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1995 Academy of Country Music Award
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An S-15 DSNG Vehicle contains everything you need, including a Ku-band uplink, satellite monitoring and control, switching and monitoring systems, audio and video equipment, and videotape units. The lightweight, high-performance, 1.2 meter antenna folds behind an aerodynamic cowling for high-speed highway travel, and raises automatically on command.

The on-board, DVB Interoperable, Harris DSE1400 Digital Satellite Television Exciter provides money-saving broadcast efficiencies which may make the S-15 the most economical choice of all.

With a low height of just over 8 feet, this standard weight-class passenger vehicle can carry a crew of three without needing a special motor vehicle license.

Over 500 years of Harris team experience in design and integration, with unrestricted customizing as the rule, means that your S-15 DSNG system can be anything you want it to be, as it takes you anywhere you want to go.

Harris offers the broadest selection of electronic equipment, backed by the industry's finest warranty and 24-hour support, worldwide.

To find out how you can do more for less, and do it first, contact Harris.
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ON THE COVER: Larry Click gets creative using the 50 compositing layers and Dveous FX, a Scitex Digital Video ImMIX StrataSphere digital non-linear editing workstation, located at Flessing & Flessing, Auburn, CA. Photos and compositing by Douglas Schwartz, Sterling Communications, Santa Clara, CA, and Rick Der Photography, San Francisco, CA. Images courtesy of Pinnacle Systems.
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Marketplace leadership

With time running out, the broadcast, computer and consumer electronics industries reached an agreement on digital TV transmission standards. Perhaps as a Thanksgiving turkey to the American public, the three groups forged an uneasy alliance on Nov. 25 to help get ATV off the ground. Just what FCC chairman Reed Hundt wanted, a decision to not decide — another word for marketplace leadership.

The agreement between the three industries is so tentative that it expires on Dec. 31. If the commission doesn't approve the Grand Alliance standard with the certain exceptions by then, the agreement expires.

The short of it is that the groups collectively recommended that the FCC adopt the Grand Alliance standard as written — with the exception of Section 5, Table 3. This table basically outlines the interlace and progressive formats along with the horizontal and vertical resolution for the 18 different display formats. With that table deleted from the standard, TV stations can transmit just about anything they want to.

Fortunately, TV set manufacturers have stated that they'll produce sets that will decode all 18 formats. This means that the sets will probably decode almost anything the broadcasters or the computer industries decide to transmit. Set manufacturers could, however, decide to produce sets that will decode only one or a few of the possible formats. That would immediately force broadcasters to adopt that format. Or, the computer industry could decide to produce programming with specifications outside the 18 specified Grand Alliance formats. Your brand new TV set would not be able to receive the signal. You can bet that your new computer would, however. We're back in a "marketplace decision" mode, a la the AM stereo fiasco.

By most accounts, the FCC will approve the GA standard with the modification by year's end. Set makers are eager to bring new models to market. The computer industry is more than ready to try to woo consumers to a progressive display and their PC/TV operating system. That leaves the broadcasters looking for direction.

Fortunately, you don't have to know what video format you're going to have to transmit. You just have to decide to stay in business and begin the planning process now. As the attendees were reminded at last month's third annual Broadcast Engineering Transition to Digital Conference, the future lies in digital. So begin making plans now to adopt digital solutions in as many places as possible.

The most important step is to start planning for the needed upgrades in the transmission system. No matter what ATV format you'll eventually need, the tower, antenna and transmitter will be the same. Any encoding changes will be relatively inexpensive and easy to implement. For instance, Harris has already announced that its ATV exciter will accommodate any of the proposed transmission formats and that future changes can be accommodated.

Your New Year's resolution should be to:
• Order a tower structural analysis as soon as possible.
• Begin the planning (and budgeting) for a new antenna and transmitter.
• Consider placing bids for the transmission components in 1997.

Because tower, antenna and transmission components may take a year or more to get, you may not want to wait until sets appear in your viewers' living rooms to start this process. These simple actions can help guarantee you a place in the manufacturing process and help ensure timely delivery of the systems you'll need to remain in business.

Brad Dick, editor
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IFplus means wider angles at shorter MODs and the widest angle lens available. It means higher MTF performance (corresponding to 6MHz) an advance that is consistent with the needs of 16:9 formats, where the censity of the scanning lines are 20% greater than 4:3. It means reduced chromatic aberration, the result of a new glass material Hi-UD. IFplus also features an ideally angled “Ergonomic Grp” allowing the user to enjoy fatigue-free shooting even over a long period of time. A special protein paint even absorbs perspiration.

When you want the best family of lenses, be sure to look for the IFplus name. We’d like to tell you more. For information, please call 1-800-321-4388.

(In Canada call 905-795-2012)
Dear editor:

The TV and the PC are not fated to merge into one appliance because, separately, they serve two different functions. Take a look at the way the consumer uses each one: The PC is an active and solitary experience — the user sits two feet away and tactically manipulates its programs. The television is a passive experience and is often shared with others.

That the television is the focal piece of furniture in America's living rooms should tell you that it's intended for group use --- much like the sofa. The PC sits on a desk facing one chair. Hmm. Would you want to lounge on the couch after a long day at the office and watch your spouse balance the checkbook on Television-Quicken? Would you ever then, frustrated and bored, go sit at a desk and watch "Independence Day" in its entirety on the PC?

I don't see a crossover working, because I hate watching powerless as my husband remote controls through TV shows I hate. If he tried to subject me to his WWW-on-TV choices, I would be forced to wrestle the wireless keyboard away from him and knock him unconscious with it. I don't think that would be good for the equipment.

Michelle Brown
Manager, marketing and communications
Tele-TV Systems

---

Dear editor:

As a local broadcaster who has been dropped from the local cable system, your editorial (BE September 1996) was right on. After six years into a 10-year retransmission agreement, the local cable system chose to accept the expression of approximately 200 of its 90,000 viewers and drop this local broadcaster from its system.

Give us a break! The cable systems seem to believe that they know best what we should watch?

Dick Tedeschi
General manager
RLB-TV

---

Dear editor:

Please inform Al Fisher, author of the "96 Olympics: Gold Medal Technology" (BE August 1996), that the International Broadcast Center for the 1996 Atlanta Olympic Games was in the Georgia World Congress Center and not at the Georgia Dome.

And while I am on my soap box, I would really appreciate it if someone would write an article about the inner workings of the TV world at the 96 Olympic Games that had actually been in Atlanta and not read it from ACOG/AOB/Panasonic press releases.

I was there and I saw a lot of great nuts-n-bolts television going on at the individual venues. But all I have read so far is about how great the Panasonic-equipped IBC and NBC worked.

And to date, no one has written a word about the hundreds of hard-working AOB TV free-lancers from all over North America that worked 16-hour days for two to three weeks. It was hard work, but satisfying.

Would I go work Sydney and face the same obstacles and more? You bet, in a heartbeat.

Andrew Parris
Production engineer and free-lance videotape OP/video operator
Taft Broadcasting

Al responds:

Thanks for your first-hand comments about the Olympics article.

I agree that reporting on an event the size of the Olympic Games is best done at the site. However, publishing deadlines sometimes don't allow that, so we had to work from press releases and from interviews with working people (including free-lancers) and managers of the broadcast organizations.

I hope you have the opportunity to work the 2000 Games in Sydney.
Telemetrics Goes The Distance.

Several feet to several miles. It's the range of distance Telemetrics delivers to turn your ENG cameras into full featured EFP cameras for the field and the studio. With direct docking camera adapters -- factory set-up ready to plug and play. And the compatibility to interface with virtually any video format including digital. It's the level of performance you would expect from the people who invented triax and coax camera control technologies.

For composite video, there's the Telemetrics TM-9250 triax system. It maintains signal integrity over the longest cable runs (5000 feet*). And offers comprehensive camera set-up and adjustment capabilities, along with video, return video, microphone audio, intercom, tally, and genlock -- plus power. It's the industry standard for quality and performance. For component video, Telemetrics' TM-9660 Triax System offers all the same functionality. With all the benefits of component video transmission to a distance of 4000 feet.

If you're working with coax, the Telemetrics TM-9255A Coax System delivers cost-effective camera remote control capabilities at distances of 1500 feet. Plus power for the camera and a large studio viewfinder. Telemetrics also offers the TM-9525 Dual Coax/Fiber System. This highly versatile system employs dual coax cables up to 500 feet and can be cost-effectively interfaced with 15MHz unidirectional fiber optic transceivers for long distance camera control without the use of repeaters.

Get more mileage from your ENG cameras. With Triax and Coax camera control systems from Telemetrics. They go the distance. For more information call 201-848-9818, or fax 201-848-9819.
Harris survey reveals TV stations' mindset on digital TV

In a just-released survey for Harris Broadcast, TV station executives described their thoughts on the conversion process to digital television. Although this survey was completed before the just-announced agreement between the computer, broadcast and TV set manufacturers, the results remain valid.

It's cheaper than you think

One of the most surprising results of the survey was how much station executives overestimated the cost of converting to ATV. Fully 25% of the respondents thought it would cost $8 million or more to convert their stations to ATV transmission. The next largest response category, 20%, thought it would cost about $2 million. See Figure 1.

The real cost of getting just the RF portion of a TV station going is closer to $1.5 million, according to some experts. This means that stations may be overly pessimistic about the cost of continuing to do business in the ATV future.

What is unspoken is the cost to equip a complete camera-to-antenna system. While that would certainly be in the higher cost range, there is no reason for stations to fear facing those costs in the near term. With the FCC expected to approve the recent agreement between the “big three” industries by year’s end, stations need only be concerned now about footing the bill for a transmitter, antenna and possibly a tower, to begin ATV transmissions.

The clock is ticking

Not surprisingly, more than 60% of the TV station respondents wanted at least 10 years to complete the conversion to digital TV broadcasts; 75% wanted at least seven years.

Despite the desire for a long conversion time frame, stations said they felt the process would be completed much earlier. The majority, 51%, felt stations would convert to digital transmission within a two- to five-year time frame after the FCC sets the process in motion.

The advantages of ATV

When asked why stations should implement digital television, a resounding 72% said it was to remain competitive. Only 3% saw ATV as having the major benefit of generating additional revenue. Another minuscule 3% saw ATV as a major benefit to their ratings. Some 17% perceived ATV’s major benefit as producing a better-quality signal.

These results might be perceived as grudging admission by TV stations that they have no choice but to implement digital transmission just to remain in business. Clearly, few respondents see immediate financial benefits from building ATV stations.

TV executives miss the mark

One area where TV station executives seem to have missed the mark is in predicting when ATV receivers will be available. The results may reveal more wishful thinking on their part, than what’s more likely to happen.

More than one-third, 34%, said that new ATV sets wouldn’t be available until five years after the announcement of a standard. Even 17% thought it would be at least six years before sets were available.

More than one-fifth, 21%, said it would take two years for sets to appear on the market. Looking at all responses, station executives predicted that sets wouldn’t be available until 4.5 years after the announcement of

Figure 1. When questioned on the predicted cost to implement ATV, most stations greatly overestimated the actual costs. According to some experts, the RF portion of an ATV system could be built for approximately $1.5 million.
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Henninger 1150 Post

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1150 Post is engineered as an all-digital facility to ride high on the next wave of post production technology. Editbox was the logical choice to add to this creative boutique. It’s perfect for autoconforming, video sweetening and graphics compositing. As a non-linear, non-compressed, component digital system, it doesn’t get any better than that.

Vicky Braden
General Manager, Senior Editor

CBS ‘60 Minutes’ segment: The National Park Service

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It is worrisome that stations may be underestimating the speed with which TV set makers and the computer industry plan to implement the new digital technology. This could leave some stations dangerously behind the technology curve as their viewers begin purchasing these new sets — and tuning to the alternatives that may be available by then.

With billion-dollar industries like computers and TV set manufacturers ready to run, broadcasters must not wait until the last minute to train for the upcoming race. Installing towers, antennas, purchasing land, and clearing zoning issues all take time — precious time. Several of the larger broadcast groups have already ordered or issued contracts for transmitters and antenna systems. Individual stations may want to take a clue from the big guys and cue up now for the needed hardware.

**Stations may be overly pessimistic about the cost of continuing to do business in the ATV future.**

**Learned lessons**

The Harris survey is a benchmark study in the “mindset” of broadcasters. In total, it presents a conflicting picture of not only the costs involved, but the time frame in which stations must be ready to move.

The most positive element is that stations have overestimated the conversion costs. It will not be as expensive to get an ATV signal on the air as many think. With a year to plan, many stations will be able to budget accordingly.

**Editor’s note:** For more information about the results of the survey, contact Harris Broadcast at 217-222-8200.

---

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**NEW BATTERY AGE**

**40% Lighter 50% More Power**

We’ve succeeded where others have failed!

IDX introduces a new age in battery technology with the world’s first LITHIUM ION rechargeable NP size battery – the NP-L40. Amazingly lighter and more powerful than traditional nickel cadmium batteries, the NP-L40 has no memory effect, requires no discharging and has unique built-in intelligent control.

Still not convinced... The NP-L40 can be used in parallel, has onboard 5-LED accurate capacity display and is environmentally friendly with no need for recycling. All this lightness power and high technology in a standard NP size!!

Take the weight off your shoulders! Try the new NP-L40 today.

[Circle (13) on Free Info Card]
Actually, when it came time to standardize on one disk interface protocol, it wasn’t that hard. The top ten manufacturers of disk systems overwhelmingly chose The Louth Protocol.

We’d like to tell you it was our impressive track record in broadcast automation that did it. Or our reputation for pioneering object-oriented programming to make automation faster, easier and more flexible. But the truth is, disk manufacturers chose the Louth Protocol because it works. It’s open. And it’s free. 100% public domain.

Now, whether you call it enlightened self-interest or investment spending, the fact is we didn’t give the Louth Protocol away for nothing. We were looking ahead.

It has not only simplified applications such as Ad Insertion, Caching, Program Acquisition, Time Delay and Multi-Channel Management, it has made the future easier for everyone. By opening a pathway that is free of gatekeepers, toll takers, and proprietary potholes. That’s why we agreed to make the protocol available to our competitors in automation, as well.

We believe in working with anything. Even when it’s hard.
A DTV agreement

A compromise has been struck by the broadcast, computer and set manufacturers on the proposed DTV standard. In a statement by FCC chairman Reed Hundt, the FCC’s goal has been to trust the market, not government, to define digital television of the future.

With the three industries coming to an agreement, the groups have recommended that the FCC adopt the voluntary ATSC DTV standard, except for the video format (Section 5 of Table 3), by Dec. 31. The FCC’s Report and Order adopting the standard will also allow data broadcasting, which is the transmission of any type of data other than real-time video and audio programming.

TV ownership rules revisited

The FCC has released two rulemaking notices seeking comments on the following TV ownership issues:

- **Issue 1. Local television ownership rule.** The FCC is proposing to allow common ownership of TV stations that are in separate designated market areas (DMAs) and that don’t have overlapping Grade A contours.

  The FCC is also seeking comments on whether to allow TV cross-ownership waivers under the following conditions: 1) when the combination will be UHF/UHF rather than UHF/VHF; 2) when the station to be purchased is a “failed” or “failing station;” 3) when the licensee is applying for a channel allotment that has remained vacant and unused for some time (e.g., five years); 4) when joint ownership will result in a small audience or advertising market shares; and 5) when the waiver involves public interest programming enhancements.

- **Issue 2. Radio-television cross-ownership rule.** In accordance with the 1996 Telecom Act, the FCC has concluded that its top 25 market/30 independently owned voice waiver policy should be extended to the top 50 markets. An applicant would be permitted to own more than one FM and/or more than one AM radio station, and one TV station in a top 50 market as long as 30 independently owned voices remained after the transaction. The FCC is also considering whether the waiver policy should be extended to any TV market that satisfies a minimum independent voice test.

- **Issue 3. Local marketing agreements.** Currently, the

FCC does not attribute TV LMAs for local and national ownership purposes. Consistent with its treatment of radio LMAs, the FCC has proposed that time brokerage of another TV station in the same market for more than 15% of the brokered station’s weekly broadcast hours would count toward the brokering licensee’s multiple ownership limits. Nov. 7 was suggested as a grandfathering date for existing LMAs. LMAs entered prior to this date could continue until they expire.

- **Issue 4. UHF discount.** The FCC has deferred further analysis of the UHF “discount” used in counting market share on a national basis, until completion of its biennial review of the broadcast ownership rules in 1998. By then, the FCC will be in a better position to assess such factors as the impact of a digital TV (DTV) table of allotments and the proliferation of cable and other multichannel program suppliers.

- **Issue 5. Satellite stations.** The FCC is considering eliminating the current exemption for satellite stations in calculating audience reach if the satellite and parent stations operate in separate markets.

- **Issue 6. Counting local marketing agreements.** The question of double counting is also raised in the LMA context, since a licensee may reach the same audience twice through a station it’s brokering. The FCC is proposing not to count a brokering station’s local market twice. This issue is only relevant if the FCC decides to deem TV LMAs attributable.

- **Issue 7. Market definition.** Presently, national audience reach is measured by Arbitron Area of Dominant Influence (ADI) market data. As mentioned above, the FCC has proposed to use DMAs as definitions of local TV markets. Likewise, the FCC feels that DMAs should be used to calculate national audience reach instead of ADIs.

Harry Martin and Richard Estevez are attorneys with Fletcher, Heald & Hildreth, PLLC, Rosslyn, VA.

Dateline

TV stations in the following states must file their license renewal applications on or before Feb. 3, 1997: Arkansas, Louisiana and Mississippi. Commercial stations in the following states must file their annual ownership reports by Feb. 3: Arkansas, Kansas, Louisiana, Mississippi, Nebraska, New Jersey, New York and Oklahoma.
When the Quincy Group decided to convert to nonlinear for their five midwest broadcast stations, they turned to Panasonic's POSTBOX.

"The system is well-constructed, well thought-out," says Quincy's Director of Capital Projects, Brad Dreasler. "Everyone likes the Windows operating system, which contributes to the system's overall ease-of-use." Dreasler says that they had confidence in Panasonic as a broadcast company, "...not a computer outfit. In Panasonic, we have a partner of considerable size and longevity—both important considerations."

