect bank architecture and tight DME effects integration in a compact format; inputs can be specified in SDI or NTSC formats; up to seven aux busses, including an edit preview bus, can be used to feed video and key signals to external DMEs, monitors and recording devices; switchable 525/625-line operation with component signals and switchable 4:3/16:9 operation; 800-635-SONY; 201-358-4058; www.sony.com
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Two microconverters
Miranda picoLink SDM-771p and IDA-771p: a monitoring D/A converter and an impedance converter, respectively; the 4"x1"x0.7" units, with lightweight, compact aluminum bodies and a simple design, allow for easy installation and operation; 800-224-7882; fax 514-333-9828; www.miranda.com
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www.americanradiohistory.com
ATSC-compliant, MPEG-2 transport stream analyzer

Digital Transport Systems MPEG-2 Transport Stream Analyzer: ATSC standards have been added to this DVB-compliant unit; available in desktop and portable configurations, it can be delivered with DVB-compliant transport stream analyzer and generation capabilities or upgraded with these features as user needs expand; allows for real-time analysis of an MPEG-2 ATSC transport stream at the output of a multiplexer, demodulator or encoder during development or manufacturing stages for quick isolation and correction; 619-675-1410; fax 619-675-1412; www.dtsys.com

HD station automation and post-production systems

Sony and Pluto Technologies International HyperSPACE HDCAM: a playout server to be used in broadcast applications for HDTV random-access station automation and as an HD disk recorder for post-production applications; uses advanced HDCAM compression technology; allows broadcasters, cable operators and post-production facilities to operate in a purely HDCAM environment, minimizing generational video quality loss and improving the on-air product; 800-686-SONY; fax 201-358-4058; www.sony.com/news.

Single-channel encoder with built-in modulator

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Digital audio cable
GEPCO 5524EZ: features improved performance at a lower price; 1110Ω AES/EBU single-pair cable features two 24-gage conductors and a high-speed foam dielectric; can be used for runs of up to and beyond 650 feet; completely shielded by a bonded aluminum/polyester tape with a 24-gage drain wire; the outer jacket is an easy-to-strip, gray UL-list type CM PVC compound; the pressurized jacket keeps the physical spacing between the pairs and the shield consistent; 312-733-9555; fax 312-733-6416; www.gepco.com
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Monitor series
Sony monitors: BVM G Series: includes 14- and 20"-models that use HR Trinitron CRT technology; features an advanced auto white balance capability; switchable 4:3/16:9 aspect ratio; can be fitted with a separate control unit from which the user can run up to 32 individual units. PVM Series: a 9-inch monitor series that provides improved degaussing function, including manual degausage, and a switchable 4:3/16:9 format ratio with a switch on the front of the monitor; includes 250-line and 450-line resolution monitors; 800-635-SONY; fax 201-358-4058; www.sony.com
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Free software upgrade
Videonics Version 1.1 Effetto Pronto Effects for Macintosh: a combination of compositing and effects software and a PCI hardware accelerator; offers instant feedback on effects processing, unlimited layering capabilities, sophisticated tilting and color correction; adds RAM and disk caching capabilities to the product; 408-866-8300; fax 408-866-4859; www.videonics.com
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360 Systems Instant Replay 2.0: a self-contained professional digital audio player and recorder; provides immediate access to 1000 audio cuts; offers high-quality linear and Dolby AC-2 digital compression technology; stores frequently used cuts to 50 panel-mounted buttons for immediate access in 10 user-defined groups; each cut is stored with a name and ID number; individual cuts can be organized into playlists and triggered remotely; audio can be recorded, titled, arranged and played with no length limitations; 818-991-0360; fax 818-991-1360; www.360systems.com

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Real-time clocks and logos application
Inscriber Technology Clocks&Logos: enables TV stations to display time, temperature and logos on-screen during live broadcasts; runs on the NT operating system; allows for placement of real-time data fields anywhere on the TV screen; the clock component includes a screen for customizing the look of a variety of digital clocks; the logo module imports and places logo files in several file formats; includes a temperature field that displays temperature data in real time from an outdoor thermometer, 519-570-9111; fax 416-391-1999;

www.inscriber.com

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SDTI interface
NDS SDTI: developed in collaboration with Panasonic, the interface enables the transparent carriage of DVCPRO Native over an MPEG-2 transport stream; allows the quality video and audio of DVCPRO to be maintained from acquisition to the newroom or post-production; will be available for NDS’ new E5000 encoders, including its Mobile Contribution encoders and DSNGs; 949-725-2500; fax 949-725-2505; www.ndsworld.com

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Panasonic

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The V-16 and V-20 are portable, walk-on, walk-off units designed to be used with ENG cameras. They are designed to be used with ENG cameras and provide up to 100 pounds of stabilization. The V-16 has a maximum height of 20.7 inches and a maximum width of 14.7 inches. The V-20 has a maximum height of 28 inches and a maximum width of 20 inches. Both units are designed to be lightweight and easy to use.

