SEARCH NO MORE.

The Pioneer Rewritable VideoDisc Recorder puts an end to the endless search. With 0.3 seconds average access time and two playback heads, you can be cued and ready to move to the next segment long before the current one ends.

That's why just about anyone doing anything with video - from the major broadcast and cable networks to sports arenas - is doing it with Pioneer VideoDisc Recorders.

The search is over for scores of O&O's, affiliates, independents, PBS facilities, nationwide networks, production houses, and corporations. Discover why KRON, KESQ, KMEX, Prevue Networks, TNN: The Nashville Network, WSFP, WFMZ, KCOP, KCNC, KDFW, Videofonics, NIKE, and many others chose the Pioneer VDR-V1000.

If you're searching for a quick return on investment, the Pioneer Rewritable VideoDisc Recorder is your ideal machine. Call today to find out why:
Northeast-Joe Wellman at (201) 236-4180; Midwest-Jim Burger at (201) 327-6400; South-John Leahy at (214) 580-0200; West-Craig Abrams at (310) 952-3021.

The Art of Entertainment

Pioneer is a registered trademark of Pioneer Electronic Corporation.

Circle (1) on Reply Card
At times like this, you better have an intercom system you can count on.

Things could go from warm and sunny to partly cloudy rather quickly on the set if you're unable to communicate effectively. That's why Telex developed ADAM," the most advanced intercom system ever designed. It allows communication with up to 1,000 people with CD quality audio and takes up minimal space, eliminating unnecessary clutter. ADAM" (Advanced Digital Audio Matrix) is cost effective, all digital and backward compatible, so it will work with your existing RTS" CS9000 series key panels. And because there is no size limitation, you'll never outgrow ADAM". These features make ADAM" a system of the future, available today. Exactly what you'd expect from a sound company like Telex. Give us a call, we'll help you keep your sunny disposition.

RTS" Intercom Systems. A Product of Telex.

9600 Aldrich Avenue South • Minneapolis, Minnesota 55420 USA • 612-884-4051 Fax 612-884-0043
NAB PREVIEW

84 BE FASTtrack
107 Map
124 Exhibitor Highlights
182 South Hall Exhibits
184 South Hall Map

THIS MONTH...

32 Post Perfect’s Digital Solution
By Dean Winkler
Upgrading signal infrastructure requires a balancing act.

38 WDSU-TV Designs a New Home
By Shawn McBride
Sometimes, it reaches the point where you simply have to start over.

48 TCI Builds New Digital Facility
By Peter Douglas
Anticipation of the future has strong influence on new design.

60 Bell Atlantic’s Digital Production Studio
By Steve Epstein
This is not your father’s post house.

68 Soundwave: Digital Audio in Perfection
By Jim Bloch
What’s worse -- outgrowing your old facility or moving to a new one?

76 Group W Network Services
By Altan Stalker
A facility grows to serve increased customer demands.

DEPARTMENTS:

8 FCC Update: NPRM on video dial-tone
10 Management: Personal chemistry, part 1
12 Transition to Digital: Serial digital video
16 Production: Using digital audio links
18 Interactive: Finding jobs
20 ATV Update: SMPTE winter conference
22 Broadcast 2000: StarSight & XDS
81 NAB conference preview
192 SBE Update: Broadcast Engineering Conference
194 Transmission Technology: Television STL systems
220 New Products

COLUMNS:

4 News
6 Editorial
200 Applied Technology: Louth Automation
206 Applied Technology: JVC Cameras
212 Industry Briefs
239 Classifieds
245 Advertisers’ Index

ON THE COVER: Artist Craig Ridenour’s rendering for station KDSU-TV.

BROADCAST ENGINEERING® (ISSN 0007-1995) is published monthly (except semi-monthly in November) and mailed free to qualified persons within the United States and Canada. Second-class postage paid at Shawnee Mission, KS, and additional mailing offices. POSTMASTER: Send address changes to Broadcast Engineering, P.O. Box 12902, Overland Park, KS 66282-2902.

2 Broadcast Engineering March 1995
What's New At

NAB95

SUNDAY, APRIL 9–THURSDAY, APRIL 13, 1995
LAS VEGAS CONVENTION CENTER

It's no secret! Digital video equipment will be the key focus at NAB95.

You'll see new digital VTRs, new digital switchers, dazzling digital effect generators, cameras... and the latest in digital video test equipment - the state-of-the-art solutions from AAVS - providing test and measurement capabilities that assist the engineering and operations staff in determining the quality of the digital transmission and issuing a warning before a failure occurs. Preventative maintenance answers that ensure your digital video facility will stay up and running - helping you maintain and increase the quality of your final product - digital video quality that your customers expect and deserve.

Visit with us during NAB95 at Booth #19623 to discover how AAVS can help with your digital video testing needs.

The Principles Of Digital Video

The “Principles Of Digital Video” provides the basics of digital video, with an emphasis on digital video system troubleshooting and testing. This tutorial is ideal for system engineers in the process of converting to digital video and those who are presently considering the implementation of digital video in their facilities. For more information on “The Principles Of Digital Video” tutorial call 1-800-769-AAVS(2287).

Don't Miss Out! To Set Up A Private One-On-One Demonstration And Find Out About The Latest Techniques In Testing Digital Video Systems, Call 1-800-769-AAVS(2287).

Circle (5) on Reply Card

AAS by Sencore
The Name To Know In Digital Video Testing

Advanced Audio Visual Systems by Sencore
3200 Sencore Drive, Sioux Falls, SD 57107
Direct (605) 339-0100 Fax (605) 339-0317
**Futurist sessions to demo new services**

TV broadcasting in a digital world and what broadcasters need to know now to plan for tomorrow will be explored during a TV futures summit on April 12.

Three-dimensional broadcast television, video-on-demand (VOD) and data broadcasting are some of the new services that will be demonstrated during a 2-hour session.

From 9 a.m. to 10 a.m., Dr. James E. Carnes, president and CEO of the David Sarnoff Research Center, will discuss digital technologies and their expected impact on TV broadcasting.

**NAB and SMPTE present computer/film/video tutorial**

An all-day seminar called “Pixels, Pictures, and Perception: The Difference and Similarities Between Computer Imagery, Film and Video” will be presented in Las Vegas on April 8, the day preceding the NAB Convention. An international team of award-winning instructors will explain everything from the physiological process of vision to the electronic effect of monitor controls, as well as how that knowledge can be used to present better pictures. Topics will range from such basic issues as color, detail, and motion, to such specifics as digital filtering in data-rate compression and spot size in the recording of electronic images on film. The seminar is available at no additional cost to all NAB '95 full-program registrants. All participants will receive supporting print materials. For more information on NAB '95, including registration and housing, use Fax-on-Demand at 301-216-1847.

**NAB features a variety of speakers**

FCC chairman Reed Hundt will address broadcasters on Tuesday, April 11, from 7:30 a.m. to 8:45 a.m. at the special chairman’s breakfast. A regulatory dialogue also is scheduled Thursday afternoon from 3:30 p.m. to 4:45 p.m. It will feature commissioners Andrew Barrett, Susan Ness and Rachelle Chong as well as NTIA chief and commerce department assistant secretary Larry Irving. James Quello will keynote the opening ceremonies of the Broadcast Engineering Conference on Sunday, April 9.

Boutros Boutros-Ghali, secretary general of the United Nations, will keynote a special dinner for international broadcasters on April 12 at 7:30 p.m. at the Mirage Hotel. His address also marks the 50th anniversary of the United Nations Organization.

Dawson B. Nail, vice president/executive editor of Television Digest and Communications Daily, will receive “The Spirit of Broadcasting” award April 10 at the NAB/TVB TV luncheon, which will be held from 12:00 p.m. to 2:30 p.m. The NAB award recognizes general excellence and is given to individuals who have a lifetime of contributions to the radio and TV industry.

Ian Diery, executive vice president and general manager, personal computer division, Apple Computer, Inc., will be a keynote speaker for NAB Multimedia World. He will share his views on the converging broadcast and computer worlds on April 11 at 9:00 a.m.

**SMPTE Proceedings available**

The Society of Motion Picture and Television Engineers (SMPTE) has published a Proceedings of selected papers from the SMPTE Advanced Television and Electronic Imaging Conference, which was held in San Francisco on Feb. 9-11.

Paid attendees who registered for the Advanced Television and Electronic Imaging Conference received a complementary copy of the Proceedings, courtesy of the SMPTE. Additional copies of the bound, 260-page paperback are available to SMPTE members for $20; the cost for non-members is $25.

The society also offers for sale a full line of test materials based on SMPTE standards and recommended practices to help engineers maintain their equipment at peak performance levels. Also for sale is a complete selection of SMPTE publications at reduced prices, including the established SMPTE Standard, 4:2:2 Digital Video, ITU/SMPTE Tutorial: Digital Terrestrial Television Broadcasting (DITTB) and A Television Continuum -- 1967 to 2017 (1991). A catalog and price list is available from SMPTE, 595 W. Hartsdale Avenue, White Plains, NY 10607 or call 914-761-1100.
As we all know, communications, video, information...everything is going digital. Isn't it time cameras did? Today's digital camera not only outperforms the best analog can offer but sets new benchmarks in video quality, features, stability and reliability. The days of the analog camera are numbered because digital offers too many advantages to be ignored.

With DIGITAL advantages such as a new video transparency, flesh tone detail to soften facial blemishes, precision detail correction, precision transfer of setups between cameras, a plug-in memory card to recreate exact setups weeks or months later and serial digital outputs for D-1 and D-2/D-3 VTR's, now is the time to consider what all cameras will be....DIGITAL.

Introducing the Digital SK-2600

- Unique PIP (Picture in Picture) allows a second video source to be windowed with camera video in any of four quadrants or reversed with camera video.
- Separate H&V detail generator for viewfinder makes focus 'pop' for camera operator.
- Exclusive single LSI device provides 13-bit (minimum) digital processing for RGB video including detail and masking.
- The 600,000 pixel CCD provides 900 TV line resolution and dramatically reduces aliasing. An optional, 520K pixel CCD is available to provide switching between 4:3 and 16:9 aspect ratios at the push of a button.

Call today for more information or a demonstration.
Hi ho, hi ho, it’s off to Vegas we go.

Every year about this time my staff and I begin to feel the excitement of attending the industry’s annual megaconvention. Preparing for the show is a monumental task in itself. Coordinating the editorial coverage for such an event with almost 50 staff members and reporters makes us tired before we ever get to the show floor. With NAB predicting 70,000 attendees and 1,000 exhibitors it’ll be a tough job to cover all the bases, but after all, someone has to do it right!

In order to get a running start on our coverage, the crack BE editorial staff was allowed to peek into some manufacturers’ back rooms for an advance look at new products. Here are a few of the hot new products you’ll want to look out for at this year’s show.

From Sillican Graphics, the Indigo-man-go, a 2,500MHz UNIX-based DTV graphics workstation, boasts 14 teraflops of floating point prowess. On-board thermal transfer coupling unit transfers dangerous heat out of unit and directly into your facility’s HVAC system for efficient re-use.

Micro-microsoft (sometimes called Picosoft) introduces When95, a 32-bit virtual TV station software package. The company claims it can do everything from CG to automation control. Delivery date is unknown, but a company official assured me it would be available soon — whatever that means.

One of the most unique devices we located will be in the Minor Flooded Heads booth. Called the Spock rock tripod, it has no legs; the camera is supported in mid-air by levitation. Unfortunately, because the tripod is invisible, it’s difficult to find in your trunk.

Panicsonic will release the latest in portable cameras, the super-duper-cam. Able to record an entire year’s worth of video on a single 1/2-inch cassette, the unit uses 2-bit processing to keep things simple.

JVCC will be competing with its highly innovative camera. Using military stealth technology, the KY-why camera provides fully illuminated images in 100% darkness. It does so by remembering what it last saw in the light. The camera figures you, like the government, which funded the technology, won’t know the difference.

Finally, don’t forget to stop by the So-me booth. The company wouldn’t release much about its surprise announcement, but it’s expected to center on a new way to interconnect everything in your facility, from video server to the coffee machine. Sources tell me its Pentium-based, but then what’s an error here or there?

Keep your eyes open while on the show floor. If you find something really interesting during your visit, let us know. You can reach us on the Internet or CompuServe. We’ll share the news with readers in our June wrap-up of this year’s show.

Brad Dick, editor
LARCAN-TTC is the answer. We’re so successful in today’s competitive transmitter market because everything we build is designed for simplicity, efficiency, reliability and long life. And everything we sell is backed by the resources of the LeBlanc Communications Group, one of the world’s largest suppliers of RF transmission equipment and services.

Who has sold more high power solid-state FM transmitters than anyone else?

FMS Series FM transmitters: 1 kW-8kW

Whether it’s a 50 watt translator or a 240kW powerhouse, when you’re ready to upgrade your UHF or FM facility, look to LARCAN-TTC. And for North America’s most popular VHF transmitter, it’s the legendary solid state LARCAN M Series. Let us help you write your own success story. Call LARCAN-TTC for the full story on our complete product line.

650 South Taylor Ave • Louisville, Colorado 80027 • Tel (303)665-8000 • Fax (303)673-9900

Please see us at NAB, Booth #12500.

Circle (11) on Reply Card
The FCC recently initiated proceedings to consider new rules governing telcos' provision of video programming to subscribers. The commission took this action in response to recent court decisions holding that the cross-ownership ban established by the 1994 Cable Act prohibits telcos from providing programming to subscribers in their service areas.

In its fourth Further Notice of Proposed Rulemaking (NPRM), the FCC seeks comment on whether telcos should be permitted to provide video programming over their own video dial-tone platforms. The proposed safeguards would protect consumers and video programmers. The FCC also seeks comment on whether it has authority to require telcos that want to provide video programming to do so over their own facilities, rather than over existing cable TV facilities. The FCC will consider the extent to which Title II and Title VI, which govern common carrier and cable services, should apply to telcos providing video programming to subscribers.

Because telcos may be able to become programmers on their own video dial-tone systems, the commission is considering whether to adopt additional safeguards against anti-competitive conduct or cross-subsidization. The commission also solicited comment on whether telcos should be limited to using a certain percentage of the capacity of their video dial-tone platforms for their own programming. Finally, the commission is considering whether to apply structural separation requirements and non-structural safeguards to telcos' programming. This would include cost allocation rules and customer proprietary network information requirements.

FCC adopts NPRM in video dial-tone rulemaking

The FCC is seeking comment on whether telcos should provide video programming over their video dial-tone platforms.

For the complete users’ fee guideline, refer to the “FCC Update” in the October 1993 issue of Broadcast Engineering.

FCC seeks comments on fee policy

In July 1994, the U.S. Court of Appeals for the D.C. Circuit invalidated the FCC's Forfeiture Policy Statement. The policy statement was improperly issued without notice and comment. Accordingly, the FCC has solicited comment on its fee policy. It also is proposing to amend Section 1.80 of its rules by incorporating the guidelines for assessing fines. The commission is proposing fee guidelines that are virtually identical to those in effect prior to the D.C. Circuit's decision.

PROPOSED NEW REGULATORY FEES FOR TELEVISION

<table>
<thead>
<tr>
<th>VHF Stations</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Markets 1-10</td>
<td>$21,450</td>
</tr>
<tr>
<td>Markets 11-25</td>
<td>$19,075</td>
</tr>
<tr>
<td>Markets 26-50</td>
<td>$14,300</td>
</tr>
<tr>
<td>Markets 51-100</td>
<td>$9,525</td>
</tr>
<tr>
<td>Remaining Markets</td>
<td>$5,950</td>
</tr>
<tr>
<td>Constr. Permits</td>
<td>$4,775</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UHF Stations</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Markets 1-10</td>
<td>$17,150</td>
</tr>
<tr>
<td>Markets 11-25</td>
<td>$15,250</td>
</tr>
<tr>
<td>Markets 26-50</td>
<td>$11,450</td>
</tr>
<tr>
<td>Markets 51-100</td>
<td>$7,625</td>
</tr>
<tr>
<td>Remaining Markets</td>
<td>$4,775</td>
</tr>
<tr>
<td>Constr. Permits</td>
<td>$3,825</td>
</tr>
</tbody>
</table>

| Terrestrial Satellite TV Stations (All Markets) | $595 |
| Constr. Permits | $200 |
| Low Power TV, Translators & Boosters | $160 |
| Broadcast Auxiliary | $30 |
| Multipoint Distribution Service (per call sign) | $120 |

<table>
<thead>
<tr>
<th>Cable</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable Antenna Relay</td>
<td>$305</td>
</tr>
<tr>
<td>Cable TV Systems (per subscriber)</td>
<td>$51</td>
</tr>
</tbody>
</table>

Table 1. The FCC has proposed the above 1995 regulatory fees for TV broadcast and cable services.
We design your **studio ceiling**, the complete **lighting equipment**, **suspension systems** (motor-driven or manual operation) as well as **positioning and control systems** — all with Sachtler products!

Why don't you write us or give us a call? We are happy to provide you with detailed information.

**Eastern Europe:** Sachtler Vertriebsgesellschaft m.b.H., Germany, Segelflieger Damm 67, 12487 Berlin,
Telephone (0 30) 6 36 43 11, Fax (0 30) 6 36 34 66

**Headquarters:** Sachtler AG, Germany, Gutenberg-straße 5, 85716 Unterschleißheim bei München,
Telephone (089)32158200, Fax (0 89)32158227,
Telex 5 215 340 sac d

**U.S.A.: sachtler® corporation of America**, New York office: 55, North Main Street, Freeport, N.Y. 11520, Phone (516) 67-49 00, Fax (516) 6 23-68 44

**Japan:** Amic Sachtler Corp.

©Amic Sachtler Corp.

See us at NAB, Booth #19526.
Personal chemistry, part 1

Building personal chemistry

• **Research the company.** Did you ever meet anyone for the first time who knew quite a bit about you? It takes you by surprise. It's a great way to make a positive first impression. Make it your business to know as much as you can about the company, the position and the person you're meeting.

• **Build chemistry when you arrange interviews over the phone.** Most interviews are arranged over the phone and you can begin building good chemistry right there. Project confidence, friendliness and enthusiasm in your voice. Use the opportunity to gather more information about the company, job responsibilities and office environment.

Find out how much time the interview expects to take. If it's 15 minutes, you'll know it's only a screening interview. If they say "all day," plan accordingly.

• Ask a theme question during the phone interview. This question is meant to stir a conversation that could tip you off about what the interviewer considers important.

• **Build chemistry with the secretary.** Most secretaries screen calls, in effect serving as "gatekeepers." Over the years a number of polls have focused on whether executives pay attention to their secretary's opinions about job applicants. About two-thirds of them did. What do you think?

The bottom line is to be attentive to the secretary. Strike up a conversation and learn more about the inside scoop. You may find that when you go out of your way to be kind and respectful to the secretary, he or she will often go out of their way for you.

• **Maintain a positive attitude.** Build positive expectations. Visualize a successful outcome. If you think you can, you will. If not, you won't.

• **Project the right image.** Most employers make up their minds in the first four minutes of any interview. Some things you can't control but image is one that you can. Ask your friends and peers to give you a frank commentary on what they think about you. Listen and learn.

• **Pay sincere compliments.** During the first few minutes, let the interviewer know what you have heard about the company. This shows that you've researched the company. It also serves as a third-party compliment where you are passing on the good news you heard from others.

• **Build chemistry when you answer questions.** There are many effective methods for doing this. A safe way out is to self-qualify your answer. When you do that, you give the interviewer the opportunity to respond and direct the conversation toward other areas if that isn't what they are interested in.

Your chemistry with the interviewer will be enhanced if you provide examples that demonstrate your grasp of an issue or familiarity with a process. This can be done with good, action-oriented stories.

Your chemistry will expand if you can handle the "insufficient information" question. Try the "polite turnaround" technique. This means that you don't give an answer, but you acknowledge the status of the interviewer and redirect the question.

Most employers make up their minds in the first four minutes.

• **Listen, find out what they want and build chemistry as you do it.** The first step is to keep your mouth shut. Listen for a description of the job requirements. If you don't get anywhere, ask questions on areas in which you can help the company. The conversation should be a mix of positive comments, questions and effective listening.

• **Let them know that you have what they want.** Consider the interviewer as a customer to whom you want to make a sale. You increase your chances for success by understanding the customer's needs and interpersonal style. First, ask a question; second, engage in a conversation so you can listen and learn; third, get across that you have the required strengths and skills. Finally, ask feedback questions. It's your best chance for determining if you've hit the mark and have what they want.

• **Always follow up.** Before concluding the interview, get feedback, make a positive summary and get the names of "the players." Write follow-up letters as soon as possible. Relay your appreciation for the opportunity to learn about their organization, stressing again the ways in which you can contribute. Separate letters should be sent to everyone who met you.

If you follow these guidelines for building personal chemistry, you'll be halfway home. Remember the adage -- listen more than you talk -- and you will be successful.

Curtis Chan is president of Chan & Associates, a marketing consulting service for audio, broadcast and post-production. Fuller-ton, CA. Respond via the 8E FAXback line at 913-967-1905 or via e-mail to be@interterc.com.
We are on the march again with Maxell's Digital Betacam tape. Realize the format of the future, now. Maxell Digital Betacam incorporates Maxell's proven Ceramic Armor metal technology to emphasize performance and produce higher output with low noise. Crisp, clear images after hundreds of plays, the ability to withstand the everyday punishment that your application can bring, and within your critical production budgets. Maxell is leading the march, and facing the future with an intelligent solution... Maxell Digital BETACAM.

In Your Hands, Our Science Turns To Art

Maxell

Maxell Corporation of America  22-08 Route 208, Fair Lawn, NJ 07410  Call: 800-533-2836
Serial digital video

on one manufacturer’s machine to play back on a machine made by someone else adhering to the same tape standard. However, what happens inside the machine is entirely up to the manufacturer; it’s the end result that’s standardized. If the world was going to be exclusively analog forever, that would be enough. There was clear vision, that digital held long-term advantages for interconnection and that demanded standards as well. Without them we’d be stuck in an analog interconnect world. Or, we would be forced to choose among proprietary systems that would lock each of us into using only the products of the single vendor whose system we originally purchased.

First, define digital

The need for improved record quality was most demanded by the production and post environments, which suffered badly from the artifacts of composite video. Those applications were already shifting to component analog video (CAV). Because this need was strongest and the value greatest, initial development efforts went into defining how CAV would be sampled for digital conversion.

The method chosen was originally called CCIR 601 (now called ITU-R BT.601-2). It’s built on 8-bit or 10-bit quantizing of either a 525- or 625-line signal at 13.5 MHz for luminance and 6.75 MHz for each of two color-difference signals. Other common terms are 4:2:2 and D-1. The term “4:2:2” comes from an arbitrary “subcarrier” frequency which, multiplied by 2 or by 4 results in the 6.75 MHz and 13.5 MHz figures above. D-1 is a tape format and is properly used only in that context. The parallel transmission standard that comes from the sampling standard is SMPTE 125M. It specifies cables with 11 twisted pairs terminated in 25-pin D connectors. The combined data rate on that cable (13.5 + 6.75 + 6.75) is 27 MHz. Unfortunately, if cables and connectors aren’t properly shielded, bad mathematical karma takes over and we get a powerful harmonic at 121.5 MHz, which is an international aircraft distress frequency.

It’s questionable whether anyone really believed there would be much use for those bulky and troublesome cables beyond occasional machine-to-machine copying. The idea was to get analog video and audio into a tape machine where they’d be digitally recorded.

Innovative post-production boutiques didn’t let bulky cables stand in their way. It wasn’t long before there were digital production switchers and parallel digital routing switchers of moderate size. Still, broadcaster interest was minimal. D-1 machines are component and broadcast is built on composite video. The cost of integrating an expensive component digital tape machine didn’t make a lot of sense for most applications though some broadcasters bought into D-1, particularly for graphics applications.

Enter D-2 and D-3

The pressing need to replace aging analog composite tape machines brought us D-2 and later, D-3. They’re digital composite machines intended to be plug compatible with the old analog VTRs they were replacing. Although the machines recorded in digital, the I/O was still analog.

Composite standardization took small steps. D-2 puts video and audio on tape in one way and D-3 puts video and audio on tape in another way. You can’t play D-2 tapes in a D-3 machine or D-3 tapes in a D-2 machine. But, while there are two recording standards, there’s only one interconnection format. You can connect the out-

As digital equipment finds its way into more facilities, engineers are faced with the task of managing hybrid analog/digital environments. (Photos courtesy of Tektronix, Beaverton, OR.)
Production suites are often the first place engineers face the challenge of installing digital video equipment in an analog environment. (Photo courtesy of Tektronix.)

help with that, so digital in Europe kept to the component path. There was not, therefore, a lot of effort expended on defining a single uniform standard. It was decided to base composite sampling on four times subcarrier frequency. For NTSC, the sampling rate is 14.3MHz, for PAL it's 17.7MHz. Because there's no reason to directly connect the two standards, it isn't much of a handicap. Both the 14.3MHz and 17.7 MHz standards support 10-bit precision, so 8-bit and 10-bit quantizing are accommodated.

Moving to serial
Here we were with tidy standards for digital interconnection and no clamor to use them because they require replacement of our existing coaxial cabling with something downright difficult. Still, with digital video on tape and lots of digital production devices, it didn't make sense to keep converting A to D and D to A, taking at least a minor picture quality hit each time. Fortunately, development of serial standards hadn't been neglected and work was going forward on squeezing serialization and deserialization into chipsets.

To get all the data traveling on 11 twisted pairs onto the single signal path of a coaxial cable, the data has to travel faster. If simply transmitting the same data faster is all that's done, the result is poor recovery potential and extreme difficulty with

"YES! THE WAY AHEAD TO DIGITAL CAN BE PRETTY TRICKY" CAUTIONED SNELL.
RF emissions. The first attempt at a component serial interface standard called for a 243Mb/s data rate that worked for 8-bit quantizing but not for 10-bit. It was later abandoned, but the 243Mb/s figure still generates occasional confusion. The final SMPTE 259M standard is based on a 270Mb/s data rate with scrambled NRZI (non-return to zero, inverse) coding that is more easily recoverable, less prone to generating RFI and allows insertion of ancillary data such as audio.