Now the Quincy stations are using POSTBOX for on-air promos, as well as commercials, PSAs, and industrial and training videos. WGEM Production/Promotions Manager, Jim Lawrence says in the first month, the POSTBOX doubled their production capability. "It's a myth that you have to spend $100,000 to get the right equipment. POSTBOX does everything we need at 40% of that cost."

Around the stations they say that productivity is up. And, "with POSTBOX, we don't need a lot of time—we're doing better spots in less time!"

“In the first month, POSTBOX doubled our production capability.”

JIM LAWRENCE, PRODUCTION/PROMOTIONS MANAGER, WGEM, QUINCY, IL
A hot topic among content developers and service providers involves capitalizing on the world’s rapidly advancing communications infrastructure. Thousands of miles of fiber-optic networks are deployed and more are on the way. Correctly choosing a transmission scheme with the flexibility and speed to handle voice, data and real-time video signals today and in the future can provide a competitive advantage. One technology that may help assure a higher quality of service (QoS) is asynchronous transfer mode (ATM) networking.

ATM defined
The ATM transmission protocol was initially described in 1988 by the CCITT, now known as the International Telecommunications Union (ITU-T). It defines ATM as “a switching technology based on unchannelized, high-speed digital links.” These links are based on fiber-optic networks, such as synchronous optical network (SONET) and point-to-point trunks arranged in a hierarchy of speeds that offer potential bandwidth well into the gigabits per second range.

<table>
<thead>
<tr>
<th>SERVICE CLASS (Signal type)</th>
<th>BANDWIDTH GUARANTEE</th>
<th>DELAY VARIATION GUARANTEE</th>
<th>THROUGHPUT GUARANTEE</th>
<th>CONGESTION FEEDBACK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant bit rate (voice, video, MPEG-2)</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Variable bit rate (data, Ethernet)</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Unspecified bit rate (E-mail, X.25)</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
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<tr>
<td>Available bit rate (E-mail)</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
</tr>
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</table>

Table 1. Typical signal-to-service class relationships in the ATM user layer. A direct correlation exists between these classes and quality of service (QoS) levels.

SONET physical transmission layer combined with ATM switches forms a network type referred to as Broadband ISDN (B-ISDN), a technology that should not be confused with the older 56kb/s narrowband N-ISDN services. B-ISDN offers an industrial-strength bandwidth and a transmission approach that may allow the delivery of vast amounts of voice, data and video content over long distances in short periods of time with virtually no signal quality degradation.

Synchronous vs. asynchronous transfer mode networking
A majority of current applications, such as telephony, rely on a synchronous transfer mode (STM) networking protocol. In STM, calls are multiplexed onto a single digital signal 3 (DS-3) or optical carrier 3 (OC-3) transmission path. Each call is assigned a channel with a fixed time slot at a fixed bandwidth, which lasts for the duration of the connection. With this approach, bandwidth is used effectively when voice, data or video signals are being transmitted. However, because the channel is dedicated, you pay for the bandwidth even when no signals are being transmitted.

The asynchronous transfer mode protocol, on the other hand, uses a connection-oriented information transfer. This can be described as an approach where a path from source to destination has been clearly identified prior to any signal transmission.

In ATM, signal traffic from multiple sources is multiplexed onto a DS-3 or a concatenated OC-3c physical network path. But first, the signal is digitally encoded into a number of 53-byte ATM cells. The cells contain a 48-byte payload and five header bytes. The header bytes identify the cell, its destination address and its sequence in an ATM chain if the source exceeds 48 bytes in length. (For more information, see “Digital Basics,” BE September 1996.)

Because ATM is connection-based and each cell contains route knowledge in its header, the cells can individually seek out the most expeditious route to their destination. By virtue of this architecture, ATM provides bandwidth “on demand.” As signal density increases, more cells are used for transmission. As a result, you only pay for bandwidth when you need it.

ATM requires at least a three-layered protocol stack that contains different types of information necessary to communication and transport of information over the B-ISDN network. (See Figure 1.) Depending on
Figure 2. A simplified diagram of how ATM can be integrated with an existing video core network. In this application, ATM is used to transmit a downlinked MPEG-2 program feed and MPEG-2 compressed pay-per-view movie from a video server over the core network to the provider's head-end using a constant bit rate (CBR) service class. From the head-end, the programs are transmitted over a conventional RF delivery system to the customer's set-top unit (STU).

what additional services are needed to support voice, data or video, additional user layers can be added. The physical transport layer is on the bottom layer of the stack. Sublayer functions handle the interface to the physical network (e.g., SONET), along with bit transmission and bit alignment functions that control the actual flow of 1s and 0s over the optical carrier. Functions include complexities like transmission frame generation/recovery, transmission frame adaptation, cell delineation, header error control (HEC) and cell rate decoupling.

The ATM layer is where cells are multiplexed, and virtual path identifiers (VPI) and virtual channel identifiers (VCI) exist. Network switches use the VPI and VCI to determine how the ATM cell should be routed through the network. The ATM adaptation layer (AAL) controls the timing relationship between the source and destination switch, the bit transfer rate of cells between them and the class of service to be used.

Tying back to the concept of ATM's connection-orientation, the user layer is where a service class that supports the requirements of a voice, data or video signal is assigned during encoding. Available service classes include constant bit rate (CBR), variable bit rate (VBR), unspecified bit rate (UBR) and available bit rate (ABR). Table 1 shows typical signal-to-service class relationships. Network performance characteristics of the service class will affect the source signal being transported. Impairments caused by insufficient

<table>
<thead>
<tr>
<th>ORGANIZATION</th>
<th>ADDRESS</th>
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<tbody>
<tr>
<td>DIGITAL AUDIO-VISUAL INDUSTRY COUNCIL</td>
<td><a href="http://www.davic.org">http://www.davic.org</a></td>
</tr>
<tr>
<td>DIGITAL VIDEO BROADCAST PROJECT</td>
<td>http://www.alphastar_tv.com/dvb.htm</td>
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<tr>
<td>INTERNATIONAL TELECOMMUNICATIONS UNION</td>
<td><a href="http://www.itu.ch">http://www.itu.ch</a></td>
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<tr>
<td>THE ATM FORUM</td>
<td><a href="http://www.atmforum.com">http://www.atmforum.com</a></td>
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</table>

Table 2. World wide web addresses of prominent standards bodies and industry consortia involved in defining the direction of ATM for video transmission.

"LOOK WILCOX, THE DIGITAL COMMUNICATIONS TREND IS CATCHING ON EVERYWHERE," WHISPERED SNELL.
transition to digital

Glossary of ATM terminology

- **AAL** — ATM adaptation layer
- **ABR** — Available bit rate
- **ADSL** — Asymmetrical digital subscriber line
- **ATM** — Asynchronous transfer mode network protocol
- **ATM cell** — A cell 53 bytes in length containing a 48-byte payload and five-byte header
- **B-ISDN** — Broadband integrated services digital network
- **CBR** — Constant bit rate
- **DS-1** — 56 Kbps digital carrier physical network path
- **DS-3** — 45 Mbps digital carrier physical network path
- **OC-3** — 155 Mbps optical carrier physical network path
- **QoS** — Quality of service
- **SONET** — Synchronous optical network
- **STM** — Synchronous transfer mode networking protocol
- **STU** — Set-top unit
- **UBR** — Unspecified bit rate
- **VBR** — Variable bit rate
- **VCI** — Virtual channel identifiers
- **VPI** — Virtual path identifiers

bandwidth, timing delays imposed by network switches, and bit errors induced by errored and lost cells in "bursty" signals like MPEG-2 will occur when an improper service class is selected for a particular signal type.

**Integrating ATM into existing distribution systems**

At present, telcos and cable operators are struggling to find ways to increase bandwidth closer to the customer's set-top unit (STU) without going broke. The financial realities of the situation dictate that technologies like ATM can best be used in the core network that links origination points to the head-end. (See Figure 2.)

To more tightly integrate the delivery system and customer STU and provide additional services, technologies like asymmetrical digital subscriber line (ADSL) show promise. ADSL can handle bidirectional signal streams over twisted pair copper wire and coaxial cable. Combined with ATM services on the core network, products like fully controllable video-on-demand and interactive gaming may be possible.

When considering ATM for integration into an existing infrastructure, providers should consider how the technology can be used to enhance the overall QoS. Several issues must be factored into the decision. First, consider the current reliability of the public networks. Growing traffic on the Internet is one example of how switching capacity is being pushed to the limit. Although there is adequate optical fiber available, not all of it is lit. On the fiber that is, brownouts and blackouts do occur, and network providers are racing to add switching equipment to overcome the congestion. Even if you can be assured of adequate capacity, do you want to entrust your signals to a third-party provider whose only perfor-

Continued on page 77

"CLEARLY THE RESULT OF AN EARLY EXPERIMENT IN COMPRESSION..." MUSED WILCOX.
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Your company will take either one road or the

Our VideoStore™ Multichannel Video File Server: This solution is ideal for broadcasters, telcos, cable systems and interconnects who are looking for a cost-effective, stand-alone, complete commercial insertion package.

And it is, indeed, a complete package. The VideoStore System has the capacity to offer hundreds of hours of storage and hundreds of channels of programming. Not to mention MPEG-2 Main Profile at Main Level (MP@ML) for the outstanding picture quality that you've come to expect from Sony.

It's also entirely broadcast ready, with support of closed-captioning and expanded motion estimation, four channels of audio, and instant access to all video clips in your library.

Yet its highlights don't stop there. There's also our Predictive Maintenance™ feature. Its built-in redundancies offer maximum protection against mishaps while letting you know of virtually all potential problems before they become real ones.

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The Sony Transmission Automation System (STAS): Our STAS System is modular, making it well suited for broadcasters of most any size, network control environments, cable networks and programming originators.

That's especially true if you consider configurability, growth and comprehensive management of both program and commercial material into a plant-wide digital format to be important requirements.

With hundreds of hours of storage capacity, STAS is more than capable of handling all your long- and short-form programming needs. You can use it for the origination, contribution and distribution of all your transmission materials. And with its MPEG-2 4:2:2 profile compression technology, our STAS System consistently delivers superior signal quality, enhanced chroma, full VBI support, frame accuracy and minimum degradation during subsequent recompression.

What's more, with its Component Serial Digital outputs, STAS offers complete digital signal integrity while being the transmission component of your digital environment.

For additional information on our VideoStore and STAS Systems, simply call us at 1-800-472-SONY, ext. INSERT. Or you can visit us on the Internet. Our address is http://www.sel.sony.com/SEL/bppg/videostore/index.html.
Goals to a successful new year

As 1996 comes to an end, it's time to review this past year. For those who have had a good year, a hearty cheer. To those of you less fortunate, as well as for those toasting the current year, a successful 1997 can begin by grabbing a piece of paper and a pen.

We all have had years where good things have happened to us like an important promotion, the birth of your first baby, that end-of-the-year bonus or your child’s college graduation. Despite the joys of these good years, we all have had bad ones, as well.

Some years are going to be bad — plain and simple, but setting some goals for the next year can help you decide what you want from your life, in your career and in your personal life.

Goal setting

Goals. We all have them, but the much ballyhooed New Year's resolutions seem to be forgotten almost as quickly as Aunt Maybie’s fruitcake. This year, take the time to really think about and write down your goals. Following are some suggestions for goal setting.

1) Write your goals on paper. Write down what you want to accomplish next year. It's so simple, yet so effective. Jot down key goals. Keep the list short and sweet. One goal might be renovating a broadcast studio by a certain date or hiring a new staff member. Or it could be continuing your education by taking a class or attending a seminar.

Some people may prefer to have separate goal lists, one for personal accomplishments, the other for work-oriented goals. Some people may combine the categories and have no difficulty tackling them together. It doesn't matter how you do it, just write your goals down.

2) Keep your goals attainable. Don't set yourself up for failure! Be honest with yourself. By writing down specific goals, you make it all the more likely that those goals will be completed. Being specific makes goal attainment much more probable because in many cases you have quantified the desired result, i.e., I want a 10% salary increase or I want to take my family on a week-long vacation to Alaska.

3) Put your goal list in a visible location. There's a magic to viewing your goals over and over again. Place your list of goals in your office and keep a copy in your wallet. Remember, the more times you are reminded of your goals, the more likely you are to accomplish them.

4) Stay on track. Regularly review your progress. In today’s crazed workplace, it's hard to find time to eat lunch, let alone sticking to a goal list. If you find yourself veering off course, determine what it is that's causing you to stray, then get back on course. Attaining your goals takes hard work, but those willing to put in that extra effort will reap the rewards.

5) Be flexible. If circumstances change and a goal doesn't seem relevant, get rid of it. By the same token, if you have a new-found desire, add it to your list. A flexible list stays current and all the more compelling.

6) Have an action plan. For those goals requiring more effort, be sure to have a plan. How long will it take to renovate the studio? What key resources will I need to accomplish my goal and how do I obtain them? Who do I need to convince to assist in my efforts? Detailed planning can help assure overall success.

7) Last, make your goals a reality. Follow these steps and believe in your ability to accomplish them. Being positive of your eventual success is half the battle. Visualize the successful completion of your goals. 1997 can be a successful year for you. Take the first step by writing down your goals and putting forth a plan to make each goal a reality. This list is not a cure-all solution that guarantees success. It can, however, set you in the right direction for realizing and attaining your goals.

If it all seems like too much bother, think of the alternative. For those seemingly stuck in a rut, many can trace their predicament to never having identified what they really want out of life and never having set goals.

Take charge of 1997 and make your goals a reality. Take out that pen and paper and start writing. Make your list as sound and complete as possible and then get busy making your plans work for you.

Ross Josephson is manager of accounts at Chan & Associates, a marketing consulting service for audio, broadcast and post-production, Fullerton, CA.
At Utah Scientific, we recognize that you need to approach the digital future one step at a time. That's why we designed the UTAH-300 routing switcher. The UTAH-300 handles analog, digital or both in the same frame. Combine this with our new SC-3 Control System and you have a routing system that's powerful and flexible enough to take on today's realities while preparing you for tomorrow's challenges. That means you can upgrade to a digital routing system without retiring your equipment prematurely. It means you have the assurance the UTAH-300 solution will be there to provide the switching and control requirements of the future.

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The UTAH-300. So advanced it actually works with your old stuff.
Choosing batteries for field production

Although new battery chemistries have entered the market or are on the practical horizon, the venerable Nickel-Cadmium (NiCd) is still the benchmark against which all other contenders are measured in the broadcast industry. "Nicads" excel in the parameters most needed by TV field-production crews: short charge time, high number of charge-discharge cycles, good load characteristics even in cold temperatures, good abuse tolerance and low price. Nicads like being discharged quickly under high-current conditions, such as those for which battery belts are used in broadcasting: lights and video cameras.

New, high-capacity Nicads and new charging techniques have combined to promise even better performance. Nicads do better when given a "burp or reverse-load" charge. This applies a series of brief discharge pulses to the Nicad while charging it, thereby promoting recombination of gases formed during quick charging. When used regularly, these reverse-load pulses can add as much as 15% to the life of the battery.

Alternative battery types

The holy grail for all batteries is high energy density (high capacity with low weight). In that quest, the Nicad's strongest competition has come from Nickel Metal-Hydride (NiMH). These offer fewer charge cycles, lower charge and discharge current, but about 30% more capacity than a standard Nicad. The newer, ultracapacity Nicads equal or surpass the NiMH, but the NiMH requires less exercising than the Nicad. Both types have high self-discharge rates, meaning that they rapidly lose their charge once the charging current is removed (about 10% in the first 24 hours).

For laptop power, new Zinc-air batteries promise high energy density, low self-discharge and no memory effect. They may eventually replace all other types in capacity-hungry portable computer applications. After economies of scale take effect in mass production, Zinc-air batteries cost should be comparable to Nicads. Recent experiments have powered vehicles with zinc-air batteries, which are also more environmentally friendly than Nicads. Zinc-air recharge time is longer, however, and fewer recharge cycles are tolerated.

For heavier-duty applications where size, weight and slow charge are not a problem, the Sealed Lead Acid (SLA) fits the bill. Sometimes known as gel cells, these

Continued on page 78
Rack Mountable and Rugged
Use it in the studio, in the field or in your rack.

12 Total Inputs
4 stereo, and 4 mono.
The world's best utility mixer.

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A TASCAM exclusive in this price range. Just like larger consoles, these handy inputs are great for compressor/limiters or using even more effects.

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What’s a mixer without a master fader? Greater visual reference of your mix.

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No need to waste a precious stereo channel for your master recorder. Assignable to L/R buss or monitor.

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4 Effects Returns
Use your imagination.

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4 XLR Mic Inputs
Complete with 48V phantom power for using the highest quality condenser microphones.

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Take your signals Pre or Post

Balanced Inputs and Outputs
Running lots of cable? Using pro equipment? You'll need these. (Unbalanced, too!)

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4 Effects Returns
Use your imagination.

4 XLR Mic Inputs
Complete with 48V phantom power for using the highest quality condenser microphones.

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No more excuses for not having a compact, full-featured utility mixer. A mixer you can plug in anywhere. Need more inputs? How about a submixer? What about audio for video or multimedia? Get a TASCAM M08. It’s the perfect mixer for these applications and more. Part of the new breed of next-generation mixers from the leader in recording, TASCAM's new M08 will surprise you. You’ll scratch your head trying to figure out how we can give you so much mixer for so little cash. No tricks. Just value.

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Who else can talk about the speed of a complete system designed around MPEG-2 4:2:2 P@ML besides Sony? After all, who else has it?

Field-to-station transmission up to **2x real time.**

Only Betacam SX™ MPEG-2 4:2:2 P@ML technology doubles your transmission capacity.

SX tape-to-hard-drive and machine-to-machine transfer at up to **4x real time.**

That's right, the Betacam SX Hybrid Recorder transfers digital footage from SX tape to its hard drive or from another hard drive to its SX drive.