**Digital TRILPACK**

Digital TRILPACK is a high-performance, lightweight camera stabilizer designed to provide excellent stability and performance. It is designed to work with ENG cameras and provides up to 100 pounds of stabilization. The unit is lightweight and easy to use, and it is designed to be used with ENG cameras.

**HyTRON 50 Battery**

The HyTRON 50 battery is a high-performance, lightweight battery designed to provide up to 100 minutes of operation. It is designed to work with ENG cameras and provides excellent performance and reliability. The battery is lightweight and easy to use, and it is designed to be used with ENG cameras.

**Digital Pro PACs**

Digital Pro PACs is a high-performance, lightweight camera stabilizer designed to provide up to 100 pounds of stabilization. It is designed to work with ENG cameras and provides excellent performance and reliability. The unit is lightweight and easy to use, and it is designed to be used with ENG cameras.

**Caddy Systems**

Caddy systems include Caddys and FLR 900 NCG_Sport, FLR 900 NCG_Tripod, and FLR 900 NCG_Light. These systems are designed to provide excellent performance and reliability. The FLR 900 NCG_Sport is designed to work with ENG cameras, and the FLR 900 NCG_Tripod and FLR 900 NCG_Light are designed to work with ENG and ENG cameras.
NewTek 3-Oz. Pocket-Sized Test Generator

The line of a full-page print and memory on a single battery. Caliber is an NTSC test signal generator that fakes a rack mounter's worst of requiring equipment into a turnkey command equipment. Caliber is the fastest, easiest, and most portable way to capture video equipment ight. No clock, no back-up. Just one button. No batteries, no rear, no charge markings in the field. It's perfect for off-line events or objects charging in the field.

- Designed for studio and field operation, 24 test pattern functions at the touch of a button. 10-bit precision digital to analog conversion assures faithful reproduction of analog signals. Caliber's convenience of low cost, portability and full-featured characters allow it deal for broadcast engineers, live production facilities, and video post houses.

PC-CODI & PC Scribe

Text and Graphics Generator and Video Titling Software

PC-CODI incorporates a broadcast quality encoder and a high-resolution linear key for the highest quality, real-time video character generator and graphics display. A video graphics software engine under Windows 95/98/NT. PC Scribe offers a new approach and cost effective solution for composing titles and graphics for video production and display applications. Combine them for a total solution for the quality your picture quality.

- Fully-anализed displays. Display and on-screen computer display.
- Less than 15 nonrepetitive pixel point resolution.
- 17 million color selection. Fast, real-time operations.
- Character. Landscape and PGA image transparency.
- Variable edge blur. Border, drop, drift and offset.
- Full position and justification of character and move.
- Slow motion. Character spacing. Character size and position.
- Multi-rate. Control character spacing and position.
- Shaded backgrounds of variable sizes and transparencies.
- Smith controlled video timing.

PC-CODI Hardware:

- User definable rules applied to titles, papers, ladders.
- NTSC or PAL lyric generator with generator.
- Board adaptability for multi-channel applications.
- Auto display rendering. Landscape, portrait and words.
- Preview output with size and intensity controls.
- Color and single video output with auto-gentle-spacing.

PC-Scribe Software:

- Multiple preview windows can be displayed simultaneously.
- Transitions effects include cut, fade, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, wipe, w
Help Wanted

CHIEF ENGINEER WZDX-TV, Fox 54, Huntsville, AL has an immediate opening for a hands-on chief engineer. The successful applicant will have extensive UHF transmitter and studio equipment maintenance experience, and will oversee master control operations. Ideal candidate will have at least 5 years experience as chief or assistant chief engineer. Send resumes, including salary requirements to: Gloria Johnson, WZDX-TV, PO Box 3889, Huntsville, AL 35810, or fax to 256 (533)-5315.