The 270Mb/s data rate is valid for both 4:3 and 16:9 aspect ratio pictures when the sampling rate is 13.5MHz. There are 720 available pixels per line regardless of line length. Pixels at 4:3 are essentially square while pixels at 16:9 are rectangular and vertical or horizontal resolution is lost. If you use 18MHz sampling at 16:9, then each of the 960 pixels are square, but the required data rate is now 360Mb/s. That leaves us guessing as to which scheme will prevail. Fortunately, equipment designed to pass 360Mb/s isn't significantly more expensive than equipment limited to 270Mb/s. The limitation is in the chip-sets; early generations didn't address 360Mb/s because nobody had thought about it.

The SMPTE 259M standard also supports composite digital signals at data rates of 143Mb/s for NTSC and 177Mb/s for PAL. The process is a little more complex because the parallel composite standard does not include a timing reference and serial transmission demands one. It's necessary to insert a timing reference signal (TRS) into the parallel signal before it can be serialized. It's placed in the digital equivalent of the sync tip and is removed when the serial signal is reconverted to parallel. Fortunately, the 3-word TRS leaves plenty of room in the sync tip for insertion (multiplexing) of up to four channels of AES/EBU audio at the time of serialization. The same process that deletes TRS at deserialization also removes the audio, demanding that recovery of the audio (demultiplexing) be done before deserialization. The TRS/ancillary data removal is total. This ensures that the problems encountered in cleaning multiplexed audio from video in the analog world are not perpetuated.

Logical options
Serial sets us free of the constraints of 25-pin connectors and bulky cables. The coaxial cable interconnect standard lets us directly re-use much existing cabling. In addition, distribution and routing techniques are familiar, though the equipment required is different. Timing is a little different but new tools make it relative easy to keep everything in time. A wealth of conversion products are now available that permit an orderly progression toward a serial digital core system.

There's just this one thing: Until now we thought only composite and now we don't have to. Analog component video offered higher picture quality but at tremendous additional cost and in system complexity. Digital component changes the equation and might just hedge against premature obsolescence.

Next month we'll compare component and composite in light of the new digital realities and look at ways to manage the transition to digital.

Les Brown is president of Les Brown Associates, Grass Valley, CA. Respond via the toll-free FAXback line at 913-967-1905 or via e-mail to be@interi.com.
"This must be the legendary analog's graveyard..." guessed Snell.

Do you really need to dump your existing equipment to change to digital?

"They obviously went digital too abruptly" gasped Wilcox.

Does changing to digital have to be so daunting?

"When the world went digital they got left behind" Snell explained.

Don't get left behind! Come and explore the way ahead with Snell & Wilcox.

Buy "Your essential guide to digital" only at NAB booth 19063.
When it comes to sending high-quality audio by land lines, the cost has never been lower, and the arrangements have never been more confusing.

The Integrated Services Digital Network (ISDN) is the up-and-coming tool for broadcasters' ground-based digital audio transmission jobs. ISDN's Basic Rate Interface (ISDN-BRI) won't be universally available in the United States until at least 1996, but it's already well established in some areas.

What ISDN-BRI provides is two bidirectional 64kb/s bearer (B) channels and one 16kb/s delta (D) channel for signaling or X.25 packet switching. With some data compression, known in the broadcast world as bit-rate reduction or digital audio coding, an ISDN B-channel can offer excellent audio fidelity.

The main pitfall in using ISDN involves knowing which terminal equipment can work, or be adapted to work, with the service and the equipment at the other end of the line.

**SPIDs and TAs**

Similar to tagging standard telephone lines, most ISDN circuits will be assigned a service profile identifier (SPID), which is created when the service order is made.

The terminal equipment on each end of these circuits is considered by telcos as customer-premises equipment (CPE). This means that it is the responsibility of the customer to select and use the proper hardware for the line.

The first of the CPE devices is the network terminator NT-1. It handles communicating with the digital circuit from the local telco office, which is supplied in one of two forms: the U-loop, a 2-wire interface, or the ST-loop, a 4-wire interface.

The next CPE item is the terminal adapter (TA) — the ISDN equivalent of the telephone instrument. The ISDN line's SPID must be configured into the TA to be used on that line. Failure to configure the TA to its corresponding SPID is a common source of trouble.

The final CPE piece for audio use of ISDN is the codec, short for coder/decoder. It is the device that applies the data compression algorithm to the original audio signal, allowing it to travel as a high-quality digital audio signal through the bandwidths offered by ISDN. Without data compression, a CD-quality stereo digital audio signal requires about 1.5Mb/s. With data compression, it can be reduced to as little as 128kb/s without excessive audio quality degradation.

**ISDN's Basic Rate Interface is already well established in some areas.**

A recent trend has consolidated some or all of the aforementioned components into a single box, simplifying things. Many units include an automatic redial/reset feature if any connections are interrupted.

**Codescs**

There are a number of different audio data compression algorithms in use. The most common is called G.722 (this terminology comes from CCITT, the international telephony standards organ), which provides reasonably quiet, 7.5kHz mono audio into 56kb/s or 64kb/s. More recently, ISO/MPEG Layer II (formerly called MUSICAM) and ISO/MPEG Layer III have been used, allowing higher fidelities at these low rates and more flexibility. But even these have difficulties. For example, due to Layer II's evolution over the years there is a degree of incompatibility among some manufacturers' Layer II codecs. Some of these problems can be corrected by simple retrofitting.

Layer II and Layer III codecs also are not interoperable, but current trends among codec manufacturers indicate that universal codecs incorporating G.722, Layer II and Layer III algorithms, with automatic detection on the receive end, are coming. A few current models offer G.722 and either Layer II or Layer III.

**IMUX, BONDING and H.221**

Although ISDN B-channels carry only 56kb/s or 64kb/s, the two B-channels of an ISDN-BRI circuit can be combined and used for a 112kb/s or 128kb/s path by a process known as inverse multiplexing (IMUX). The same process can be used to combine multiple ISDN-BRI circuits, adding all their B-channels together to provide 256kb/s, 384kb/s and so on. This provides another user option — and another source of incompatibility. The IMUX can be performed either by the codec or the terminal adapter. For compatibility, it is more desirable to let the TA handle the IMUX. Most current TAs use a multiplexing method known as BONDING (Bandwidth-On-Demand INteroperability Group). Although widely used, BONDING is not perfect. If one B-channel of an IMUX'd path is interrupted and the IMUX synchronization is lost, BONDING won't restore it.

A newer IMUX method called H.221 is an in-band protocol. It runs constantly, checking synchronization and restoring it quickly if one line is interrupted. Unlike BONDING, H.221 steals a few bits from the B-channel in the TA to accomplish this. Although not yet widely deployed, the more reliable H.221 will likely supplant BONDING as the most common language of tomorrow's inverse multiplexing. Over the next year or so, the industry will begin hearing about J.32, which is the specification for implementing H.221 in audio codecs (rather than in the TA). Most codec manufacturers have announced that they will be using it. In the meanwhile, unless there are identical codecs at each end of the line, it's safer to rely on TAs using BONDING to handle IMUX.

Confusion still abounds on ISDN service and its terminal-gear maze. It's a "dot-rich" environment with many protocols, but it's getting simpler. The key for ISDN users is having a close working relationship with the manufacturer of their terminal equipment. Most offer 24-hour hotlines for support and some third-party companies can provide equipment and service setup. Until signals, service and equipment are truly standardized, ISDN may continue to stand for, "I Still Don't Know."

Liles is an audio engineer for Georgia Public TV, Atlanta. Respond via the BE Feedback line at 913-967-1905 or via e-mail to bellintenetc.com.

Acknowledgments: Thanks to David Lin of CBS, Tom Hannett at Comrex, Joel Quint of DCI Communications, Jack Kelly of Intraplex and Steve Church at Telco Systems.
The central problem of our age is how to act decisively in the absence of certainty.

Is it any accident that 'SUCCESS' is the root of 'SUCCESSIVE'? Not in this universe. Here, what succeeds is ADAPTATION, not abrupt change. BUILDING ON WHAT YOU HAVE, vs. gambling on what you don't. EVOLUTION, NOT REVOLUTION. It is a long term vision, and a much bigger idea. This is Sony's approach to the digital future. Good enough for THE UNIVERSE, we figured, good enough for broadcast.
ACQUISITION

The rhinoceros, biggest land animal next to the elephant, is a marvel of adaptation, for he is also one of the oldest. Living proof that despite his poor eyesight, he can see the horizon. Speaking of optics, the kind of vision and versatility suited to broadcast is embodied in our new system. Digitally acquired video will be fed, for example, via digital satellite modem or microwave link and will be streamed on to the server, logged on to the database and be instantly available for editing.

The adaptation of an organism to a digital environment, through intelligent selection.
FIGURE A/B: revolution vs. evolution

---

**Fig. A**

**REVOLUTION**

A CYCLE OF CHANGE

OFTEN SPORADIC,

ALWAYS LEADING BACK

TO WHERE IT STARTED.

---

**Fig. B**

**EVOLUTION**

PROGRESSIVE,

LONG-TERM GROWTH,

BUILT ON THE LESSONS

OF REVOLUTION.
A single allele on a single gene can make the difference between survival and extinction.
Build on what you have

“Evolution is the law.”
— ANON

Pathways, not Products

“If you fail to plan, you plan to fail.”
— ANON

FIGURE E: hierarchy of fear

- revolution
- obsolescence
- death
- IRS
- hair loss
- other people's breath
- missing your flight
EDITING

The poor rhinoceros has no incisors to speak of. Leaves, leaves and more leaves, hundreds of pounds a day. If he could cut through steak he’d get his RDA of Protein in about 1/10 the time. If your editing system could cut both on line and off, how much more efficient would you be? Our new, non-linear digital editing workstation shares EDL file compatibility with existing dedicated systems. A hybrid system that edits from VTR’s and hard drive simultaneously and with real time 3-D effects.

DISTRIBUTION

Rhinoceroses are no big-hearted. They have to pump the 40-plus quarts that circulate through bloodstream. Human heart pumps 8 quarts. This gives us a rough idea of the efficiencies possible. Sony’s hierarchy of video compression is optimized for appropriate application. SDDI, the end of SDI, is the “pipeline” that will carry BRR video and multiplexed signals.
STORAGE

What does a rhinoceros look like under a microscope? (Ans.; muscle, bone, tissue, and fat). As with any efficient system, close inspection reveals not one single storage media but rather, a combination. Our hybrid storage delivers a perfect balance of access time, throughput, capacity and cost. It will employ RAM, hard drive, digital tape and MO disk, as the application requires.
Luck is the residue of DESIGN evolution

OUR SOLUTION disdains an ad hoc 'island' approach for integration. Our solution is a total END-TO-END digital network. A networked systems architecture under software control, component technology and file server based. From ACQUISITION to TRANSMISSION. The system management software efficiently operates in program creation, data base management, plant operations. The system also allows EASY INTEGRATION of current analog composite equipment as you layer in digital technology, while protecting your present and future product investments. In short, this is a natural progression toward a DIGITAL FUTURE.

Not another revolution. But Evolution.

Introducing the UTAH-300. History Repeats Itself. Digitally.

If you're in the market for a routing switcher, you'll be happy to know Dynatech's new UTAH-300 is the ultimate achievement of four generations of router technology. In 1978, our AVS-1 proved that rugged, versatile routing switchers could also be affordable. Today the UTAH-300, with analog/digital capability, is the most sophisticated member of a full family of mature, reliable routing products. The UTAH-300 is built for growth. It goes from 32 x 32 to 256 x 256. And beyond. It's compatible with every control system we've ever built, so it integrates into any Utah installation. And not only does the UTAH-300 manage D1 (serial component) and D2 (serial composite) formats, it's ready for 360 Mb/sec. data rates of future ATV signals. Far more capability, yet it's priced competitively.

Experienced Support, Too.

Over time, we've also learned about what you need in the way of support. That's why we offer reliable 24-hour, 7-day Global Customer Service Support Center, training and on-site repair, and a 10-year warranty. Call your nearest Dynatech sales office for more information on the routing system everyone is smiling about.

Americas
Phone: 801-575-8801 Fax: 801-575-3299

Europe
Phone: 44-1635-521939 Fax: 44-1635-528387

Asia
Phone: 852-2868-1993 Fax: 852-2525-8297

© 1995 Dynatech Video Group, Inc.
Circle (19) on Reply Card
From the pioneer in multimedia furniture, designed specifically for the most popular editing and production systems, both linear and non-linear. Curved work surface ergonomically surrounds user with comfortable usable space. Choose from 5 models designed for Matrox, Pinnacle, Fast, ImMIX or other video systems.

- Adjustable height monitor shelves
- Sizes from 48” to 94” wide
- Black granite laminate work surface & riser shelves
- Wire management system
- Sturdy 6” angled steel legs.

For details and pricing, write or call toll-free:

1-800-447-2257

Winsted®

10901 Hampshire Ave. So. • Minneapolis, MN 55438-2385 • Fax 612-944-1546

Preferred by Professionals Worldwide
You’re a news editor, it’s 5 minutes to air and a big story breaks. The material’s about to come down the line and the producer desperately wants it as the lead item.

What can you do?

Linear system.
Don’t even think about it.

Ordinary non-linear system.
Oh well...start digitizing for the next newscast.

Newsbox™
The whole job, no problem.

Begin your edit immediately - even as your feed comes in. Using Scene Select,” grab the clips you want ‘on-the-fly’ and instantly link them into a rough-cut. That’s it - you’re ready to go on-air. Even so, nothing is committed - you can still re-arrange with Segment Replace and fine tune the edits as required - right up to the wire. The story is always available for instant playout.

With Newsbox’s unique true random access operation it’s as fast, flexible and simple as that. No dead time, no waiting, no panic.

Newsbox offers all this - and much more - at a very competitive price.

To catch up on all the very latest news, call Craig Sherter now at: (203) 656 3100.

NEWSBOX™
Dedicated to news, because you are.

Quantel Inc. 85 Old Kings Highway North, Darien, CT 06820, Tel: (203) 656 3100, Fax: (203) 656 3459

Circle (30) on Reply Card
When WDSU-TV began planning for a new broadcast facility, management had more to consider than the industry's burgeoning technological requirements. For 45 years the station's staff and equipment have been packed into a quaint old building in New Orleans' famed French Quarter.

There were compelling reasons to seek a new home. Though the current location is prestigious and busy, it presents logistical challenges for the news staff. Parking is practically non-existent, and congestion renders ingress and egress for news vehicles difficult. Furthermore, the staff works through three interconnected buildings.

A modern facility specifically designed to accommodate the natural flow of fast-paced broadcast work was needed. Adequate parking, ready access to main thoroughfares and convenient ingress and egress were among the requirements. An additional requirement was flexibility to meet the technological challenges of today and tomorrow.

Beyond those necessities, WDSU-TV also sought to expand and enhance its community image. Perceiving that its involvement with downtown New Orleans was directly linked with profitability, the station wanted to fit in and assert its technological eminence, while retaining a uniquely "New Orleans" presence.

After much research, a site was chosen south of the New Orleans central business district and adjacent to the historic warehouse district. Bounded on the south by an elevated section of the Ponchartrain Expressway and fronting on Howard Avenue at Baronne Street, the site affords high visibility.

Although the Louisiana-shaped site was problematic, creative building design proved the space large enough for the 47,000-square feet of usable space needed. Ample space for parking and a garage for technical vehicles was also available.

By choosing a downtown location, it was inevitable that architectural implications would become a major factor. Aesthetic considerations became as important as technological function. The new facility had to be state-of-the-art to accommodate contemporary as well as future broadcast technology. However, the design would also have to be intricate and detailed, with a greater than usual proportion of the eight-million-dollar budget being spent on appearance.

Continued on page 42
Solid State
LPTV Transmitters and Translators

3dbm Offers:
- **Reliability** -
  100% Solid State Design with Redundancy
- **Cost Effective Solutions** -
  No Tubes to Replace
- **Warranty** -
  Full 24 Month Limited Warranty
- **Service** -
  Complete Customer Service Organization
  Including Technical Assistance And
  Spare Parts Inventory

**Standard Features:**
- 100 to 2000 Watts Peak Sync
- Full 10% Aural Power
- 2 Video Inputs
- 3 Audio Inputs
- Automatic Sync Pre-correction
- Automatic Station Identifier is Standard
- Automatic VSWR Shutdown Protection
- Automatic Loss Sync Shutdown
- Individual Power Amplifier Protection Shutdown
- Individual Metering of Current for each Amplifier
- Individual Power Output Meter for each Power Amplifier
- Modular Plug-In Design
- RF Output Monitoring on Front Panel
- Output Monitoring of Modular Output Amplifier
- Remote Control Interface Built-In

**Technical Specifications:**
- Call 1-800-279-3dbm

![Image of LPTV Transmitter]

(1KW Model Shown)

**Represented By:**

**UNITED STATES**
Factory Direct Sales
17194 Preston Road
Suite 123-297
Dallas, TX 75248
Tel (800) 279-3dbm
Fax (214) 377-1625

**EUROPE**
MAFSA Management Finance, S.A.
Bernkrasse 15
CH-3280 Mursen/Morant
Switzerland
Tel +4137711303
Fax +4137711302

**ASIA**
3dBm, International Co., LTD
208-3, Yangsaa-Dong,
Seocho-GU, Seoul, Korea
Tel 822-579-8280
Fax 822-579-8281

**Please come by booth 15745 at the NAB show and see our new 2 KW Transmitter !!**
You can spend millions on ads, public relations and big trade show productions convincing the world you've created the first truly practical pro video disk recorder.
Or, you can build it.

The Profile™ Professional Video Disk Recorder from Tektronix. Hundreds now playing worldwide. See it at NAB '95 booth 16528. Or call 800-998-3588 today.

©1995 Tektronix, Inc. All rights reserved. Profile™ is a trademark of Tektronix. TVG-137

Circle (32) on Reply Card
Microwave tower or architectural landmark?

An on-site microwave tower was required for the station's eight mile STL. Despite the nearby presence of buildings and having to cross the Mississippi River twice, the city enforced a maximum height of 125 feet. This ensured the tower would not detract from a nearby statue of General Robert E. Lee. Nor could the tower be simply a functional steel structure; the city's representatives required that it blend aesthetically into the unique New Orleans cityscape.

Rees Associates, Inc., the firm of architects, planners and consultants retained to design the facility, elected to incorporate the microwave tower into the footprint of the building. The tower is enclosed in a New Orleans-style interior courtyard disguising its electronic function with a campanile-like facade. Through its location and orientation, the tower achieves line-of-sight with the transmitter site, as well as with the main ENG microwave site two blocks away.

Designing for technology and aesthetics

Fitting the building to the site and to the needs of the organization was not easy. Rees, with its long-term experience in design of broadcast facilities, first reviewed the existing facility and interviewed key station personnel. They explored anticipated equipment and staffing needs. Taking everything into consideration, the firm designed a building to take full advantage of the site.

Like the site, the building is roughly L-shaped. The main entrance gives way to a spacious interior courtyard — a significant design feature with multiple benefits. Functionally, the courtyard serves as a central circulation and communications corridor for staff and visitors. Through clerestory windows it also allows diffused natural light into the open offices and work spaces. Additionally, the courtyard allows visitors to look into master control and the tape operations area.

Offices are situated toward the front, with technical functions behind them. As the building extends back from the street, it spreads into the base of the "L." The news operations are housed at the heart of the facility in a 2-story-high space that visitors can view from a second-floor vantage.

Facilitating work through design

A primary objective was to co-locate departments that need to interface. The design calls for a newsroom of generous dimension, with access to the outside and easy ingress/egress for reporters and camera people. Along one wall is the news studio, with news edit booths on another wall. Also contiguous is a series of news-related offices. The assignment desk and photographer station are integrated into one unit to enable simultaneous communication of assignments to field crews.

Keeping options open for the future, a removable panel was specified on the wall separating the news studio from the newsroom. If removed, the panel exposes the newsroom as a backdrop during broadcasts from the news studio. There is also a large, second-floor expansion space that can be converted for additional news staff or other functions when needed.

Accommodating electronic evolution

Although the digital age is approaching rapidly, for WDSU-TV, it is not quite here. Most of the equipment is analog, but will be converted to digital in the not-too-distant future. The rack room must do double duty, accommodating analog equipment brought from the current facility and future digital equipment. Both must be accommodated during the inevitable conversion period. In the near term, the space allocated for electronic equipment may appear oversized, but every square foot will eventually be put to effective use.

Planning for the technical area took natural work flow and access needs into consideration. The rack room is positioned amid all the spaces that require connection to it: the studios, the control rooms, the post-production edit suite and the satellite dishes.

The master control area is large and designed for future change. It will comfortably contain all existing equipment as well as additional digital switchers, satellite controllers and increased staff, if needed.

Adjacent to master control is the tape room. In the near term, it will be filled with reel-to-reel and videocassette machines, along with the library management system. In the future, newer machines with smaller footprints will occupy the area. It is assumed that eventually the LMS will give way to a video file server connected to workstations dispersed throughout the facility. Experience indicates that smaller equipment usually means more individual components, greater flexibility, and more sophisticated staff. The generous space allotment will no doubt prove advantageous in the long term.

The station's maintenance shop, intended to serve as the center for all repairs, is in the middle of the technical operations, between tape operations and the rack room. This center will be a welcome improvement over the existing facility, which depends upon two separate maintenance shops — both inadequate. The new maintenance shop was deliberately made larger than necessary. The excess space will make it possible to expand tape operations or the electronic rack room, if needed.

Miles and miles of cable

Accommodating the miles of cabling required for a broadcast facility received plenty of attention during the planning stages. To en-

As of early February, when this photo was taken, much of the preliminary foundation work was complete and reinforcing bars were in place for the concrete slab flooring. (Photo courtesy of Rees Associates, Inc.)

Another shot of the concrete work during construction. Note the expressway on-ramp in the background, a key issue during the site selection. (Photo courtesy of Rees Associates, Inc.)
Our Latest Breakthrough Is Also Our Widest.

See us at NAB Booth #18456.

Canon

The Number One Lens

Circle (33) on Reply Card
sure maximum flexibility and adaptability, efficient pathways connect all spaces, vertically as well as horizontally. Computer access flooring is used in master control, the studio control rooms, tape room, the rack room and the maintenance shop. Walker duct, overhead wireways and underfloor conduits allow convenient bundling and quick access. Plans call for stacking of telco rooms with chases between floors to permit efficient continuity of cable from story to story.

For the present, all internal cabling will be traditional. It will be coded in multiple colors to identify bundles by type of video (air program paths, reference, sync, monitoring, etc.). This should simplify wiring changes in the future.

For connecting to the outside world, the new facility is being equipped with service entrances for fiber optics from the cable companies as well as the capability to receive fiber from the telephone company and private vendors in the future. All entrances allow for quick access to the rack room.

### Storage space that works hard

Another source of relief for WDSU-TV personnel will be well-conceived and adequate storage space. At the current facility, tapes are stored literally anywhere and everywhere, the space originally allocated has long been filled. The new facility will rely on high-density storage space, using movable shelving without fixed aisles.

Next to the news edit booths there will be a space for news archives, while the station's main videotape library sits equidistant from the programming, tape and shipping areas, and adjacent to a stairway for access from the traffic, sales and program departments located on the second floor.

News-gathering vehicles will be garaged in a space that is large enough for both ENG and SNG trucks. The 20-foot ceiling allows the satellite antenna to be raised for indoor service and maintenance. The garage is located in the southeastern corner of the L-shaped structure.

### Electrical and mechanical systems

The facility will be served by three distinct power distribution systems: one for sensitive technical equipment; one for noisy, high-power, mechanical motor loads; and one for normal usage. For emergency power, plans call for a large generator with automatic switch-over capabilities to be installed in the future to furnish emergency power.

Because staying on the air is a basic requirement, the mechanical system has built-in redundancy to support operations during power outages. Two chillers ensure that vital areas remain cool. In addition, a free-standing system dedicated solely to electronic equipment will normally take chilled water from the central chiller. However, it is configured to draw on its own direct expansion system should the main system fail or be degraded. Such backup is especially vital in New Orleans, where extreme heat and humidity are commonplace. For acoustic reasons, the air-handling equipment serves each studio inde-

The first floor contains offices at the front with technical functions behind; news operations are tucked conveniently into the heart of the facility. Administrative offices are housed on the second floor.
DM-800 Digital Audio Workstation

The Power Studio From Roland

The new DM-800 provides power, speed, portability and reliability like no other system available.

Power  Eight discrete tracks with 100 layers per track. 12 channel automated mixing and EQ. Time compression and pitch correction. Nondestructive, full featured editing. Sub-frame accurate SMPTE sync. Optional ADAT, DA-88 or RS-422 interface.

Speed  The DM-800 is easy, fast and quick to learn, using powerful hardware controls with tape recorder style punch in and out. No computer required.

MIDI Support  The DM-800 supports MMC, MTC and dynamic functions like tempo mapping, bar and beat editing, control of external sequencers and trigger mode for instant phrase playback.

Portability  All the features and functions you need are contained in a single 12 pound unit. You can literally grab it and take it with you. Uses internal and external SCSI drives. View any level of information on the built-in LCD or plug the DM-800 directly into your video monitor.

Reliability  The DM-800 is a completely dedicated piece of hardware with Roland's renowned reliability.


Circle (21) on Reply Card

Call today for your free brochure and video.
dependently with low velocity air flow to reduce ambient noise.

**Acoustical considerations**
Being located near a highway has advantages, but it also presents greater acoustical challenges. The studio and control room are designed to meet NC-20 criteria. The envelope design isolates spaces within the overall structure and suppresses sound conduction. The foundation is isolated from the floor, as is the ceiling from the roof; and the inner walls are isolated from the outer walls.

**Site security**
Security is a primary concern. Beyond a broadcast facility's vulnerability to acts of terrorism and revenge, stations must be concerned with acts of violence and vandalism. The higher visibility expected to enhance WDSU-TV's ratings may also increase the station's exposure to risk.

The property will be enclosed in wrought-iron fencing. All points of ingress will be equipped with electronic security, including camera monitors and eventually passive card readers. Although there was an effort to keep doors and windows to a minimum, the L-shape of the building demanded six entries. The building is set upon an elevated platform, which affords protection from potential flooding, and also prevents a direct line of sight through the windows from the street, dispelling the threat of drive-by shootings. The exterior courtyard functions as a security buffer, and, as a further precaution, staff parking is mostly on-site and secured.

**Realizing the dream**
Rees Associates and WDSU-TV are watching their plans take form. Ground was broken last November, and completion is scheduled for early 1996. There have been unique demands associated with the project: the ornamental tower, site complications, and the requirement to accommodate current technology while anticipating and planning for future transitions. The owner and architect have planned a facility that meets those demands and satisfies the station's priorities of community integration, architectural profile and contemporary TV work patterns.