Saving transponder time and money. Whether you transmit one channel at twice real time or two channels simultaneously in real time, this is the algorithm built for abuse. No more worrying about breaking up or going down.

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hard drive at up to 4x real time.

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With the Betacam SX “Good Marker” system, you can pre-select scenes in-camera before you begin editing.

Then with the DNE-50 and the Hybrid Recorder you can shuttle through your footage at 20x real time for a high speed review of your “picture stamps."

What's more, you can review incoming feed while you're still recording.

**MPEG-2 4:2:2 P@ML compression** for superior picture quality.

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Designed for high speed transmission through a narrow tunnel.

detail hold up to the rigors of broadcast because it is the only system designed around an algorithm that can do it at 18 mbps.

Don’t be left behind as the Betacam SX system goes on air.

Call 1-800-635-SONY, ext. SX for more information.

**SONY**
Networking your home, part 2

By Steven Blumenfeld and Mark Dillon

As described last month, the Residential Gateway will bring all your services into a common device that will distribute the proper signals to the end-user devices.

The network connection

The Residential Gateway will allow the interconnection of various existing and future external networks to various in-home networks and consumer devices. This interconnection is achieved by providing Network Interface Unit (NIU) cards for each external network connected by a bus to Customer Premise Interface (CPI) cards for each in-house network.

An NIU adapter is required for each access network reaching the residence. At least one CPI adapter is required for each type of cable or network that extends within the residence. In many cases, a single adapter may be able to service several in-residence cables, such as multiple telephone extensions.

A weatherproof unit is designed to be mounted at the point of entry to the residence. It has lockable hatches that permit the owner or the subscriber access to different sections of the unit. Internally, there are slots for NIU and CPI adapters. The unit also includes a high-performance, low-cost bus for communication among the adapters, a controlling microprocessor and memory.

The Residential Gateway provides communication among the adapters at some defined rate. Additionally, it will allocate the capacities of the outbound and inbound channels to the various end-user services. The system may also provide a bridging function among the adapters on the residence side, connecting, for example, a home automation network to a PC LAN.

The system contains a microprocessor and memory that support the software services required to operate the basic functions. The system processor and its resources should not be employed for end-user applications, because there is no way to guarantee that these applications will not reduce the available computational resources below the level required for reliable operation of the gateway. End-user applications can be supported by embedding processors and memory on the adapters.

Typically, each adapter will be servicing multiple data streams, multiple telephone calls, multiple Internet accesses or multiple video streams. When the Residential Gateway is initially configured, and whenever an adapter is added or removed, each adapter will register with the system manager services that are connected.

The Residential Gateway's control microprocessor collects the data from the adapter and passes it to the system manager program. If there is available capacity, the system manager returns the bus address of a register on the appropriate adapter to the requesting adapter. The requesting adapter can independently pass small bursts or cells of information to the allocated adapter.

The requesting adapter may have received a request to initiate an Internet protocol session. The packet representing this request is fragmented by the LAN adapter into multiple cells, which are then transferred via the bus to the access network adapter. The register address allocated by the system manager will correspond on the access network adapter to a data transport service. There may be multiple requests for this kind of service, and their requests are managed separately using the stream identifier allocated by the requesting adapters.

The access network adapter assembles the cells into the format required for transmission over the access network and transmits them.

The future

As consumers see the benefits of technology integrated into consumer products, they will also have to pay for previously subsidized services and bear the costs of bringing information into the home. The Residential Gateway can make the use of these new services easier and cheaper for the consumer.

Acknowledgment: This article summarizes "The Residential Gateway Document" created by the following companies: Bellcore, GTE, Hewlett-Packard, IBM, Reliance Comm/Tec, BPC Consulting and Sarnoff Research Center. For a tour of the Residential Gateway, surf the web to: info.gte.com/gtel/sponsored.rg/.

Steven Blumenfeld is vice president of technology and studio operations, and Mark Dillon is vice president, on-line services, with GTE, Carlsbad, CA.
WHILE SOMEONE IN YOUR OFFICE IS ADDING UP THE COSTS OF MIGRATING TO DIGITAL, WE'RE REDUCING THEM.

The robust algorithm
MPEG-2 4:2:2 P@ML
helps you do things faster
and reduce operating costs,
making Betacam SX™ the
most cost efficient product that Sony has made for broadcast systems.

Mix and match SP and SX for as long as you want.

Merge digital with the tape world without paying a penalty.

Camcorders are almost half the cost of the last camcorder you bought. They have better video, better audio and record 60 minutes on your current 30 minute tapes.

In the Hybrid Recorder, that tape travels less distance at a slower speed. Causing less friction and breakdown on heads. And parts are less expensive as well. The upper drum in the recorder, for instance, is half the cost of your current drum.

Don't be left behind as the Betacam SX system goes on air. Call 1-800-635-SONY, ext. SX for more information.

SONY
The Grand Alliance consortium has ceased to exist and we are left with a terrestrial transmission standard that will be an FCC standard. As we enter stage three of the five-part plan, the model or experimental station project will conduct a series of demonstrations of HDTV broadcasting with a fully equipped HDTV studio-transmission facility. The project will also serve as a test ground for electronics manufacturers and their wares.

Moving on
In the first part of the plan, the transmitter and studio sites were prepared including the physical space, the HVAC and power requirements. The experimental licenses required preparation, too. In stage two, video was transmitted. The initial transmission was a VTR playback of a pre-compressed bitstream at the transmitter site and the studio site with an in-line STL.

Now in the third stage, post-production capability has been added to the model HDTV station. This is the point where the station is actually a true broadcast facility. Later, the fourth stage will add production capability. And finally, the fifth stage, set for 1999, will add flexibility to the HDTV model station.

On the air
The model station WHD-TV, at WRC-TV, the host station in Washington, DC, is now up and running. The knowledge gained regarding equipment performance and user needs will be essential prior to the construction and operation of regular commercial HDTV stations. In the long run, information from this project will prove invaluable in encouraging manufacturers to develop next-generation equipment with improved performance, simplified operation, reduced cost and enhanced capabilities. The project will involve the collaboration of respective organizations to design, install and operate an experimental high-definition TV terrestrial broadcast station.

The model station will serve as a source of encoded digital TV signals to aid equipment manufacturers in the development of new lines of electronic equipment. Auxiliary data transmission, interactive video services and satellite, optical fiber and microwave feeds will also be evaluated. Some of the potential evaluations will include equipment interface issues, ranging from program organization through studio management, transmission and reception. It is anticipated that information on availability and performance on prototype and commercial HDTV equipment will be better learned.

In addition to providing public demonstrations in the Washington, DC, area for viewing of HDTV, the model station is also offering training for broadcast station technical personnel.

Prior to the availability of prototype or commercial equipment, the Grand Alliance is loaning two sets of Grand Alliance HDTV hardware for use. Much of the equipment and program material is being supplied on a loan or grant basis by manufacturers and broadcasters that are members of the Grand Alliance. In addition, individual manufacturers are providing equipment maintenance and technical assistance.

Pay attention
Keep in mind that the HDTV Broadcast Service is on its way. Most of the new second-channel assignments will be in the UHF band, sometimes high up, in unfamiliar territory. The first issue will be to ensure that your current viewing audience will be able to receive the new signal.

Remember that approximately 1,700 TV stations across the United States will also be planning to build their HDTV facilities. This means there will be serious competition between stations with respect to construction of new broadcast facilities. For now, you should follow the progress of the experimental station closely so you can be ready to prepare for your own HDTV facilities.

Louis Libin is director of technology for NBC, New York.
The new Sachtler Vario Pedestals offer unique features for studio and OB operation:

1. Continuous column stroke, for shooting from sitting to standing person's height – Vario Ped 2 - 75.
2. Rock steady and 50 kg/110 lb lightweight, to carry equipment up to 90 kg/200 lb – Vario Ped 1 - 90.
3. Carriage and column can be disassembled in seconds – compact modules for ease of transportation.
4. Quick-dix, allows instant change of fluid heads for flexibility – included.
5. Track width, narrow and wide, symmetric and asymmetric – set in no time and you can expect precise, easy steering and crabbing, smooth and jerkfree column movement thanks to the patented Sachtler pneumatic system. Test for yourself the optimum camera support for all compact Studio/OB cameras, now!

Space age CCD-cameras don't fit on iron age pedestals.
The future of television is on your desktop.

By Jerry Whitaker

It's the invasion of the body snatchers, with computers playing the part of the pods. Don't let your editor go to sleep — he or she may wake up as a video workstation.

From editing to graphics, the area of digital television has changed radically in only a few years. Look at your desk. What was on it 10 years ago? Probably a Selectric typewriter; a bulky, feature-poor telephone; and papers, books and magazines (lots of those). The computer age had just reached the desktop in 1986 with products and features that made sense for business. And your desktop today? The typewriter is gone, replaced by a networked PC; the telephone tells you who is calling before you answer; and — well, OK — the amount of papers, books and magazines hasn't changed much. The point is that technology has reshaped the way we do business. The extent to which it has changed our professional lives is evident only when we step back and consider the "old days."

In the studio

Digital technology tends to come in waves. We have seen several so far:

• **First wave**: The replacement of analog devices and circuits with digital equivalents. This wave, which crested in the mid-1970s, saw the replacement of relays, diodes and other switching mechanisms with smaller, more reliable TTL and CMOS integrated circuits. Other common analog functions, such as timing, were replaced with one-chip digital equivalents. Countless RC networks fell victim to the 555 timer chip (which, of course, required R and C components to function). First wave technologies were widely implemented into video products of all kinds.

• **Second wave**: The beginning of the end of the signal tracer. This wave appeared in force in the early 1980s and was signified by the disappearance of individual signal paths into a bus structure. Signals became data, and data became bursts of state changes on a bus. Early implementations of bus-based technologies suffered from speed limitations and software overhead requirements. Video products generally took a cautious approach to second wave...
implementation, preferring instead dedicated, purpose-built systems to general-purpose computer-based systems. Thus, began the distinction between "video products" and "computer products" or specific-purpose vs. general-purpose systems.

- **Third wave**: The turning point for general-purpose hardware. This wave, which is cresting now, is marked by the elimination of the competitive advantage of specific-purpose (or closed-platform) systems vs. general-purpose (or open-platform) systems. Although it is still true that a well-designed purpose-built system will almost always outperform a stock computer design, the costs of development are radically different.

- **Fourth wave**: Clear your desk for a supercomputer. Few things in electronics are more predictable than change. Each year brings products that are faster, smarter, better, simpler and cheaper (at least from the standpoint of the feature set). In the realm of desktop workstations, the fourth wave is signified by the utilization of multiple microprocessors for increased speed. With current Pentium-class devices routinely running at or above 200MHz, multiple-processor technology is impressive indeed. It is the fourth wave that will drive the video production center of the year 2000.

**NUMA**

A number of technologies hold great promise for the desktop of tomorrow. Perhaps the most powerful (and sometimes controversial) is non-uniform memory access (NUMA). The idea behind NUMA is to dramatically speed up the microprocessor's ability to read and write data to and from memory. The end
Desktop video wars

result is that massive parallel processing systems are practical. Just this month, for example, Sequent Computer Systems unveiled a computer based on NUMA technology that can contain up to 252 of Intel's fastest Pentium Pro chips. Most current high-end multiple-microprocessor systems use 16 to 30 devices.

The development of NUMA machines — and other technologies that seek the same objectives — are intended primarily to attack the mammoth and rapidly expanding demands of corporate data processing work now handled by mainframe computers. Fortunately for broadcasters, in the realm of computers, data is data. Advancements made for one market are rapidly transferred to another, such as video. The price of these high-end systems is high (the Sequent NUMA machine is initially priced at about $250,000), but those costs will drop in the years to come. While the thought of spending a quarter of a million dollars on a computer is a bit staggering, think about what you paid for your ADO system a decade ago, and the feature set that it offered.

Who needs this stuff?

I subscribe to several computer publications, and about once a month I get annoyed as I read an article that tells me how I need to buy the next big thing or I'll be stuck in the technical stone age. I think, "No way. Get with reality. The system I have is just fine, thank you." At the risk of failing to practice what I wish others would preach, let me suggest that mammoth systems such as NUMA will have a place in the video center of the not-too-distant future.

Desktop computers are a valuable element in the video center of today. They are, however, only a stopping point, not the end of the journey. The definition of "desktop computer" is also the point of some disagreement (or at least confusion). Desktop computers have traditionally described general-purpose machines that could be as comfortable running an Excel spreadsheet as editing video. The only difference between machines is the software and add-in cards loaded. "Workstations" have traditionally described more powerful systems that may be optimized for some function, such as graphics throughput. Mainframes, on the other hand, are those big blue boxes that sit in a room by themselves and are lorded over by MIS people (who we may or may not be on speaking terms with).

These divisions are becoming arbitrary. The desktop computers of today are as powerful as the workstations of a few years ago, and the workstations of networks. Out in front were ABC and CBS, which both offered virtual reality graphics and sets (to match the virtual candidates). On CBS, correspondents were surrounded by cybersets with bars and graphs of the results shooting out of virtual desks and virtual walls.

First implementations of any new technology always bring with it their share of rough points, and usually a rather steep learning curve. Still, the way of the future is clear: It is virtual, and virtual means high-power computers.

To infinity and beyond!

The remarkable accomplishments of animation on computers have been popping up in theaters. More offerings are on the way, driven by better, more lifelike graphics made possible by smarter software running on faster hardware.

For broadcasters, perhaps the greatest change in video graphics creation, manipulation and storage will come when the digital TV (DTV) standard is finally adopted by the FCC. As DTV stations take to the air, the last analog link in the broadcast chain will be set aside. Developers can then focus on system-wide implementations of digital video that overcome the problems inherent in multiple levels of quantization and bit-rate reduction throughout the facility. Although the DTV standard speaks primarily to the transmission aspects of television, every transmission standard has had a profound impact on the production equipment used to feed the transmitter. DTV is no exception in this regard.

Whatever twists and turns the video industry may take on the road to the next century, it is a foregone conclusion that high-power computers will play a critical role. The desktop video wars of today will surely give way to the workstation video wars, followed by the supercomputer video wars. Regardless of how those wars go, the end-user will emerge the victor.

Jerry Whitaker is a consulting editor for Broadcast Engineering magazine.

Nowhere is desktop editing more popular than in the newsroom. Systems, such as the Sony DNE-1000 shown above, bring the advantages of desktop power and non-linear versatility to even small-market operations.
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Litton Electron Devices

Circle (16) on Free Info Card
Cable/broadcast partnerships

Cable/TV partnerships can pay.
By Edmond M. Rosenthal

THE BOTTOM LINE:
Cooperative agreements are becoming the trend for cable and TV stations and can be mutually beneficial to both partners. With DBS encroaching upon cable and TV audiences and stealing revenue, it may be worth considering such an arrangement. Could your TV station benefit from extra presence on the local cable system? Or, could your cable station benefit from local news, weather or sports coverage? A profitable partnership could definitely make it worth your while.

It's becoming clear that when the resources are there, cable operators would rather do it themselves — but, nevertheless, broadcast-cable programming partnerships are making their mark across the country.

Focusing mostly on news and informational programming, many of these arrangements are a product of the Cable Act of 1992, which opened negotiations for retransmission consent. Rather than paying to carry stations in their markets, many cable operators have opted to provide TV stations with additional channels for local programming.

These channels have yet to prove themselves as major revenue producers for the stations, but there has been progress in advertising sales as measured audiences have become significant enough to show up in the Nielsen rating books. For the broadcaster, one of the benefits has been using these channels to promote the station's news franchise in the area. For the cable operator, these channels are an inexpensive means of providing local service.

But for a major cable operator like Time Warner, this isn't the road map to the future. John Newton, senior vice president of Time Warner Cable Programming, asserts, "It may not serve our purpose to simply extend the brand of an existing broadcaster." Time Warner is more interested in developing local news services, such as New York 1, in Manhattan.

Photo: Behind the scenes at one of the news sets at Channel 4 in Kansas City.
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Cable/ broadcast partnerships

Is MMDS the answer?

As broadcasters look toward more programming and data services, cable isn’t the only answer, nor is the hoped-for allocation of digital spectrum by the FCC. Another prospect is MMDS. Andrew Craig, vice president and general counsel of the Wireless Cable Association International, points out that MMDS has the spectrum that broadcasters are seeking for entry into the multichannel marketplace.

Craig says it isn’t practical for broadcasters to enter this marketplace alone with advanced TV frequency allotments. Providing pay services, for example, would be expensive and isn’t something for which broadcasters are well-equipped. He holds that broadcasters won’t receive enough spectrum for viable multichannel services. A better route is a relationship with wireless cable operators or acquisition.

Echoing this proposition is Marcia De Sonne, director of technology assessment for the NAB. She points out that broadcasters have had no restrictions on ownership of MMDs systems since the 1996 Telecom Bill. She also sees agreements with wireless cable operators as an opportunity for broadcasters to extend their coverage beyond the signals.

“Wireless cable is the closest brethren to broadcasting,” De Sonne says, “because it’s over-the-air and omnidirectional. Wireless cable will be using the same MPEG-2 compression scheme as broadcasters.”

Working relationships: BayTV

Meanwhile, relationships with cable operators are in place, and as these channels become entrenched in their markets, they may be on an irreversible path.

While many of the TV-cable relationships in operation are characterized by low overhead and use of existing assets, BayTV, an undertaking of KRON-TV, San Francisco, launched July 1, 1994, with a major investment.

As part of its six-year retransmission consent agreement with cable interests dominated by Tele-Communications Inc. (TCI) and Viacom Cable, KRON committed to a 24-hour channel with nine hours of live, original programming including local news updates, talk shows and coverage of local events.

For BayTV, KRON Video Enterprises co-produces New Media News, a daily half-hour on computers and technology with Jones Computer Network. BayTV fills the rest of its 24 hours with time-shifted programming.