SOFTWARE ENGINEER Gainesville, FL. Develop algorithms for television automation using expert system rules to discriminate between program materials & commercials, in absence of discrete data that would identify the existence or location. Design new version using newest technology available & transform to Windows NT system. Evolve hierarchical storage management system for digital video resident in caches & video tile servers. 40 hrs/wk, 9AM-6PM, M-F, $46,000/yr, requires B.S. in Computers or Math. 5 yrs. exp. in job offered or 5 yrs. as Systems Analyst. Send resume to: Dept. of Labor, Bureau of Workforce Program Support, PO Box 10869, Tallahassee, FL 32302-4869. Job Order: FL-1871112.

MAINTENANCE TECHNICIAN Requires self-starter having experience with Beta, VPR-3, PC's, DVC PRO, and other studio equipment maintenance. Experience with microwave, satellite, VHF & UHF transmitters, CADD ability and FCC General Class Licenses preferred. Contact Charles Holer, Manager of Engineering Maintenance, WTNH-TV, 8 Elm Street, New Haven, CT 06510. No phone calls please. EOE.
TELEVISION MAINTENANCE ENGINEER

needed for UHF TV/FM/AM Remote truck/Uplink facility in upstate New York. Work involves troubleshooting all facilities' equipment to the component level. This position will provide a continuous flow of technical problems to challenge your imagination.

Experienced staff members will provide support and assistance with maintenance and construction projects and provide educational opportunities at this aggressive station. Preferences are given for training and experience in Sony video cassette transports; satellite receive/uplink; digital/computers; UHF, FM, and AM transmitters; linear and non-linear editing systems; SBE certification; and previous installation work. We offer a competitive salary. Rochester has a four-seasons climate, an international population with a technology base, with good sports, cultural, and recreational opportunities. Send cover letter, resume and salary expectations to: WXXI Human Resources, PO Box 21, Rochester, NY 14601. EOE.

CHIEF ENGINEER

WTSP-TV is seeking a Chief Engineer to direct all of the technical operations of the television station reporting directly to the General Manager. Candidate must have experience in all aspects of broadcast engineering, including in-depth knowledge in the transition to digital technology. As technology and industry demands develop, the duties of this position will grow to meet those challenges. Responsibilities will also include all aspects of capital planning and expenditures. Advanced computer skills are desirable. FCC license/SBE certification are preferred. Favorable candidates will have five or more years of technical management experience in a broadcast environment and proven ability to manage a large technical staff. WTSP is an equal opportunity employer and encourages women and minorities to apply. Send resume to: Noreen Parker, Vice President & General Manager, WTSP-T.V., P.O. Box 1008, Denison, TX 75021. EOE.

CHIEF ENGINEER - KMBY TV

Duties include: UHF Transmitter Maintenance & Repair, Microwave and Studio Maintenance & Repair, Good working knowledge of computers & automated broadcast systems. Apply to: KMBY Box 7277, Bismarck, ND 58507 Call: (701) 223-1700. Equal opportunity employer supports a drug free workplace.

MAINTENANCE/RF ENGINEER

Looking for someone with a strong TV maintenance background. Experience in maintaining 1" tape equipment. This is also a DVC Pro house. Need experience with Panasonic and Sony Equipment as well as studio cameras and Oedecia Spotbank systems. Windows 95 and Windows NT Experience a must. We are also looking for a RF Engineer for both TV and Radio transmitters as well as RPU, Marti and microwave systems. Please no phone calls. Send resume to: Stephen Gimbert, Director of Engineering, Equity Broadcasting, #1 Shackelford Dr., Suite 400, Little Rock, AR 72211 or Fax (501) 221-3955.

MAINTENANCE ENGINEERS NEEDED

WAMI-TV, Southern Florida's most progressive television station needs qualified engineering personnel. Studio experience required. Transmitter experience and SBE certification a plus. Great work environment & excellent Miami Beach location. Please fax resume to: (305) 604-0406 Attn: Human Resources. Equal opportunity employer. No phone calls please.

MASTER CONTROL OPERATOR

Applicants will be considered who have previous experience as Master Control Operator. Must be familiar with affiliate operations, satellite and microwave equipment. Knowledge of NTSC and ATSC standards required. Must be willing to work nights/weekends and overtime as needed. To apply, send cover letter and resume to Human Resources Director, ABC25/WJXX, Inc., 7025 A.C. Skinner Pkwy, Jacksonville, FL 32256. Fax (904) 332-2527. No phone calls accepted.