This has all been achieved at a price per square foot below average for New Orleans. This project could only have been accomplished with careful, knowledgeable planning nurtured by working together and communicating continuously. Using interactive work sessions, modeling and gaming processes, (see the related article, "Facility Planning for Growth and Technological Change") the architects can identify and present options to those who will be using the space. By making maximum use of the technical expertise of the station's broadcast engineering staff, the architect can facilitate planning at every step and assure the end result will meet all the station's needs.

**Facility planning for growth and technological change**
To get the most when building a new facility or expanding an existing facility, managers and architects must combine the best of their individual areas of expertise and experience. It's always advisable to deal with architects who understand the specialized needs of the broadcast industry. Every facility is unique and individual stations will always have some unique requirements and goals. Every effort must be made to identify all the issues up front. This permits early consideration of options and appropriate, timely decisions.

A structured method should be developed and refined to systematically elicit input from all those who understand present and future work flow, equipment requirements and the individual station's personality. The method should incorporate creative strategies for data collection and verification, program conceptualization, development and evaluation of alternatives and estimation and control of budget.

The planning phase should give the client all the information needed to make a "go" or "no go" decision and to plan for cash flow requirements. The resulting planning document should be completed in a matter of weeks and for a fraction of the cost of the full-blown project.

The critical steps of a successful planning phase include:

* Review existing facilities and equipment to determine a starting point for planning.
* Interview key station personnel to determine past and future trends and operational requirements.
* Assess the functional requirements of areas required for each operational department to determine gross space requirements.
* Prepare conceptual block diagrams to identify space requirements. (Rees Associates creates a gaming model with levels of Plexiglas supported by pedestrians to represent each floor of the facility. Each level is overlaid with transparent sheets containing floor plans. Gaming pieces — paper cutouts to scale — are then used to enable the client and the architect to explore dozens of options.)
* Develop a description of the construction method and the level of quality proposed for each portion of the facility.
* Prepare a project development schedule outlining the time and order of all actions required to achieve the facility's target on-air date.
* Develop a statement of probable budget and delineate a cash flow schedule, both month-by-month and total.

Other steps may be appropriate to specific situations. The bottom line during the planning phase is to identify all decision points and provide sufficient information for those decisions early in the project and at a relatively low level of investment.
Exciting Exciter.
SNG is going digital, and Harris leads the way.

For SNG and other SCPC TV links, upgrading to digital compression and transmission is essential for efficient, cost-effective operation. The Harris DSE 1400 Digital Satellite Exciter and DSR 1400 Studio Grade Receiver will give you a competitive advantage now, and into the 21st century.

With this integrated Digital Satellite News Gathering (DSNG) system, you can access a wider range of transponder channels, achieve lower transponder costs, use less transponder bandwidth and less HPA power, get improved signal quality, and save space and money by using a smaller antenna. The innovative design of the DSE 1400 Satellite Exciter provides the latest MPEG-2 video and audio compression standards with advanced motion compensation and digital coding algorithms in a compact video encoder, combined with QPSK modulation and frequency conversion in a single, rugged, 6RU high unit. The DSR 1400 Integrated Receiver Decoder (IRD) provides L-band downconversion, demodulation and decoding. These single units require less space than separate 3-unit configurations, and are easily installed or retrofitted in SNG vehicles or fly-away terminals.

Each part of this Harris Digital Satellite TV System is designed for simple, error-free operation. All commands are entered from a single, user-friendly keypad, and are confirmed by colored LEDs. Routine set up requires no subsystem adjustment. The MPEG-2 encoder with I, P and B frames, modulator and frequency converter automatically establishes, maintains, and displays the required operating status.

With this system, the cost of upgrading to digital technology is quickly offset by operational savings, which then continue, year after year.

Other features include variable data rates of 2, 3, 4, 6 or 8 Mbps, compatible with IDR standards; NTSC 525/60 and PAL 625/50 standards; analog composite video, S-VHS component, and Betacam* component inputs; CCIR 601 serial digital video input; standard 2-channel analog or AES/EBU digital audio; 64 kbps auxiliary channel; and 85-265 Vac, 47-63 Hz power supply for worldwide operation.

Contact Harris Allied to learn more about how this exciting digital satellite TV system can give you a competitive edge.

Harris Allied
7990 Kentucky Drive
Florence, KY 41042 USA
Phone: 606 982-4800
Fax: 606 283-2818

*Betacam is a registered trademark of Sony Corp.

See us at NAB RADIO HALL BOOTH #3615
and TV HALL BOOTH #16001
Circle (22) on Reply Card
TCI builds new digital facility

Anticipation of the future has strong influence on new design.

The Bottom Line: TCI took an empty building and created a full-service network origination and production facility from the ground up. In preparation for the changes in technology currently taking place, flexibility became the key design element for building this modern digital facility. The open design of the facility will allow it to adapt to the changing needs of its clients as they evolve. 

Within the shell of a 1970's industrial building is rising the nation's premier service facility for the new explosion of cable networks. The mission of this new facility is to provide a myriad of services to new and existing networks. Housed in this 260,000-square-foot building are such services as uplink, downlink, post-production, studio production, master control, traffic and authorization services.

The primary design forces in building this facility are flexibility and speed of construction. Since the time line involved in this construction was such that the eventual occupants of the various parts of the facility were unknown at the time of design, much attention was given to a flexible and "clean" type of construction.

The first decision was to place raised flooring with an 18-inch rise throughout the entire facility. This allows all space to be technical space as the need dictates. All cabling and HVAC is via the floor. Again, this allows racks and equipment to be placed anywhere without worrying about routing of cooling and power. A large network of cable trays was installed below the floor to facilitate routing of video and audio cable without interfering with power or other under-floor utilities.

The second major design decision was the use of "demountable" walls. This type of construction involves the use of ¾-inch duct-liner material (similar to Sheetrock with a much higher audio STC rating) precouered with a vinyl wallpaper. These panels are assembled above the computer floor with metal studs and plastic trim, creating an attractive look. The primary benefit is the ability to relocate and/or remove these walls without problems such as dust and paint. We are using a local drywall contractor to build and assemble the components of the walls.

The basic floorplan is an open design with racks and demountable walls defining the individual areas. There are essentially two types of technical areas, master control rooms and post-production, and in each case the technical areas flow around mechanical electrical/IDF cores. Each core serves up to four master control rooms or up to six post-production facilities. Additionally, office space along the perimeters was also built on the raised floor to allow for conversion at a later date. By planning ahead, the facility will be ready for changes in technology that may dictate non-traditional use of office space.

By Peter Douglas

Circle (29) on Reply Card—>

Broadcast Engineering March 1995
and assigned via the routing switcher control system.

A digital sample rate converter allows digital audio signals to be converted between sample rates without having to be converted into analog (e.g., a 44.1 kHz compact disc can feed the 48 kHz digital audio input of a VTR). Two standards converters connected to the analog and digital video routing switches convert between 525/60 (NTSC) and 625/50 (PAL) formats. Several digital audio delays connected to the analog and digital audio routing switches correct for signal path delays introduced by conversion devices such as standards converters and decoders.

In addressing how and where cable corrections would be made, Post Perfect decided all signals would be level corrected and equalized so their signals were correct at all possible destinations. This is accomplished by VVG 8303 precision distribution amplifiers on every analog video routing switcher input and output. In addition, precision distribution amplifiers are used on all of the normalised signal paths.

Determining no router, all router or hybrid router approaches was another major issue. It was decided that analog signals take the hybrid approach, with most sources normalizing into analog control rooms each of which have two routing switcher connections in addition to their normalized signal paths. Digital signals are distributed solely via the routing switchers. This eliminated the need for digital distribution amplifiers. However, it necessitated using large routing switcher frames.

In determining the specifications of the routing switcher, the primary question wasn’t simply how large to make the new routing switcher, but rather how large could Post Perfect afford to make it? All manufacturers allow facilities to buy frames larger than they need, and the prospect of big amounts of headroom is tempting.

Post Perfect analyzed its current needs and planned for a reasonable amount of growth in various different signal points. The facility counted on a constant demand for filling the digital frame and a decreasing demand on the analog side. This resulted in the following specifications: 128 x 128 analog video, 64 x 64 analog video with characters burned in, 64 x 64 4-channel analog audio, 32 x 32 2-channel analog audio, 128 x 128 digital video, 128 x 128 AES/EBU digital audio (each signal is two channels) and 64 x 64 time code.

The routing switcher is controlled at individual destinations (e.g., at each VTR) by dedicated panels. In addition, a touchscreen control system has been installed in each control room, allowing operators to have personalized setup parameters for all of the routing switcher connections to and from each control room.

Post Perfect knew astute clients would appreciate the ability to instantly configure a room to meet their needs -- even at the last minute. With touchscreen control, editors can call up any machine in the house -- video, audio, time code and visual time code -- at the push of a button. Encoding and patching equipment that clients forgot to book is a thing of the past. The extra minutes gained in a session translate into more time for creative decisions, with the editor continuing to concentrate on the task at hand instead of on the mechanics of the technology.

Because the digital control rooms are so router intensive, each repeat monitor in these control rooms has an LED display showing what signal is being routed -- a functional feature for operators and clients alike. These “under-monitor displays” are controlled by the central routing switcher controller.

Post Perfect considered custom under-monitor displays when the facility was built nine years ago. The per-room cost for under-monitor display at that time turned out to be the total amount Post Perfect invested in displays for the entire facility in 1994.

At Post Perfect, every input and output in the facility has a patch point for maintainence. The quality control area performs digital signal monitoring with Tektronics’ 601-scope that permit the viewing of the analog characteristics of serial digital video signals. This means problems can be detected before they become significant enough to affect the picture.

In transforming any facility, a day a service area is closed means missed opportunities and lost revenue. So it was important for Post Perfect to engineer its massive infrastructure changeover with little or no downtime for the facility and its clients.

Glendale, California’s National TeleConsultants (NTC) handled the design, installation and project management of a patchbay-based temporary routing system whose goal was to keep the facility open and at full capacity; NTC had the same responsibilities for Post Perfect’s permanent router.

NTC worked with the facility’s operations and engineering people to determine what needed to be available on the temporary system to ensure maintenance of day-to-day operations over a 5- or 6-week period. Because it is easy to overlook certain requirements for a temporary installation, as much care went into the patchbay-based system as into the permanent基础设施.

Because Post Perfect had added cables on top of cables during the past eight years, a piecemeal switchover to the temporary system was not practical. The entire facility was taken down over a long weekend and transferred over to the patchbay-based system. NTC had prefabricated hundreds of cables in Glendale and shipped them to Post Perfect where it had personnel on site.

While the temporary system was on-line, NTC gutted and rewired the analog video

One of Post Perfect’s all digital color correction suites. Color A features a da Vinci Renaissance 8x8x8 color corrector (center console), digital and analog scopes, TLC keyboard, digital switcher and touchscreen routing switcher monitor (far right).
Post Perfect required the highest level of signal quality physically possible. While reclocking is usually an option on routers, it was an absolute necessity for Post Perfect. The outputs of the serial digital router had to reclock the signals, rebuilding their time base. Without this capability, the facility would not face hard failures but intermittent, difficult-to-track problems.

Equally important was the ability to properly equalize both input and output sides of the analog video router. Post Perfect opted for a significant additional expenditure to have high-quality distribution amplifiers on every input so that all signals hit the router correctly without hum and on every output, establishing a correct level for the signal destination.

Resolving the question of dedicated vs. assignable signal paths involved not only Post Perfect's engineering staff but also its operations personnel. They decided on completely assignable signal paths for all devices in the machine rooms that have utility to more than one room (e.g., VTRs, digital disc recorders). Room-specific devices, such as title cameras, character generators and telecines, which offer no functional gains to the overall facility, have dedicated signal paths and do not use up router space.

All assignable signal paths have multipoint distribution, with the exception of machine control signals. Because the signals only go from one place to another at a time, control consistently seems to be the one thing worth patching in a post-production environment. With no signal-quality issues at stake, a control router didn't rank high in the cost/performance area.

Post Perfect decided to invest a significant sum in certain control panels and control heads for the consoles of edit and graphics rooms that shared these devices. This configuration eliminated the need to physically wheel a control panel or head from room to room in front of clients.

For the degree of flexibility required by the facility, all normal operations are performed without having to patch signals; however, every signal is available at patch points. Signals distributed and/or routed include analog composite video, analog composite video with visual time code burn-in, digital composite video, digital component video, analog audio, digital audio and time code. Post Perfect decided analog component video signals would not be distributed due to quality problems; instead they are converted into component digital video at individual machines and distributed as digital component video. Also, machine control signals operate on normalized signal paths and must be patched to assign them.

At Post Perfect, all digital video is serial. There are absolutely no parallel video signal paths. Devices that have only parallel digital inputs or outputs have their signals converted into serial format at their connectors via Miranda serializers and deserializers.

It was determined to treat AES/EBU digital audio as an individual signal and to not embed it in digital video signal paths. At the time Post Perfect speckled its router, there was a big push on the part of manufacturers to embed audio and video in one signal path. But Post Perfect felt it had nothing to gain by embedding audio, only to use multiplexers and demultiplexers to separate it out again. Although embedding audio saves a router frame, it seemed to be a process better suited to the broadcast environment or to facilities with multiple locations.

All AES/EBU digital audio signals are distributed 75Ω, unbalanced so standard video jackfields can be used. Devices that have only 110Ω balanced inputs or outputs have their signals converted into 75Ω unbalanced at their connectors, via Canarie transformers, enabling serial audio to be sent down a standard video cable.

All of Post Perfect's digital facilities (e.g., editing, telcine and graphics suites) work in both 525/60 (NTSC) and 625/50 (PAL) formats. Switching from 525/60 to 625/50 is accomplished with one master switch in each control room.

Signals are translated from one format to another in a number of different ways. Component digital VTRs and component digital control rooms have individual encoders (serial component digital in to analog composite video out) to feed analog video routing switchers. In addition, three encoders connected between the digital video routing switcher and the analog composite video routing switcher are assigned via the routing switcher control system.

Each component digital control room has several decoders (analog composite video in to digital component video out) so composite analog sources from the routing switcher or from individual machines can feed these control rooms. Two decoders connected between the analog composite video routing switcher and the digital video routing switcher are assigned via the routing switcher control system.

All digital VTRs are connected to and from the analog audio routing switcher in addition to being connected to and from the digital audio routing switcher. External analog-to-digital and digital-to-analog converters are installed on those VTRs without this built-in capability.

All digital control rooms feed both the digital audio routing switcher and the analog audio routing switcher. They have several analog-to-digital converters so analog audio sources from the routing switcher or from individual machines can feed these control rooms.

Four analog-to-digital and four digital-to-analog converters are connected between the analog and digital audio routing switchers.
Upgrading signal infrastructure requires a balancing act.

The Bottom Line: Post Perfect leaps forward and sets the standard for modern post-production houses by increasing its digital capabilities. In a major facility-wide upgrade, this leading post-production facility has balanced cost and performance to come up with the perfect design.

By Dean Winkler

Facility signal infrastructure may not be as high-profile a topic as pioneering hardware or software or innovative facility layout and design, but as the driver of facility operations, it is critically important to every post-production house. Whether a new installation or an upgrade to an existing facility, as was the case last year for Post Perfect, signal infrastructure requires careful planning; its design must balance cost, operational capabilities, signal quality, flexibility, maintainability and expandability.

One of New York City's leading high-end commercial post-production facilities, Post Perfect, was designed in 1986 when the industry was on the cusp of the coming digital revolution. Although we recognized the impact digital would have on video, audio and graphics and were determined to be among the first to take advantage of digital technology, there were few options for digital routing at that time, and the facility was built without it. But the recent advent of serial digital routing gave us the practical option we had been looking for.

Since opening its doors, Post Perfect has consistently increased its digital capabilities, offering digital component edit suites, film transfer and graphics. Based on the success of Edit 4, a fast, powerful NTSC/PAL compositing room that is fully-booked, we converted a second edit suite, Edit 1, from analog composite to digital component last year. In addition, we expanded with Edit 5, a high-quality interformat digital component environment that enables budget-conscious clients to maintain a high level of signal quality throughout the entire post process at accessible broadcast and longform prices.

As Post Perfect's digital offerings reached critical mass in 1994, we decided it was time to install a massive new signal infrastructure to better accommodate current needs and provide a pathway for future growth. In planning this major facility-wide upgrade, there was no single 'correct' answer for the facility. Like all engineering issues, it involved a series of trade-offs in which design criteria were weighed against cost and performance. Because the signal infrastructure affected the daily operation of the facility, decision-making required the representation of all of Post Perfect's departments and the consideration of ergonomic factors impacting the operators' day-to-day activities.

First and foremost, we determined that
The digital revolution.

With competition increasing and technology moving at an increasing pace, many facilities are finding that now is the time to upgrade. In any such project, the challenges are many. However, one effective key to success is to build on solutions developed by others. This month’s facility showcase highlights how some leading-edge broadcast and production facilities have rebuilt their facilities with an all-digital tomorrow in mind.

In addition to the traditional facilities, we’ll also look at some cable, satellite and telco studios that address video and audio production (they call it content) in innovative ways. The solutions they have adopted to some traditional video/audio production problems may surprise you. It might be that we old dogs could learn a few things from these new pups.

“Post Perfect’s Digital Solution” ......................... 32
“WDSU-TV Designs a New Home” ....................... 38
“TCI Builds New Digital Facility” ...................... 48
“Bell Atlantic’s Digital Production Studio” ........ 60
“Soundwave: Digital Audio in Perfection” .......... 68
“Group W Network Services” .......................... 76

Brad Dick, editor
10 Bits.
4 Fields.
$2495.

Like these numbers? Then call this number: 1-800-455-8525.

A 10-bit, 4-field video synchronizer with dual video outputs, multiple hot switch modes, multiple freeze modes (1-2-4 field), variable strobe, GPI, adjustable black/white clip, dual blanking widths and vertical line advance for under $2,500? How about a dual channel version for less than $4,500? Believe it or not, both of these systems are available today thanks to the new DPS MicroSYNC-X 10-bit synchronizer card.

With thousands of 8-bit MicroSYNC™ cards already in use, DPS is the industry leader for modular synchronizer systems. Our approach makes it easy to add additional channels at any time by simply plugging in another module. And at $1,995, the MicroSYNC-X card will deliver premium performance at a budget price. A variety of rack mounting and remote control options are available, including 12-slot frames with redundant power supplies, 2-slot frames and combination audio/video frames. DPS frames also accept our TBC, VDA, waveform/vec-torscope, audio synchronizer and monitor switcher cards.

From the MicroSYNC-X to the legendary DPS-265, the DPS family of synchronizers offers a spectrum of capability and performance that no one else can match. And we include something else that can’t be beat, too. The reliability, durability and value that only DPS can offer. We’ll be glad to tell you more or even arrange a demonstration in your facility. So if you like our numbers, just call our number. 1-800-455-8525.

DIGITAL
PROCESSING SYSTEMS INC.
In the U.S. call (606)371-5533  Fax: (606)371-3729
In Canada call (416)754-8690  Fax: (416)754-7046

MicroSYNC™ is a trademark of Digital Processing Systems, Inc. Prices shown are suggested U.S. list prices for NTSC products.

See us at NAB, Booth #11832.
Circle (9) on Reply Card
According to David Elliot, vice president of engineering at the ABC Television Network, Index Plus and the XDS system offer two main benefits. “First, it is a service to our viewers. If someone wants to record Home Improvement and they have Index Plus, they can just tell their VCR to record that show without concern as to when it goes on. The machine gets the information from the schedule and updates it from the live program information that is transmitted in the XDS field.”

The second advantage offered by XDS is that it helps cope with channel surfing: “People scan across channels and may hit in the middle of a network break or commercial. With this system, they will be able to know immediately what show they are watching. This is a service to us and our clients,” presumably, their advertisers.

Commenting on the overall benefits of using XDS and Index Plus in light of the new realities of broadcasting, Elliot says, “It helps ABC by giving us a stronger network identity with the viewer. With the efforts everyone is making in stamping their video these days, branding and identifying is becoming more and more important in these days of multiple channels and channel surfers. “ABC is anticipating a second phase of its XDS implementation, but has not yet decided what other information it will be adding.

In testing and preparing for national launch of Index Plus, Gemstar is also leasing VBI lines at stations and cable networks. This way, the company can broadcast title data itself on a national basis to over 90% of the United States.

Support from broadcasters is a benefit to Index Plus users and to Gemstar because it enhances its product's features. “It's more content rich,” explains company CEO, Dr. Henry Yuen, “if the broadcaster is involved.” He also provides reasons why broadcasters would find it in their interest to support the system: “It gives the broadcaster a pre-emptive right to do last-minute program corrections and extend a recording beyond the normal time. Also, the broadcaster can provide live program information.” Yuen predicts that the first VCRs incorporating Index Plus will probably reach consumers in the third quarter of 1995. Licensees include RCA/GE, Panasonic, Hitachi, JVC, Sanyo/Fisher, Mitsubishi and Sharp. Gemstar has either made or is negotiating agreements with other major broadcast and cable networks to support Index Plus. The company is also expected to license its Index Plus technology for TV sets in the future.

As the broadcast industry gathers in Las Vegas for NAB '95, we are likely to hear more about new ventures and announcements related to XDS and the VBI. Broadcasters are learning that you don't have to own a broadcast license to fill in the lines of the VBI but it always helps to make deals with someone who does. With its new high profile, the VBI is offering innovative ways for veteran broadcast operations to benefit from new products offered by start-up companies in other fields. Through these new offerings, broadcasters can provide a service to their viewers as they raise their own profile with viewers and advertisers.

Marjorie Costello is a broadcast and video industry consultant and Broadcast Engineering contributing editor based in New York. Respond via the BEFaxback line at 913-967-1905 or via e-mail to hcl@intertec.com.

For more information on services using VBI, circle the following numbers on the Reply Card:
• Electronic Industries Association (302)
• Gemstar Development (303)
• StarSight Telecast (304)
“The Matrix Plus II gives us new communications flexibility and power. Even on election night, with 13 crews in the field, we all kept in touch and on the air without a hitch. And the reliability is rock steady.”

Randy Knedler
Engineering Supervisor
KING-TV, Seattle

Everybody’s Talking About the Power of the Matrix Plus II Intercom System.

KING-TV is the king of Seattle broadcasting; the market’s news leader. A team of dedicated broadcast pros puts more than 4½ hours of live TV on the air everyday. At any given time, staffers are in the station, on the street, up in the chopper, or beaming in via microwave and satellite. While they rely on state-of-the-art equipment, they depend on one thing even more: each other. No matter what the situation, they have to stay in touch.

That’s why Randy Knedler relies on the Matrix Plus II intercom system. Fully integrated, the system ties everybody together easily and neatly, whether they are on-site or calling in on the wireless, or via the bird. Many of the system’s powerful intercom stations have bright electronically-labeled displays to let everybody know who’s on-line and in-touch so that broadcasts go off without a hitch. And since there is no telling what the next broadcast will bring, the system reconfigures quickly to let anybody communicate with anybody...in just seconds.

No matter what news breaks in Seattle, Randy knows he can rely on the Matrix Plus II, just like broadcast engineers from San Francisco to Miami and from London to Tokyo. The Matrix Plus II. It’s the talk of the town.

Matrix Plus™
DIGITAL INTERCOM

Domestic Sales: Clear-Com Intercom Systems
945 Camellia Street, Berkeley, CA 94710
Tel: (510) 527-6666, Fax: (510) 527-6699
Circle (17) on Reply Card

Export Division: Clear-Com International
PO Box 303, Walnut Creek, CA 94597
Tel: (510) 932-8134, Fax: (510) 932-2171
See us at NAB Booth #18936
A SIGNAL OF STRENGTH

THOUSANDS OF BROADCASTERS rely on JAMPRO’s attention to pattern requirements, antenna gain, tower constraints, and budget. From concept to completion, JAMPRO’s dedication to detail and quality has made us a world leader in the broadcast industry.

JA/LS LPTV SLOT ANTENNA
- Over 50 standard azimuth patterns available
- Lightweight, low windload
- Excellent VSWR specifications
- Un-pressurized feed system

JAMPRO ANTENNAS, INC.

Covering That Won’t Quit
JAMPRO ANTENNAS, INC., 6340 Sky Creek Drive
Sacramento, California, 95828 USA
Phone (916) 383-1177, Fax (916) 383-1182

SENDING POWER

YOU’LL ALSO FIND THE SAME quality in our complete line of passive RF components. JAMPRO knows how to integrate the equipment you need – hybrids, harmonic filters, TV channel combiners, MMIC filters, UHF inter digital combiners, directional couplers, TV intermod filters, patch panels, and more.

JAMPRO RF SYSTEMS, INC.

When You Want More Than Just An Antenna
JAMPRO RF SYSTEMS, INC., P.O. Box 293296
Sacramento, California, 95828 USA
Phone (916) 383-7844, Fax (916) 383-1182

Look beyond the ordinary with JAMPRO

Circle (26) on Reply Card See us at NAB. Booth #16617

upon that by opening up field 2 for captioning, which is not part of the requirements, but it has been documented in an EIA standard.

The next part of the progression, notes Szakoczy, was the design of a packetized data service within field 2, the XDS standard. XDS uses the same data format as closed-captioning but CC has priority at all times. XDS’s data packets carry a range of information but the detail it can deliver is limited by its small bandwidth. The Mitsubishi VP continues to explain the hierarchy: “Then there is StarSight, which is a full-blown guide service that is not as bandwidth limited because it is using a chunk of three of four PBS VBI lines.”

Despite its bandwidth limitation, XDS is capable of delivering valuable information and services to viewers. Unlike StarSight, XDS is free. (For both systems, of course, consumers have to purchase products that can capture and display each service’s data.) Some of the information that can be provided via XDS includes the name of the show, its length and the time left in the program, captioning and audio services, the aspect ratio, and the network name and station call letters.

In 1994, PBS became the first broadcast operation to transmit some of this XDS information with nationally distributed data augmented locally, depending on the station. Current model VCRs that can display XDS information are recent models from Mitsubishi. Because XDS can also perform automatic VCR clock setting, in 1994 Sony added the feature to its SLV-770HF and SLV-920HF VCRs so the time is always correct and not blinking “12:00.”