Amy McCombs, president of parent company Chronicle Broadcasting, declines to reveal start-up costs, which are incorporated into the KRON infrastructure. Trade estimates of the cost of a launch of this magnitude, though, run as high as $25 million. While BayTV capitalizes on existing staff and facilities, staff dedicated to BayTV — mostly in newsgathering, sales and traffic — is about 60. Engineering and maintenance work is absorbed by the KRON staff.

The channel reaches nearly 1.3 million subscribers with TCI acquiring Viacom’s cable operations, TCI will control 85% to 90% of these homes.

“We’re transmitted by a combination of everything from T1 lines to fiber to microwave,” McCombs notes. TCI has an aggressive program of putting in fiber and eliminating head-ends, so she looks forward to more dependability. Programming is sent complete with commercials from KRON.

The venture is only partly a child of the Cable Act of 1992. “Retransmission consent certainly made it a lot easier,” McCombs concedes, “but before that, we had already begun discussions with TCI and Viacom, and they saw the value of this. The Cable Act gave them a reason to finalize an agreement with us where they were able to add value to their cable operations.”

An important aspect in cable carriage is not being relegated to cable’s never-ever land — channels that can’t be received on cable-ready sets without converters or that are available only as a tiered package for an additional charge.

Working relationships: Pittsburgh Cable News Channel

Started more than two years ago and operating in the black in its second year is Pittsburgh Cable News Channel (PCNC), a venture of NBC affiliate WPXI-TV with cable operators including TCI, Adelphia Communications, Time Warner Cable, Armstrong Group, Comcast Cable and Cox Cable.

The 24-hour PCNC revolves around exclusive and time-shifted newscasts and talk shows. A “week in review” program originates from the station’s Washington bureau. The 10 p.m. newscast is the only one available at that time in the market. Unlike BayTV, WPXI, according to retransmission consent negotiations, charges cable operators a per-subscriber fee and shares in ad revenues. This arrangement came about “after lengthy and trying negotiations,” WPXI general manager John Howell admits. Evan Pattak, community affairs manager for TCI of Pennsylvania, adds “The concept for PCNC had been discussed for a number of years before retransmission consent came along, but that’s what provided the impetus.”

With some 800,000 cable subscribers in the Pittsburgh market, PCNC is accessible to about 521,300. The remainder either lack the channel capacity or the fiber connection to carry it. Much of the 75-mile fiber-optic loop carrying PCNC to the systems has been built by TCI, reports Fred Hamm, director of engineering for TCI of Pennsylvania. His operation has reduced head-ends from 19 to 10 via fiber and expects to eliminate more.

Like the Bay Area, the Pittsburgh area has an advertising interconnect among cable operators. The operators have Seachange digital commercial insertion equipment, with commercials downloadable into a processor at each head-end.

Pattak labels PCNC a significant asset, stating, “It does for local news what
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Cable/broadcast partnerships

CNN does for national news. When we had floods, viewers didn’t have to wait for a regular newscast to get coverage.”

Working relationships: TCI

Meanwhile, an arrangement between WSFA, Montgomery, AL, and TCI, occurred prior to the 1992 Cable Act. According to Carl Stephens, WSFA operations manager, and Jack Gilbert, TCI area manager, the subsequent retransmission consent negotiations were handled by the parent companies, with the broadcaster wanting cash and settling for TCI bearing the expense of a fiber-optic link to the station.

A variety of programming from WSFA appears on TCI’s local origination channel, with both parties sharing ad revenues. The best revenues stem from a package of Southeastern Conference basketball games that the station acquires from Jefferson Pilot Communications. WSFA runs only the Auburn and University of Alabama games, pre-empting its regular programming on Wednesday nights for the games. The remaining seven or eight games go to TCI.

TCI also carries barter-syndicated programming and does some programming on the local origination channel.

Working relationships: American Cablevision

The approach of WDAF-TV, Kansas City, MO, six years ago was to produce five to eight five-minute news inserts per day for American Cablevision to insert into its transmission of Headline News. Ed Piette, general manager of the Fox affiliate, says this arrangement was incorporated into retransmission consent negotiations. The cable system, jointly owned by Time Warner and TCI with the former as managing partner, pays cash for the service and has the advertising time exclusively.

Based on all the news gathered for its own newscasts, WDAF pre-tapes the inserts. According to Jeff Johnston, vice president of marketing for American Cablevision, the cable operator has a dish at WDAF to receive Headline News, and cue tones in the national feed start the tape at WDAF. The station puts cue tones into its inserts, which start up the Starnet commercial insertion equipment.

American also built a short fiber-optic extension to receive the programming from the station. This gives the system connectivity to the Kansas City Teleport, which it uses to uplink sports programming and teleconferences outside the market.

Working relationships: TNi

While some broadcasters work with cable through voluntary partnerships and others as part of a retransmission consent agreement, WBIR-TV, Knoxville, TN, does both. Its TNi channel launched in May 1994 with Scripps Howard’s cable operation as a financial partner. Added as part of retransmission consent agreements were Intermedia, Inc. head-ends in West Knoxville and the Maryville/Alcoa area, as well as a Marcus Communications system in Morristown, TN.

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The station learned many lessons about programming since its start. It programs 18 hours a day and carries Bloomberg Financial Service overnight on TNi.

“We initially programmed it with news, information programming and local sports where we could get them,” David Cowen, director of program operation notes. “This programming included rebroadcast of our local news and a half-hour a day of original reporting. We also did weather updates each day that were more extensive than what we do on our regular newscast.” Three half-hour programs were produced once a week and repeated throughout the week, twice a day at the most.

Now owned by Gannett Company, Inc., WBIR initially was owned by Multimedia and did additional runs of Multimedia talk shows. The broadcast day was filled out with barter-syndicated products not carried by the station, that were generally intended for weekend use by TV stations.

Since then, the station has learned that local sports is the most marketable product to audiences and advertisers. In May 1995, TNi shifted to a sports emphasis.

“Sports, including call-in talk programming, is now 45% of our programming and growing,” Cowen states. “We still have syndicated programming, especially outdoor programming, and we still have weather, but we discontinued news when we went to sports.”

Production for TNi, Cowen notes, uses the in-place production staff. “There are definitely costs associated with it, but we’ve never broken them out.” He says ad sales, at times, have allowed the station to break even on its known costs, “but like any cable channel after three years of existence, it’s not where we want it to be.” Audiences are now sufficient to show up in the Nielsen measurements, he says.

The Scripps-Howard cable operation has fiber distribution to the node, and the programming is distributed to its head-end via fiber. Scripps-Howard hands the programming off to Intermedia via fiber. A microwave relay from the station’s transmitter site covers the Marcus system.

All programs are played back on S-VHS from the control area, with the control automated by an Odetics PC-based system using cue tones. Commercial playback is via an ASC Virtual Recorder hard-disk system at the station, with all the spots on 3GB SCSI drives.

Edmond Rosenthal is a technical free-lance writer based in Freehold, NJ.

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**DITTO.**

BayTV morning hosts Terry McGovern and Margarite Jackson at KRON Channel 4 in San Francisco.

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Controlling HVAC noise

It’s important to recognize acoustical pitfalls before they swallow you up.
By Richard Schrag

When people who work in existing broadcast and production facilities are surveyed about workplace comfort, their most prevalent complaints involve the heating, ventilating and air-conditioning (HVAC) systems. The problems they cite most frequently, aside from temperature control, have to do with excessive noise and vibration.

How can this happen so often? First, the requirements for an HVAC system in a technical facility are quite different from those in typical office spaces. Technical spaces have extensive heat loads and other unique characteristics associated with a high concentration of electronic equipment or production lighting. As a result, adequate cooling, airflow, humidity control and filtration are vital issues. Second, a majority of these technical spaces have acoustical requirements that are much more stringent than those for run-of-the-mill buildings. Combine these two features and it’s no surprise that without a great deal of care, the results are often disastrous.

It would be nice if there were qualified engineers and acoustical consultants involved in the design of every construction project (we all have our little fantasies), so that a TV facility’s management and staff would not have to

Photo: The spring isolation of a rooftop HVAC unit is defeated by transmission of vibration through the stanchion that supports its electrical disconnect.
The packing blanket (labeled "trash") stuffed into gap around conduit will do little to attenuate noise passing through this oversized penetration.

understand the ways in which noise and vibration problems can arise from a poor HVAC design. Unfortunately, the reality is that architectural acoustics is one aspect of broadcast and production that is commonly misunderstood, misrepresented or misapplied — by broadcasters and by many design professionals.

This article discusses some problems with HVAC system noise and vibration that are commonly encountered in broadcast and production facilities. Sometimes just knowing the potential pitfalls is enough to avoid falling headlong into them.

Estimating heat loads

When designing an HVAC system, the first step is to accurately identify the heat loads generated by the occupants, equipment, lighting and surrounding environment. Although this isn't really an acoustical issue, it's an area that suffers from the "garbage in, garbage out" syndrome. If a project's mechanical and electrical engineers are given bad information about equipment loads by the broadcaster's engineers, consultants or systems integrators, the HVAC systems they design may never be able to provide an appropriate environment for equipment or operators. When HVAC systems don't work right, it can often be traced to a mismatch between capacity and actual load.

Unfortunately, it's difficult to obtain accurate information about the power requirements of broadcast equipment, much less the heat dissipation. Manufacturers sometimes list peak power consumption, sometimes power consumption at idle and sometimes just the fuse rating or recommended circuiting requirements. Invariably, if they exist at all, the manufacturer's specs represent some sort of worst case, which for many equipment items (audio amplifi-
Controlling HVAC noise

ers or any machine with a tape transport motor, for example) bears little resemblance to their actual power consumption over time.

For someone trying to tabulate power consumption of dozens or hundreds of equipment items, it's tempting to guess high when the data you're collecting is ambiguous or undefined. This isn't much of a problem for the electrical systems, where the downside of excess capacity is only the cost of oversized circuits or transformers. For HVAC systems, however, it's sometimes worse to have too much capacity than to have too little.

Besides the increased noise and vibration that comes with oversized equipment, some HVAC system types — particularly less-expensive varieties — don't respond well to conditions outside their design range. If oversized, many systems will short-cycle, rapidly dropping the temperature in an occupied space over the span of a few minutes, then shutting off for a longer period while the humidity climbs and the air stagnates.

Compounding the problem is the diversity of room types that exist in a typical TV facility. Production control rooms and edit suites may have technical equipment that operates 24 hours a day, 365 days a year, but they undergo fairly drastic swings in their lighting loads and number of occupants over the course of a typical day. Technical operations centers or tape rooms, on the other hand, will have relatively constant equipment loads with few occupants. Furthermore, neither of these types of rooms are subject to the seasonal changes in HVAC system operation that are typical in the office areas. Technical spaces often require cooling year-round.

Duct silencers

You would think that any device called a sound attenuator, silencer or sound trap would be invariably beneficial to HVAC noise control. Sound attenuators are an effective means of reducing broadband noise as it travels down a duct system, and have the advantage of predictable performance. Like any other tool, however, these products work properly only when they're used correctly.

Duct silencers operate by restricting the airflow through a system of baffles, exposing as much of the air stream as possible to sound-absorptive filler materials and/or resonant cavities. As a result, they have "self-noise" characteristics, meaning that they generate noise themselves due to turbulence in the airflow through their internal baffles. Silencers should be located far enough upstream of any acoustically sensitive space to ensure that the noise they generate is adequately attenuated before it reaches the occupied room.

Another frequent misuse of sound attenuators involves their placement in the duct system. If a silencer is located within a mechanical room, noise may enter the system through the sheet metal duct prior to being handled by the specialized needs of technical facilities. In evaluating an existing building to determine the existing mechanical systems, as well as the space needed for supplementary systems.

TIP: Think ahead. Whether in a new facility or a renovation, knowing where HVAC equipment will be located relative to the acoustically sensitive spaces can keep you from having to face intractable problems later on.

HVAC equipment location

There is no substitute for keeping equipment that generates noise and vibration as far away as practical from acoustically sensitive spaces. If an air handler is too close to a studio, obtaining adequate sound attenuation through the duct system can quickly become a losing battle. And the risk of excessive noise or vibration via every other potential path is greatly magnified.

Perhaps due to their superficial resemblance to warehouse space, TV studios may appear to inexperienced mechanical engineers to be perfect candidates for rooftop units located directly overhead. This is almost always a big mistake, because exposing a studio to noise and vibration by poking a hole in its roof and placing rotating machinery there makes it virtually impossible to achieve industry-standard background noise levels.

Standard building mechanical systems are almost always inadequate to handle the specialized needs of technical facilities. In evaluating an existing building to house technical spaces, it is essential to consider the existing mechanical systems, as well as the space needed for supplementary systems.

TIP: Do your homework. When you're asked to estimate power consumption for your technical electronic equipment, the time spent getting accurate information can mean the difference between a successful facility and one that just never works right.

Figure 1. Unless properly placed, a duct silencer's effectiveness can be reduced by mechanical noise that is emitted upstream of the silencer or recoupled into duct work downstream.
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Controlling HVAC noise

Duct-borne noise
The duct work that connects a fan or air handler to a room is a contained system that will also connect the equipment noise and vibration to the room unless adequate precautions are taken to attenuate the noise before it gets there. Without internal sound-absorptive duct liner or prefabricated sound attenuators, noise travels effectively down the duct system right along with the conditioned air.

Acoustical crosstalk is a similar problem that occurs when two spaces are connected by a common duct system with inadequate internal sound attenuation. Noise from one space enters the duct through the supply-air diffusers or return-air grilles and travels through the duct to a similar opening in another room.

Although noise control issues through the supply air duct system are routinely considered in HVAC design, inexperienced mechanical engineers and contractors often forget that the return-air path is an equally important contributor to noise problems. In fact, because return-air systems sometimes employ common plenums above corridor ceilings, there may be less duct work in the return-air path to attenuate the noise, and the transfer of return air from one space to another may be a significant breach of the sound isolation between them.

TIP: Make sure all duct systems are laid out to prevent crosstalk and to attenuate fan noise.

Velocity noise
As conditioned air travels from a fan to an occupied room, it is subjected to acceleration, deceleration, changes in direction, division and a variety of surfaces and obstacles. Each of these effects disturbs the uniformity of the airflow and causes turbulence, which in turn creates noise.

It is essential to limit the velocity of the airflow through all duct work systems in order to keep it from generating excessive noise. This is particularly true at the final branch ducts and the neck of the supply diffusers and return grilles, where this regenerated noise is exposed directly into the occupied spaces.

TIP: Keep airflow velocities low throughout the duct systems serving acoustically sensitive spaces.

Volume dampers
An important feature in the proper design of a duct work system is the ability to control the amount of air that flows through each segment of the duct, to ensure that the volume of air supplied to each space is tailored to its conditioning needs and that each supply diffuser in a given room is balanced with the others. To accomplish this, volume dampers are needed to limit the amount of air that is allowed down the duct path. Unfortunately, dampers accomplish their volume control by pinching down the air stream, increasing the pressure and consequently the noise wherever they occur. (See Figure 2.)

For office spaces, ceiling supply diffusers routinely are installed with face dampers, which are volume control dampers located right at the inlet to the diffuser. The airflow noise created by face dampers is essentially exposed directly into the room. In acoustically sensitive spaces, even if face dampers are left wide open they can generate audible noise.

TIP: Don’t use face dampers at the diffusers to adjust the airflow. Adjust the volume upstream using opposed-blade-type dampers.

Continued on page 75
"Today, TV Stations Have To Be Future-Proof."

Tom Bohn
VP Engineering and Product Operations
Maryland Public Television
Or The Set Of Wall Street Week With Louis Rukeyser

Hitachi Digital Cameras Help Maryland Public Television "Stay Ahead Of The Curve."

Tom Bohn feels the change from 4:3 analog to 16:9 digital technology "will be a revolution every bit as big as black-and-white to color. And since we don't know what the standards will ultimately be, we must start to future-proof now."

As he invests in new technology, Bohn looks for upgradeability in each piece of equipment. That's one reason he purchased eight Hitachi digital cameras. The SK-2000 Series has four built-in upgrade paths, from the single LSI processor, and A/D converter, to the newest CCD block technology.

"As the fourth largest producer of PBS shows, MPT creates programs with very long shelf lives—which makes 16:9 digital capability crucial. So we needed a camera that was digital from the head all the way through the CCU. I personally visited all the factories and trade shows, and I found Hitachi to be two years ahead of the competition.

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Circle (18) on Free Info Card
Major names in the TV and computer industry line up to take consumers on-line.

By Marjorie Costello

Joining the Internet boxes and web-browsing televisions discussed in the last Broadcast 2000 are PC/TVs, Internet appliances and other new technologies designed to display web pages on a TV screen. Companies that are offering products today or planning them for the near future include Gateway, NetTV, Thomson/RCA, Compaq, Microsoft, Netscape and IBM.

Gateway gets Destination to retail

This past May, computer direct marketer Gateway 2000 started selling its PC/TV, the Destination. It includes all the functions associated with a PC, such as web browsing and word processing, as well as the ability to watch TV channels. The Destination uses a 31-inch data-grade tube, connected to a CPU, designed to look like a black A/V component. The TV tuner resides on a PCI card inside the computer, along with the Pentium processor, hard- and floppy-disk drives, CD-ROM drive, modem and other components. Control is provided with a wireless keyboard and Gateway's Field Mouse remote control.

Destination, although it features an electronic programming guide (EPG) from Harman Interactive, does not offer the ability to move seamlessly from a TV show listing — or program — to a related web site.

NetTV'S PC/TV

Another PC/TV that provides web browsing and TV viewing is available from NetTV of San Rafael, CA. The company introduced its Home Theater Computer WorldVision models this past spring. The company actually shipped models before Gateway — back in April— but only to a few stores. Similar in concept to Destination, WorldVision prices start like Gateway's at less than $3,000, but for a system that offers a smaller 29-inch monitor. However, the NetTV monitor features a 125-channel, cable-ready tuner.

The processor and other components are built into WorldVision’s Computer-Deck, a sleekly designed black case resembling a VCR. Control is provided with a wireless keyboard. The company is also offering 33- and 37-inch screen sizes. Because NetTV is a relatively small company, its models are still in limited distribution — mainly on the West Coast. And because of Gateway’s considerable financial resources, Destination also received most of the media coverage.