CORPORATE CHIEF ENGINEER

Lockwood Broadcasting Group seeks Corporate Chief Engineer. Candidate must have a minimum of three years experience as Chief Engineer and should possess strong working knowledge of VHF transmitters, microwave STL/TSL, digital storage/routing and station operations. Above average computer, technical and people skills are necessary. Candidate must be able to repair all electronic studio and transmitter equipment. Reply to: Station Manager, KENTV, P.O. Box 1068, Denison, TX 75021. EOE.

MTV NETWORKS SENIOR POST-PRODUCTION TECHNICIAN

Begin a career with MTV Networks, one of the world's most successful entertainment companies. As part of the Viacom family and comprised of MTV, VH1, Nickelodeon, Nick and NITE, NICK at NIte's TV Land and M2, we offer outstanding opportunities for professional growth. We currently have a challenging opening for an experienced Post-Production Technician. In this role, you will support and maintain all broadcast graphics and post-production systems. Key responsibilities include maintaining and repairing technical equipment, troubleshooting linear and non-linear editing systems, and providing operational instruction and technical support to users. To qualify, you must have 2+ years of industry related experience with strong knowledge of video and computer graphic equipment such as GVG, Sony, Avid, Quantel, and SGI. Post production system operation and A/V equipment troubleshooting and repair skills are essential. Solid analytical and interpersonal skills are musts. A college degree is preferred (High school with vocational or technical school training acceptable). We offer a competitive salary and benefits package. For consideration, send your resume and cover letter with salary requirements to: MTV Networks, Staffing Resources-Dept. JP-AV, 1515 Broadway. 16th Floor, New York, NY 10036. We regret that we can respond only to those candidates who meet the above requirements. We are an equal opportunity employer.

MAINTENANCE ENGINEER

New England Cable News in Newton, MA seeks a 3/F Maintenance Engineer to join our talented team. Qualified candidates must have 3-5 years maintenance experience in a cable or broadcast operation, a solid background of computer and electronic skills, and the ability to perform component-level maintenance on a variety of electronic equipment. Computer experience should include skilled PC troubleshooting and previous work with Windows NT and I-S technology. Previous Internet experience desired as we are currently running a state of the art streaming video website. SBE certification and/or technical degree preferred. We are in the 3rd phase of an extensive expansion project, and we are looking for the right person to help facilitate that growth. Interested candidates should send their resume with cover letter to: Nancy Buzby, Operations Manager, NECN, 160 Wells Ave., Newton, MA, 02459, or fax to (617) 630-5057.

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Multi-channel cable TV facilities in Littleton, CO. Duties include installation and repair of all types of broadcast video and audio equipment. Minimum qualifications include 3+ years of broadcast video, audio equipment repair and operations experience. The preferred candidate will also possess an Associates Degree in Electronics and experience in maintenance and repair of analog and digital studio and editing equipment, including cameras, multiple format video tape recorders, video switchers, digital video effects, character generators, switchers, audio mixing consoles, Avid non-linear editors and CMX edit controllers. Other duties: weekend and shift work as required. A drug and background check will be required for successful applicants. Non-smoking environment. Please submit resume with salary history to:

TCI-National Digital Television Center
4100 E. Dry Creek Road, Littleton, CO 80122
Attn: Studio Engineering Supervisor
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STUDIO SUPERVISOR

Engineering Supervisor for studio operations at KOB-TV. Should possess minimum of Associate Degree in Electronics. Must have five years experience in the repair of Beta, SP, cameras, studio production equipment, video servers, and have a solid background in computer systems. Analog and digital troubleshooting skills plus the ability to communicate with others. FCC Radio Telephone Operator License desirable. Send resume to: KOB-TV, Job #46-58, 4 Broadcast Plaza, SW, Albuquerque, NM 87104. EOE/M/F.

MORRIS CERULLO WORLD EVANGELISM is seeking a Television Engineer to manage, maintain all equipment (Beta SP, Sony 3100 1/4” VTR’s, Panasonic D3, Grass Valley 200 switchers, K-Scope, Router, 100 Switcher, Sony BVP 7 cameras, Chyron 4200 & Super Scribe, Audio Consoles. Requires strong working knowledge of RS170A timing standards. Experienced with DOS. Contact at MCWE, P.O. Box 85277, San Diego, CA 92186-5277 or fax to (619) 277-5111.