Gemstar and ABC join forces for XDS launch
XDS will receive a major push in 1995 through the joint efforts of a commercial TV network and a consumer electronics development company. In February 1995, the ABC Television Network and six of its owned and operated (O&O) stations began transmission of XDS information. The added service was launched in collaboration with Gemstar Development through its new Index Plus system, with the company providing broadcast insertion/encoder hardware to ABC.

Gemstar, based in Pasadena, CA, took the VCR industry by storm in the past few years with the introduction of its VCR Plus technology. The technology solved a major consumer problem by making it much easier to record with a VCR. It is now a common feature in all major VCR brands after its debut as a separate handheld device in 1990. To record a program, consumers punch in the show’s VCR Plus code number, printed next to a show in TV listing guides found in newspapers and TV Guide.

According to Gemstar’s co-founder, and VCR Plus’ co-inventor, Dr. Henry Yuen, his company now wants to simplify playing back tapes. Index Plus provides an on-screen directory of shows recorded on each videocassette and automatically fast-forwards or rewinds to selected programs. Index Plus VCRs use a proprietary computer chip to grab program titles and other information in the VBI.

Another important feature of Index Plus is its ability to access program information during live viewing. Program name and channel number can be displayed with the push of a button. An on-screen electronic guide covering the rest of the day for a specific channel being viewed can also be displayed instantly. Although this information is far from the detailed and week-long guide provided by StarSight, Index Plus does not require consumers to pay a subscription or other fees. Similar to StarSight, Index Plus also offers an easy point-and-record capability.

ABC and most of its O&O’s are broadcasting show titles and other information via the XDS in phase one of its implementation. In addition to passing along their network’s XDS information, the O&O’s will be adding their own call letters, local program titles and running times.
and General Instrument/Jerrold converter boxes.

In addition to making TV viewing more manageable and convenient, Burns predicts StarSight will offer promotional opportunities to broadcasters and cablecasters in the future — presumably for a fee. Although StarSight products' president was not ready to reveal specifics, he did offer these possibilities: "One way is to highlight what is hot tonight." A viewer presses a button on the StarSight remote and, "Up pops some of the specials that are on tonight." Another way, suggests Burns, is for a station or network to put a marquee around a box at a certain time and the viewer can move to a bigger screen with more information. This could include tie-in possibilities with advertisers.

StarSight has also given indications that it plans to add weather, news and sports information in the future. We can assume that these services could be provided in partnership with broadcasters, cablecasters or their competitors at newspapers or wire services. The company is also exploring two-way communication with viewers through a phone or data jack.

**Index Plus and XDS**

The EIA subcommittee that set the standard for closed-captioning and XDS was chaired by Julius Szakolczay, Mitsubishi Consumer's vice president of new technologies research. Because of his EIA committee work and his company's adoption of both StarSight and XDS, Szakolczay has a unique perspective on these new services. According to Szakolczay, "They should be viewed as hierarchical. It starts with closed-captioning, which uses field 1 of line 21 of the VBI." He goes on to explain that they improved
StarSight provides the name of the network, the channel number and the station's call letters. StarSight makes TV watching easier by displaying the name of a movie or show as you channel surf along with the time remaining in the program.

TV viewing also becomes more interesting as well as convenient because a viewer can easily obtain a program synopsis, actors' names and the year a movie was released.

According to John B. Burns III, president of StarSight Products Group, the benefit to broadcasters is that, "StarSight gives [consumers] up-to-date information about [a broadcaster's] programming in a format that is easy to access and understand for a consumer." As Burns, formerly with Showtime, goes on to explain, "The problem is that there is a lot of good TV on and people can't find where it is. This is a tool for accessing it. This is a home run for broadcasters."

Since all the major TV set manufacturers — including RCA, Sony, Panasonic and Magnavox in addition to Zenith and Mitsubishi — have also signed agreements to offer StarSight products, it's likely that the service will gain wide acceptance in the United States. Another introduction that is likely to hasten the spread of StarSight is its stand-alone box sold by Magnavox at retail for under $150. Companies will also be offering StarSight in VCRs with Samsung and GoldStar planning to be the first to make models available by summer. StarSight has also licensed its technology to other players in communications. Uniden is selling home satellite decoders incorporating StarSight, and Bell Atlantic Video Services (BAVS) will feature StarSight in its planned video dial tone service. StarSight is also available from cable operators in Zenith.

The StarSight interactive on-screen guide provides detailed information on current and upcoming programming as far as one week out. The signal is currently carried on PBS stations, MTV and Nickelodeon.

StarSight provides the name of the network, the channel number and the station's call letters. StarSight makes TV watching easier by displaying the name of a movie or show as you channel surf along with the time remaining in the program.

TV viewing also becomes more interesting as well as convenient because a viewer can easily obtain a program synopsis, actors' names and the year a movie was released.

According to John B. Burns III, president of StarSight Products Group, the benefit to broadcasters is that, "StarSight gives [consumers] up-to-date information about [a broadcaster's] programming in a format that is easy to access and understand for a consumer." As Burns, formerly with Showtime, goes on to explain, "The problem is that there is a lot of good TV on and people can't find where it is. This is a tool for accessing it. This is a home run for broadcasters."

Since all the major TV set manufacturers — including RCA, Sony, Panasonic and Magnavox in addition to Zenith and Mitsubishi — have also signed agreements to offer StarSight products, it's likely that the service will gain wide acceptance in the United States. Another introduction that is likely to hasten the spread of StarSight is its stand-alone box sold by Magnavox at retail for under $150. Companies will also be offering StarSight in VCRs with Samsung and GoldStar planning to be the first to make models available by summer. StarSight has also licensed its technology to other players in communications. Uniden is selling home satellite decoders incorporating StarSight, and Bell Atlantic Video Services (BAVS) will feature StarSight in its planned video dial tone service. StarSight is also available from cable operators in Zenith.

The StarSight interactive on-screen guide provides detailed information on current and upcoming programming as far as one week out. The signal is currently carried on PBS stations, MTV and Nickelodeon.
ing guides so consumers know what's on television. Ironically, these new services amount to full-blown consumer-oriented versions of information until recently restricted to network VBI transmissions to their affiliates.

The first of these new on-screen viewing guides is StarSight, launched in 1994. As evidenced by the recent 1995 Winter CES in Las Vegas, StarSight is one of the hottest new features on televisions and VCRs. Along with XDS-related services like Index Plus, StarSight is likely to change the way people watch television and make their viewing selections.

**StarSight: Navigating the future**

StarSight is an interactive, electronic on-screen guide designed to help consumers navigate their TV information highway. It goes far beyond the information and capabilities provided by a cable system's preview channel and the print listings found in newspapers and TV Guide. StarSight, a Silicon Valley start-up founded in 1986, is leasing VBI lines from PBS to carry its information throughout the United States.

StarSight's on-screen features, displayed on its grid guide, include instant program selection, 7-day program information, and schedules for dozens of channels. The Fremont, California-based company's system also offers direct tuning by program title or by themes — such as movies, sports, news — as well as one-touch VCR recording.

Designed to incorporate its patented technology in TV sets, VCRs, satellite decoders and other converter boxes, StarSight's first major appearance was in several Zenith TV models. These sets, which shipped in summer 1994, were joined by Mitsubishi models this past fall.

StarSight data is supplied by TV Data Technology (TVDT) in Glen Falls, NY, a corporate partner in StarSight and one of the major providers of TV program guide information to print media. The TVDT information, formatted to StarSight specifications, is sent by dedicated data lines to StarSight in California.

After StarSight formats the schedules and adds security algorithms, the information is again sent by dedicated data lines, this time to PBS in Alexandria, VA. In Virginia, the StarSight data is inserted into the PBS VBI and uplinked to the Telstar 401 satellite. The StarSight information is downlinked at 200 PBS member stations achieving coverage of virtually every household in the United States.

To ensure national coverage and provide redundancy back-up, StarSight is also transmitting on the VBI of two cable networks, MTV and Nickelodeon, owned by StarSight equity partner, Viacom. These cable networks are also uplinking the StarSight data on their VBIs to Satcom C3 and Satcom C4 from Viacom's Hauppauge, Long Island satellite facility. Incidentally, other StarSight equity partners include Cox Communications, The Tribune Company, Times Mirror Cable, The Providence Journal, Spelling Entertainment/Blockbuster and KBLCOM/Houston Industries.

To activate a StarSight-equipped product, a consumer calls an 800 number and provides cable system and home equipment information along with a credit card number. Then, in a matter of minutes, information specific to that consumer reaches the home setup, transmitted over the pathway described above. Consumers pay a one-time $15 activation fee, and a monthly subscription fee averaging under $4. After the entire initial download, which can take several hours, the consumer's StarSight information is refreshed daily when the consumer is not using the StarSight-equipped home hardware.

StarSight does offer a capability that on the surface might rattle broadcasters: The consumer can rearrange the order of channels on the StarSight grid and customize them for his/her viewing habits. As an example, a viewer could place channel 13 before channel 2, preceded by a frequently watched cable channel, like CNN.

**StarSight: Home run for broadcasters**

The overall effect of StarSight should make all broadcasters and cablecasters happy. Based on first-hand experience, StarSight leads to increased TV watching. The reason is that with the click of the StarSight remote, the viewer gets an excellent rundown of what's on now or in a few hours or days. And,
As broadcasters face a future of increased competition for viewers' attention and advertisers' dollars, keeping up with change is more important than ever. The purpose of this bi-monthly column is to address a growing range of new or announced technologies and services that will affect the world of broadcasting and cable. That way, your operation can keep current, competitive, and cash in on change.

Some of these developments will let your station develop new revenue sources, while others will have to be offered simply to stay competitive. And since what you don't know can kill you, we will also discuss a third area: services that may initially appear to be threats to your operation.

But before you pull out the patch cords and turn off the transmitter, we will also point out some interesting partnering opportunities for the savvy station. Even in a world filled with new competitors, broadcasters should always remember they have valuable and unique assets they can leverage. These include spectrum space with a license to broadcast and many years of real-world experience in producing professional-quality “content” — the term computer and telco people often use to describe TV programming.

The face for VBI space
The subject of this debut column, new consumer-oriented services using the VBI, incorporates several aspects of the new media mix. The VBI is becoming one of the most sought-after parts of the spectrum because it provides an existing, cost-effective and dependable pathway for distributing data to consumers. New consumer data services and products tapping the VBI include StarSight, XDS and Index Plus.

Up until recently, the VBI’s primary consumer use has been to transmit information for closed-captioning. As you may know, as of July 1, 1993, all TV sets 13 inches and larger manufactured for sale in the United States required built-in closed-captioning (CC) circuitry. Because of this federal mandate, TV-set makers have been exploring other ways to use this technology and circuitry to display additional text and information services.

This has led to a new standard called XDS, extended data services. Developed by the consumer electronics trade association, the Electronic Industries Association (EIA), you may have seen XDS demonstrated at recent NAB Conventions under its previous name, EDS.

Also moving consumer electronics (CE) manufacturers to offer new on-screen display features is the proliferation of channels available to TV viewers. VBI lines are being used to deliver new on-screen electronic view-
ADC's New LightSwitch™—The "Future-proof" Digital Router.

As digital formats come and go, so does a lot of expensive equipment. But while changing formats often requires upgrading cameras, decks and other source equipment, it doesn’t have to affect your switching system.

Introducing the new LightSwitch digital router from ADC. A switching system that literally doesn’t care what format you use. By avoiding internal reclocking, the LightSwitch router is able to switch any true digital signal, regardless of format—even ones that don’t exist yet! It can interface with either coax or fiber and features on-site matrix mapping, group takes, chop mode and RS232/RS485 control panel interfaces.

So, regardless of what digital format the future holds—from D1 to HDTV—turn on the LightSwitch router from ADC. For more information about LightSwitch or our digital video and audio fiber optic links and DAs, call us at 1-800-726-4266 or circle the reader service card below.

See us at NAB, Booth #19935.
This year's SMPTE Winter Conference was held in San Francisco in early February. The last three meetings centered on the converging of video and computers. This year's theme, "New Foundations for Video Technology," continued that development, but with a slightly different twist.

This year's meeting brought together some of the highest-regarded experts in both the computer and video industries. No longer satisfied to simply talk about the merging of these two worlds, the meeting provided a good overview of how general-purpose computers will become an even more important tool for the video professional.

The language barrier

Three year's ago the conference was called "Collision or Convergence: Digital Video/Audio, Computers and Telecommunications." I recall that the event resembled a meeting of foreign delegates, all speaking different languages. At times, attendees almost needed a real-time translator to understand what the other party was saying. For instance, resolution conjures up one definition to the computer type and something different for the video professional.

I chuckled when the computer-based presenters called the small, jerky pixelated pictures on the computer screen video. One computer-based presenter showed "real video" on a computer monitor. It was QuickTime. The video professionals shook their heads in amazement. Not that the technology was possible, but that anyone would call it video.

For the video old fogies, seminar chairman, Charles Poynton of Sun Microsystems, delivered a wake up call on the merging fields of computers and video.

He showed how the two industries are becoming closer in terminology and function. As future technology is developed, it will be a blend of consumer electronics technology and information industry technologies, he said. In many ways, the video industry is piggybacking on the developments of the computer industry. The economics of scale are critical when it comes to producing a cost-effective product. For one thing, it's far better to be able to amortize the cost of R&D over one million devices rather than 10,000, especially if the device was expensive to develop.

Look at video monitors. For every professional video monitor sold, perhaps thousands of computer monitors are sold. However the monitors cannot be identical because the applications are different. Fortunately for video applications, as manufacturers develop higher-quality (and less expensive) monitors for the computer market, the video products gain from that R&D, which is paid for by the computer products. The result is better products, more features and lower costs.

Another good example of the advantage of scale is the CD-ROM. It is now becoming standard equipment for computer users. However, were it not for the audio CD, the CD-ROM might still be a thousand dollar option reserved only for expensive computers.

Table 1 summarizes how the design parameters for video and computer products are fundamentally different. What makes the criteria different is the application, not the product. Understanding this premise, makes it easier to understand how hardware developed for one application may not prove effective in another.

Multimedia

Multimedia is something easy to say, but hard to describe accurately. The executive director of the Interactive Multimedia Association, Philip Dodds, addressed the group at the Thursday luncheon. While some video types were outspoken in their wonderment at his selection as featured speaker, he proved up to the task.

Dodds' theme centered on the current development of interactive products. He complained that interactive media was not well understood. He said that only the old systems where the video and control were kept separate produced a quality experience.

Originally, the systems were composed of a video disc player with the video and graphics combined in overlay cards. He complained that today, no commercial delivery systems, including CD-based systems, can produce the quality of video and degree of control as those "antiquated video disc systems" had. According to Dodds, the key was that the computer exerted only control. It did not handle video.

Dodds stated that the computer industry has declared "Analogue is a scourge upon the earth and must be eliminated." In other words, "If you can't compute it, it is inherently bad."

He claimed that the video disc is dead because analog is a dirty word to the computer industry. "Like it or not," he said, "we all have begun the wholesale shift to computer-intensive, CPU-cycle-sucking digital multimedia." The video crowd loved it! The computer guys didn't see a problem.

Next year

The SMPTE Winter Conference has never been a large show, and probably wasn't intended to be. And, it's not designed to teach you how to repair your tape recorder or provide a hands-on practical experience. However, for what it lacks on the practical experience level, it gains measurably by providing attendees with an important look at their industry's technological future.

It is a major gathering of the video and computer industry's experts. If you want to know where video and computer technology is going, or what tomorrow's hardware might look like, consider attending next year's conference in Seattle. You won't be disappointed.

<table>
<thead>
<tr>
<th>Design parameter</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Industry Standards</strong></td>
<td>Video products</td>
</tr>
<tr>
<td>Static, monolithic</td>
<td>Detailed and layered</td>
</tr>
<tr>
<td>Standards are large</td>
<td>Lets user plug and unplug parts of standards</td>
</tr>
<tr>
<td><strong>User Access Patterns</strong></td>
<td>Sequential</td>
</tr>
<tr>
<td>Ex: moves; run from beginning to end</td>
<td>Ex: caching, storing used data for future/repeated use access and use</td>
</tr>
<tr>
<td>Ex: pass only</td>
<td>Ex: access and use</td>
</tr>
<tr>
<td><strong>System Topology</strong></td>
<td>Open loop; ex: broadcast no feedback from end user to information source</td>
</tr>
</tbody>
</table>

Table 1. Because the basic application needs are different, the design parameters for video and computer products must be dissimilar. For example, computer monitors make low cost TV sets. They don't produce sufficient image brightness. Likewise, TV monitors are larger, designed for distance viewing and must have narrow cabinet depth. One cannot optimally replace the other.
Designed for Each Other

Peaches and cream, a mouthwatering combination. Now there's another. We've introduced the new V4238 Digital Encoder, the perfect partner to the already successful V4228 Digital Varicomb Decoder. Our Industry Standard Varicomb® technology has been refined and implemented digitally so your pictures will never look more appetizing.

Ask to see the menu.

V4228 DIGITAL DECODER
- 2-D OR 3-D VARICOMB® ADAPTIVE DECODING
- AUTOMATIC MULTI-STANDARD OPERATION
- ANALOG AND DIGITAL INTERFACES
- ALL DIGITAL PROCESSING (10 BIT)
- ULTIMATE COMPONENT QUALITY FROM A COMPOSITE SOURCE

V4238 DIGITAL ENCODER
- VARICOMB® PRE-PROCESSING FOR 'CLEAN' ENCODING
- AUTOMATIC MULTI-STANDARD OPERATION
- ANALOG AND DIGITAL INTERFACES
- ALL DIGITAL PROCESSING (10 BIT)
- THE CLEANEST COMPOSITE SIGNAL FROM A COMPONENT SOURCE

A peach of a decoder
The cream of encoders
On-line services such as CompuServe, Prodigy, and the Internet often are misperceived by the public as electronic hideouts for software hackers or a collection of chat lines for struggling souls desperate for a computer date. In fact, these access points to the so-called information superhighway are primarily networking tools that people in a range of professions, including broadcasting, are using to make contacts, find new jobs, buy and sell equipment, and exchange industry information.

Useful resource
As a technology journalist, I log into CompuServe's Journalism Forum several times a day as part of my prospecting and networking strategy. There, I can discern the latest trends, or talk to editors seeking a specialist in a given subject area. I can even find press releases from universities and companies involved in the science and business fields. Having worked as a PBS-TV producer, I also use the Broadcast Professionals Forum to see if there are any documentaries looking for research assistance.

So, if your range of contacts in this business is limited, or if you want to investigate moving to a new locale, start by equipping your 486 PC or MacIntosh to move in the fast lane with one of the commercial on-line services. Setting up your system for on-line access is relatively easy. The off-the-shelf software can be purchased almost anywhere for $20 to $150. You'll also need a modem that has at least 9,600bps capacity. That should cost about $150.

Having just hinted that the whole process is easy — I lied. Well, it is easy if you're talking about one of the major on-line services like CompuServe, America On-Line or Prodigy because they all provide customized software. However, getting your system configured for the Internet is akin to having to wire a 64 x 64 component routing switcher using a manual written in Swahili with one hand tied behind your back and being color-blind!

Once you have your system up and running, call the on-line service (some software packages do this automatically) and log in. The system will ask you a few questions — like your life history — no, really just some credit card stuff. Answer the questions and you'll be in. You now have an official e-mail address. Using a local access number will connect you to the service and you're now an official member of the I-way.

Networking

Now that you've gone to all this trouble, what's out there? One quick answer is about anything you can imagine. Let's take a quick tour of the Professional's Forum on CompuServe.

Forums consist of areas composed of like interests. Clicking on the Professional Forum brings up the following selections:

- Aviation
- Business Management
- Data Processing/MIS
- Media Services
- Engineering/Technology
- Entrepreneurial/Small Business
- Engineering/Technology
- Health Professions
- Legal Services
- Education
- Market Quotes/Highlights
- Other Interests

There are ads from people looking for specific equipment. One guy was looking to buy a PAI Betacam. Others were seeking to sell equipment from an Edit Master, to an ATVista and two MII decks, to a Barco CVS monitor. Many forums provide such classified sections like this one and they are accessible 24 hours a day.

The personal touch
When operating on-line, keep in mind a couple of rules. Because you don't know what the other person looks like and you receive no social cues as to their status, you must deal with them on an equal level. Also, there are mores on-line. Generally, anyone who engages in vulgar language will be asked to leave by the system operator (SYSOIP). Keep in mind that all your replies and messages are public (except your personal e-mail box). If you want privacy or want to send an individual message to someone, you have to log out of the forum and send them a direct e-mail message.

In the future as more people adopt this interactive technology, electronic networking will be a commonplace — not a cutting-edge — business practice. Until then, see you on-line.

Gene Koprowski is a technology journalist based in Chicago and a former PBS producer. Reprint via the BFE Feedback line at 913-967-1905 or via e-mail to be@intercom.com.
Coming in April...

Cover Story: TV Station Builds Cable News Network

Broadcasters and cable systems have finally stopped beating each other up as economic realities force cooperation. Savvy TV stations now use cable systems to deliver programming to areas they can’t normally reach. San Francisco station KRON-TV was looking to the future when it built an entire network of cable outlets through the use of ISDN and transmission equipment.

Using Fiber for Video:

One of the hottest in-studio technologies is fiber. The demands of high-speed data and video are often best-suited for fiber. We’ll take a look at how fiber can solve many in- and out-of-studio problems.

Automation for multicasting:

As stations forge alliances with cable systems and develop their own mini-service areas, one key to success is localized commercials. We’ll look at tape- and disk-based storage technology, which is crucial to the effective implementation of multicasting.

Building an RF ATV facility:

This “how to” is for engineers needing to plan for their station’s ATV future. We’ll discuss implementation costs for the RF portion of the system, including towers, transmitters, antennas, coaxial lines, filters and combiners.

Technical Glossary:

A humorous look at the acronyms that plague our everyday technical environments.

DON’T FORGET THE D.A.!
The best value in “broadcast quality” distribution amplifiers available. Guaranteed!!

- Audio & Video - Gain & Equalization Controls - Wideband - Duplication
  Y/C - Balanced / Unbalanced - PC Cards - Rackmount
  - Stand-Alone - 1 x 4 - 1 x 24 - $95 - $495

3 YEAR WARRANTY

142 Sierra Street, El Segundo, CA 90245 • (310) 322-2136
The inventors of the VideoCube® introduce

TURBO

Cube

It's new.
It's hot.
It's from ImMIX!
(Who else?)

Experience the next generation of power
at NAB - ImMIX booth #19779.
Wearing this button could change your life.

Just ask Kimberly Cowden. She wore a VideoCube button during last year's NAB Convention and won a complete VideoCube system worth more than $40,000.

Now it's your turn to win at NAB — and this year, the stakes are even higher. Pick up your ImMIX button at booth #19779, wear it during the NAB Convention, and you can win the most exciting new product at the show — the TurboCube.

Two years ago at NAB, ImMIX made history with the VideoCube — the industry's first nonlinear finishing system. This year at NAB, TurboCube will set the new standard for nonlinear finishing.

So wear your ImMIX button at NAB, for your chance to turbocharge your business by winning the TurboCube.
such as non-linear workstations.

Functionality and ergonomics were important considerations in the design of the facility. The control room lighting is quite different from what most of us have seen in the past. A study has shown that the largest factor in eye fatigue among operators was not low light but the contrast between the typical direct light work space (about 70 foot candles [fc] and the light emitted from a typical CRT (about 15-20fc). Another problem was the glare from the standard track light fixtures. To address this problem, we installed dimmable indirect fluorescent fixtures that maintain a constant 3,500K color temperature. The result is a glare-free, evenly lit area with a constant illumination of about 20fc. An interesting facet of this is that when left to their own and without any suggestions, the operators consistently set the lights at this level. The cost of these fixtures is high, about $1,800 per 6-foot strip, but it has proven to be a good decision based on operator feedback. These same fixtures are used wherever possible, especially in common work areas, such as cubicles, where individuals have little control over their environment.

For the comfort of our employees and overall aesthetics, we opted to install carpet tiles over the raised flooring. There were also advantages in cost because we were able to use some used tiles since they would be covered. A Milliken static-free overlay carpet was used for the entire facility. I have yet to experience any static discharge as a result of walking the floors. In the electronic shop, we used a grounding-type floor tile with a full bonded ground grid beneath the adhesive. A key factor in keeping static discharge to a minimum has been constant humidity and good maintenance of the carpeting. This requires a special cleaning treatment to maintain the static-free properties and Milliken factory people come in once a month to clean the carpet.

General wire and construction concepts

In a facility this size much emphasis is placed on neatness, documentation and serviceability of installation. All the areas with discrete audio are interconnected with the ADC ICON system. All routers, DAs and other high-density devices are connected to swingout punchdown panels installed in the backs of each rack so that repeat connections do not disturb or wear the high-density connections on the equipment. Testing is also facilitated with this installation technique. The racks are interconnected with 26-pair numbered and insulated snake cable with intermediate blocks mounted on the walls behind each technical area.

Because our wiring area under the floor is considered a plenum, it was necessary to use plenum-rated cabling. For video, we use Belden 1506A (a mini 8281 product). For long audio runs we use a specially made plenum-rated 12-pair snake cable. Because the plenum-rated audio snakes are difficult to strip, we opted to use 3-inch flexible conduit for the rack-to-wall and wall-to-rack connections. The snake cables were placed in the conduits prior to them being installed under the floor and this turned out to be a relatively easy process — much easier than...
dealing with several thousand plenum-rated audio cables.

**Power and HVAC systems**

Each of the four master control pods and six post-production areas is served by a core mechanical/electrical room. The HVAC system consists of a pair of 300-ton water-cooled chillers backed up by a pair of 200-ton air-cooled chillers. In five years, the efficiencies of the water-cooled system will have paid for the extra cost involved in building a separate chiller building. To keep the demand load down and to load test the generators, the backup chillers are only run while the backup generators are running. This is an effective test and exercise of both systems. Within each M/E core are Liebert air handlers that pressurize the floor with cooled and humidified air. A temperature of 72° F with 40% humidity is maintained throughout the facility and by distributing the air handlers and backing up the chillers, chances for HVAC failure are remote.