Thomson getting ready with TV/PC

Starting last fall, Thomson/RCA has been demonstrating its Genius Theatre (GT), which the company prefers to call a TV/PC. GT takes a more integrated entertainment approach than Destination. In prototypes that we have seen, Thomson’s Genius Theatre II featured a master unit control center that permits the integration and operation of a number of devices, including a big-screen monitor, from one remote control. A
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Circle (19) on Free Info Card
wireless keyboard for simplifying Internet access has also been shown.

Although Genius Theatre is connected to a mini tower CPU, Thomson does not currently plan to use the system for other computer applications, such as word processing. Instead, the focus is on web browsing and playback from devices, such as a CD-ROM and eventually DVD.

Of particular importance to Thomson’s TV/PC plans is the integration of the StarSight electronic programming guide, which will pave the way to move seamlessly from a TV show to a related web site. For instance, RCA showed how — when watching television — an automated link could move a viewer from a TV show to a related Internet site.

The company is working on a special version of StarSight that will make it easy to jump from a broadcast web to a web site. StarSight is slated to provide easy access to any of the playback boxes, and in some cases, coordinate their operation. In fact, RCA even calls the EPG the killer app of the 21st century, when entertainment — as opposed to information — management will be king.

Microsoft sets its sites on StarSight

Microsoft, which has made the Internet the core of its corporate strategy, has announced plans to move the PC into the living room. To make it easier to integrate TV watching with web browsing, the software giant formed an alliance with a name known in CE circles and to these pages: StarSight.

The two companies have been reluctant to specify what they are planning through their cross-licensing agreement and long-term collaboration, which led the software giant to pay $20 million to StarSight. Based upon StarSight’s expertise and what Microsoft has announced, it is not too difficult to come up with some educated guesses as to what the two may have in the works.

Microsoft moves: SIPC, BPC and MSNBC

This past April, Microsoft chairman Bill Gates unveiled the Simply Interactive PC (SIPC) framework of hardware technologies for Windows-based PCs. According to Gates, the SIPC technologies will make the PC platform the center of entertainment, communications and productivity for both the home and office, providing the ease of use and convenience of a consumer appliance. SIPC is designed so that web browsing integrates more easily and effectively with other add-ons (such as telephony and cable cards) and software applications. Microsoft has also promoted its concept for the broadcast PC (BPC), which downloads, manipulates and displays programming and data from a variety of signals. This past summer, Microsoft and NBC launched MSNBC on the
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Internet. The web presence provides news and information that complements the programming transmitted on the new cable network, MSNBC Cable, launched simultaneously with the on-line operation. Microsoft, current Department of Justice investigations notwithstanding, is toiling into the night to overtake Netscape's lead in web-browsing software.

And, as we reported in Part 1, Microsoft formed a strategic relationship with WebTV this past fall to develop technologies and standards for delivering high-quality Internet browsing for display on televisions.

It is likely that a StarSight version of Windows may be in the works for the BPC, SIPC and any other PC/TV-related products now under wraps in Redmond. Another possibility is a StarSight plug-in for Microsoft's Internet Explorer browser that could simplify navigating to web sites. And, Microsoft could use its special version of StarSight to navigate viewers from MSNBC Cable to MSNBC on the Internet. Microsoft's deal with StarSight does not affect the customized version of the EPG that Thomson is developing for its products. Both Thomson and Microsoft are StarSight licensees, and besides, Thomson owns a stake in StarSight.

It is clear from Microsoft's announcements and collaborations — including the one with WebTV — that the software giant wants to be a major force behind the web, whether displayed on a TV or PC screen.

**Netscape ready to navigate TVs**

Netscape, while seeking legal relief from the government for what it claims is Microsoft's anti-competitive practices in pushing web-browsing software, is not resting on its laurels. The company is also moving forward on the technology front as it plans to integrate the PC and the TV.

This past summer Netscape established a new company to bring its Navigator web-browsing software and technology to consumer electronics devices and other non-PC systems. Netscape has established Navio Communications, an independent Internet software company, in which Netscape has a major equity position. Navio will work with CE and computer names to develop a wide variety of leading products. Companies mentioned were Sony, Nintendo, NEC, Sega, IBM and Oracle.

Navio is planning to find ways to develop versions of the Netscape Navigator for televisions, telephones, set-top boxes, game players and the new breed of network computers and information appliances designed for homes and businesses.

**Network computer news**

Netscape, along with IBM, Sun Microsystems, Apple and Oracle, are the major backers of the Network Computer (NC). NC refers to a set of technical standards — announced this past May — for developing simple, relatively inexpensive devices for cruising the Internet. In some cases, NC devices will be designed to connect to TV sets. In fact, Thomson (RCA) said that it would sell a set-top web-browsing box, based on Oracle's Network Computer (NC) design next spring.

The first official NC product was announced by IBM this summer and features a customized version of Netscape, designed by Navio. Called the IBM Network Station, the product is smaller than an algebra textbook and weighs in at 2.5 pounds. It is designed to sit upright next to a computer monitor. Featuring varying amounts of memory, the device also includes a network adapter card, keyboard and mouse, an optional monitor — but there is no disk storage.

The Network Station, in addition to providing web access, can also link to a company's central server computers, so employees can use other applications and store their work. It is geared toward business customers at $700 and uses a computer monitor for display.

**IBM's PC/TV plans**

IBM is also working on a PC/TV, and news of a collaboration with a major consumer electronics name is expected in the future. This past September, Big Blue introduced its new Aptiva S line, with a split-system that separates the floppy and CD-ROM drives, along with the power controls, from the CPU. With these components now packaged in a newly introduced media console, which resides beneath the monitor, the CPU can be moved up to six feet away from the work area.

IBM plans to use the media console in its collaboration with one or more consumer electronics companies to offer a home theater system that includes a PC/TV. The media console will also be leveraged by IBM to create the networked home of the future, which includes console access stations throughout the house, linked to a central server.

In a demonstration provided by IBM, a big-screen television was linked to a mini tower incorporating a TV card, modem and other software, such as a web browser. The system also included familiar audio and video devices, such as a home theater sound system, VCR and DSS. The Aptiva media console incorporated a DVD-ROM drive.

IBM also demonstrated an on-screen graphical user interface it designed for integrating and controlling the system.

IBM demonstrated a special remote control, dubbed a "media wand," that operates with the interface and responds to hand movements — as well as button pressing — for controlling a range of devices and functions. Web browsing is one of the capabilities we expect from a PC/TV from IBM and its as-yet-unnamed TV-set partner.

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**Conductors**

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**Broadcast Engineering** December 1996
It's an exciting time to purchase a new TV transmitter. There are so many questions about the impact of DTV. Who can you turn to for answers?

**Comark is the world leader in UHF high power transmitters.**

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And it's only the beginning. In just a few months, we'll introduce new products and services that will make your transition to DTV even easier. We'll also introduce innovative solid-state technologies that deliver ultra-high performance and reliability.

**Get our free guide, “DTV Questions & Answers.”**

Call us today at (215) 822-0777 and ask for our new guide, which describes the issues broadcasters face today, and the innovative ways Comark is solving them. Or you can request it from erainey@comarkcom.com.
Fox rises to the challenge with a squeaky clean feed.

By Tom Cook, senior managing editor

Before the New York Yankees beat the Atlanta Braves to win the 1996 World Series, the senior vice president of operations and engineering for Fox Sports, Jerry Gepner, knew he faced a dilemma. Holding the TV broadcast rights for the World Series, Fox Sports had an obligation to provide not only the domestic coverage, but also the international feed—a clean international feed.

It wasn't too long ago that sports broadcasting companies would put up a key for the score and another key with the network's logo, and they would just send a clean feed out upstream of that logo for the international feed. Thus, when you saw the World Series in Japan, you didn't know that ABC, for example, was broadcasting it in the United States because you never saw any of its monikers on the screen.

Photo: Two 20-inch color monitors display the results of Sony's Squeaky Clean digital solution for Fox Sports' broadcast of the 1996 World Series. The monitor on the right shows the Fox Sports and Major League Baseball logos, which appeared on the slab of each DVE replay. On the left, the bar contains generic artwork, which would be filled during the game with a different logo for the international audience.
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**Fox Sports, Sony hit home run with World Series coverage**

### The clean feed challenge

Well, if you watched any Major League Baseball on Fox this past season and saw the Fox Box (a continuous graphic in the upper left corner with inning, scoring and base running data) or witnessed the swoosh of some statistics flying onto the screen, you knew that providing a clean feed to the rest of the world was not going to be an easy task.

"The problem was the way they do that show, there was no way Fox could meet its obligation of a clean feed," said Steve DiFranco, director of production and post-production marketing for Sony's Broadcast and Professional Products Division, San Jose, CA.

Gepner agreed: "As domestic U.S. production gets more and more complex visually, and as more and more graphical branding of a product takes place, then the obligation to service the international market with that clean feed becomes more difficult from an engineering standpoint. Many of us are including an identifying graphic somewhere in the DVE replay (Major League Baseball's and Fox's logos on the 3-D slab), and although you don't want to compromise the ability of your executive production people to brand your product, you need to provide as brand-free a feed as possible for the world's broadcasters."

With less than five months until the World Series, Fox enlisted the help of Sony, which was partly responsible for the construction and equipment supply of at least five of today's digital mobile production units.

That's when the creative juices started flowing. Gepner, said DiFranco, came up with the idea of tying two switchers together, in this case Sony's DVS-7000. "He (Gepner) wanted one switcher to do domestic distribution with all of the logos everywhere and have the other switcher do the international feed without all of the graphics," DiFranco said. "Except he didn't want to hire two TDs (technical directors) or two directors or have to run the show twice."

Tom Belford and Glenn Hill, senior sustaining engineers for Sony, came up with the ideal solution, called Squeeky Clean. An option with the DVS-7000 is that one of the three M/Es could be controlled by another control panel. So, thought Hill, if two control panels can run one set of electronics, why not have one control panel run two sets of electronics?

"Why don't we park two trucks next to each other, tie them together with a communications line, and as the TD is switching the show in one truck, the other switcher will literally mimic in real time the switch?" Hill asked himself.

"We'd send the same camera feeds to both switchers and send the Fox graphics to the main switcher, but the still-store in the other truck would just have a generic Major League Baseball icon." DiFranco admitted being apprehensive when approaching Gepner with the solution. "When we told Gepner about how this would work, I expected him to hit the ceiling when I said he'd have to rent two trucks," DiFranco said. However, DiFranco's worries turned out to be unwarranted.

"We were going to use two trucks anyway," Gepner said. "Because of the number of cameras and tape machines you use, it doesn't make sense to use one truck and then build all that other stuff up outboard. It's much more cost-effective to bring in a second mobile unit.

Fox, which doesn't own any mobile facilities, called on National Mobile Television (NMT), Cincinnati, and its DX-2 digital unit to be the main truck, and LIN Productions, Arlington, TX, to provide LIN-1 as the truck for the international feed. The Squeeky Clean system originated only from Atlanta. (Fox rented CBS' MU1 and NMT's A16 for analog production in New York.)

"Frankly, I was shocked when Steve DiFranco called and said, 'By the way, you know, it works,'" Gepner admitted. "I was floored, absolutely flabbergasted. I said, 'You mean you went and did it?' And he said, 'Yeah, it was a good idea.' It's very gratifying to have those kinds of relationships."

### No turning back now

DiFranco knew there was no turning back, but he also did not want to go to the World Series and give this a try for the first time. Never before had two digital trucks been linked for a broadcast. "I wanted to make sure that nobody questioned the use of Digital Betacams, Sony cameras, switchers or digital video effects in a live production," he said. "And I wanted to prove to the country that we had the kind of support systems that everybody felt Grass Valley was always able to provide."

So Gepner called chief engineer Mark Brooks at NMT and arranged for DX-2, which had just completed a September weekend series between the Los Angeles Dodgers and San Diego Padres, to..."
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Fox Sports, Sony hit home run with World Series coverage

be parked in Sony's San Jose barn and put through the paces of producing an entire baseball game. A second DVS-7000 posed as LIN-1's switcher. Eight hours later, after numerous tests and purposeful power failures, etc., DiFranco and Fox Sports' Jerry Steinberg, director of field operations, were comfortable with the setup.

“Here's a way that the programmer, Fox, worked with a company, Sony, to help two of their customers, NMT and LIN, solve a problem for Fox, where Fox called us first,” said DiFranco. “And that relationship is what’s changed in our industry. Twelve years ago, it would have been a network working with its internal engineers, and the manufacturer would have had nothing to do with it.

“Today, the programmer calls the manufacturer to come up with a solution for the manufacturer's customers, and I think that relationship is an indication of what's going to happen in this business. I spend as much time talking to programmers now about what they want these trucks to do as I do with the truck owners. I think it will be a completely different arena in the way we interact with each other.”

Gepner, whose Fox Sports Division is still the new kid on the block for network sports programming, approached the 1996 baseball finale with a sense of excitement, seeing this as the crowning achievement in digital sports broadcasting. “We were very excited about the possibility of an all-digital compound,” he said, “and being able to share very conveniently facilities between two large digital production plants without some of the normal angst you go through when you tie together multiple analog environments. This is where emerging video technology . . . and digital technology . . . will take us.”

INDUSTRY STANDARD

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Isn't your job complicated enough? The answer is simple.

The answer is Mirage.
The advent of ATV (or one of its other aliases) will introduce many station engineers to the world of UHF TV transmitters. This has been discussed earlier to some extent in Broadcast Engineering, but without really going fully into new maintenance requirements.

One of the required major changes will be having to deal with new volumes of hot air and/or water with the possibility of also dealing with steam. Because no one really knows what the final configuration of the ATV transmitters will be (we don’t even know what the scan rate will be), it’s highly possible that some vapor-cooled devices will be inflicted upon engineers who are used to dealing only with docile blowers. In addition, for those who already have such systems, this is a good time of the year to be taking another look at those systems.

The cooling system

While some UHF equipment, even at fairly high power, is totally air-cooled, the majority of the higher-power devices use some combination of air and liquid in their cooling system. With a few exceptions, the final heat removal is by air. If the air is not cooling the device directly, it is used in a heat exchanger to cool a liquid, which is then used to cool the device. Some systems are even more exotic where distilled water is used to cool the amplifier with a heat exchanger used to transfer the heat to another liquid containing an antifreeze, which is then turned cooled by air in a heat exchanger.

While most experienced station engineers are familiar with blowers, filters and their associated problems, dealing with all of those non-potable liquids is where the problem arises. It can be assumed that all summer long the cooling systems have been simply doing their thing. However, as winter sets in, new demands are placed on the system — namely, don’t freeze. Just as winter follows fall, the next few months will see some stations go down because no one has serviced the cooling systems.

The inspection check list

A simple check of all fluid levels is always in order. This should be accompanied by an inspection of all belts, motors, gear boxes and other blower and pump drives. When the staff is worrying about neat digital boxes and how to get them wired into the video system, there is a tendency to ignore the more mundane things like flow rates, filter conditions and the freezing point of cooling solutions. The result is often a frozen heat exchanger with more holes in it than a politician’s promises. The problem is that the cooling systems are so dependable that no one really thinks about them until it’s too late.

For the newcomer, much can be done with the cooling system to protect it from harm. Where pure water is directly cooled by outside air, controlled louver systems need to regulate the temperature of the cooling air. To explain this better, let’s first look at the system when nothing is running. Without the transmitter making steam/hot water/hot air, the heat exchanger will be subjected to whatever temperature of air is in the surrounding room or in the duct work.

Heat exchangers can be inside the transmitter building with duct work for air input and output, directly located outside or in an air-handling room of their own. For vapor-cooled transmitters using distilled water and heat exchangers, which transition directly to air, something must be done to keep the system from freezing during down time. In fact, these systems will freeze up while operating if the airflow is not properly controlled. For indoor systems, louvers must be installed on the intake and exhaust of the heat exchanger. Then, a heat source must be provided to keep the air around the heat exchanger above freezing. This is usually either in the form of a small space heater or heating rods placed near the core of the exchanger.

The louvers must be adjusted automatically to permit outside air to flow when the transmitter starts heating up the water. This may be done by a system that will partially open/close louvers to maintain the air temper-
ITS, the market leader in low and medium power television transmitters, introduces the new ITS-800A series of solid state UHF transmitters. The 800A series offers the design, performance, and operational features you require for your broadcast installations. With years of experience in the broadcast industry, ITS has the expertise to engineer, manufacture and install the highest performance transmitter systems available today.

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ature at a reasonable level. That is, some of the exhaust air will be recirculated to the input to keep the input air temperature within an acceptable range. It's advisable to call on your heating/air-conditioning service to check these systems out thoroughly before the really bad weather arrives. The louver operation and controllers are critical to the operation of your system. When everything is frozen solid with ice is not the proper time for preventive maintenance.

As a word to the wise, some protection should be provided for the louvers themselves. Your heating contractor can construct protective hoods to cover the intake and exhaust louvers. Without such protection, ice can build up on the louvers during a storm, which will prevent them from opening when air is needed. Even worse, if the louvers are frozen in the open condition and the transmitter shuts down, outside air is free to enter the heat exchanger room with dire results.

Water/vapor cooled systems create a whole new set of worries for the transmitter crew. Remember, if the power at the transmitter site goes down during a winter storm, you must have standby protection available.

This can be in the form of a standby generator, which will at least operate your electric heating systems or non-electric heaters to keep the heat exchanger and transmitter warm. If the power stays down long enough for the building to get below freezing, you can kiss a few things goodbye starting with heat exchangers, klystrons, pipes, pumps and, perhaps, your warm indoor job.

There is some good news here. The pure water systems are primarily found in existing equipment using regular klystrons or MSDC klystrons with vapor phase cooling. Most of the new equipment use IOT devices, which aren't vapor-cooled. For these systems, the collector is cooled with water andethylene glycol at ground potential. All other parts of the IOT are air-cooled.

Carefully inspect all belts, motors, gear boxes and other blower and pump drives.