VIDEO ENGINEER

The MSG Metro Traffic & Weather Channel is looking for a Video Engineer to be responsible for doing systems level to board level diagnosis, repair and maintenance on DVCPro VTRs, HP MediaStream disk recorders, Locut automation, Probel routers and control systems. Must possess strong computer skills (PC/Windows, Mac, Unix) and LAN experience, and be a self-directed individual able to work independently. Valid driver’s license and clean driving record required.

Please send cover letter and resume to P.O. Box 999-JB, Woodbury, NY 11797. EOE.
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When was the last time you dropped into Leidschendam for a business meeting? The town, just east of The Hague, The Netherlands, is about a 30-minute drive north from the Rotterdam airport. During IBC in Amsterdam, it is certainly a good place to drive to, thereby ensuring that there are no other convention delegates at the same restaurant wondering what you are so earnestly talking about. I should be happy because the group of 12 who met in Leidschendam is, intentionally or not, going to throw a monkey wrench into the works of Wintel’s Advanced Television Enhancement Forum (ATVEF)(see EOM, September 1998). Unfortunately, I’m not fully convinced I should smile all that much.

Certainly, some of the ATVEF members are not happy with this group and the initiative they are founding for what they term Advanced Interactive Content (AIC). The proposal ties various multimedia platforms as content into the same datastream. ATVEF is focused on limited interactive Internet. I worried about the ATVEF proposal because it appeared to be another avenue by which we would be forced feeding marketing messages.

The founders of AIC (read “ace”) have the backgrounds and histories to quickly get some standards made. AIC points out that it is not another standard body. Its goal is to get information to the multimedia committees concerning the direction required to harmonize standards. The fact that these founders will be reporting developments from their various committees is, in itself, something we ought to be blessing and praising. A central reference point for these technologies is long overdue.

The main thing AIC has in common with ATVEF is providing content for the DTV environment. While the Win-terror direction is Internet content, AIC wants to integrate BHTML (broadcast HTML) with MPEG-4, VRML and BIFS (binary format for scenes). BHTML is being written in XML (extensible mark-up language) which is tight with Java and one of the two competing formats being evaluated by ATSC’s DTV Application Software Environment (DASE) group. The other format comes from, guess who? ATVEF, of course. The chairman of the DASE group is Aninda Das-Gupta, one of the founders of AIC. (If I were an ATVEF proponent, that might worry me a little.)

Joining technologies

Apparently there aren’t any insurmountable problems in joining the technologies together. However, there are several different directions they could take, including a natural one. MPEG-4 offers access to 2D and 3D objects as well as audio-visual streaming. MPEG-4 could also be the main supplier of content with additional material from BHTML language and VRML/BIFS textual/binary images. MPEG-4 is also a natural for the DTV channel. It shares the same timing and clocks as MPEG-2 and fits like a glove in the datastream. Assembling the syntax and tools to put BHTML and VRML/BIFS into MPEG tools also appears straightforward.

The 12 founders of AIC have set themselves an incredibly ambitious timetable: • The first agreement on the specification is scheduled for this month.

• Validation testing should be complete by March 1999.

• Products are expected to be available by the last quarter of 1999.

The timetables of the various committees are being merged and member resources are being allocated to make sure this happens.

So, am I smiling? I am relieved to a certain extent that none of these founders is content rich. Therefore, they are probably not pitching particular sales in our direction. However, those who can push such material are only a short hop away and are solid waiting in the wings. The founders believe the applications will be the ever-popular program guide (rich in graphics this time), video/audio streaming, outtakes, and the ubiquitous shopping opportunities we are all anxious to let our kids loose with.

Overall, I am withholding judgment on this one; it smells good. At best it kills ATVEF. At worst it dilutes it to be like one of cable’s interactive offerings. The timing almost certainly means products will be in the market quicker, and everyone is anxious to get that 6MHz filled up.

For reference, the 12 founders and the committees they represent are: Olivier Avaro, MPEG-4; Don Brutzman, VRML; Leonardo Chiariglione, MPEG-4; Aninda Das-Gupta, ATSC; Rob Glidden, VRML; Rob Koenen, MPEG-4; Chris Martin, VRML; Rick Rafey, VRML; Cliff Reader, MPEG-4; Pete Schirling, BHTML; Neil Trevett, VRML; and Ted Wugoński, BHTML.

Paul McGoldrick is an industry consultant based on the West Coast.
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