Because all air conditioning is via the floor and intended primarily for equipment, we had some concern with the ability to control areas occupied by non-equipment (people). To solve this problem we used a 2-step process. First, all racks were sealed up as much as possible allowing cool air to flow in the bottoms and out of the vented tops of the racks. Secondly, thermostatically controlled floor vents with quiet fans are being used to control the temperature of the operator areas. To protect the control rooms from mysterious circuit breaker trips, we installed floor-mounted non-UPS outlets in the floor beneath the operating consoles for the inevitable portable heaters (not encouraged, but always present).

Three 1,250KVA diesel generator sets feeding three 750KVA rotary UPS systems keep the facility well-powered in the event of a commercial power failure. The gensets and UPS systems are all paralleled on their outputs to allow for future expansion and service. Within the system one genset and one UPS are considered backup units. Although rather expensive (about $160,000 each) the rotary UPS has proven to be extremely reliable while providing a spike-free clean AC waveform. The UPS feeds a series of power distribution units each located within an M/E core. The power distribution units are fed from 480VAC and transformer-isolated, supplying each rack or outlet with isolated ground AC power. The circuit breakers are located on panels within the power distribution units.

In a facility covering this large an area, much attention was paid to proper grounding. Beneath the computer floor, a 4' x 4' grid of 3-inch copper strap was placed. All connections are welded to the grid and all racks are grounded individually with No. 4 copper wire. The ground system is tied to a ground rod network installed within the base of five 9-meter satellite dishes outside the building.

**Voice and data**

Scattered throughout the facility are more than 20 IDF closets. Each IDF is interconnected to the main telephone and data area with 200 pairs of traditional telephone lines and eight fibers. The standard communication outlet for each office or other location is four 4-wire telephone jacks and two RJ45 data connectors. The data networks are interconnected using fiber so there are no data lines in excess of 100 feet. In addition to the voice and data, a dual 750MHz house cable system was installed. We are currently using one of the LANs to carry e-mail/Internet, printer sharing, and two traffic systems.

**All-digital master control**

Early in the process we made the decision to use the digital formats where applicable to our clients’ requirements. Not all clients wanted to go the digital route. The first full digital master control room is being used by Encore to originate all nine of its movie networks. If you watch Encore, Starz or any of the Encore “Multiplex” channels, such as Mystery or Western, the signals are coming from this digital master control room. All origination from this MCR is done using serial component digital with embedded audio.

Construction of this MCR was a challenge. While not a complete “turnkey” job, our partners in construction were Sony Systems Integration Division. We quickly discovered that there were many “digital holes” in the plan. Such things as digital downstream keyers and logo generators were not commonly available. In addition, we created a control system to use DAT for each network’s audio voice-overs.

The basic system consists of 55 Sony DVW-A510 digital betacam tape machines, a GVG SMS7000 96 x 96 serial component router, primary and backup Alamar automation systems, Nvision digital audio mixing equipment, nine DAT playback machines, 18 Microvision digital downstream keyer/logo generators, four Chyron Max+ character generators with digital output options and a large assortment of Wohler digital audio VU/monitor amps, Sony digital conversion/demux boards and monitors/scopes.

All tape machines are fed into the router with four channels of embedded audio and the Alamar systems control the router and machines according to nine active playlists. The user bits are used to assure that the right tape gets to the right channel and all active tapes have a second tape synched to the original for backup purposes. The automation system monitors the RS-422 control lines for machine errors and will switch to the backup in the event of an error. Each channel has its own DAT machine that is used for voice-overs and is controlled by the Alamar system with time code. The advantage of the DAT system is twofold. First, we are able to keep all audio digital, and second, instead of the usual pile of analog carts we are all familiar with, we simply have one digital tape per channel per day. The program audio is dipped and voice-over audio is added with Nvision mixer components controlled by Alamar systems.

Downstream keys were added with the Microvision keyers (not off the assembly line in Great Britain). On the Encore and Starz east/west networks there are three of these keyers. One is used for inserting the logo during the program and the other two are used for inserting live keys of upcoming events and other promotional material live in the MCR. The reasoning behind the stacked keyers is ease of controlling the key and fill video as well as being able to trigger the keys via the automation system.

**Traditonal and non-traditional operations**

Being client-driven, we are quite diverse in our operations. We operate several master...
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. Quickfix, allows instant change of fluid heads for flexibility - included.
5. Track width, narrow and wide, symmetric and asymmetric - set in no time and you well 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

55 North Main Street
Freeport, N.Y. 11520
Phone (516) 867-4900
Telex 140 107 sac frpt
Fax (516) 623-2844

California office:
3316 West Victory Blvd.
Burbank, CA 91505
Phone (818) 845-4446

Circle (24) on Reply Card

sachtler
corporation of america

See us at NAB, Booth #19526.
You have confidence in the reliability of your tube cameras. You count on their high resolution, low lag and the exceptional picture producing quality. Shouldn't you count on the best replacement tube for your cameras? Philips wants you to know we are standing by with a complete line of the best replacement camera tubes in the industry.

By providing replacement tubes for the world’s most popular cameras we have earned a reputation for uncompromising quality products and customer support. So when you are standing by ready for broadcast, have confidence in your equipment. Know that Philips is standing by with the camera tubes you need now and in the future.

Philips Components, 100 Providence Pike, Slatersville, Rhode Island 02876, USA. Tel: +1-401-762-3800, Fax: +1-401-767-4493.

Philips Components, Prof. Holstaaan Post-box WAG-04 5656 AA Eindhoven, The Netherlands Tel: +31 40 742191, Fax: +31 40 744090.

Philips
Components
See us at NAB, Booth #17011.
control rooms that would be considered traditional with LMS and MC switchers. We also operate a number of non-traditional control rooms. For our clients running longer-length program formats such as movies, we have combined as many as 10 channels out of one control room. All tape playback is fully redundant with backup copies synched to the original. These signals are switched to air with large routing switchers controlled by a automation system with keys put in downstream. Routing switchers are kept individualized between clients to prevent inadvertent airing of another client's material on the wrong channel. This heavy use of automation results in large savings on personnel costs and has proven to be effective and error free.

We are in the process of converting several networks to use disk-based commercial playback. Currently, we have three 3-channel AVID airplay systems installed and are using two single-channel systems to compile off-line. The 3-channel system grows out of the need for full redundancy in these network feeds. Two channels operate in a parallel mode with separate processors and disk buffers fed from a central 12-hour disk archive unit. These two channels provide a primary and backup feed to the air switcher and the third channel is used for inputting new spots.

One example of a busy master control operation is the control room for the new network "TV!" This is a sampler network now available in about six million homes and growing. The concept of the network is to allow basic cable subscribers to sample various upgraded service options at no cost. During the week, the schedule varies to include such premium services as Disney, Encore and Starz as well as many other services. The complicating factor is the need to switch into and out of up to 16 different networks each day and covering all spots with new ones in the process. Timing must be exact and automated operation is only possible about 50% of the time. Four 4.5 meter C/Ku dishes are used to feed eight frame sync and audio mixers with source material for this control room. An AVID system supplies the commercial playback. Because of a special ID effect used by "TV!" a 2-channel Grass Valley DPM 700DVE is installed downstream of the air switcher to allow a special effect that keys two live video sources over an animated cube. This effect is done "on the fly" repeatedly throughout the day. A typical daily event schedule for this channel may contain up to 2,200 events.

Traffic for many channels is handled individually with a large Columbine system and our own traffic system, called Savant, was developed primarily for the multichannel pay-per-view movie channels. All of the traffic systems are networked together for maximum operator flexibility.

**Studio and post-production**

We currently operate five on-line edit suites with varying levels of complexity and tape formats. Most of these suites are used for promo production and formatting of program materials. The simplest suite is run by a Grass Valley DPE 241 editor with GVG 110 switcher and DPM 700DVE, while the largest is a CMX Omni 1000E with Abekas A-83 switcher and three channels of Abekas A-57.

Continued on page 56
Introducing the NEW family of non-linear editors from D-Vision: OnLINE™ and FilmCUT™. They beat the competition. And with true broadcast quality, they eliminate online costs and are even MORE affordable than our D/Vision Pro. All for under $10,000*.

For starters, D-Vision OnLINE has full CCIR-601 resolution with serial D1 in and out. Avid® and Media 100® don't. And with compression ratios under 2:1, D-Vision gives you beautiful D1 image quality.

What's more, D-Vision FilmCUT lets you edit at 24 frames-per-second, input and output four channels of 48 KHz audio, and mix and playback 24 audio tracks.

And when it comes to open architecture, D-Vision goes beyond merely beating the competition. Using the power of Windows NT®, D-Vision lets you edit from...
MEDIA 100® HAD THE BEST PICTURE. AFFORDABLE. NOT ANYMORE.

up to 210 standard hard drives. This means instant access to over 130 hours of BetaSP quality video — 15 times more than Avid with the 14-drive Mac limitation.***

Now, D-Vision gives you a choice of many non-proprietary compression boards, seamless integration with third party tools and editing over a network. And our new software supports up to 8,000 lines of resolution. So you have a built-in upgrade path to HDTV, film quality and other technology that hasn’t even been invented yet.

D-Vision OnLINE and FilmCUT. The same D-Vision affordability with a whole new image.

D-VISION SYSTEMS, INC. Making Digital Media Work For You®

To find out more, call 1-800-8DIVISION or +1-312-714-1400.

*For software and board kit. **All competitive comparisons are based on Avid and Media 100 products available on 3/1/95.

***Hard drive comparisons assume no specialized hardware such as RAID's or servers are present.

Circle 35 on Reply Card
Dealing with multiple tape formats is a continuing challenge. We currently operate 89 D-3 decks, 72 Digital BetaCam, 43 Beta SP decks, more than 100 high-grade S-VHS decks and the ever present 3/4- and 1-inch machines as well as a few D-2 machines. In the post rooms, format is matched to switcher as much as possible. For example a digital BetaCam format suite may contain an Abekas A-83 serial component switcher or a GVG 4000 switcher. A central tape room and dubbing facility allows for dubs from various analog and digital formats without loss of quality. The central facility also contains a large Sony still-store system and a variety of Chyron Infinity and Abekas A-72 character generators available in all edit suites and studio control rooms.

In the interest of maintaining good functionality, we abandoned the concept of separate tape rooms in edit suites. With the advent of relatively quiet tape machines and the reality that most people do little truly qualitative audio monitoring, we feel that tape machines in the suite are a good idea. Tape machines are mounted in a rolling cabinet that can contain up to six machines. Triple B&W monitors are mounted above the machines in the cabinets, providing menu access to all machines. Our editors enjoy this feature, and it has proven to be a time saver in situations where a large number of tapes must be cycled through the machines in an edit session. In lieu of the usual producer desk located behind the editor, we have simply increased the counter space to the left and right of the primary editor position.

Currently under construction and due for completion in May of 1995 are four new production studios. The smallest is 65 x 40 and the largest is 100 x 80. All studios are built using a 12-inch filled concrete block inner shell with a ceiling consisting of four layers of Sheetrock hung with dampeners. Additionally, to prevent the occasional jet noise overhead, we re-enforced the roof deck and placed a layer of 2-inch concrete pavers outside on the surface of the roofing material. This, along with generous acoustic treatments, results in an ANSI quietness spec of less than 25dB. Each studio contains a catwalk-type system to support the lighting and support equipment. A new type of semi-resilient flooring is being installed over a leveled concrete surface. It is hoped that this material will solve the traditional problems of studio floors that are either too hard or too soft. The material was originally specified for automated warehouse operations, which are similar in many ways to studio applications.

Each studio is supported by its own control room and all the switchers are Grass Valley 4000-2A digital switchers. A 9-channel Grass Valley Kaleidoscope DVE system is shared between the studios and some edit suites. Cameras are either Sony BVP375 or Ikegami 1K 377 and audio systems are automated Sony 3000 series boards. All mic pre-amps are placed in the studio connection boxes to reduce low-level runs of cables.

Transmission facilities

Although not considered a primary uplink facility, there are considerable uplink operations within this facility. The dish complement is five 9-meter dishes and six 4½-meter dishes. The 9-meter dishes are used for uplinking several compressed and analog signals. Again redundancy is a key issue. All HPA and transmission systems are fully redundant. Diverse fiber routes interconnect this facility with other local facilities as well as the YVXX network.

Compression

One of the things that makes a facility like this work is the ability to compress video and audio signals to place multiple signals on transponders. The math on this is easy. For instance, let’s say you own a C-band transponder on a prime satellite such as C-3 (F-3). A typical monthly cost for this transponder can run as high as $200,000. What if you wanted to expand your service or sell space to additional users? Compression is expensive. The Digicypher I equipment we currently use costs about $750,000 per 6-channel redundant unit. The additional five transponders would have cost you one million a month. As you can see, the hardware is paid for in less than one month.

We use the General Instrument Digicypher I units in both a 4:1 and 6:1 configuration. The units have provided satisfactory results for us and many high-quality premium movie services are aired using them. Digicypher II is a fully proprietary system not compatible with any known standard such as MPEG-1. When the Digicypher II MPEG-2 compatible systems are available, all units will be converted.

Eighty-four channels of video are compressed and uplinked from this facility. Of these, 72 are for PrimeStar DBS customers while the rest are for traditional cable network signals.

QC off-air monitoring

The last step in the process is an off-air monitoring facility. We use this area to provide a complete test of all systems from master control to downlink. This area is able to monitor up to 144 channels. Separate monitors with under monitor channel displays line the walls of this glass-enclosed room, but the real work is done within the four computer workstations. All 144 signals are received and the audio and video routed into four routing switchers (one for each workstation). Within each workstation are three powerful PCs with 17-inch touchscreen monitors as well as one analog high-resolution monitor with overlaid scope and audio monitoring equipment. Custom software scans the routing switchers to route every fourth frame of video of each channel into the PCs where they are analyzed for a change in average picture level within a window of both time and level. Audio signals are monitored by the PCs full time. The purpose of the system is to provide an operator with an alarm in the event of black, noise or loss of video on a particular channel. Each touchscreen contains 12 small pictures with
I didn’t know Snell & Wilcox did that...
The new OConnor 25L Carbon Fiber 2 Stage Tripod goes Higher, gets Lower... and is Lighter and more Stable than any comparable tripod in the known universe. Beam one up from your OConnor dealer!

66" to 15"

GET LOWER

OCONNOR
PROFESSIONAL CAMERA SUPPORT SYSTEMS
100 Kalmus Drive, Costa Mesa, CA 92626
Tel (714) 979-3993 - Fax (714) 957-8138

visual VU meters. In the event of an alarm, a tile lights below the affected picture. By touching the picture, the signal is routed to the analog monitoring system for manual evaluation by the operator. After determining if the alarm is real or just the way a particular program acts, the operator is prompted to various levels of activity to log, follow-up or dismiss an alarm. This software was developed for this facility by Procion, a division of Pro-Bel Corporation.

Authorization and "HITS"

One thing unique to facilities of this type is the need to provide authorization services for cable systems. Located within the facility is a large computer room that is capable of many thousands of transactions daily. Primarily, this is used to authorize individual cable converters in cable systems that do not have the computer resources to do this themselves. Usually these systems are small operators. The datastreams are transmitted on subcarriers of two satellite transponders that are received by virtually all cable systems. Modems are used to transmit the transaction requests and subsequent billing information back to the cable system.

A new product exclusive to this facility is Head-end In The Sky ("HITS"). This will be the source of the true 500-channel universe we have heard so much about. The basic premise is to transmit compressed video all the way into the consumer's home over existing bandwidth. This facility will begin testing this system this fall using new equipment compatible with MPEG-2. Compressed signals will be uplinked then downlinked at the cable system but, instead of being demodulated and remodulated, they will simply be transcoded and a local datastream added. The result is the ability to increase the number of video signals fed to the home by a large factor (average 5:1). Therefore, your existing 36-channel system can carry as many as five times that number of channels without an expensive rebuild. In addition to expanded channel capacity, operators will have the benefit of fewer dish needs, since all signals will be available on a single satellite. This product will be available to all cable operators, telecommunications operators, wireless systems and SMATV operators.

Conclusion

As you can see, this is not what most people in broadcasting would consider to be a typical "cable" facility. Indeed, we do not consider ourselves anything but a full-service network origination and production facility. Remember, all those cable channels have to come from somewhere.

Peter Douglas is vice president operations and engineering at Tele-Communications, Inc., Littleton, CO. Contact via the 827 FAXback line at 213-967-1905 or via e-mail to be@intertec.com.

THE DESIGN TEAM

Client: TCI
Senior management: David Beddow, TCI
General project design and implementation: Peter A. Douglas, TCI
General contractor/architect: Cybercon Corporation
Acoustic and lighting consultant: David L. Adams & ASC
RF, voice & data design: WTIC Engineering (an engineering division of TCI)
Power systems design: Ben Summers, WTIC Engineering; Ron Dixon, Cybercon Corporation
Broadcast systems design: Bradley Martins, TCI
Integration partners: Sony Systems Integration Development, Burst Communications, Grass Valley Group
Two filters are better than one.

- Frame-based recursive filtering
- Three dimensional median filtering
- Automatic noise threshold

KUDOS NRS30 MEDIAN & RECURSIVE NOISE REDUCER

No amount of filtering can help the smoker. But in noise reduction, a dual-filter system enables the Kudos NRS30 to eradicate different kinds of video noise whatever the cause. It is simply the most powerful noise reducer in its class.

Not only does it offer advanced recursive filtering to deal with random ‘white’ noise, but also the power of a 3-dimensional median filter in a sophisticated design ideally suited to removing impulse noise such as satellite ‘sparkries’.

At this price nothing else comes remotely close.

WARNING
NOISE CAN SERIOUSLY HARM THE QUALITY OF YOUR PICTURES.
Bell Atlantic's digital production studio

This is not your father's post house.

The Bottom Line:

Nearly all of today's post houses take advantage of the new digital equipment. However, most are installing it within the confines of an old design model. At the new Bell Atlantic facility, analog and digital audio and video exist, but most interconnection is a combination of component serial digital video, digital audio and digital datastreams using computer networks.

Not far from the nation's capital, what may be the post facility of the future is evolving. The walls are up, and the gear is in, but everyday the process of getting the job done changes. It's not that those involved don't know what they are doing, on the contrary, most are professionals with many years of experience. The process changes, or more appropriately — evolves — because the tools and procedures used are being refined constantly. The facility is the Digital Production Studio, and it is a crucial piece of Bell Atlantic's Video Services Company.

Bell Atlantic is the Regional Bell Operating Company (RBOC) that serves the Northeast. The Video Services Company, located in Reston, VA, was set up by Bell Atlantic to deliver interactive and broadband services to area customers on a trial basis. Unlike many of the video on-demand (VOD) and video dial-tone (VDT) experiments, the Bell Atlantic system is commercially viable today. The system is designed to deliver interactive video data at 1.5Mb/s over asymmetrical digital subscriber line (ADSL). Because the system is designed to be viable today, it may not offer the flash of other trials. The set-top decoders cost several hundred rather than several thousand dollars. The basic system is also scalable and extensible. As the inevitable economies of scale bring more horsepower to set-top boxes, the system's throughput can be easily increased, bringing additional services to customers.

Within Bell Atlantic's Video Services Company, there are four main divisions. One, the Digital Service Bureau (DSB) prepares video for interactive delivery. A second division is the Digital Production Studio (DPS), whose mission is to provide interactive video production services. The third, the Operations Center, houses servers and video databases used to provide video and audio information to subscribers. The fourth division markets the service and provides customer service and support. According to plans in place at this writing, the divisions will be split into separate companies by April.

The high-tech facility was designed and built as a turnkey installation by Communications Engineering Inc. (CEI), Newington, VA. The systems are built around extensive computer hardware and software including large-scale file server technology. CEI was responsible for technical design, planning
‘The whole truth and nothing but the truth’.

- Every broadcast standard
- All digital and analogue formats
- 8 and 10-bit digital outputs
- More than 500 resident patterns
- Ultra-precise outputs
- Special moving test images
- Serial digital pathological test patterns
- 16:9 downloadable patterns available
- Custom pattern generation software available

KUDOS TPG20 TEST PATTERN GENERATOR

Test patterns are judged by their absolute precision so here’s a clear cut case for the Kudos TPG20.

Full-frame, line repetitive and moving test images in every broadcast standard and format, with more than 500 resident patterns and an unlimited number downloadable from a PC. The TPG20 is supremely versatile yet outstandingly easy to use.

Patterns are computer synthesised for absolute mathematical accuracy. Moving test images reveal system defects that would otherwise remain undetected. Special downloadable patterns, including real images, can be made to your requirements, and the optional Pattern Master software enables the user to generate customised line based test patterns via their own PC. It’s the only test generator you’ll ever need.

Snell & Wilcox offices: UK Tel: +44 (0)181 607 9455 Fax: +44 (0)181 607 9466 E-Mail: info@Snell.co.uk
USA Tel: +1 408 734 1686 Germany Tel: +49 611 99 0840 Japan Tel: +81 3 3446 3996
Italy Tel: +39 6 66 38 584 France Tel: +33 1 47 99 83 08 Russia Tel: +7 095 4125016

Circle (26) on Reply Card
and documentation as well as installation, testing and operator training on the equipment.

The Digital Services Bureau

The DSB takes standard video programming, movies and syndicated shows and prepares them for delivery. Programs are quality checked and then MPEG encoded. Currently, it takes three hours to encode each hour of original material. Four encoding rooms have been built, and up to seven more can be added when necessary. The current capacity of the rooms is 20,000 minutes per month. With all 11 on-line, it will increase to 50,000. Once encoded, programs are stored on 8mm Exabyte tapes. Later, depending on the air schedule, the encoded versions are downloaded onto the video server for playback to subscribers. Currently, the facility is using MPEG-1 encoding. MPEG-2 will be used in the future as new encoding equipment becomes available.

At present, the equipment complement of the DSB is anything but impressive to anyone familiar with the equipment requirements of a typical network video facility. Less than a dozen tape machines, both analog and digital, a router and four Silicon Graphics towers (see photo on opening page) along with test equipment make up the common equipment area. The encoding suites use off-the-shelf hardware configured in a proprietary manner. What is impressive is how much is being done with this small complement of equipment. The key to this facility’s capability is how this small amount of dedicated equipment is combined with high-speed computer systems. The result is nothing short of amazing. Whenever possible, dedicated equipment has been replaced by specialized software running on powerful computers.

It is also interesting to note that the compression process is accepted as part of the package. Comparisons are not done before and after encoding. Instead, the final compressed product is viewed by a group of regular viewers — not video professionals — to determine its acceptability. For the most part, the comparison is made relative to a cable TV signal in the home. After viewing video delivered over ADSL, I was surprised at the quality. Yes, there were some artifacts, but for the most part, they were negligible and did not affect the viewing experience. Professional video people will discern the artifacts, but the average viewer will not. Rather than being touted as high quality, it was realistically portrayed as being good enough.

The prevailing philosophy is different from the typical broadcast mentality. For one thing, the majority of what takes place happens through software. For example, there are no DVEs in the DPS, but there is DVE software. Because so much of the system is software-based, it can be modified. Having serious programmers on staff doesn’t hurt either. As the job parameters change, so can the software. Another difference is the issue of quality. On one hand because the delivery medium is ADSL, “good enough” is sufficient. On the other hand, because it is all digital, the signal will not degrade. Artifacts that exist today will still be there tomorrow, but they won’t get any worse, and new ones will not suddenly appear.

Comparing this facility to the DirecTv facility featured last year, the contrast is striking. At DirecTv, there are more than 300 Digital Betacam decks. At the Bell Atlantic facility there are just a handful. DirecTv compresses everything on the fly prior to uplinking. Because of this, compression ratios may vary based on the content of other channels. At Bell Atlantic, everything is compressed once for a 1.5Mbps data-stream. Picture quality will not vary from one showing to the next as it might with DirecTv. In a sense, DirecTv is built on a parallel model whereas the Bell Atlantic facility is closer to a serial model.

Digital Production Studio

Like the DSB, dedicated hardware exists in the DPS, but for the most part, it’s workstations running specialized software. One of the major issues considered when the equipment was specified was related to connectivity. In a real sense, everything is connected to everything else. This has been accomplished by keeping everything in either the serial digital component domain or simply as digital data.

Another key aspect of the DPS is the interactive nature of everything produced. Almost everything is short form, 15 seconds or less. Much of it is background and icons for menus, other items include still and moving video for interactive shopping. Because of this, few of the standard editing tools are needed. Rendering and compositing packages tend to be the production tool of choice. In addition, authoring software is used to develop the code (programs) needed to navigate through the various on-screen menus required for an interactive service. A significant portion of the work is done using low-tech tools — white boards. Menu hierarchy and decision points necessary to navigate through the system are all first carefully laid out. Once the planning stages are finished, the results are tested. Only after testing

One of the production suites within the DPS used to build interactive productions.
"I sync, therefore I am."

- Full bandwidth 4:2:2 processing
- Wideband Gate decoder
- Powerful noise reduction
- Component and composite inputs and outputs
- Digital horizontal and vertical enhancement
- Ideal for format interchange
- Multistandard operation and transcoding

KUDOS TBS24T WIDEBAND SYNCHRONISER

If your philosophy is to have superb quality output from practically any input source then the logical choice is the multistandard TBS24T. It is the classic stand alone Synchroniser and Timebase Corrector.

Broadcast quality 4:2:2 processing, composite and component inputs and outputs, plus a rugged, wideband decoder using proprietary Gate technology, give the TBS24T the power you need.

Full user adjustments are provided, including digital horizontal and vertical enhancement and a powerful adaptive noise reducer.

Snell & Wilcox offices:
- UK Tel: +44 (0)181 607 9455 Fax: +44 (0)181 607 9465 E-Mail: info@Snell.co.UK
- USA Tel: +1 408 734 1688
- Germany Tel: +49 611 99 0840
- Japan Tel: +81 3 3446 3996
- Italy Tel: +39 6 66 38 594
- France Tel: +33 1 47 69 83 06
- Russia Tel: +7 095 4126016

Circle (27) on Reply Card
Network Quality
Small Station Affordability

Fibox modular fiber optic audio systems give you the best of both worlds. Performance that sold NBC. At a price that pleased Grove City College’s WSAJ-FM.

Fully Modular
Two To Twelve Channels Per Fiber
Premium Quality Mic Preamps

"The audio coming out of our new Fibox system was so good that it was almost shocking...night and day compared to copper. And the system has been very reliable."

Bill Parinello, Technical Manager, NBC Sports

Analog And Digital Output Modules
No Line Loss
No Ground Loops

"We dropped our STL noise floor about 15dB by going from copper telco lines to the Fibox, which was great for our 24-hour classical format. Cost was not a problem, even with the limited budget of a small college station."