The other primary problem is the liquid itself. Many systems use an ethylene glycol solution as the primary cooling medium. This is for liquid-cooled, not vapor-cooled, transmitters. Ethylene glycol in a vapor-cooled klystron would deposit new and interesting compounds as it's boiled away. In addition, it's not non-conductive and cannot be directly applied where voltages are present, as is the case in an MSDC klystron. For the liquid-cooled systems, ethylene glycol is readily available and inexpensive.

Checking the chemicals

The chemicals used most are Dowtherm (Dow Chemical) and UCARTHERM (Union Carbide). The first requirements are to check that the mix is good to the coldest temperature anticipated and that it remains clean. The ethylene glycol is usually mixed with distilled water to avoid introducing other chemicals into the system. In addition, most systems have filters in the liquid that should be checked periodically. A testing kit is available for the mixed liquid, which should be used regularly. The problem is that the corrosion inhibitors break down after time, which can start the growth of unwanted deposits in the klystrons. When this occurs, the system should be drained, flushed and refilled with new coolant just like you do with the radiator in your car. You do check that regularly, don't you?

The cooling system is simple and there should be no problem with its maintenance. The only real difficulty is remembering to check it periodically. It is the old squeaking wheel syndrome where the cooling system rarely squeaks. Unfortunately, when it does squeak, it's more like a roar.

Don Markley is president of D.L. Markley and Associates, Peoria, IL.
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The ability to transfer compressed files in a broadcast facility from one video server to another or from acquisition equipment to video storage devices is a growing demand in the broadcast industry. A number of different approaches to this requirement have been proposed by various vendors. Philips Broadcast Television Systems (Philips BTS) has endorsed the emerging SMPTE standard of compressed serial digital interface (CSDI) to transfer compressed files from one device to another.

**Application-specific servers**

An important issue facing broadcasters as they migrate to more centralized disk-based servers is the problem of supporting multiple applications in a facility, all intermixed in a single box. Video servers may be used for commercial playout, programming, dubbing and news applications. Material may be developed on file is imperative. Decompressing and recompressing files can already be done with existing serial digital interface (SDI) technology. The advantage to sending compressed files is threefold. First, there is no additional generational loss of the video signal. Second, because the signal is compressed, it can be sent faster than real time from one server to another. Third, associated file database information can also be transferred, eliminating the need to recreate the information manually on the destination server.

**CSDI: A new solution for server-to-server communication**

CSDI is an emerging standard for sending compressed files from one device to another. The standard allows the use of existing digital broadcast infrastructure to send data, as opposed to video, between devices. Data (compressed video files) are synchronized to a standard digital video signal and sent. The data is effectively synchronized to video scan lines. The data being sent includes compressed video, all audio tracks and time-code tracks. Compressed files can be sent via direct connections or routed through a serial digital video router. Also, multiple connections can be established with other devices in use at the facility.

**CSDI vs. SDI**

How does the video server send compressed files over the same infrastructure used for video? Consider that with a regular video server, when video is written to disk, it is compressed to save bandwidth and storage space. On output, the video is sent through a video decoder, brought back to full bandwidth and sent out over the SDI to a digital video router where it goes to monitors, other devices or to air. With CSDI, the same compressed file is read from disk, but instead of going through the compression engine and decoded, it is sent directly to the serial digital interface as a compressed file, not as video. The data signal, which runs at up to 270Mb/s, can be sent to the same router and distributed to other devices that support SDI.

**Real-world solutions**

How will networked servers address these requirements? In order to obtain maximum benefit of server-to-server transfers, the ability to transfer a compressed a news server that later airs as a promo on a spot playout server or replayed during the newscast on the on-air server. Stations want to be sure that the activities in their news room and edit suites don’t affect the operation of their commercial playout channels.
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</tbody>
</table>

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  Member ........................................................................... $100  $125
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  Members of AIVF, I.P, I.A, DBA, ITVA, ITS, AICP and Women in Film receive SMPTE member rates on Shooting on Film seminar registration only. Please specify your organization
- A Technical Introduction to Digital Video by Charles Poynton
  Member (Book incl.) .......................................................... $135  $155
  Nonmember (Book incl.) .................................................... 160  175

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- Partner’s Program ......................................................... $125  $150
- Get-Together Luncheon .................................................... 50   60

AUTHORS: Two days Papers Program Complimentary Seminar $100  $100

TOTAL AMOUNT DUE .......................................................... $  

- Cancellations must be made in writing. A $50 administrative fee will be incurred.
- No refunds or cancellations postmarked after January 20, 1997.
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SMPTE member? □ Yes □ No Membership Number

Payment Method □ Check enclosed (payable to SMPTE) □ MC □ Visa □ AmEx
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Circle (44) on Free Info Card
Intraserver compressed transmission

Server-to-server (intraserver) compressed file transfer is a new technology for broadcasters. The technology offers many advantages. These include compressed file transfer, faster than real-time transfer, point-to-point transfers, point-to-multipoint transfers and media management.

In addition, a CSDI-based solution also provides additional features that may not be included in other implementations, including forward error detection or correction, automation control, support for acquisition equipment, faster than real-time file transfer and support for existing broadcast equipment.

Support for acquisition equipment

The CSDI standard not only includes support for video servers, but also supports acquisition and tape-based devices. DVCPRO cameras and VTRs may support CSDI providing up to four times transfer from field cameras (pre-recorded tape) directly to VTRs or to servers. Videotapes can be loaded onto the VTR and transferred into the server in the same manner as files are sent between servers.

<table>
<thead>
<tr>
<th>FEATURES/BENEFITS</th>
<th>CSDI</th>
<th>FIBRE CHANNEL ARBITRATED LOOP</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPRESSION FILES</td>
<td>SUPPORTED</td>
<td>SUPPORTED</td>
</tr>
<tr>
<td>FASTER THAN REAL-TIME TRANSFER</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broadcast Industry Standard</td>
<td>PROPOSED SMPTE STANDARD</td>
<td>COMPUTER STANDARD</td>
</tr>
<tr>
<td>Uses Standard Broadcast Equipment</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Scalable Bandwidth</td>
<td>Multiple CSDI connections supported bandwidth scalable based on needs</td>
<td>Arbitrated Loop limits bandwidth with many devices connected</td>
</tr>
<tr>
<td>Uses Existing Infrastructure</td>
<td>YES</td>
<td>NC</td>
</tr>
<tr>
<td>Additional Computer Technology</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>Point-to-Point</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Multicast</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Routeable</td>
<td>Via Serial Digital Video Router</td>
<td>Via Address on Arbitrated Loop</td>
</tr>
<tr>
<td>Supports Other Devices</td>
<td>Acquisition, VTR</td>
<td>NO</td>
</tr>
</tbody>
</table>

Table 1. Feature comparison between CSDI and Fibre Channel topologies.

Scalable bandwidth

One of the requirements of interconnecting servers is having the required bandwidth to transfer files over the connection. Today's solutions provide suitable bandwidth for at least a single compressed stream and sometimes it provides suitable bandwidth for multiple streams. Currently, there are two main approaches to interconnect servers, arbitrated loop technology (Fibre Channel Arbitrated Loop) and matrix switched technology (CSDI).

With a loop technology, each loop has a maximum bandwidth it can support. As more servers or nodes are added to the loop, more congestion may be created. With CSDI, scalability is provided by adding new crosspoints between servers, just as they are done today with video. A serial digital video switcher can take a single input and route it to multiple outputs or multiple source destination connections can be made as additional bandwidth is required.

Standards-based solutions

CSDI has been proposed for standardization by SMPTE. The proposal will support standard file formats, a specified bit rate and synchronization. Today, there is one file format being proposed. It is possible that, in the future, CSDI will support multiple file formats for different applications. For instance, DVCPRO could be supported for acquisition and news applications and Motion JPEG supported for spot playout and programming. Additionally, MPEG-2 may be supported for distribution servers. Because the transfer is, in most cases, faster than real time, the file format should be irrelevant. As long as the data can be synchronized to the data rate of the connection, it should be possible to send the data over that connection.

CSDI vs. Fibre Channel

CSDI offers most or all of the advantages of a computer networking technology, such as Fibre Channel. It also provides some additional advantages. CSDI offers increased scalability over Fibre Channel. A single Fibre Channel Arbitrated Loop can support about 75MB/s to 80MB/s. Each CSDI connection can support about 34MB/s. Although Fibre Channel has more initial bandwidth, multiple CSDI connections can be made to support more data transfer.

CSDI also uses existing familiar broadcast equipment, and uses the existing professional video paradigm: serial digital routers, coax cable and standard video connections. With CSDI there is no new equipment to buy. Existing systems are already compatible and expansion can be easily supported. No new computer technology needs to be learned or installed. CSDI also fits in well with today's automation systems.

The future

Today's broadcast and post facilities increasingly require the use of multiple applications, large servers and dispersed site operations. All of these needs can benefit from a fast, easy-to-implement intraserver file scheme. The new CSDI standard provides these advantages in a server-to-server interconnect topology at faster than real-time rates. And just as important, its implementation can be accomplished using existing broadcast equipment.

Charlie Bernstein is senior product manager, storage and retrieval products, Philips Broadcast Television Systems Company, Simi Valley, CA.
new products

Digital camera
Hitachi Denshi America Ltd.

- Z-2000A digital camera: a three-chip CCD color camera that features a new data transfer system for quick transfer of camera set-up information between cameras; an instructional 42-minute videotape is available that demonstrates the features of the Z-2000A, as well as the proper setup of menu-selected items, such as special gamma, six-vector color corrector and flesh-tone detail control.

Hitachi, 150 Crossways Park Dr., Woodbury, NY 11797; 516-921-7200; fax 516-496-3718

DVB-compliant QAM TV modulator
Barco

- Quasar: a DVB-compliant QAM modulator for transmission of digital signals; n-QAM capability, combined with a selection of different bit rates and channel bandwidths, makes the unit fit to operate in virtually every CATV or MMDS system; in addition, full remote control and monitoring of all settings are possible through Barco's ROSA cable TV management system.

Barco, Th Sevenslaan 106, B-8500 Kortrijk Belgium, +32 56 386 493; fax +32 56 386 293

Video panel
ADC Telecommunications

- CJMID staggered video panel: a CJMID staggered midsize jack video panel, especially designed for use in broadcasting trucks and other high-density digital video applications where true 75Ω impedance is required; the panel features 2x32 video circuits in a standard EIA width panel (1.75"x19"); in order to accommodate the large number of circuits, ADC designed midsize coax jacks — the CJ3011 and CJ4011 short- and long-body midsize single video jacks are staggered alternately on the panel and feature closed-entry BNC contacts for maximum center conductor force over sustained periods.

ADC, 4900 W. 78th St., Minneapolis, MN 55435; 800-366-3891 (ext. 3475); www.adc.com

DVCPRO VTRs
Panasonic

- 600 series: the series is made up of the AJ-D650 studio editing deck and the AJ-D640 recorder/player; the AJ-D650 delivers complete editing functions and the AJ-D640 provides a cost-effective solution for high-quality DVCPRO recordings and playback; with analog I/O, digital I/O (optional), and versatile interfacing via RS-422A and RS-232C remote, the VTRs address applications in linear and non-linear editing.

Panasonic, One Panasonic Way, 2A-2, Secaucus, NJ 07094; 800-524-0864 or 201-392-4319; fax 201-392-6001

Routing switchers
Leitch

- Xpress 12x1: routing switchers that offer low-cost equalizing and re-clocking digital video routing with the AES/EBU version meeting the need for small digital audio routers; available in 1RU 19-inch rack mounting, local or remote control and capable of being integrated with the existing XPRESS video and stereo audio switchers.


By Deanna Rood

December 1996 Broadcast Engineering
Accessories catalog
The Winsted Corporation
• 1996 Winsted Furniture and Accessories catalog: a free catalog featuring accessories for Winsted racks and consoles, such as doors for vertical equipment racks that feature shatter-resistant tinted Plexiglas and a security lock; two handy items that attach to the underside of the work shelf include a retractable cup holder and a new keyboard tray featuring a unique pull-out mouse pad.

The Winsted Corporation, 10901 Hampshire Ave. So., Minneapolis, MN 55438-2385; 800-559-6691; fax 612-944-1546; www.winsted.com; racks@winsted.com

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new products

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The mission for Tektronix’ Video and Networking Division is to bring the highest quality video broadcast/transmission to our customers, which means that we are pioneering the way in areas such as digital television and video. In fact we were recently awarded an Emmy Award for leading the television industry into the 10-bit world! That’s Emmy #7 for Tektronix! If you’re a creative, talented professional looking to join the top team in digital video and television, look no further.

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Picture perfect describes not only our technology focus but the quality of life available to our employees and their families. We offer an informal results-oriented environment nestled in the Sierra Nevada foothills, combined with an excellent quality of life—affordable housing, less congestion, clean air and an excellent school system. The following two opportunities are currently available:

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You will work with a team of professionals providing applications solutions utilizing Tektronix products from our Video and Networking Division. Responsibilities include pre-sales support of requests for quotations and proposals, and applications support for production switchers, routers, video effects, distribution and digital storage products. Requires a Bachelor’s degree in an engineering/technical field or equivalent and 4-6 years’ product application experience in the television, post production or broadcast industries.

International Support Manager
As a management professional, you will direct the development of the infrastructure and processes needed to support Regional Support Centers worldwide. Your team of customer service professionals will be responsible for product support to International customers and distributors of Tektronix Video and Networking products. Responsibilities include: pre-sales technical support and problem resolution. Requires a Bachelor’s degree in a technical field or equivalent and 3-5 years’ managing an International customer service support team.

New York & Los Angeles
Field Service Engineers
Tektronix is seeking individuals interested in joining a team of field professionals responsible for on-site repair, configuration and alignment of video and teleproduction equipment including: production switchers, routers, video effects, distribution and digital storage products. Requires BSEE degree or equivalent and 4-6 years’ technical support experience in the television, post production or broadcast industries.

To become part of the winning GRASS VALLEY team, mail your resume to: Tektronix, Inc., P.O. Box 1114, Dept. BE1296/RM, MS N4-2H, Grass Valley, CA 95945, Attn: Ron Marenco; Fax to (916) 478-3808; or E-mail to: ron.marenco@tek.com

To become part of the winning NEW YORK & LOS ANGELES teams, mail your resume to: Tektronix, Inc., Janet Maxino, Tektronix, Inc., 430 Mountain Ave., Mountain Heights Center, Murray Hill, NJ 07974; or Fax to: (908) 665-9379

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Harris Broadcast Division
• S-2D: a flyaway satellite uplink system that uses carbon fiber instead of metal for the reflector and support structure and weights 30% less than the original S-2; using Harris’ DSE 1400 exciter with MPEG-2 compression, the S-2D requires as little as 10W to 12W of power to transmit a superior signal; it can be powered by a battery-inverter system instead of shore power or a portable generator.

Harris, 3200 Wismann Lane, Quincy, IL 62305-4290; 606-282-4802 or 4808; fax 217-224-1439; www.broadcast.harris.com

Circle (268) on Free Info Card

Ampex-brand DBC tape
Quanegy
• Ampex brand DBC digital Betacam video cassettes: a state-of-the-art metal particle, digital video cassette designed for the most demanding broadcast applications; Ampex’s small particles develop higher magnetic energy and deliver the higher output required by digital systems; each particle is coated with a specially developed protective coating layer to ensure long-term stability; a new binder system provides more stability in still-framing modes or during multiple passes across tape heads.

Quanegy, 1025A Terre Bella Ave., Mountain View, CA 94043-1829; 415-903-1100; fax 415-903-1141
Circle (257) on Free Info Card
Serial digital proc amp

**Videotek**

- **DPA-100**: a serial digital proc amp that can control 601 digital signals in a manner familiar in composite analog, while staying 100% component digital; the unique “broadcast legal” function monitors a signal while in component digital and automatically makes appropriate adjustments.

Videotek, 243 Shoemaker Rd., Pottstown, PA 19464; 800-800-5719 or 610-327-2292; fax 610-327-9295

Circle (253) on Free Info Card

Lighting products catalog

**Frezzi Energy Systems**

A 12-page catalog featuring Frezzi’s lighting products, lighting kits, accessories, adapter cables and more; includes recent battery test results and battery comparisons.

Frezzi, 5 Valley St., Hawthorne, NJ 07506; 800-345-1030 or 201-427-1160; fax 201-427-0934

Circle (262) on Free Info Card

High-resolution camera system

**Philips BTS**

- **LDK-20** system: the 12-bit Hi-Res Digital LDK20PS and LDK 20P portable cameras featuring a unique split-body design that separates the front lens assembly from the rear control housing allowing the front of the camera to be placed in smaller areas; with the Philips BTS SuperX-Pander large lens adapter, both cameras can be converted from a portable to a full studio role (using a seven-inch viewfinder and large lens).

Philips BTS, 805-584-4700; fax 805-584-4750

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e-mail: pagusa@aol.com

Circle (46) on Free Info Card


Circle (45) on Free Info Card

December 1996 Broadcast Engineering 73
**new products**

**Microwave ENG equipment**

*NuComm*
- 47PT3 & 47RX3: portable ENG transmitter and receiver that are fully agile across the 4.5 to 5GHz frequency band; some of the features that offer 50% improvement in ENG efficiency include video presence detector for remote standby operation, field selectable audio subcarriers and universal power supply that handles most AC or DC voltage requirements.

NuComm, 101 Bibly Rd, Building 1, Hacketstown, NJ 07840; 908-852-3700; fax 908-813-0399

Circle (258) on Free Info Card

**Digital video line quadrupler**

*Miranda*
- Quartz: an advanced digital video line quadrupler featuring a large-screen digital video processor that delivers leading-edge capabilities in edge detection and motion compensation; VDSP technology ensures sharp video pictures without line structure, flicker or jaggies; one notable feature of Quartz is its ease of use.