Everett DeVelde, Chief Engineer, WSAJ-FM, Grove City, PA

48kHz Sampling
20-bit Conversion With 108dB Dynamic Range
High CMRR

"We bought the Fibox primarily for lightning isolation on a 500-foot run between our studio and STL tower. But we also noticed that the audio came through crisper and brighter than on our temporary shielded pair."

Galen Hassinger, Director of Engineering
WINK-FM, Ft Myers, FL

Transmission Distances To 4km
Easy Installation And Set-up
Systems Start At $1,495.00

Call 800-525-3443 For Information

The central control room provides full support for the compression suites. The room is equipped with a serial digital router, digital and analog videotape machines for master tape playback, and full machine control capability.

By the simple addition of an ATM card tied to the outside world, the DBS can become part of a virtual production community that operates over long distances using data links to transfer information from one location to another.

DPS is staffed with TV and multimedia producers, interactive and graphic designers, and audio and video engineers. Needless to say, getting them all to work together can be difficult at times. Each has a different background and, therefore, a different perspective of how the product should look. In addition to navigation tools, the DPS provides advertisers with the expertise needed to make their message work within an interactive environment.

Within the facility, computer systems are tied together by an array of networks. The networks operate on various standards including primarily Ethernet and ATM. By the simple addition of an ATM card tied to the outside world, the DPS can become part of a virtual production community that operates over long distances using data.
TVSTOR! allows iNFiNiT! to function as a full-color, high resolution still store device with video and full linear key signal in analog or digital CCIR 601 domain. TVSTOR! features powerful database search functions, flexible playlists and extremely rapid recall of stills and an optional TVSTOR! recall panel. Also available for Chyron MAX!> and MAXINE!

THIRD OUTPUT CHANNEL allows for full resolution program video output from any iNFiNiT!. Assign the available three channels to any combination of still store or graphics functions. Air all three program outputs simultaneously or select two for program and the third as preview.

EXTENDED EFFECTS FRAME BUFFERS provide three times the number of display frames as the standard buffers. This offers digital layering, dissolves, mix effects, and sub-scanline rolls in a single channel.

For more information on:

TVSTOR! for iNFiNiT!
THIRD OUTPUT CHANNEL for iNFiNiT!
EXTENDED EFFECTS FRAME BUFFERS

Return this card or fax to 516-845-3895

Name ____________________________ Title ____________________________
Company ____________________________
Address ____________________________
City/St/Zip ____________________________
Phone ____________________________ Fax ____________________________
BUSINESS REPLY MAIL
FIRST-CLASS PERMIT NO. 72 MELVILLE, NY 11747

POSTAGE WILL BE PAID BY ADDRESSEE

CCI

I111111111111111111111111111111111111111111111111111

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

CHYRON

Isaac Hersly, Exec. VP
5 Hub Drive
PO Box 1901
Melville, NY 11747-9686
Chyron’s iNFiNiT! provides the highest quality graphics for live and post production applications.

You can count on iNFiNiT!

See the new options available for iNFiNiT!, MAX!> and MAXINE! at NAB Booth # 19401

Tel: (516) 845-2026
Fax: (516) 845-3895

Chyron’s iNFiNiT! displays full color graphics, stills, 2D and 3D animations. With the brand new TVSTOR! option, iNFiNiT! becomes a full function still store as well!

Information may be entered manually or automatically downloaded from computer newsroom and election systems via iNFiNiT!’s Intelligent Interface.

Dual Channel and dual user capability provide the flexibility to instantly display quality images in analog or 601 digital format.

BRAND NEW! Third channel output!

You can count on iNFiNiT!

See the new options available for iNFiNiT!, MAX!> and MAXINE! at NAB Booth # 19401

Tel: (516) 845-2026
Fax: (516) 845-3895
GUI, NUI and LUI

Finally, there is the operations center, which houses several video servers. Current storage capacity for the on-line servers is 42,000 minutes for programming plus an additional 10,500 minutes that is used to instantly update the system with new programming. This is typically done at the end of the month when old programs are dropped and new ones added. A second server is used for testing new software. Another system for business and operations is used to provide the required interface between the subscriber’s set-top box, the video server and the telephone switching network.

When describing the inner workings of the interactive video service, three levels of interfacing software get the job done. The GUI (graphical user interface) is what the customer sees, including on-screen menus and icons that allow users to navigate through the system.

NUI is the navigational user interface that comprises the necessary code to get users from one area of the interactive system to another area. By design, navigation is simple; point and click. The idea being that your grandmother can sit down with a remote, and if she can't get where she wants quickly and easily, more work is needed.

The LUI (linking user interface) is how subscriber commands are translated through the system. When a subscriber points and clicks, the relevant information, along with a user profile, goes through the business and operations system where it can be stored and tabulated if desired. Billing information is recorded, and the necessary verifications are made. These verifications ensure that subscribers do not get shows they don't want to see. The upcoming trial period will help resolve the numerous privacy issues that still need to be addressed. Finally, the LUI generates the necessary commands to initiate playback of the request.

Where to go from here?

Recently, Bell Atlantic received regulatory approval to market its interactive services to area residents. In addition to the interactive services, broadband services are to be delivered over standard technologies (coax or fiber). With the combination of broadband and interactive services, Bell Atlantic hopes to attract 50% of current cable subscribers away from cable to these new services. Time will tell whether the project is a success or failure, however, there is little doubt that the current facility is on the cutting edge of technology, both in terms of equipment and innovation.
FAROUDJA INTRODUCES

LINE QUADRUPLE and the PAL/NTSC DIGITAL DECODER

at the NAB exhibit

Please Visit our Booth #12827

FAROUĐJA Laboratories
750 Palomar Avenue
Sunnyvale, California 94086
Telephone 408/735-1492
FAX 408/735-8571

Circle (41) on Reply Card
At its start more than 15 years ago, Soundwave was a typical rock-and-roll studio in Washington, DC. The facility had been retrofitted into a pre-World War II-era apartment building-turned-office space. In 1983, Soundwave began to offer audio post-production services. By 1987, the music recording portion of the business was nearly phased-out — a familiar story. The next and natural step was to add yet more services in the allied disciplines of graphics and video. Soundwave was putting new and extraordinary demands upon the capabilities of the building — old electrical systems and poor air conditioning, to name just a few. The Soundwave staff found itself conducting a growing business in an ergonomic nightmare. By 1993, the company's business goals became too much for the old building. The only alternative involved the M-word: move.

After extensive searching, an appropriate space was found in the nearby suburb of Arlington, VA, and a project team was assembled. Several ground plans for the facility were roughed out, with each examined to see if it met the facility's needs technically and ergonomically. The plans were based on the same basic number of audio, video and graphics rooms in the old space, plus room for expansion. Flexibility was one of the tests applied to the design: Could it be an office today and an off-line or graphics suite tomorrow? Eventually, an agreeable plan was attained.

Next up was examination of the building's mechanical core. This primarily involved air conditioning and power. The project's acoustic and mechanical consultants specified an air unit that would meet the HVAC needs and the noise constraints required. An additional air-conditioning unit would be required for the master control area to cool and humidify the machine core separately.

Power requirements were divided into three classes: 1) general use, 2) office computers (with an isolated ground) and 3) technical power (with full transformer isolation plus spike- and surge-suppression).

Making the move

The design was broken down into major categories: audio, video, graphics, music composition, office space and miscellaneous.

Continued on page 72
At NAB, Comark will launch...

\[(PS)^2\]  

And once again UHF transmitters will never be the same.

Come see this exciting new technology at COMARK'S NAB booth # 16117
NO, I AM NOT AN SV-3700.
The SV-4100 Pro DAT Recorder from Panasonic. Think of it as an SV-3700 with Instant Start, External Sync, improved sonic performance, and a whole lot of attitude. If you would like detailed information, call 800-777-1146, code 02.

Panasonic
Broadcast & Television Systems Company
©1994 Panasonic

Circle (50) on Reply Card
The interformat D-2 video suite would make the move to the new space essentially intact. The design team made sure that the distances between the main equipment racks in the new master control would be the same as in the old facility. This avoided extensive retiming issues and allowed the existing wiring harness to be reused. Equipment relationships within the edit suite were also kept as close as possible to the old space. Moving this room became mostly a re-installation issue. It needed to be back up in 10 days, and it was. This was one of the few pleasant surprises encountered.

The facility's Avid on-line and graphics rooms were fairly self-contained so they presented few problems in relocating. They both moved with the same furniture and internal room wiring intact, although their harnesses to the master control had to be redone.

The staff composer's MIDI-based room also moved to the new facility with its existing harness and some slight modification to its cabinetry. This room was back up in about a day.

The bulk of the design and installation work occurred in the facility's four audio rooms. These had to be designed and built with all new equipment because the existing facility's rooms had to remain operational throughout the move to satisfy client needs.

The new plan called for three identical digital workstation rooms and one analog room with an existing NED Post Pro in it. After extensive budget/feature/performance analysis, AMS/Neve Logic 3 consoles with Audiofile Spectra workstations were selected for the DAW rooms. Near-field monitoring (Genelec 1031A) would also be used in all of the control rooms, allowing simplified acoustic design and acceptable performance for the majority of projects. (The focus of the new facility's design and budget considered the type of work that was done 90% of the time. The additional cost for the other 10% of projects was simply deemed not worthwhile.)

Making the three DAW rooms identical allowed additional design economies, because once choices were made for one room, a simple copy and paste finished out the other two. (Unfortunately, this also applied to any errors or changes required.)

**Interconnection**

System interconnection design included audio (digital and analog), video (component and composite), sync reference (blackburst and subcarrier), time code, control, grounding and data.

Operationally, minimal to no patching was desired for normal operation in the audio rooms. This implied the use of extensive normalizing. The budget could not accommodate an audio routing system, so standard bantam patchbays were used. All audio paths were normalized first through the master control patchbays and then into the audio control rooms.

Custom panels were fabricated in each recording booth for plugging in microphones and headphones. These included built-in microphone pre-amps and headphone amplifiers (by Benchmark Media Systems), which minimized the amount of mic-level and power-level audio lines required. All audio runs were therefore at analog line level or AES/EBU. A custom-built central DC supply was used to power all pre-amps and headphone amps throughout the facility.

AES/EBU paths were carried on Apogee 110V AES/EBU cable. Patching of digital audio was done via XLR patchbays in master control and in each control room. All video was run on Belden 8281. Most video decks are housed in master control. Formats include D-2, Betacam, 1-inch Type C, U-matic, VHS and ASC virtual recorders.

Serial 9-pin was the control standard adopted for the facility. All machine control centralized to an ADC serial patchbay in master control, which provides cost-effective flexibility and expandability via its modular and user-configurable design. Grounding was approached conventionally using a star plan to a central earth point. Telescoping shields were used for the audio runs. All grounding was done with low-gauge copper bus wire for the main star feeds and 1/8-inch braided shield for the equipment chassis runs.

Data and telephone systems are located in a corner of master control. This provides easy access to ISDN circuits used for the
As the manufacturer which performed the world’s first installation of a full digital studio back in 1985, THOMSON BROADCAST is proud to introduce the 9200, the newest member of its digital switcher family. This unit is the crowning achievement of a design team that boasts almost a decade of experience in conceiving, manufacturing and delivering only component digital switchers. The 9200 is a compact 1M/E + DSK with functional innovations that blow away the standard limitations of switchers of this size: M/E or multilayer, video or key freeze, fluorescent display, double transition, input level correction, source memory Mem Box with keyframes and sequences, timeline control, 6 auxiliary busses, and more. Besides being feature-rich, the 9200 switcher is ergonomically designed and interfaces easily with existing equipment. THOMSON has funneled its years of experience to produce a powerful, innovative component digital switcher within an affordable package. We used our expertise to do the hard work, so you won’t have to.

THOMSON BROADCAST
State of the digital art

9200 Component Digital Switcher
Soundwave's IDB and EDNET interconnections. The entire facility is wired for level 3 10Base-T LAN. Modem and data lines also star from master control to all control rooms, primarily for clients' use.

Construction and installation
The construction went as well as could be expected for such detail-demanding work. There had to be someone on site every day checking the progress and details. Because this project was on such a fast track (aren't they all?), the different tradespeople were on top of each other through most of the construction. Permits and inspections created some uncontrollable delays.

To simplify installation and avoid exposing new patchbays to the drywall dust, the audio room racks were pre-wired off site. These rack systems held patchbays and the majority of ancillary equipment. Everything was wired with connectors and all runs were punched down to the bays. When the new rooms were deemed dust-free, cabinetry was brought in, racks were installed and the main rack harnesses were dressed into the troughing system, back to master control. This saved weeks of on-site installation time.

The final construction hurdle was presented by the sophisticated HVAC system. Prior to its installation, no occupancy permit could be issued, and no equipment could be operated. Naturally, it was late in arriving, caused in part by a tropical storm that stranded the unit on its manufacturer's loading dock in Georgia. It took a pontoon truck to get it on its way. When it arrived, the mechanical installers had to demolish several walls to get it into place. Finally, the process of moving in staff and equipment could begin.

Each Soundwave division — audio, video, graphics and music composition — came up against its own set of unique challenges during the facility move. In most cases, each group had an adequate amount of time to shut down operations in the old downtown location and power-up in the new suburban facility. The exception to this was the audio division, which was in the unenviable position of trying to keep fully operational through the move. This was necessary to accommodate the weekly network-broadcast schedule of a long-standing client.

The original, over-the-weekend shut-down/start-up plan was scuttled by combination of late county inspections and last-minute client demands, forcing the two facilities to be operated in parallel for more than two weeks. Despite the staff's best efforts to prevent it, some producers became understandably skittish as pieces of equipment and acoustic treatment began to disappear from the old facility. Ultimately, the programs made it to air on time, and the facility transition was completed. Before and during the move, comments from the clients ranged from, "I can't wait to work in your new place," to "I'll never leave the city to work in Arlington." But the latter group of clients were curious about the new facility, nevertheless. Their curiosity generally led to "trial" sessions, and then to positive reactions. Clients who had sworn off Soundwave before the move began to come back. As a result, virtually the entire client base has moved with the facility to its new and improved home.

Jim Bloch is vice president of operations/technical and a partner at Soundwave, Arlington, VA. Respond via the BE FAXback line at 913-967-1905 or e-mail to beintertec.com.

THE DESIGN TEAM

Architect/interior design: Brennen Beer, Gorman Monkkenn McCobb, chief architect: Jennifer Kyner

Acoustic consultant: Shen Milsom & Wilke

Francis Daniels

Mechanical/electrical engineering: GHT Limited

General contractor: Structure Tone

Technical Design: Soundwave
Jim Bloch, vice president
Tom Perrell, systems engineer

Figure 1. Floor plan of the new Soundwave facility in Arlington, VA.
The Agile Omni Global VU option gives you one touch access to all satellite formats.

More channels, more signals, more frequencies — life in the down link is becoming more complex every day.

What you need is something to simplify your life.

What you need is the Global VU Model CAM830 Control Access Monitor from Standard Communications.

**Direct or remote control.**

Used in conjunction with the Agile Omni receiver, the Global VU gives you simplified access to all satellite formats from easy front-panel controls or from a PC comfortably situated on your desk, miles away.

Directly or using the straightforward Windows®-based software, the CAM830 lets you add or modify formats, then scan them by RF frequency and/or audio subcarrier. It gives you complete control over all three audio subcarrier demodulators, as well as international video features such as PAL, SECAM and NTSC. It gives you control of video and audio output levels with individual channel memory.

And we're just getting started.

**Spectrum analysis.**

Want to really see what's going on? The Global VU gives you a screen-filling display of the RF spectrum for each satellite on your remote PC. It also gives you a real-time look at the CN ratio without any time-consuming precalibration.

And there's more. As a field retrofit or optional add-on, the CAM830 gives your Agile Omni more easy-to-use control than you may have ever thought possible. To get the full story fast, including complete specifications, fax Standard today at 800/722-2329.

(California and International numbers, 310-532-0397 and we'll fax it right back to you.

Be a know-it-all. Get your hands on a Global VU.

**The Right Technology for Right Now.**

**SATELLITE & BROADBAND PRODUCTS DIVISION**

P.O. Box 92151 • Los Angeles, CA 90009-2151
310-532-5300 ext. 280 • Toll Free: 800/745-2445
Fax: 800/722-2329 Toll Free: • 210-532-0397 (CA & Int'l Only)

Canadian Address: 41 Industrial Pkwy S., Units 5 & 6
Aurora, Ontario Canada L4G 3Y5
905/841-7657 Main • Fax: 905/841-3693
Sales: 800/638-4741

Knows all. Tells all.
High-quality standards, technical excellence and customer satisfaction have made Group W Network Services (GWNS) a leading independent outsourcer of TV facilities and services. GWNS provides a variety of customized production, post-production and transmission services tailored to the needs of its customers, which include all major commercial broadcast networks, leading cable programmers, special-events producers and business networks.

The potential market for independent distribution of video signals and associated technical services didn't really exist until the mid-1980s, when broadcasters and fledgling cable networks began to use satellite transmission. The 1990s have experienced the growth of cable channels and broadcast services, the convergence of video and the computer and the Fortune 100's interest in private television for real-time domestic and international communication. This has provided many new growth opportunities for distribution companies. To keep up with growing demand, GWNS has had to redesign its facilities on an almost continuous basis. One of its largest and most sophisticated renovations occurred in 1994.

Serving new customer demands

GWNS has had a long history in this business. When CBS became the first commercial broadcast network to change from AT&T landlines to satellite transmission in 1984, it chose Group W to handle the task. Since then, the company has helped launch many of today's leading cable programmers including The Discovery Channel, A&E, Lifetime, The Travel Channel, Home Premiere Network (which became Viewer's Choice), Request TV and most recently, The History Channel.

Each of the company's clients has unique requirements, but they all benefit from full-service operations housed in two Stamford, CT, locations: the Harbor Plaza Complex, which has two floors of playback, traffic, studio production, post-production, graphics and administrative facilities and, just three miles away, the Glenbrook Earth Station, which is the center for all transmission operations.

The Harbor Plaza Complex was expanded recently to accommodate a special-
Who says it's lonely at the top...

For 25 years we've helped set industry standards. Thanks to you, we're the driving force behind EAS!

A Long History of Leadership

25 years ago, TFT developed the first practical, off-air modulation monitors. When TV stereo was born, we developed the first BTSC aural modulation monitor. We pioneered the FM synchronized booster system. We introduced the only digital STL that accommodates additional subcarriers.

For 25 years we've listened to our loyal customers, and together we've helped set the standards for an industry. Now we're at it again. This time we've got a jump on EAS, the new Emergency Alert System.

Low cost, easy EAS

As one of the originators of the EBS standards back in '75, TFT has been the major force behind EAS. We've put our new low cost, easy EAS encoders and decoders through the FCC field tests in Denver and Baltimore, worked with government agencies and customers, and now we're ready for broadcasters and cablecasters. And we're here to help you with a low cost, easy transition!

We're ready to supply the broadcast & cable industries with low cost, easy-to-use, encoders & decoders.

Call TFT Today for Your FREE Primer on EAS

For years folks have relied on us for direction into the future. And again we're here to help. We've put together a comprehensive Primer on the new Emergency Alert System. You'll learn about FCC rules & regulations, equipment descriptions, implementation, and application diagrams. It's all yours FREE for the asking. Call or fax TFT now, and we'll send the info you need on the new EAS. 1-800-347-3383

TFT

Sound Quality for Over 25 Years!

3090 Oakmead Village Drive, Santa Clara, CA 95051-0862
Phone: (800) 347-3383 (408) 727-7272 Fax: (408) 727-5942

Circle (42) on Reply Card
events master control center, which includes nine 9x9 foot master control rooms. This facility is capable of collecting and disseminating up to eight events (sports matches, concerts and the like) simultaneously. (The ninth room serves as a spare.)

The company's work on special events for pay-per-view channels Request TV and Viewers' Choice has provided valuable experience in the growing special-events business. In 1994, when the National Football League (NFL) decided to create a special package of events for the direct-to-home subscription market, it chose GWNS as its turnkey provider. As many as 12 regional NFL games are collected each Sunday during the season via downlinks and terrestrial circuits, then promotional and commercial video elements are inserted, and the program (called NFL Sunday Ticket) is encrypted and uplinked to the C-band TVRO market. On Saturdays, GWNS provides a similar service for college football to ESPN Enterprises.

The output from each master control is sent to the Glenbrook Earth Station on a Com/Lux fiber-optic transmission system where the signals are encrypted by individual VideoCipher II Plus scrambling systems. The scrambled signals are then uplinked to the appropriate satellites for distribution. Backup links and hardware are always standing by.

All feeds are received on consumer-grade equipment and displayed in a central monitoring area at Harbor Plaza. This area is equipped with TV monitors for all downlinked feeds, descrambling status monitors and phones. An intercom system allows the central monitoring center to be in communication with the technician in each of the master control rooms.

Helping customers grow

An example of the company's commitment to its clients occurred when Arts & Entertainment, which has been a client since 1984, approached GWNS about providing similar services for The History Channel, its new 24-hour service that launched on Jan. 1, 1993. A&E and The History Channel needed separate but integrated control rooms so that they could be managed from a common location yet operate independently. Two contiguous master control rooms—one for A&E and one for The History Channel—were constructed in addition to four shared rooms: an audio mixing room, a quality-control room, a common tape room and a tape library.

Each of the master control rooms uses a Bosch MCS 2000 master control switcher, a Digicart digital audio cart machine, a Microtime Genesis Act 3 digital video effects unit and one Leitch Still File. Various playback signals are monitored on 14 JVC TM9005U color monitors and one Ikegami 20-inch downlink monitor in each of the rooms.

The common tape area is equipped with six tape machines: four Sony BVH-2000 1-inch machines with S-VHS and 3/4-inch tape machine backup and two Sony BVW-75 1/2-inch tape machines. One-inch machines were chosen because virtually all of the A&E and The History Channel programs are archival tapes in the 1-inch format. Twelve monitors in the common tape area are used to display the various playback signals, and an aircheck tape is made of the downlinked signal to check any discrepancies.

Two Odetics TCS 90 cart machines, each with six Sony Beta decks automate the tape loading and playback process, which involves the insertion of approximately 960 commercials and promotional spots each day for each channel. The backs of the Odetics cart machines are built into a passageway outside of the room. A maintenance technician can open doors on the passageway to gain easy access to the Odetics and its components.

The quality control room, where tapes are checked for quality as well as time and then dubbed, is outfitted with two 1/2-inch tape machines and two 1-inch machines. A Sony PVE500 editor and a Quanta Delta character generator in an adjacent console allow the technician to add titles and make minor edits in the tapes.

The audio mixing room includes a recording booth for creating voice-overs. The area is equipped with a Ramsa audio mixer, a SADiE digital audio workstation and two Digicart cart machines, as well as cassette and CD players.

Tucked in a rack room alongside the complex are a BTS TVS/TAS 2000 router, two Orban Optimod-TV audio limiters and all the electronic frames for the various equipment used throughout
The future of TV.

How do you see it?

TELEVISION IN TRANSITION
Symposium and Technical Exhibition 8-13 June 1995
Your theme, your debate, your opinion, your future. If you want to keep pace with the changing face of television, you can't afford to miss Montreux. To register please call now or: +41 21 963 3220 or fax: +41 21 963 8851.
toward
dio
era
A
80
with
CD
The recently expanded GWNS Glenbrook Earth Station in Stamford, CT.

One-stop video shopping
Included in the Harbor Plaza facility are production and editing facilities: a 3-camera production studio, a full-capability on-line post-production edit suite and a graphics suite. A second on-line edit suite is currently under construction. Digital audio and multimedia tape dubbing are also offered at the facility. The facility is aimed toward commercial/entertainment and business/non-entertainment video users.

The two edit suites and the studio can operate independently or as an integrated system. The edit suites and studio share three Philips LDK 9RS cameras and an Abekas A-53D dual-channel digital video system with WARP effects and key channels. Tapes in either D-2, 1-inch, 1/2-inch or 1/2-inch formats can all be accommodated. The 40 x 45 foot studio is equipped with a 15-foot grid and floor lights, controlled by Strand Century 24-channel, 2-scene, 4-submaster dimmer board and a CD-80 66-circuit dimmer. A QVT teleprompter system is used in production.

The studio control room is outfitted with a GVG-220-2 video production switcher, Sony MPX 3036 audio console, Leitch dual-channel Still File system, Chyron infinit dual-channel character generator with Transform and five Sony BVW-75SP Betacam recorders.

The edit room is an on-line suite with dedicated D-2, 1-inch and 1/2-inch Beta decks for interformat editing. It includes a Sony BVE-9100 editing system, GVG200-2N production switcher with streamline effects and fully expanded wiped system. Also included is a Quanta Delta SX dual-channel digital character generator. A Graham Patten D/ESAM 800 digital audio console with 48 inputs, 16 channels of digital equalization and full automation is interfaced with the rest of the suite’s digital equipment to handle audio sources completely in the digital domain. A Leitch Still File DSF 3100 still-store and a Studer Dyax-11 digital audio workstation complete the suite.

A recent addition to the facility is a nonlinear editing suite, featuring an Avid MC-1000 with AVR-27 digitizing software. The system includes multicamera editing software, four channels of audio and 27GB of hard drive storage.

Transmission control center expansion
To provide transmission services to the growing number of special-events producers as well as increased broadcast and cable traffic, GWNS recently doubled the size of its transmission control center at its Glenbrook Earth Station.

Two separate transmission control areas have been established. One for broadcast, cable and special-events transmission was expanded to allow for two additional operators and more efficient handling of special events and international traffic. A new independent transmission control and customer service desk was constructed to service the growing business TV segment.

The business TV transmission control was designed with a variety of corporate communications uses in mind. Video signals originate from the Harbor Plaza studio or from the client location and are sent to the earth station via terrestrial fiber-optic link or portable satellite uplink at the client location. One client placed fiber throughout its manufacturing facility and put cameras on the factory floor so that its equipment can be demonstrated via its training video network.

Two new high-power amplifier (HPA) rooms are capable of handling 14 additional HPAs, bringing the total on hand to 38. To serve this expansion, the electrical system for the earth station was also doubled in capacity. It is powered by two 675kVA generators and two 300kVA uninterruptible power supplies.

The combined Harbor Plaza and Glenbrook Earth Station facility is the largest video earth station complex in the United States. It includes 15 satellite antennas: 11 C-band and four Ku-band. Nine antennas are equipped for full uplink and downlink and six are downlink only. The Ku-band system has full international capability, including INTELSAT E-3 certification for the Atlantic Ocean Region.

All critical path equipment is redundant, or can be bypassed, and all facility support systems are backed up. GWNS provides 24-hour, 7-day maintenance staffing and support to all program services and transmission clients. This reliability and the facility’s overall flexibility combine with GWNS’s dedication to customer satisfaction and its expertise to create a true “video services supermarket” for the TV industry.

The Atlantic Ocean Region.

The two edit suites and the studio can operate independently or as an integrated system.

Allan Stalker is senior vice president and general manager of GWNS, Stamford, CT. Respond via the BE FAXback line at 913-967-1905 or via e-mail at leithstartrc.com.
<table>
<thead>
<tr>
<th>Features/Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 64 Channels per server</td>
</tr>
<tr>
<td>Unlimited scalability—any number of servers can be connected to meet your needs</td>
</tr>
<tr>
<td>MPEG-1 and 2 compatible</td>
</tr>
<tr>
<td>PAL and NTSC compatible output</td>
</tr>
<tr>
<td>Genlock</td>
</tr>
<tr>
<td>Stereo audio output</td>
</tr>
<tr>
<td>Up to 15Mb/sec per channel</td>
</tr>
<tr>
<td>Store up to 240 hours per server at 1.5Mb/sec</td>
</tr>
<tr>
<td>Fault tolerant—Video RAID</td>
</tr>
<tr>
<td>VCR/VTR-like control protocol</td>
</tr>
<tr>
<td>Standard 19&quot; rack mounting</td>
</tr>
</tbody>
</table>

**What is an AV Server?**
Think of it like a VCR that can jump to any image or scene in a movie instantly, without queuing; a VCR that lets you view anything in the video library without having to change a tape; a VCR that permits use by up to 64 of your friends, at the same time (or at anytime), viewing the same movie (or different ones, for that matter)—all the time!
APPLICATIONS

HOTELS
In-room entertainment. Watch movies, sports, and look for places to go or shows to see; order room service; or go shopping and skip those lines with video-check-out when you’re ready to leave. Increase your occupancy and room revenue!

KIOSKS
Information at your finger tips. Talking yellow pages and shop in virtual reality; multimedia guides are the future. It’s the new advertising medium!

CRUISE SHIPS
View ports of call, preview activities and schedules, or learn how to gamble—if you can stay away from the video games. Keep your passengers from threatening a mutiny!

AIRCRAFT

BROADCAST TV
Wondering where you’re going to put the next LMS? This is the video “Cache” for on-air programming, ad-insertion, and net-delays. And it’s a lot less expensive—even if you buy another for a spare. Flexibility and economy!

CABLE HEADENDS
500 channel ad-insertion with VTRs? Not likely! How about any channel, any ad, any time, one copy. Thinking about Pay-Per-View? How about PPV in the same system. Two systems for the price of one!

TRAINING AND EDUCATION
Interactive education—Multimedia enhanced
A teacher with patience. No more boring text books. Get results. Interactive learning on-line!

DESKTOP VIDEO
Turn your desktop PC into multimedia client. All you need is a TV tuner-card and video overlay card to turn your desktop PC into a multimedia client capable of handling any video database. From stock listings to weather reports and in between, get it all. Welcome to the future!

KARAOKE
Over thousands of video titles available at your finger tips.
Any music video, any user, any time, all the time. Skip this, play that, and order a beer without getting up from your seat. Keep your customers and your accountant singing!
**Implementation**

**Content Preparation**

*Post-Production:* Video material is edited for video server playback.

*Content Preparation:* Video and audio can be indexed and logged for contextual retrieval.

*MPEG Encoding:* Audio and video is encoded in real-time and a MPEG stream is produced.

*Video File Formatting:* A MPEG stream is required to be interleaved and formatted in the AV Server File Format for playback.

**Transmission/Communication**

*Satellite:* Provides single point to multipoint transmission. Allows everyone to be updated with a single transmission.

*Telephone:* Allows communication and control of VOD system remotely with limited point to point transmission of data.

*Cable:* Provides single point to multipoint transmission on multiple channels. Allows selective receives.

*Store and Forward:* Provides a holding tank of incoming data which allows reconstruction of data before loading.

*Error Correction:* Provides verification and error correction of incoming data to ensure data integrity.

*Upload:* AV Server dynamic load balancing allows fastest possible uploading by using all excess bandwidth.
Operation & Control Methods

VOD Control System: The AV Server responds to high level - VTR/VCR like commands. The Micropolis proprietary communication protocol can be used on RS-232 or TCP/IP over existing LAN.

AV Server: The Micropolis AV Server is the heart of the VOD system. It is the video storage and playback engine delivering up to 64 simultaneous user with full random access capabilities.

Analog AV Out: The AV Server provides up to 64 of composite video and 64 48KHz stereo audio channel per system.

Database Server: A traditional database server can be used to provide contextual information for each video file over existing LAN.

Distribution Methods

Video Switcher: A Crossbar switch can provide mapping of N video sources onto M video output ports.
Frequency Modulator: Provides modulation of video signals into VHF or UHF band for use with TVs.
Combiner: Aggregates all modulated channels for distribution on a single coax cable.
MATV: Transmission system for standard cable RF distribution.
LAN: Data network.
RF Coupler/Decoupler: Couples and decouples RF from data signals.
PC TV: PC-TV Tuner and overlay card provides an RF video feed to a video in a window.
Introducing the Micropolis AV Server

- It's digital.
- It's random access.
- It's based on Micropolis' patented Video RAID technology.
- It's got MPEG.

AV Server Architecture

The Micropolis AV Server is based on a “Disk Centric” Architecture. The Server uses the CPU only as a file manager, and traffic controller over the Fast-Wide SCSI Data Bus. The data is delivered directly from the RAIDION VOD video RAID storage subsystem to the SCSI based Multi-Channel MPEG Video Decoders. No data is passed through the CPU while playing. The AV Server is designed with fault-tolerance in mind. It is capable of sustaining single drive failures without degradation in performance. Each drive and video decoder board is designed to be easily hot-plug replaceable while the system remains running. Communication with AV Server is provided through RS-232 or with TCP/IP over LAN. Using Micropolis VTR/VCR-like high level communication protocols, controlling the AV Server is as easy as selecting a channel, and a video file for play.
RAIDION VOD

The RAIDION VOD is based on the Gandiva Video RAID Controller. It is designed around a 33MHz R3000 RISC processor with one Fast Wide host SCSI bus and four Fast SCSI-2 drive bus on a PCI architecture. At the heart of Gandiva is the Micropolis custom Parity ASIC. The Gandiva is tasked to provide simultaneous random access for all users while maintaining video data rates. Each of the four drive SCSI bus can deliver up to 10MBytes per second with a combined parallel data throughput of 40MBytes. The Gandiva can sustain an aggregate throughput of 17MBytes per second to the Video Decoders while allowing full random access. The RAIDION VOD is capable of connecting up to 28 drives with a maximum of 8 drive arrays; holding a total of 252GB or approximately 240 hours of MPEG-1 video. A patented feature of the RAIDION VOD is “concurrent parity”. Provided through the custom ASIC, the RAIDION VOD can sustain a drive failure and still guarantee video playback on all channels.

AV Server CPU

The AV Server CPU is an Intel based 486 PC workstation. It is the heart of the AV Server. Its primary function is to direct user requests to each video decoder board and to manage the data flow over the Fast-Wide SCSI data bus. The AV Server OS/App is written on top of DOS to take advantage of hardware compatibility, however, all I/O and file management functions are unique to Micropolis. All MPEG data is formatted in the AV Server File Format by the Server CPU before it is stored on the RAIDION VOD.
The Micropolis
MPEG Decoder

Multi-Channel MPEG Video Decoders
Each Micropolis MPEG Video Decoder provides up to four composite and four stereo audio channels. On each Video Decoder Board resides the Micropolis Video Stream Manager running on the onboard 186 CPU. The stream manager controls each of the four video decoder modules on board, and is responsible for real-time delivery of video data to each of the four MPEG decoders. The AV Server CPU provides each Decoder Board video file location on the RAIDION VOD system (for each channel) and Video Stream Manager is then responsible for fetching the data.
**Decoder Specifications**

**Decoder Module**
- **Resolutions:** SIFF, 1/2 D1, Full 601
- **Compatibility:** Support MPEG-1, 1.5 (CL-950), and 2 (CL-9100) bit streams
- **Data Rate:** 1.5Mbits/s

**Decoder Motherboard**
- **Data Rate:** 6Mbits/s per channel with 4 channels active (higher if fewer channels are active)
- **Data Rate:** 3.5MB/s per motherboard
- **Features:** Trigger Accuracy: ±360ms

**Video Specifications**
- **Output:** RS170A Composite
- **Format:** NTSC and PAL software selectable
- **Features:** Full Chroma Genlock with host and reference sync.
  - Jitter Margin: 50 ppm

**Audio Specifications**
- **Output:** Stereo Audio up to 48 KHz @ 16-bit per channel
- **Format:** MPEG Layer I

**Connector Mechanical Specifications**
- **Video Output:** BNC
- **Audio Output:** BNC, Left and Right
- **Genlock:** SNB
**AV Server 200**
- Up to 64 Channels
- Up to 252 GB storage
- Video RAID
- 19" Rack format
- AV Server CPU
- Redundant Power

**AV Server 100**
- Up to 32 Channels
- Up to 252 GB storage
- Video RAID
- 19" Rack format
- AV Server CPU
- Redundant Power

**AV Server 50**
- Up to 16 Channels
- Up to 252 GB storage
- Video RAID
- 19" Sub-rack format
- AV Server CPU
- Redundant Power
**System Specifications**

<table>
<thead>
<tr>
<th>Date</th>
<th>Fast SCSI-2</th>
<th>10 MB/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>RS 232; 9600 baud; TCP/IP Token ring, Ethernet</td>
<td></td>
</tr>
</tbody>
</table>

**Video**

- Output: RS170A Composite
- Format: NTSC and PAL s/w selectable
- Features: Full Chroma Genlock with host and reference sync.

**Audio**

- Output: Stereo audio @ 48KHz per channel

**Electrical Specifications**

- Input Voltage: 120v at 20 amps, 240v at 10 amps

**Components**

<table>
<thead>
<tr>
<th>Description</th>
<th>Components</th>
</tr>
</thead>
<tbody>
<tr>
<td>AV Server 50</td>
<td>16 channels</td>
</tr>
<tr>
<td>AV Server 100</td>
<td>32 channels</td>
</tr>
<tr>
<td>AV Server 200</td>
<td>64 channels</td>
</tr>
</tbody>
</table>

**VDEC MODULE**

- MPEG decoder module; resolutions: SIF, 1/2 D1, CCIR-601, support MPEG-1, 1.5 (CL-950) and 2 bit streams;
- Data rate: 1.5 Mb/s to 8 Mb/s sustained

**GANDIVA VOD**

- 9-inch rackmount module contains GANDIVA array controller, power supply and cooling fan

**VDISK 2/4 MODULES**

- VDISK drive modules; 3 modules per 19" rackmount tray, capacity (per module): 2 or 4 GB, power supply and cooling fan

**VDISK 9**

- VDISK 9 drive module with one 9 GB 5.25" disk drive, power supply and cooling fan

**DISKRACK 3**

- 19-inch rackmount tray; holds up to eight VDISK 2 or VDISK 4 drive modules

**DISKRACK 9**

- 19-inch rackmount tray; holds up to three RS drive modules

**PCX 486**

- Optional Intel 486 For satellite link and error correction

---

- **VDEC MODULE**
  - MPEG decoder module; resolutions: SIF, 1/2 D1, CCIR-601, support MPEG-1, 1.5 (CL-950) and 2 bit streams;
  - Data rate: 1.5 Mb/s to 8 Mb/s sustained

- **GANDIVA VOD**
  - 9-inch rackmount module contains GANDIVA array controller, power supply and cooling fan

- **VDISK 2/4 MODULES**
  - VDISK drive modules; 3 modules per 19" rackmount tray, capacity (per module): 2 or 4 GB, power supply and cooling fan

- **VDISK 9**
  - VDISK 9 drive module with one 9 GB 5.25" disk drive, power supply and cooling fan

- **DISKRACK 3**
  - 19-inch rackmount tray; holds up to eight VDISK 2 or VDISK 4 drive modules

- **DISKRACK 9**
  - 19-inch rackmount tray; holds up to three RS drive modules

- **PCX 486**
  - Optional Intel 486 For satellite link and error correction
NAB conference preview
A help to planning your time carefully.

The Bottom Line:
Change is a way of life in the broadcast industry. Today as the computer, video and communications industries converge, change is quicker than ever. The only way to succeed is to keep up with the changes. NAB allows individuals to see the latest equipment, speak with the manufacturers and learn from those on the cutting edge. Between the conferences and the show floor, this year’s show offers something for everyone.

Broadcasters, video professionals, and those involved with multimedia will all converge the second week of April in Las Vegas.

The reason is the annual NAB convention, the largest show of its type in the world. This year’s show will bring together more than 1,000 exhibitors and more than 70,000 attendees. For the third year, multimedia exhibits and conferences, co-sponsored by the Interactive Multimedia Association will be in the Hilton. New this year and expanding on the HDTV Production Conference will be the Digital TV Production Conference.

This year’s exhibits will be spread throughout more than half a million square feet of exhibit space. Also included this year will be the convention center’s south hall. The hall was opened to make room for more than 150 exhibitors on the NAB waiting list. Unlike the other areas, where specific technologies are displayed, the new hall offers technology of all types. Numerous treasures surely await the adventurous who take the time to explore this area.

Three technical seminars are scheduled to start on Saturday April 8. An all-day seminar, “Pixel, Pictures and Perception,” will examine similarities and differences between the various imaging technologies. In addition, a morning tutorial on digital video will be offered as will an afternoon session on digital radio.
Broadcast Engineering Conference  
Las Vegas Convention Center, Las Vegas, Nevada  
Saturday, April 8 - Thursday, April 13

Gain an insider’s perspective on the newest technologies, systems and products for radio and TV in the most comprehensive broadcast engineering conference in the world. You’ll explore advances in digital technology, data broadcasting, satellite and auxiliary systems, post-production and more.

<table>
<thead>
<tr>
<th>Sat. 4/8</th>
<th>Sun. 4/9</th>
<th>Mon. 4/10</th>
<th>Tues. 4/11</th>
<th>Wed. 4/12</th>
<th>Thurs. 4/13</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MORNING</strong></td>
<td><strong>MORNING</strong></td>
<td><strong>MORNING</strong></td>
<td><strong>MORNING</strong></td>
<td><strong>MORNING</strong></td>
<td><strong>MORNING</strong></td>
</tr>
<tr>
<td>Special Technical Seminars</td>
<td>Special Technical Seminars</td>
<td>9:00 am - Digital Video Made Easy</td>
<td>9:00 am - Keynote: FCC Commissioner James H. Quello</td>
<td>9:00 am - Tapeless Video Production: The Evolution</td>
<td>9:00 am - Television RF Workshop: Maintaining the Signal</td>
</tr>
<tr>
<td>9:00 am - Digital Video Made Easy</td>
<td>10:30 am - TV Data Broadcasting: Technology Development</td>
<td>9:30 am - Advanced TV Technology - Part I</td>
<td>9:00 am - Audio and Video Testing: New Technologies</td>
<td>12:30 pm - Engineering Awards Luncheon</td>
<td></td>
</tr>
<tr>
<td>Pixel, Pictures &amp; Perception: The Differences and Similarities Between Computer Imagery, Film &amp; Video - Part I</td>
<td>9:00 am - Advanced Television Technology - Part II</td>
<td>1:00 pm - Designing the All-Digital Video Facility: Broadcast and Production</td>
<td>2:00 pm - Digital Video: Maintaining the Image</td>
<td>2:00 pm - Ham Operators Reception</td>
<td></td>
</tr>
<tr>
<td><strong>AFTERNOON</strong></td>
<td><strong>AFTERNOON</strong></td>
<td><strong>AFTERNOON</strong></td>
<td><strong>AFTERNOON</strong></td>
<td><strong>AFTERNOON</strong></td>
<td><strong>AFTERNOON</strong></td>
</tr>
<tr>
<td>Special Technical Seminars</td>
<td>Special Technical Seminars</td>
<td>1:00 pm - Advanced Television Technology - Part II</td>
<td>1:00 pm - Television On-Line: Interactivity and the New Media Computer Technology for Broadcast Support: BBS, LANs, WANs and the Internet</td>
<td>6:00 pm - Ham Operators Reception</td>
<td></td>
</tr>
<tr>
<td>1:00 pm - Advanced Television Technology - Part II</td>
<td>1:00 pm - Television On-Line: Interactivity and the New Media Computer Technology for Broadcast Support: BBS, LANs, WANs and the Internet</td>
<td>1:00 pm - Designing the All-Digital Video Facility: Broadcast and Production</td>
<td>1:00 pm - Designing the All-Digital Video Facility: Broadcast and Production</td>
<td>1:00 pm - Designing the All-Digital Video Facility: Broadcast and Production</td>
<td></td>
</tr>
<tr>
<td>1:00 pm - Advanced Television Technology - Part II</td>
<td>1:00 pm - Television On-Line: Interactivity and the New Media Computer Technology for Broadcast Support: BBS, LANs, WANs and the Internet</td>
<td>1:00 pm - Designing the All-Digital Video Facility: Broadcast and Production</td>
<td>1:00 pm - Designing the All-Digital Video Facility: Broadcast and Production</td>
<td>1:00 pm - Designing the All-Digital Video Facility: Broadcast and Production</td>
<td></td>
</tr>
</tbody>
</table>

**Broadcast engineering conference highlights**

Starting at 9:00 on Sunday morning, FCC commissioner James H. Quello will give the keynote address. Following that will be two technical sessions on advanced television technology. The first is sched-

uled to start at 9:30, the other at noon. These sessions will cover the current status of HDTV, the regulatory issues surrounding it and numerous technical issues involved with the transition from NTSC to HDTV.

Monday morning starts off with a look at TV data broadcasting, followed by sessions addressing on-line interactivity for networks and local stations. Another afternoon session will look at how computer technology such as BBSs, LANs and even the Internet can be used to interact with viewers and streamline station operations.

On Tuesday, the morning starts out with a pair of sessions; one on tapeless video production, the other on encoding (compressing) digital audio. In the afternoon, attendees can delve into designing all-digital broadcast and post-production facilities.

The morning sessions that will be held Wednesday look into the realities of testing audio and video equipment and the technical regulatory issues facing broadcasters. The Engineering Awards Luncheon follows at 12:30 with Lewis Platt, chairman/CEO of Hewlett Packard as the featured speaker. The afternoon sessions will focus on digital video and regulatory issues. The traditional Ham Operators Reception will round off the evening at 6:00.

On the last day of the conference, sessions will take place only in the morning. For television engineers, a workshop will focus on RF. Throughout the convention, sessions will also be taking place on management and multimedia. For those wishing to expand their horizons, these sessions are an excellent way of becoming familiar with new areas of responsibility. Just like conventions of the past, there is far more to do and see than there is time. Plan your time carefully to get the most out NAB '95!

**Also included this year will be the convention center’s south hall.**

See page 84 for the BE FASTtrack, your personal guide to NAB products and services.
The Legend Continues.

The Old Standard.
Our M267 Mixer is more than the best selling mixer of the last ten years. It's the most versatile, the most durable, and the best performing. You trust it in your rack – you trust it on the road. And while production environments have changed, your mixer remained the same. Until now.

The New Standard.
Our new M367 Portable Mixer gives you all the reliability and durability of the M267, plus a list of new features and improvements. We made it over 25 dB quieter with a low noise circuit — ideal for digital formats. We added two more mic line inputs, bringing the total to six. We added peak LEDs. And we gave it 12 and 48-volt phantom power for your condenser mics.

What we didn't change was its toughness. It's still made with a rugged all-metal chassis and manufactured in the USA with legendary Shure durability.

The New Features.
Without increasing the size, we were able to pack in dozens of new features and improvements. The M367 has all the features of the M267, plus:
- Input peak LEDs
- Detachable power cord
- Two XLR outputs
- Easy-access side battery compartment
- Headphone monitor circuit
- Output peak/limiter LED
- Balanced, 2-position mix bus
- Adjustable limiter threshold
- Battery/AC VU meter illumination
- Monitor input sensitivity selector
- Program/monitor input selector

With the Shure M367 mixer, we've just raised the standards. It's time you raised yours.

For The Shure Dealer Nearest You, Call 1-800-25-SHURE.

See us at NAB, Booth #11800.
Finding the products you need at a convention as large as NAB is difficult at best. First, the companies are not arranged by product type, but by a seniority and size process. Second, because many companies offer a variety of products and services, it would be impossible to group them by product category.

Finally, most of us don’t have time to visit all the booths just to find that perfect piece of equipment, even if we knew what products every company was exhibiting.

Recognizing this, the BE editors devised a better plan. The result is the BE FASTtrack.

**Shortcut**

The BE FASTtrack provides you with a shortcut to locating the companies that provide the products and services you are looking for. Instead of arranging companies by name in an alphabetical order, the BE FASTtrack groups companies first by product type, then by booth number.

The result is a list of all companies providing products and services in any of 40 categories, broken down by booth number. This allows you to select the type of product needed and immediately know what companies provide that type of product.

Then, using the BE FASTtrack listing, you can take the shortest path between booths. The result should be a more efficient use of your time. The time saved can be used to see more equipment or, if no one is looking, relax and enjoy the other attractions Las Vegas has to offer.

### Audio Mixers - Portable

- Audioarts Engineering
- Yamaha Music
- Logitek
- Euphonix
- Audio Services Corporation
- Audio Developments
- RAM Broadcast
- Seen Audio A/S
- Wheatstone Broadcast Group
- Henry Engineering
- Fontex
- Audio Technica US
- Shure Brothers
- SESCOM
- Micron Audio Products
- ATI Audio Technologies
- TASCAM
- AMEK Consoles

### Audio Mixers - Studio, On-air, Recording

- Otari
- Trident Audio USA
- Bradley Broadcast Sales
- Neotek
- Audioarts Engineering
- Yamaha Music
- Audiconics
- Logitek
- LPB
- Pacific Recorders & Engineering
- Fidelipac
- Euphonix
- Hallikainen & Friends
- RAM Broadcast
- Seen Audio A/S
- Wheatstone Broadcast Group
- Autogram Corporation
- Fontex
- Graham-Patterson Systems
- Harrison by GLW
- Whirlwind/US Audio
- Dan Dugan Sound Design
- Siemens Audio Inc.
- Ward Beck Systems
- Mark IV Audio Group
- Dorrough Electronics
- ATI Audio Technologies
Spanning the Spectrum

with Leadership in Broadcast Tubes

From UHF to VHF to HF, Varian has offered a full spectrum of EIMAC power tubes to the broadcast market for more than 60 years.

EIMAC has delivered generation after generation of leadership products. Tubes from watts to megawatts. Cavities from megahertz to gigahertz. And a wide range of accessories. A full spectrum of solutions. Supporting a broad selection of radio and television products.

We deliver quality and dependability. Not only is every EIMAC tube subject to the strictest manufacturing standards, it’s also warranted 100% free of defects. The result: dramatically reduced transmitter downtime and operating overhead. We also provide rapid, expert customer service and support to assure success in your efforts.

From design to final product, we’re there for you. EIMAC is flexible enough to handle special orders. And big enough to handle large requirements. Whatever you need, we can provide it now and – we guarantee – for years to come.

Perhaps the best proof of this promise is our past – more than 60 years of keeping you on the air, around the world, across the spectrum.

Power you can trust...