Miranda, 8055, Transcanada, St-Laurent, Quebec, Canada HAS 1S4; 514-333-1772; fax 514-333-9828

Circle (271) on Free Info Card

**MMDS transmitters for wireless cable**

*Acrodyne*
- Transmitter line for MMDS/ITFS: MMDS transmitters for wireless cable that includes power levels for 10W, 20W, 50W and 100W peak visual output with 10% aural; designed for complete compatibility with all formats, all amplifiers are broadband class A linear including the aural side; a single RF output connector providing combined visual and aural is used for the 10W and 20W models, while the higher-power transmitters make use of an external diplexer.

Acrodyne, 516 Township Line Rd., Blue Bell, PA 19422; 800-523-2596 or 215-542-7000; fax 215-540-5837

Circle (255) on Free Info Card

**MPEG-2 compression module**

*Leitch*
- MPEG-2 compressor: an MPEG-2 compression module that supports the 4:2:2 profile at main level; the single-board module fits into a three-rack unit DigiBus frame; it uses IBM’s latest MPEG chipset providing I, IP, IPB and GOP structure support; the MPEG-2 compressor allows compression from 270Mb/s to 40Mb/s (about 7:1 compression) providing six multiple generations while retaining studio quality.


Circle (250) on Free Info Card

**Windows-based interface for iNFiNiT! graphics systems**

*Chyron*
- WiNFiNiTi! GUI: a graphical user interface for Chyron's iNFiNiT! family of graphics systems; WiNFiNiTi! provides a Windows NT front-end for Chyron's iNFiNiT! family of character generators; Chyron offers a new keyboard, keyPC with WiNFiNiTi! that incorporates a Pentium-based CPU and has direct connections for an SVGA color prompt monitor and SCSI-based peripherals; all existing users of iNFiNiT!, MAX!> and MAXINE! graphics systems can add WiNFiNiTi! capabilities using the new keyPC keyboard or a 486 or newer external PC and Microsoft Windows NT.

Chyron, 5 Hub Dr., Melville, NY 11747; 516-845-2182; fax 516-845-2058; www.chyron.com

Circle (266) on Free Info Card

**Air-cooled tube**

*Thomson Tubes Electroniques*
- TH 610: a tube designed as an air-cooled unit that ensures simple and economical operation for all new-generation 10kW common-mode analog transmitters; the TH 610's excellent linearity makes it an ideal component for digital broadcasting in the 2kW to 5kW power range and in the design of amplifiers for high-quality transmissions.

Thomson Tubes Electroniques, 13 av Morane Saulnier, Batiment Chavez, Veilzy Espace, BP 121, Veilzy Cedex France F-78148; +33-1-3070-3643; fax +33-1-3070-3650

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**bvs**

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Chyron, 5 Hub Dr., Melville, NY 11747; 516-845-2182; fax 516-845-2058; www.chyron.com

Circle (266) on Free Info Card
Vibration isolation

Airborne noise that radiates directly from HVAC equipment is only one part of the story. Rotating or motor-driven machinery also generates vibration energy that can travel through a building's structure and radiate from the walls, floors and ceilings in the form of airborne noise. It is essential to control vibration at its source, because once it's allowed to transmit into the building structure, vibration from HVAC equipment is widespread and extremely difficult to contain.

Vibration is best controlled by decoupling the vibrating equipment from the surrounding structure. This can involve spring mounts, elastomeric mounts, inertial bases, floating floors and/or structural isolation joints.

Vibration isolators must be matched to the load they carry. It's fairly intuitive that a spring that is fully compressed doesn't offer any isolation from the supporting structure. What may not be so obvious is that an uncompressed spring is just as ineffective. If the weight of the equipment doesn't deflect the spring, it means that the spring is stiff enough that the vibration can transmit directly through its coils. Oversizing a spring's capacity is just as detrimental as leaving it out entirely.

TIP: Use properly sized isolation mounts to keep vibration at the HVAC equipment from being transmitted into the building structure.

Flanking paths

When isolating HVAC equipment or piping or duct work from the building structure, it's important to verify that there are no flanking paths or other means for their vibration to be transmitted into the surrounding construction. For example, it is futile to mount a fan unit on springs unless there are flexible canvas or neoprene connectors at the supply and return ducts that attach to the fan. Otherwise, the vibration will travel through the duct to the first place it attaches to the building. Similarly, any piping and conduit that are connected to vibrating equipment must also be isolated with flexible connections.

TIP: Remember that noise and vibration don’t always follow the most obvious path in getting from the source to the place you don’t want it to go. Don’t allow rigid connections to defeat the operation of vibration isolators.

Penetrations

One of the most commonplace problems caused by HVAC systems has nothing to do with noise and vibration generated by the equipment or duct work. As it is distributed throughout the technical spaces, duct work inevitably penetrates the walls, ceilings and floors that are responsible for a room’s sound isolation capabilities. If these penetrations are not adequately treated, they allow sound leaks that can render these acoustical barriers completely ineffectual.

First, the penetrating duct work should be supported independently from the partition. If a duct rests on the wall it penetrates, any vibration within the duct can be transmitted into the wall itself, which can then provide a large radiating surface to turn the vibration into airborne noise. Second, the duct should be resiliently isolated from the surrounding construction as it passes through the partition, to avoid any contact that might transmit the vibration into the wall. Third, the area surrounding the penetration should be sealed airtight, using materials that won’t allow noise from an adjacent space to leak through the gap.

TIP: Make sure all penetrations through sound isolation walls and ceilings are sealed resiliently and airtight.

The best defense

When it comes to HVAC noise and vibration control, even with the best of intentions, there are hundreds of ways to make acoustical blunders that can render a technical space virtually unusable. There is no substitute for getting qualified help for the mechanical and acoustical design of HVAC systems in a technical facility.

If you're cognizant of the general mechanisms behind typical acoustical problems, however, it's much more likely that you'll be able to avoid at least the most common ones.

Richard Schrag is a consultant with Russ Berger Design Group, a recording and broadcast studio design firm in Dallas.

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- Balanced or unbalanced switching, inputs or outputs
- Front panel headphone jack

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Dielectric, Raymond, ME, and ABC Inc., New York, reached an agreement whereby Dielectric will supply digital and NTSC TV equipment for ABC’s stations nationwide.

In a separate agreement, Dielectric will also provide TV equipment to stations owned by Hearst Broadcasting, New York.

Sony, Park Ridge, NJ, announced that it was chosen to design and equip a new direct-to-home broadcast center for American Sky Broadcasting, Gilbert, AZ.

Quantel, Darien, CT, announced the sale of an Editbox 4020 system to Ocean Post, a London-area post-production facility. Quantel also announced the sale of an Editbox 301 to Flipside Films, San Francisco.

Pioneer New Media, Long Beach, CA, announced that the first Digital FastFile integrated stills and clips system was shipped to WUSA, Washington, DC.

Harris Corporation, Quincy, IL, announced that its broadcast division has entered into a TV transmitter purchase agreement with Tribune Broadcasting Company. Under the agreement, Harris will provide current NTSC and future DTV transmitters to Tribune-owned TV stations nationwide.

Additionally, Harris’ broadcast division was selected to provide DTV transmitters for the KCTX/Seattle and Oregon Public Broadcasting, Portland, experimental DTV facilities.

Tektronix, Beaverton, OR, signed an agreement to acquire Dynatech Newstar, Inc., Madison, WI. The terms of the transaction were not disclosed.

Also, Tektronix was awarded an Emmy for Outstanding Achievement in Engineering Development for its Profile Professional Disk Recorder.

Pinnacle Systems has relocated to 280 North Bernardo Ave., Mountain View, CA 94043; 415-526-1600; fax 415-526-1601; tech support 415-237-1800.

Comark, Colmar, PA, and Paxson Communications, West Palm Beach, FL, reached an agreement for the provision of Comark DTV transmitters to all of Paxson’s TV stations across the country.

Acrodyne, Blue Bell, PA, was awarded a contract for two diacrole 60kW UHF TV transmitters by the state of Wisconsin. The contract also includes installation services and test equipment.

Ken Ellis has been appointed chief executive officer of Quantel, Inc., Darien, CT. Also from Quantel, David Dever was named vice president of business development, broadcast and cable.

Kevin Prince was appointed director of marketing for Digital Graphix, Paramus, NJ.

A runway collision at the Quincy, IL, airport on Nov. 19 claimed the lives of three prominent men in the broadcast equipment industry.

Dennis Reed, 37, was director of international programs for Harris Corporation’s Broadcast Division. James Beville, 50, was president of Dielectric Communications Company of Raymond, ME. Mark DeSalle, 43, was Dielectric’s vice president of finance. All three were on their way to business meetings at Harris Broadcast’s headquarters in Quincy. Their commuter flight had just landed when it collided with a private plane at a runway intersection.

Wayne Coleman, chief engineer for Eagle Mountain Productions, was the winner of a Videotek SDC-101 digital color corrector at the third annual Broadcast Engineering Advanced Television Conference held in Chicago. More than 100 engineers from across the country, as well as Brazil, Italy and Mexico, attended the event.
transition to digital

Continued from page 18

mance guarantee may be a service credit if network uptime and bit error rates (BER) fall short of your requirements? If not, can you justify the expense of building a private network or leasing one?

On the technical side, ensuring high QoS requires diligent network administration performed by highly qualified people using the best equipment. Signal switching, coding and timing errors induced anywhere along the signal path can ripple through to the customer if not caught and corrected. Can you afford to hire the best people and provide them with the right tools? Finally, because ATM is relatively new to commercial applications and standards are still evolving, are you willing to spend the time and money required to discover ATM's true potential? Adopting ATM is a bold move and you must be prepared to grow with the technology.

Tracking ATM developments

Most of the current information on transmitting video using ATM comes from international standards bodies and industry consortia comprised of commercial network, service and content providers. Three of the most prominent standards bodies engaged in defining globally acceptable standards for ATM include the International Telecommunications Union (ITU), the European Telecom Standards Institute (ETSI) and the American National Standards Institute (ANSI). ETSI and ANSI are members of the ITU.

Commercial providers are exploring real-world adaptations of ATM for video through implementation agreements (IAs). Interactive TV trials are under way in many locations throughout the United States and the major industry players are involved. Industry organizations actively involved in resolving technical issues surrounding ATM for video include the ATM Forum, the Digital Video Broadcast Project (DVB) and the Digital Audio-Visual Industry Council (DAVIC).

Asynchronous transfer mode networking for voice, data and video holds considerable promise as an efficient connection-oriented technology. It is useful for transmitting complex signals over great distances in short periods of time offering bandwidth on demand that reaches well into the gigabits-per-second range. From all indications, ATM mated to a pay-for-bandwidth-used cost structure can position it as an attractive alternative to today's conventional networking schemes.

Richard Duvall is a marketing manager for Tektronix Inc., Beaverton, OR.

A Battery Analyzer so powerful, it restores batteries other analyzers classify as dead

Five years ago we invented the programmable battery analyzer. Now with configured Snap-Lock Battery Adapters, easy-to-program Smart Cables, numeric keypad, a computer interface plus one hundred other innovations, we have taken leadership in advanced battery analyzers.
Continued from page 24

Table 2. Leading battery suppliers and the battery types they provide.

<table>
<thead>
<tr>
<th>Supplier</th>
<th>Battery Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>NICEL CALCIUM</td>
<td>Nickel Metal</td>
</tr>
<tr>
<td>ANTONI BAUER</td>
<td>Sealed Lead Acid</td>
</tr>
<tr>
<td>PRO BATTERY INC.</td>
<td>Lithium</td>
</tr>
<tr>
<td>PERAKO</td>
<td>Nickel Metal</td>
</tr>
<tr>
<td>FREEZE ENERGY SYSTEMS INC.</td>
<td>Lead Acid</td>
</tr>
<tr>
<td>ENERGEX SYSTEMS CORP.</td>
<td>Ion</td>
</tr>
<tr>
<td>SCHRITZER AG</td>
<td>Zinc</td>
</tr>
<tr>
<td>SYNERGETIC</td>
<td>Solar Power</td>
</tr>
<tr>
<td>PAG LTD.</td>
<td>Other</td>
</tr>
</tbody>
</table>

* ALKALINE. CARBON ZINC, SILVER
** ALKALINE

NICKEL CADMIUM NICKEL METAL HYDRIDE NICKEL METAL HYDRIDE SEALED LEAD ACID LITHIUM ION ZINC AIR OTHER

are durable, cheap and provide a high-discharge (2Ah-30Ah) power source. Unlike Nicads and NiMHs, SLAs don't like being fully discharged and must be stored in a charged state. Although still expensive, Lithium Ion (Li-Ion) batteries have charge-discharge characteristics similar to Nicads, but much higher capacity and in some low-current applications they represent an interim step between Nicads and Zinc-air.

SLAs and Nicads are noxious to the environment when disposed, while NiMHs and Zinc-air batteries contain little poisonous metals. Some batteries will explode if burned and all batteries should be sent to vendors for recycling rather than being discarded.

As portable equipment’s requirements and usage patterns change, keep aware of what different battery types can offer for optimal field performance.

Bennett Liles is an audio engineer at Georgia Public Television, Atlanta.

Circle (162) on Free Info Card. See also “Batteries, Chargers, Analyzers, Reconditioners” on p. 87 of the BE Buyers Guide.
The Logic Series (DIGITAL) batteries are acknowledged to be the most advanced rechargeable battery technology. In addition to the comprehensive features listed below, all Logic Series batteries incorporate mini-clip connectors that communicate directly with Anton/Bauer's microprocessor, tracking, and monitoring system. Significant new benchmarks for reliability, performance, and life. They also completely the communication network between battery, charger, and camera. With the network in place, DIGITAL batteries deliver the feature most requested by customers: a reliable and accurate indication of remaining battery power.

**DIGITAL PRO PCS**

The Digital Pro Pac is the ultimate professional video battery and is recommended for all applications. The unique high-energy density cells deliver long life and high performance even under high current demands. A combination of state-of-the-art technology and manufacturing techniques into the Digital Pro Pac creates perfect shoulder balance with all current cameras.

- **DIGITAL PRO PAC 14** Logic Series NICAD Battery
  - 14-4-80 Watt hours. 5.11 lbs. Run time 2 hours @ 27 watts.
- **DIGITAL PRO PAC 13** Logic Series NICAD Battery
  - 13-2-53 Watt hours. 4.0 lbs. Run time 1 hour @ 25 watts.
  - 3 hours @ 17 watts.

**DIGITAL PRO PAC 16**

Now you can instantly reach a professional sales associate in our Order Department to assist you with your special needs. This new feature provides the latest and the most information and ordering process, making your communication with B&H a more pleasurable experience.

Simple look over the chart below to see the QuickDialog codes for each department. Call B&H, then the code for your department code at any time during your welcome message, to instantly connect you to the department you need.

**QuickDialog Options for**

**VIDEO & PRO-AUDIO MENU**

**QuickDialog**

- Industrial/Broadcast Equipment
  - 72 Digital/Analog Video
  - 72 Pro Video Equipment & Accessories
  - 74 Audio Equipment
  - 74 Non-Linear Editing & Computer-Based Video
  - 71 Used Video Equipment
  - 75

**Logic Series DIGITAL Gold Mount Batteries**

- **CA7X**
  - Single-Stage ENG Fluid Head System
    - CADDY Fluid Head
    - 335-2 Single-Stage Fluid Tripod System
    - SP 100 Lightweight Spreader
    - SD-120 Pan and Tilt Head
    - SD-120 Compact Spreader
    - SD-120 Junior Spreader

- **CA7S**
  - Two-Stage ENG Carbon Fiber System
    - CADDY Fluid Head
    - 335-2 Single-Stage Fluid Tripod System
    - SP 100 Lightweight Spreader
    - Soft Padded ENG Bag

- **Vision 12 Systems**
  - All Vision 12 systems require 335-3 SD-22 fluid and lubricated fluid connection. pan head with multi-segmental bar and clamp with dual 100mm/150mm bowl system.

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The PVR-2500 offers powerful tools for non-linear editing, including integration with your Windows NT applications. Any acquired video to computer-generated special effects (SFX) is simultaneously displayed in real-time in the titles and credits. Using the PVR-2500, video data may be pumped to the PVR-2500. Video may be stored directly on hard disk, allowing use with the most powerful computers.

- **Video output**: Real-time reverb and compressor/limiter. Additional effects can be added, such as fades, filters, and transitions.
- **Audio output**: Real-time reverb and compressor/limiter. Additional effects can be added, such as fades, filters, and transitions.
- **Network**: Non-destructive audio editing. No waiting for edits to complete.
- **Video out**: Quicklime 2.1 compatible. Can be used directly out of the box.
- **Audio out**: Quicklime 2.1 compatible. Can be used directly out of the box.
- **System**: The PVR-2500 is designed to meet the needs of video professionals who are looking for an open-system solution that uses standard video formats and provides broadcast quality CCIR-601 (720 x 480) resolution. The system is designed to be flexible, with the ability to work with any resolution format, from 24 fps film rates to 2400 x 1800 digital still images.
- **Storage**: The system is equipped with a large video and audio hard drive, allowing for the storage and retrieval of large amounts of data.
- **Performance**: The PVR-2500 has been optimized for real-time operation, allowing for the smooth playback of high-resolution video. The system includes a high-performance CPU, which allows for smooth real-time operation.
- **Programming**: The system includes a powerful set of programming tools, allowing for the creation of custom video effects and transitions.
- **Integration**: The PVR-2500 is designed to integrate seamlessly with other video systems, allowing for the creation of complex video productions.
- **Support**: The system includes a comprehensive set of technical support tools, including a user manual and technical support documentation.
Data Translation

BROADWAY MPEG-1 Encoder

BROADWAY Captains full-color, full-motion compressed video and audio data. The MPEG-1 standard, when combined with software MPEG-1 players such as those from Big Sur Interactive, provides a multimedia environment that can be used for video editing and presentation. The MPEG-1 standard is also ideal for viewing video capture via SMPTE time code, so digitizing video can be reviewed in real time at your editing station and then transferred to the computer for further editing.

Video Capture:

MPEG-1 delivers VHS-quality at CD-drive rates. Also ideal for field presentations on your notebook computer. MPEG-1 compression from within your favorite application is performed on-the-fly by the MPEG-1 Encoder to your specifications. Take advantage of Broadway's full-motion video capture and playback features for CD-ROM and other digital video applications.

Existing Software:

Use With/Without Existing Software:

Media 100 QX

MEDIA 100QX is based on Vector's, the same digital engine used in professional Media 100 systems. TARGA OTX includes MPEG-1 compression, broadcast-quality products and ingest/transport capabilities that are not available with the Macintosh and Windows operating systems.

Existing Software:

OPERATES IN YOURLIGHT SPACE

MPEG-1 quality video data can be transported and used on the Web. MPEG-1's high-quality video compression is an ideal format for streaming video into your network. The MPEG-1 standard is used in QuickTime media players to deliver high-quality video and audio to your desktop applications. MPEG-1 provides the ability to capture, edit, digitize and play video without losing quality.

Media 100qx and TARGA 2000 DTX/RTX

Adobe After Effects 3.0

Adobe After Effects 3.0 is a powerful motion graphics editor that can be used to create sophisticated motion graphics on the desktop. Produce on-air promos and bumpers, computer-generated animations, or even entire television broadcasts with this tool. The After Effects plug-ins also work with Photoshop, Illustrator and QuarkXpress.

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SDV 4-4 - Serial Digital and Analog Video Monitoring DA - 4-2/710 mbps. Four relocked SDV outputs, plus four CVBS or RGB outputs. 10 bit DAC, Fm GVG 8500/8800 DA frames. $895

TBC-RMT - TBC Remote Control Unit Remote control of up to 3 IBC's. For use with internal TBC's on BVW, DVW, PVW, UVW, and BVH Beta machines or any machine using Sony BVR-50 controller. Purchased with 1, 2, or 3 modules. Now available for NC machines - Series 22, 80, 85. $960

SCR-4X8 - Serial Machine Control Router - Input/Output Twelve rear mounted DB9-F connectors (four controllers, eight devices). EIA RS-422 send and receive. Controls: Twelve lighted pushbuttons for channel assignment. $980

SCP-10 - Serial 422 Patch Panel 10x10 passive non-normalling serial data patch panel. Two rack units high. Legend strips and 10 patch cords included. $350

VU2-P - VU/Peak Meter with Phase Indicator - Simultaneous peak and VU display. Solid state phase indication. Highly readable LED arrays. Adjustable headphone output. Hi-impedance looping inputs. $890

SPK-2 - Two Channel Audio Monitor Two channel audio confidence monitoring. Accepts both balanced and unbalanced inputs. Fire switchable listening modes. Headphone output with speaker mute. $650.

FOR SALE

Video Equipment Blowout! The former Corporate Television Productions is selling out everything to the bare walls! Pkg price suggested; individual items also available.
- Laird Legend Character Generator
- JVC CR-600 3/4" Recorder
- Abekas A51 Special Effects Unit
- Sony PVM-411 4/BW monitors
- JVC TBC KMF250U (2) w/remote
- Sony CRK-2000 Chroma Keyer
- Sony PVM-2030 Monitor (2)
- IDEN TBC NT/7
- Broadcast Electronics Cart Recorder Stereo
- Broadcast Electronics Cart Player Stereo
- Sony EVO-9800 Hi-B Editing Recorder (2)
- Sony Betamax SL-H1900 (makes a nice boat anchor)
- Forte Color Corrector CC-1
- Ace (Abekas) TR SEC/ Switcher
- Conversion 204T Editing system (JVC & Sony int)
- Anton Bauer Magnum & Pro Pak 14 Batteries (8)
- Anton Bauer Chargers LSF (4) & 4 place (3)
- Anton Bauer LSNP 4 place (1)
- Anton Bauer Battery Belts (4)
- Sony DX32/ SV90000/ H.3ch Camcorders(2)
- Comprehensive Edit Master (2 complete systems/ Sony & JVC int)
- Lots of other stuff, monitors, VCRS, consoles, etc.

CALL (516) 673-0778

For video duplication, demos, audition reels, work tapes, our recycled tapes are technically up to any task and downright bargains. All formats, fully guaranteed. To order call:

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Circle (101) on Free Info Card

FOR SALE

The World's Leader In Degaussers

The Eliminator 4000

There's nothing better than the Model 4(XX) to completely erase metal particle media in just seconds, including the hard to eliminate audio and control tracks. It's the one degausses approved by major television networks and production facilities across the world. Join the owners of the Eliminator 4000 and see what a Gamer Degausser can do for you.

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Lincoln, NE 68504
1-800-228-0275
TEL (402) 434-9100
FAX (402) 434-9133

HELP WANTED

TELEVISION ENGINEERS

Turner Broadcasting System, the leading News, Sports, and Entertainment system in satellite communications, has career opportunities for engineers with broadcast maintenance experience. These positions demand an extensive background in television engineering and at least two years of training in electronics technology. Turner Broadcasting System offers an excellent benefit and compensation program.

Send resumes to:
Mr. Jim Brown, Corp. Engineering
Turner Broadcasting System, Inc.
One CNN Center
P.O. Box 185366
Atlanta, GA 30348-5366
(404) 827-1638 office
(404) 827-1835 fax
TBS is an equal opportunity employer

ADVERTISING SALES

Join the leading publisher & trade show producer in the entertainment technology industry. College grad w/mag sales exp; excel communication, organization, computer skills req'd. Send letter resume, & salary history to:
Human Resources, Lighting Dimensions, 32 W 18th St., NYC 10011.
An Intertec/K-I media Co.
EOE.

EQUIPMENT WANTED

WANTED: USED VIDEO EQUIPMENT Systems or components. PRO VIDEO & FILM EQUIPMENT GROUP: the largest USED equipment dealer in the U.S.A. (972)869-0011.

WE PLACE

ASSISTANT CHIEF ENGINEER: Good chance for someone to step up to assistant or bigger market. Must have experience with UHF transmitters and capable of maintaining studio equipment. Must be computer literate. SBE certification and FCC license a plus. Send resume to Bob Hardie, CE, KSMO UPN62, 10 E. Cambridge Circle Dr., Suite 306, Kansas City, KS 66163 or Fax (913) 621-4703. EEO M/F

ADVERTISING RATES

Advertising rates in Broadcast Engineering Classified Section are $128¢ per column inch, per insertion, with frequency discounts available. There is a one inch minimum and ten inches maximum.

Ads may also be purchased By-The-Word for $1.80 per word, per insertion. Initials and abbreviations count as full words. Minimum charge is $40¢ per insertion.

Blind Box ads (replies sent to Broadcast Engineering for forwarding) are an additional $40¢. Reader Service Numbers are available for $50¢ per insertion. Ads 4 inches or larger receive a free Reader Service Number and will be listed in the Advertiser's Index.

Call Matt Tusken, Classified Sales Manager at 1-800-869-9939 or fax 913-967-1735.
MAINTENANCE ENGINEER


Mail Resumes to: Bob Boynton
801 South Main Street
Burbank, CA 91506

NBC 6 IS LOOKING for highly qualified Maintenance Engineers. Positions available with emphasis on Beta VTR repair, studio equipment, microwave, satellite and Avid equipment. Remote television and computer experience a plus. Two or more years of television experience required. We have a congenial working environment with excellent benefits. Qualified individuals please forward your resumes, salary history and cover letters (in care of phone calls) to: NBC 6, Human Resources Department, Attn.: Megan Druilard, re: position 96-6, 1001 Wood Ridge Center Drive, Charlotte, NC 28217. EOE/M/F/V/H

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PIMA COMMUNITY COLLEGE, TUCSON, AZ

Broadcast Engineer. Community Campus. Closing January 31, 1997. Please be on the cutting edge of telecommunications interests you. This position will be responsible for operating a new telecommunications facility with state of the art analog and digital video, satellite, and field equipment. The facility was designed to anchor the College's effort in providing instructional and student services. This is a full time position with maintenance of video cameras, switchers, fixed and ENG microwave, antenna systems and remote control systems. Send resumes, 4905-D E. Broadway Blvd., Tucson, AZ 85709-1190. Phone: (520) 748-4852. Fax: (520) 748-4624. EOE/AA

AM-FM-LPTV, same ownership over 20 years needs experienced hands-on Chief Engineer knowledgeable in computer, digital, audio, video and RF. Resume and salary requirements to: One Broadcast Center, Plano, IL 60545 - ATTN: Larry Nelson. FAX (630) 552-9393. EOE.

WAGT-25 TV ENGINEER Needed experienced television engineering. Candidate must have experience in videotape, switchers, VTRs. Mail resume to: P.O. Box 1526, Augusta, GA 30903. EOE. No phone calls.

MAINTENANCE ENGINEER NBC owned and operated TV station, WRC-TV, seeks an experienced maintenance technician for a staff position. Individual must have at least 5 years experience in installation and repair VHF broadcast, microwave, VHF television transmitters, EMCEE translators, CATV, and MATV, transmission and reception equipment. Candidates must have extensive maintenance experience with repair VHF broadcast, microwave, CATV, CATV, MATV, and CATV maintenance engineer position as well as video battery, satellite and RF equipment. Requires strong troubleshooting skills using the appropriate testing equipment. FCC General Class and radio amateur license holders preferred. For prompt consideration, please send resume to NBC, Employee Relations Department, DM 700 Nebraska Avenue, N.W., Washington, D.C. 20016. NBC is an Equal Opportunity Company continuously seeking to expand its diversity to better its communities.

KLVX-TV has openings for the following engineering positions: Senior Engineer-DUTIES: Supervise engineering staff, operate, install, maintain, and repair VHF broadcast, satellite, ITFS, and CATV facilities. QUALS: HS diploma and 6 years experience OR AS degree, plus 6 years experience, and FCC license. PREFERRED QUALS: Familiarity with Harris TV-30H transmitter, uplink systems, and SCE certification. STARTING SALARY: $34,598 benefits. TV Engineer II-DUTIES: Broadcast, ITFS, MATV, and CATV maintenance engineer position to operate, install, maintain, and repair multi-point systems and electrical power and wiring. Candidates must have at least 5 years experience maintaining satellite equipment. Successful candidate must be willing to maintain transmitter during the off hours of the day and maintain 10 other electronic sites throughout the state. Send resume to: CLARK PRODUCTION ASSOCIATES, INC. 296 BROADDIE ROAD, BETHLEHEM, PA 18017. VISIT OUR WEB SITE: http://www.clarkpro.com

REGIONAL DIRECTOR OF ENGINEERING

Quantel, the world leader in the design and manufacturing of digital imaging equipment, seeks a Regional Director of Engineering. Responsibilities include but are not limited to engineering representation of the Company and its products to potential clients and industry associations. The position requires significant broadcast engineering experience with the ability to design digital media systems and to cultivate relationships with media companies. Significant computer experience would be a plus. Good technical writing and presentation skills are required. Fax resume in confidence to Manager, Human Resources, 203-656-3459. EOE.

MAINTENANCE ENGINEER

KXV-TV, Phoenix, Arizona seeks an individual with repair and installation skills of television broadcast and computer equipment. Should have three years experience in maintaining audio, video, computer and RF broadcast equipment and systems. This position requires a two year electronic technical degree or equivalent, and experience with Beta and CCD ENG camera equipment. Fax resume to: Engineering Manager at (602) 304-3000 or send to KXV-TV, 4625 S. 33rd Place, Phoenix, Arizona 85040. EOE.

TV SYSTEMS ENGINEER


RF MAINTENANCE ENGINEER - Qualified candidates must have at least 5 years experience with VHF television transmitters, EMCEE translators, fixed and ENG microwave, antenna systems and remote control systems. Extensive experience needed. Also requires 3 years experience maintaining satellite equipment. Successful candidate must have an extensive understanding of multi-site systems and electrical power and wiring are a must. Also requires knowledge of studio equipment and computers. Contact: Gerry Grunig, Chief Engineer, KSAT-TI, 511 W. Adams St., Phoenix, AZ 85003 FAX (602) 262-0177. EOE.

VIDEO PRODUCTION ENGINEER

Clark is looking for a client oriented engineer who can work as a team player on a "flying by the seat of your pants" video crew. Good sound techniques & understanding of "Paint Box" operation is important. Knowledge of multi-camera ISO & live-switch production is desirable. Work with all of the newest Betacam SP & Digital formats. Our clients include Fortune 500 companies and the most creative & demanding production companies. Attention to detail & commitment to perfection are the required qualities for this position. Please send resumes to: CLARK PRODUCTION ASSOCIATES, INC. 296 BROADDIE ROAD, BETHLEHEM, PA 18017. VISIT OUR WEB SITE: http://www.clarkpro.com

KGGV SAN DIEGO'S 10, looking for broadcast maintenance engineer. Experience maintaining Beta SP equipment a must. Experience also needed working with station automation systems, microwave equipment, studio systems and audio equipment. Candidate must be computer literate. Minimum 5 years broadcast maintenance experience. FCC General License required. SBE certification a plus. Must be a self starter with good work habits and organizational skills. Send resumes to KGGV, Attn.: Ron Jennings, P.O. Box 85247, San Diego, CA 92186

KLVX-TV has openings for the following engineering positions: Senior Engineer-DUTIES: Supervise engineering staff, operate, install, maintain, and repair VHF broadcast, satellite, ITFS, and CATV facilities. QUALS: High School diploma and 6 years experience OR AS degree, plus 4 years experience, and FCC license. PREFERRED QUALS: Familiarity with Harris TV-30H transmitter, uplink systems, and SBE certification. STARTING SALARY: $34,598 benefits. TV Engineer II-DUTIES: Broadcast, ITFS, MATV, and CATV maintenance engineer position to operate, install, maintain, and repair multi-point systems and electrical power and wiring. Candidates must have at least 5 years experience maintaining satellite equipment. Successful candidate must be willing to maintain transmitter during the off hours of the day and maintain 10 other electronic sites throughout the state. Send resume to: CLARK PRODUCTION ASSOCIATES, INC. 296 BROADDIE ROAD, BETHLEHEM, PA 18017. VISIT OUR WEB SITE: http://www.clarkpro.com

REGIONAL DIRECTOR OF ENGINEERING

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By Paul McGoldrick

Compression and the video data rate

This is the second version of this column. The first posed a math question that I couldn't figure out. Steve, BE's technical editor, found my problem, saving me from a flood of E-mails—all because I hadn't heeded Mr. George.

Mr. George was my senior lecturer in electrical engineering at college. He was a tyrant from the old school and would thunder at innocent idiocy and moan at the ignorance of an 18 year old. He insisted on a couple of things. As far as he was concerned, "bulbs" grew in the garden, the things you plug into light fixtures were lamps. But the things that were right-on were fundamentals and units. It's amazing how many engineers cannot give you the approximate gain of a circuit or understand Kirchoff or who have heard of Lenz. When solving problems, Mr. George insisted on two calculations: the one with the numbers and a separate column showing the units involved and the final result unit.

So what did I do? I took a unit in a competing publication at face value. It is rare that I do not check on a standard, and the unit slipped by me. It is a good time to remind those who know, and to educate those who don't, that there is a fundamental difference between a bit and a byte. There are eight bits in one byte. The distinction seems to be blurry, and hasn't been helped by the computer industry popularizing an incorrect unit.

If you buy a hard-disk drive, the capacity will be given as, say, 2GB. As far as professional engineering societies are concerned, that reads as 2 Giga-Bels (VERY loud). The standard for professional papers and books is to spell out bit and byte. Data rates should be, for example, 100byte/s; using Bps reads as Bels-pica-second, all multiplied. Spelling it out makes it more difficult to change willy-nilly between upper and lower case.

The problem started with an error, but it was intended to lead into the data rates needed for full bandwidth, uncompressed video. We typically see 270Mbit/s for the serial interface, which includes all the frame and line intervals. Let's run through the numbers for the active video of eight-bit, 4:2:2 digital component video for 525 lines. Frame rate is 29.97/s, pixel count is 720 horizontally by 486 vertically, each pixel has two samples (luminance at every pixel and plus the alternating B-Y and R-Y), with eight bits per sample (one byte). That gives a data rate of 29.97x720x486x2x1 byte/s, which computes as 20.97x10^6 byte/s (or 167.79x10^6 bit/s). In computerese, this is equivalent to 20.0026Mbytes/s (1Mbyte=1,024kbytes, 1kbyte=1,024bytes).

Matrox Video Products (Dorval, Quebec) seems to agree with me, nearly. The company uses the same numbers and comes up with 20.02Mbyte/s instead of 20.0026Mbyte/s because they less accurately use the frame rate of 30/s. Matrox shows even more with a little quirk in compression, in a way going back to the fundamentals Mr. George would have been proud of. The concept of getting MPEG-2 or Motion-JPEG signals through a PCI bus has not been popular because of data bottlenecks.

Matrox's "over-the-top" solution, with a separate bus connecting dedicated video application cards in its DigiSuite, shows imagination. The company has put together the ingredients for mathematically lossless M-JPEG on the bus. The theory is simple: instead of the DCT followed by quantization followed by entropy encoding (that is, run-length and Huffman encoding to recognize and dispense with strings of repeat information and shorten up regular codes), you eliminate the DCT and quantization. The latter is where information is lost.

The bit-rate reduction is estimated by Matrox at about 1.6:1, translating into a manageable 13Mbyte/s or so data rate, while maintaining the quality of the image and allowing the full benefits of editing. The implementation still requires an M-JPEG codec with an internal pipeline architecture at least at the ITU CCIR-601 clock rate of 27MHz, and the Zoran (Santa Clara, CA) ZR36050 has been identified for the task. The codec with intermediate memory buffer is being labeled DigiMotion. A complete A/B roll editor consists of that plus a Fast-20 Wide SCSI, the preferred storage system and stream management/buffering with Microsoft's ActiveMovie software, the whole handling two lossless video datastreams plus audio.

Peace on earth Mr. George and readers, at least until the computer industry gets a hold of ATV standards.

Paul McGoldrick is a free-lance writer and consultant based on the West Coast.

Editors note: It is BE's policy to use MB/s to denote megabytes per second and to use Mb/s for megabits per second.
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