Varian Power Grid Tube Products
301 Industrial Way
San Carlos, CA 94070 USA
(415) 592-1221 or 1-(800) 414-8823

©Varian Associates

See us at NAB, Booth #13805.
**Audio Processing: Telco-Related Products**

<table>
<thead>
<tr>
<th>Company</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apogee Electronics</td>
<td>1601-2</td>
</tr>
<tr>
<td>HHIB Communications Ltd.</td>
<td>1604-5</td>
</tr>
<tr>
<td>Inovonics</td>
<td>1625-8</td>
</tr>
<tr>
<td>Bradley Broadcast Sales</td>
<td>1903</td>
</tr>
<tr>
<td>Symetrix</td>
<td>1911</td>
</tr>
<tr>
<td>Gorman-Redlich Mfg. Company</td>
<td>1913</td>
</tr>
<tr>
<td>Aplex Systems</td>
<td>2125</td>
</tr>
<tr>
<td>Eventide</td>
<td>2707</td>
</tr>
<tr>
<td>Logitek</td>
<td>2725</td>
</tr>
<tr>
<td>Orban/Harmon Pro Audio</td>
<td>2910</td>
</tr>
<tr>
<td>AGK Acoustics/Harman Pro Audio</td>
<td>2910</td>
</tr>
<tr>
<td>Studio Technologies</td>
<td>3003</td>
</tr>
<tr>
<td>Penny &amp; Giles</td>
<td>3004-5</td>
</tr>
<tr>
<td>Corporate Computer Systems/CCS</td>
<td>3813</td>
</tr>
<tr>
<td>Intraplex</td>
<td>3904-5</td>
</tr>
<tr>
<td>Audio Developments</td>
<td>3910-11</td>
</tr>
<tr>
<td>Audio Processing Technology Ltd.</td>
<td>4007-9</td>
</tr>
<tr>
<td>Telos Systems</td>
<td>4203</td>
</tr>
<tr>
<td>Group One Ltd.</td>
<td>4601-3</td>
</tr>
<tr>
<td>Wheatstone Broadcast Group</td>
<td>4709</td>
</tr>
<tr>
<td>Roland Corporation</td>
<td>4713</td>
</tr>
<tr>
<td>Gentner Communications</td>
<td>5621</td>
</tr>
<tr>
<td>Modulation Sciences</td>
<td>11113-5</td>
</tr>
<tr>
<td>Sony Electronics/Business &amp; Prof.</td>
<td>11514</td>
</tr>
<tr>
<td>Comrex</td>
<td>12105</td>
</tr>
<tr>
<td>Yamashita Engineering Mfg/ YEM</td>
<td>12810</td>
</tr>
<tr>
<td>SESCOM</td>
<td>13600</td>
</tr>
<tr>
<td>Hartron</td>
<td>13611-2</td>
</tr>
<tr>
<td>Manhattan Production Music</td>
<td>13633</td>
</tr>
<tr>
<td>Siemens Audio Inc.</td>
<td>13813</td>
</tr>
<tr>
<td>Mark IV Audio Group</td>
<td>15717</td>
</tr>
<tr>
<td>NVISION</td>
<td>15884</td>
</tr>
<tr>
<td>Dorrough Electronics</td>
<td>16443-4</td>
</tr>
<tr>
<td>Dobby Labs</td>
<td>16567</td>
</tr>
<tr>
<td>Solid State Logic</td>
<td>16621</td>
</tr>
<tr>
<td>TASCAM</td>
<td>17167</td>
</tr>
<tr>
<td>Alexis</td>
<td>18372</td>
</tr>
<tr>
<td>Pixel Instruments</td>
<td>18638</td>
</tr>
<tr>
<td>FM Systems</td>
<td>19031</td>
</tr>
<tr>
<td>ASC Audio Video Corporation</td>
<td>19784</td>
</tr>
<tr>
<td>Harris Allied Broadcast Division</td>
<td>4416/16001</td>
</tr>
</tbody>
</table>

**Audio Recording & Playback Equipment**

<table>
<thead>
<tr>
<th>Company</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digidesign</td>
<td>1203-15</td>
</tr>
<tr>
<td>International Tapetronics/ICC</td>
<td>1410</td>
</tr>
<tr>
<td>Otari</td>
<td>1414</td>
</tr>
<tr>
<td>HHIB Communications Ltd.</td>
<td>1604-5</td>
</tr>
<tr>
<td>Bradley Broadcast Sales</td>
<td>1903</td>
</tr>
<tr>
<td>Crouse-Kinney Company</td>
<td>1914-15</td>
</tr>
<tr>
<td>360 Systems</td>
<td>2116</td>
</tr>
<tr>
<td>Yamaha Music</td>
<td>2425</td>
</tr>
<tr>
<td>Broadcasters General Store</td>
<td>3007</td>
</tr>
<tr>
<td>Pacific Recorders &amp; Engineering</td>
<td>3025</td>
</tr>
<tr>
<td>Fidelic</td>
<td>3122</td>
</tr>
<tr>
<td>Audio Services Corporation</td>
<td>3607</td>
</tr>
<tr>
<td>DENON</td>
<td>4004-5</td>
</tr>
<tr>
<td>Audi-Cord</td>
<td>4416</td>
</tr>
<tr>
<td>Roland Corporation</td>
<td>4713</td>
</tr>
<tr>
<td>Sprague Magnetics</td>
<td>5015</td>
</tr>
<tr>
<td>AKAI Digital</td>
<td>5021</td>
</tr>
<tr>
<td>Henry Engineering</td>
<td>5625</td>
</tr>
<tr>
<td>Fostex</td>
<td>10952</td>
</tr>
<tr>
<td>Barco-EMT</td>
<td>11450</td>
</tr>
<tr>
<td>Sony Electronics/Business &amp; Prof.</td>
<td>11514</td>
</tr>
<tr>
<td>Nagra Kudelski SA</td>
<td>11805</td>
</tr>
<tr>
<td>Sonic Solutions</td>
<td>12046</td>
</tr>
<tr>
<td>Multidyne Electronics</td>
<td>12262</td>
</tr>
<tr>
<td>McCurdy Radio Industries</td>
<td>13110</td>
</tr>
<tr>
<td>Siemens Audio Inc.</td>
<td>13813</td>
</tr>
<tr>
<td>PEP</td>
<td>16601-701</td>
</tr>
<tr>
<td>Solid State Logic</td>
<td>16621</td>
</tr>
<tr>
<td>TASCAM</td>
<td>17167</td>
</tr>
<tr>
<td>ASACA ShihaSoku</td>
<td>17406</td>
</tr>
<tr>
<td>Ramsey Audio/Panasonic</td>
<td>18101</td>
</tr>
<tr>
<td>Alexis</td>
<td>18372</td>
</tr>
<tr>
<td>ASC Audio Video Corporation</td>
<td>19784</td>
</tr>
<tr>
<td>Harris Allied Broadcast Div.</td>
<td>4416/16001</td>
</tr>
<tr>
<td>Optical Disc Corporation</td>
<td>M1024-1026</td>
</tr>
<tr>
<td>FOR-A Corporation</td>
<td>M1529</td>
</tr>
</tbody>
</table>

**Audio Routing & Distribution**

<table>
<thead>
<tr>
<th>Company</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>International Tapetronics/ICC</td>
<td>1410</td>
</tr>
<tr>
<td>360 Systems</td>
<td>2116</td>
</tr>
<tr>
<td>Sierra Automated Systems</td>
<td>2710</td>
</tr>
<tr>
<td>Audtronics</td>
<td>2721</td>
</tr>
<tr>
<td>Studio Technologies</td>
<td>3003</td>
</tr>
<tr>
<td>RAM Broadcast</td>
<td>4413</td>
</tr>
<tr>
<td>Videoquip Research</td>
<td>5315-17</td>
</tr>
<tr>
<td>Benchmark Media Systems</td>
<td>10052</td>
</tr>
<tr>
<td>Image Video</td>
<td>11216</td>
</tr>
<tr>
<td>Barco-EMT</td>
<td>11450</td>
</tr>
<tr>
<td>IRIS Technologies</td>
<td>11529</td>
</tr>
<tr>
<td>Multidyne Electronics</td>
<td>12262</td>
</tr>
<tr>
<td>Lighthouse Digital Systems</td>
<td>12337</td>
</tr>
<tr>
<td>Beck Associates</td>
<td>12350</td>
</tr>
<tr>
<td>Yamashita Engineering Mfgs/YEM</td>
<td>12810</td>
</tr>
<tr>
<td>Avtel Electronics</td>
<td>12942-4</td>
</tr>
<tr>
<td>Omicon Video</td>
<td>13040-2</td>
</tr>
<tr>
<td>Di-Tech</td>
<td>13106</td>
</tr>
<tr>
<td>McCurdy Radio Industries</td>
<td>13110</td>
</tr>
<tr>
<td>Television Equipment Associates</td>
<td>13410-411</td>
</tr>
<tr>
<td>SESCOM</td>
<td>13600</td>
</tr>
<tr>
<td>PSE</td>
<td>13601-8</td>
</tr>
<tr>
<td>Adrienne Electronics</td>
<td>13640-740</td>
</tr>
<tr>
<td>Audio Accessories</td>
<td>13642-742</td>
</tr>
<tr>
<td>DYNAIR Electronics</td>
<td>13800</td>
</tr>
<tr>
<td>Siemens Audio Inc.</td>
<td>13813</td>
</tr>
<tr>
<td>Datatek</td>
<td>13824</td>
</tr>
<tr>
<td>Visetek Electronics</td>
<td>13835</td>
</tr>
<tr>
<td>Nova Systems</td>
<td>13842-14042</td>
</tr>
<tr>
<td>Sandar Electronics</td>
<td>15661</td>
</tr>
<tr>
<td>NVISION</td>
<td>15884</td>
</tr>
<tr>
<td>Broadcast Video Systems/BVS</td>
<td>16348-50</td>
</tr>
<tr>
<td>Burst Electronics</td>
<td>16351</td>
</tr>
<tr>
<td>ATI Audio Technologies</td>
<td>16602-702</td>
</tr>
<tr>
<td>OpAmp Labs</td>
<td>16674</td>
</tr>
<tr>
<td>Broadcast Electronic Services</td>
<td>16771</td>
</tr>
<tr>
<td>RTS Broadcast Television Systems</td>
<td>17011</td>
</tr>
<tr>
<td>Utah Scientific/Dynatech Video</td>
<td>17124</td>
</tr>
<tr>
<td>Dynatech Video Group</td>
<td>17124</td>
</tr>
<tr>
<td>ASACA ShihaSoku</td>
<td>17406</td>
</tr>
<tr>
<td>Grass Valley Group</td>
<td>18117</td>
</tr>
<tr>
<td>Videotek</td>
<td>18132</td>
</tr>
<tr>
<td>Wohler Technologies</td>
<td>18369-569</td>
</tr>
<tr>
<td>Ross Video</td>
<td>18632</td>
</tr>
<tr>
<td>Pixel Instruments</td>
<td>18638</td>
</tr>
<tr>
<td>Link Electronics</td>
<td>18676-778</td>
</tr>
<tr>
<td>Pesa Switching Systems</td>
<td>19401</td>
</tr>
<tr>
<td>Digipath</td>
<td>19929</td>
</tr>
<tr>
<td>ADC Telecommunications</td>
<td>19935</td>
</tr>
</tbody>
</table>

**Digital Audio Workstations**

<table>
<thead>
<tr>
<th>Company</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digidesign</td>
<td>1203, 1515</td>
</tr>
<tr>
<td>SADIE</td>
<td>1207</td>
</tr>
<tr>
<td>Otari</td>
<td>1414</td>
</tr>
<tr>
<td>TimeLine</td>
<td>1821</td>
</tr>
<tr>
<td>Crouse-Kinney Company</td>
<td>1914-15</td>
</tr>
<tr>
<td>360 Systems</td>
<td>2116</td>
</tr>
<tr>
<td>Gefen Systems</td>
<td>2304-5</td>
</tr>
<tr>
<td>Yamaha Music</td>
<td>2425</td>
</tr>
<tr>
<td>Eventide</td>
<td>2707</td>
</tr>
<tr>
<td>Orban/Harmon Pro Audio</td>
<td>2910</td>
</tr>
<tr>
<td>AGK Acoustics/Harman Pro Audio</td>
<td>2910</td>
</tr>
<tr>
<td>Broadcasters General Store</td>
<td>3007</td>
</tr>
<tr>
<td>Pacific Recorders &amp; Engineering</td>
<td>3025</td>
</tr>
<tr>
<td>Adams-Smith</td>
<td>3613</td>
</tr>
<tr>
<td>Augan Instruments</td>
<td>3613</td>
</tr>
<tr>
<td>Synclavier</td>
<td>3901-2</td>
</tr>
<tr>
<td>Roland Corporation</td>
<td>4713</td>
</tr>
<tr>
<td>AKAI Digital</td>
<td>5021</td>
</tr>
<tr>
<td>ComStream Corporation</td>
<td>5615</td>
</tr>
<tr>
<td>Gentner Communications</td>
<td>5621</td>
</tr>
<tr>
<td>Henry Engineering</td>
<td>5625</td>
</tr>
<tr>
<td>ABC Digital/Australian Broadcasting</td>
<td>5627</td>
</tr>
<tr>
<td>Nagra Kudelski SA</td>
<td>11805</td>
</tr>
<tr>
<td>Siemens Audio Inc.</td>
<td>13813</td>
</tr>
<tr>
<td>Solid State Logic</td>
<td>16621</td>
</tr>
<tr>
<td>AVID Technology</td>
<td>19539, M1515</td>
</tr>
<tr>
<td>AAVS/Sencore</td>
<td>19623</td>
</tr>
<tr>
<td>Fairlight ESP Pty. Ltd.</td>
<td>19920</td>
</tr>
<tr>
<td>Harris Allied Broadcast Division</td>
<td>4416/16001</td>
</tr>
</tbody>
</table>

**Microphones, Speakers, Headphones**

<table>
<thead>
<tr>
<th>Company</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neotek</td>
<td>1907-9</td>
</tr>
<tr>
<td>Audio Intervisual Design</td>
<td>2203</td>
</tr>
<tr>
<td>Murry Rosenholm Sound Associates</td>
<td>2428</td>
</tr>
<tr>
<td>AGK Acoustics/Harman Pro Audio</td>
<td>2910</td>
</tr>
<tr>
<td>Crown International</td>
<td>3203</td>
</tr>
<tr>
<td>Audio Services Corporation</td>
<td>3607</td>
</tr>
<tr>
<td>Bryston</td>
<td>3907-8</td>
</tr>
<tr>
<td>Group One Ltd.</td>
<td>4601-3</td>
</tr>
<tr>
<td>Professional Sound Corporation</td>
<td>5116-7</td>
</tr>
<tr>
<td>Audio Technica US</td>
<td>11206</td>
</tr>
<tr>
<td>beyerdynamic</td>
<td>11214</td>
</tr>
<tr>
<td>Nady Systems</td>
<td>11226</td>
</tr>
<tr>
<td>Lectrosonics</td>
<td>11232</td>
</tr>
<tr>
<td>Sony Electronics/Business &amp; Prof.</td>
<td>11514</td>
</tr>
<tr>
<td>Countryman Associates</td>
<td>11607</td>
</tr>
<tr>
<td>Share Brothers</td>
<td>11800</td>
</tr>
<tr>
<td>Sennheiser Electric</td>
<td>12035</td>
</tr>
<tr>
<td>Sanke/Developing Technologies</td>
<td>12802</td>
</tr>
<tr>
<td>Samson Technologies</td>
<td>12829</td>
</tr>
<tr>
<td>R-Columbia Products</td>
<td>13044</td>
</tr>
<tr>
<td>SESCOM</td>
<td>13600</td>
</tr>
<tr>
<td>Wireworks</td>
<td>13602-3</td>
</tr>
<tr>
<td>Connectronics</td>
<td>13627</td>
</tr>
<tr>
<td>Systems Wireless</td>
<td>13634-5</td>
</tr>
</tbody>
</table>
A New Generation

Varian’s Klystrode® IOT Tubes for HDTV

The Klystrode IOT designed by EIMAC – a new generation solution for demanding new UHF-TV broadcast requirements.

- Keeps energy costs in check
- Simple and easy tuning
- User friendly tube replacement
- Improved linear dynamic range
- Enhanced reliability
- Covers complete UHF-TV band

The new generation Klystrode IOT combines the latest technology and reliability enhancements with new input and output circuits in a completely redesigned package. Made in the USA, the resulting amplifier offers outstanding performance across the entire UHF-TV band and is very easy to operate and maintain. Input cavity tuning is accomplished with only two adjustments, and all four cavity adjustments are readily accessible. Tube replacement is simple and easy to perform.

So, bridge the generation gap. Take a look at the Klystrode IOT. And see what a difference it can make as you move up to HDTV... and into a new generation broadcast future.

Power you can trust...

Varian Power Grid
Tube Products
301 Industrial Way
San Carlos, CA 94070 USA
(415) 592-1221 or 1-(800) 414-8823

See us at NAB, Booth #13805.
## Automation Systems - Radio
- International Tapetronics/ITC: 1140
- CSI Custom Business Systems: 2113
- Gelen Systems: 2304.5
- Louth Automation: 10158
- Alamar Electronics USA: 11829
- McCurdy Radio Industries: 13110
- Adtec Productions: 13262
- Videomedia: 15724
- AAVS/Sencore: 1963

## Automation Systems - Video, TV, Newsrooms
- CBSI Custom Business Systems: 2113
- Louth Automation: 10158
- Media Computing: 1115
- Sony Electronics/Business & Prof.: 11514
- Alamar Electronics USA: 11829
- Tel-test: 12107
- FloriCal Systems: 13102
- Enterprise Systems: 13253
- Adrec Productions: 13262
- Jefferson Pilot Data/JDS: 13810
- Videomedia: 15724
- American Broadcast Systems: 1579-829
- Columbine Systems: 15731
- Oedics Broadcast: 15734
- IBM Power Visualization Systems: 15773
- Unique Business Systems: 16358
- BTS Broadcast Television Systems: 17011
- Utah Scientific/Dynatech Video: 17124
- Dynatech NewStar: 17124
- Dynatech Video Group: 17124
- ASACA ShibaSoku: 17406
- Panasonic: 18101
- Leighttronix: 18577-777
- NewsMaker Systems: 18585
- Matrix Mfg. & Test: 18937
- Chennanical: 18977
- AVID Technology: 19539, 19515
- AAVS/Sencore: 1963
- DCM-Data Center Management: 19768
- Pioneer New Media Technologies: 19771
- ASC Audio Video Corporation: 19784

## Cameras, Lens Systems, & Accessories
- Sony Electronics/Business & Prof.: 11514
- Toshiba Corporation: 11740
- BURLE INDUSTRIES: 12100.1
- Fujinon: 15959
- Thomson Broadcast: 16117
- TECEC/Technical Necessities: 16721
- BTS Broadcast Television Systems: 17011
- E/E: 17136
- Arriflex: 17152
- JVC Professional Products: 17359
- Innovation Options: 17569-769
- CAMEX/Concept W Systems: 17784
- Panasonic: 18101
- Hitachi Denishi: 18127
- Band Pro Film/Video: 18370-870
- Canon USA/Broadcast Optics: 18456
- Century Precision Optics: 18972
- Ikegami Electronics: 19214
- NAC Visual Systems/Anguineux: 19226
- Anguineux SA: 19226
- Nikon Electronic Imaging: 19536
- AVID Technology: 19539, M1515
- FOR-A Corporation: M1529

## Camera Support Products, Robotic Equipment & Controls
- Chapman/Leonard Studio Equipment: 10252
- Chapman/Leonard Studio & Prod. CRT: 10252
- Shotmaker Dollies/Camera Platforms: 10949
- Quickset: 11527
- Cinema Products: 11810
- M S Russian Group: 16112-3
- AF Associates: 16338
- Radamec EPO Ltd.: 16338
- KXV Products: 16343-5
- Stanton Video Services Ltd.: 16373-473
- Italiano Ponti Radio SRL: 16677-777
- CSI/Camera Support International: 16855
- Miller Fluid Heads: 16967
- O'Connor Engineering Labs: 17148
- Arriflex: 17152
- Micron Tool & Mfg./Camcorder: 17570-670
- Band Pro Film/Video: 18370-870
- Telemetrics: 18932
- Vinten Broadcast/TSM: 18939
- Egripment: 18975
- Bogen Photo: 19372
- Sachtler: 19526
- Cinematic: 19563-5

## Character Generators, Promoters, Captions Equipment
- Dubner International: 10861
- Ahekas Video Systems: 11853
- Horita: 12650
- Questar Systems (Farpoint Systems): 12862
- Brek Conner Group: 13832
- Video Data Systems: 15578
- QSI Systems: 15828-16028
- Knov Video Products: 16346
- Sherriff Systems: 16374-474
- Magic Teleprompting Inc.: 16359
- Microtime - See Digital Graphix: 16624
- Digital Graphix: 16624
- Textscript: 16755
- Image Logic Corporation: 16774
- BTS Broadcast Television Systems: 17011
- Quanta/Dynatech Video Group: 17124
- Dynatech Video Group: 17124
- Q-TV: 17148
- ASACA ShibaSoku: 17406

## Hamlet
- Chevron Systems: 17969-18069
- Comprompter: 18148
- Computer Prompting & Captioning Co.: 18630
- Listec Video: 18748
- Tekskil Industries: 19048
- Norpak: 19090
- Chyron Group: 19401
- Texscan MSI: 20068

## Desktop Video Equipment
- Gelen Systems: 2304-5
- DVision Systems: 10549
- Toshiba Corporation: 11740
- Nova Systems: 13382-14042
- Elastic Reality: 1516-8, M1220
- Advanced Digital Imaging: 15169-369
- Newtek: 15171
- Silicon Graphics: 15779
- Knox Video Products: 16346
- BTS Broadcast Television Systems: 17011
- Discreet Logic: 17772
- Comprehensive Video Supply: 17848
- Grass Valley Group: 18117
- Pinnacle Systems: 18380
- United Media: 18914
- Chyron Group: 19041
- Hewlett-Packard: 19656
- InMIX: 19779
- ASC Audio Video Corporation: 19784
- Intelligent Resources: 20048
- Desktop Images: M 117-136
- Optimum Interactive: 9628
- RGB Computer & Video: 18132
- FOR-A Corporation: M1529
- Divicom: M1603
- Adobe Systems: M1609
- Y/C Plus: M1806

## Graphics & Animation Systems
- Toshiba Corporation: 11740
- Kavouras: 12332
- Alden Electronics: 12901
- Advanced Designs: 12905-6
- WSI: 12956
- Microvideo Ltd: 13626
- Bencer: 13632
- Alias Research: 15179
- Autodesk: 15184
- Silicon Graphics: 15779
- Getrix Images: 15985
- Sheriff Systems: 16374-474
- Wavefront Technologies: 16379
- Digital Graphix: 16624
- Microtime - See Digital Graphix: 16624
- Softimage: 16755
- Dynatech Video Group: 17124
- ColorGraphics Systems/Dynatech: 17124
- Discreet Logic: 17772
- Comprehensive Video Supply: 17848
- Quantel: 18151
- Pinnacle Systems: 18380
- Accu-Weather: 19025-8
- Aurora Systems/Chyrion Group: 19401
- Chyron Group: 19401

---

_Beast track_
The Diaphragm
We vacuum-laminate gold - just a few molecules thick - to our ultrathin diaphragm. Its unique diameter provides an extremely uniform, supercardiod pattern, wide dynamic range and exceptional transient response.

The Transformer
Our custom-designed Jensen® output transformer is low in distortion and a true 150 ohms. It provides the high rejection of electromagnetic noise that only a transformer can.

The Performance
Self-noise is 5 to 10 dB lower than "industry standard" microphones. And we keep it that way even in conditions of high humidity with our Constant Environment System® (CES), which keeps the element at a constant 125°F.

The Amenities
Shock-mount system, computer-grade power supply, external pop filter, hard-shell case, stand adapter and 20 ft. of premium cable with gold connectors.

The Awe-Inspiring, Uncompromising Studio Condenser Microphone

Even before its introduction, the RE2000 had earned an amazing reputation and an enthusiastic following. Its expecting performance elicited accolades from professionals who thought they had heard it all.

"The RE2000 has a richness of sound I have experienced only along the lines of a tube mic" — David Esch, Eschicago

"The perfect mic for recording any acoustic string instrument." — John Beland, Flying Burrito Brothers

"The RE2000 has the warmth of a tube mic - extremely quiet and sensitive, allowing me to pickup low-level material without adding noise." — Scott Weber, Buena Vista Sound, Walt Disney Studios

"The RE2000 has a crisp, clean and quiet response. I used less EQ to achieve what I look for. What goes in...comes out! It's also extremely versatile...from vocals to acoustic guitars to trumpets and violins." — Tom Cusic, TM Century, Dallas, TX

"I think it's one of the most versatile I've ever used." — Roy Thomas Baker, Producer

In fact, all of these professionals asked one remarkably familiar question:

"When can I get one of my own?"

It's available now! And once you've heard it, we expect you'll be inspired to send us an accolade or two as well.

Electro-Voice, Inc. a MARK IV company 600 Cecil Street Buchanan, Michigan 49107 616/695-6831 800/234-6831 In Canada: 613/382-2141

Circle (49) on Reply Card
**Multimedia Products**

- Advanced Digital Imaging 15169-369
- Autodesk 15184
- Videomedia 15724
- Chyron Group 19401
- Intelligent Resources 20048
- Pacific Bell 109
- Target Vision 202-4
- Adda Technologies 315
- Optimage Interactive Services 512
- Micropolis 518
- Caligari 801
- Proxima Corporation 807-906
- Creston 901
- Engineering Animation 907
- LegaSys International M1028-30
- Celect Multimedia Products M1034
- Multimedia Accessories/TTL M1120
- Optibase Inc. M1214
- Communications Specialties Inc. M1228
- Apple Computer Company M1403
- Crystal Graphics M1415
- AMX Corporation M1421
- Electronics M1603
- Adobe Systems M1609
- AmPro M1627

**Production & Master Control Switchers**

- Image Video 11216
- Sony Electronics/Business & Prof. 11514
- Abeaka Video Systems 11853
- Tel-test 12107
- J-Lab 12337
- Echolab 13423-26
- Visteon Electronics 13835
- Thomson Broadcast 16117
- BTS Broadcast Television Systems 17011
- Dynatech Video Group 17124
- Alpha Image/Dynatech Video Group 17124
- Utah Scientific/Dynatech Video 17124
- Ampex Corporation 17401
- Panasonic 18101
- Grass Valley Group 18117
- Viedoteq 18132
- Ross Video 18632
- Smell & Wilcox 19063
- FOR-A Corporation M1529

**Routing & Distribution Switchers**

- Sierra Automated Systems 2710
- Videoquip Research 3315-17
- Video Accessory 11126
- Image Video 11216
- IRIS Technologies 11529
- Sierra Video Systems 11650
- Multidyne Electronics 12262
- Lighthouse Digital Systems 12337
- Yamashita Engineering Mfg/YEM 12810
- Avitel Electronics 12942-4
- Omicron Video 13040-2
- D-Tech 13106
- Television Equipment Associates 13410-411
- ESE 13606-8

**Standards Converters**

- Video Int'l. Development 11200
- VAS Group 11447-8
- Yamashita Engineering Mfg/YEM 12810
- Faroudja Laboratories 12827
- Quality Video Supply 13246-8
- Interlace Engineering Corporation 13601
- Microvideo Ltd. 13626
- Intevideo 13628-9
- Visteon Electronics 13835
- Accom 15766
- Wegener Communications 16133
- Magni Systems 17284
- James Gruner & Associates 17436
- Link Electronics 18676-778
- Snell & Wilcox 19063
- Miranda Technologies 19648
- Progressive Image Technology 19926
- Digipath 19929
- Prime Image 19984
- RGB Spectrum M1102
- Extron Electronics M319
- Communications Specialties Inc. M1228
- FOR-A Corporation M1529

**Time-Base Correctors, Frame Synchronizers**

- Digital Processing Systems 11832
- Ikon Video 12335
- Ensemble Designs 12646-746-7
- Hotronic 13611-2
- Nova Systems 13842-14042
- Digital Graphix 16624
Twenty five years ago Neil Armstrong made history by stepping on to the moon. Now Leitch has made history with technological achievements placing the company at the forefront of digital systems equipment.

If we can't fly you to the moon, we can guarantee you out of this world performance from all our Digital Glue™ products.

**Digital to Analog Encoders**

Leitch pioneered monitoring encoders with the introduction of the VSM-6800. Its superior performance and features remain unsurpassed, giving four PAL/NTSC outputs as well as four reclocked serial outputs from a serial 4:2:2 input. It is also zero SCH locked and can pass vertical interval signals such as VITC, teletext and closed captioning.

This is the proven industry leader for monitoring encoders.

The CES-3500 is a 'next generation' precision quality encoder. It uses 12 bit signal processing and unique filter circuitry to provide exceptionally high resolution PAL or NTSC outputs from a component digital source. It has many matchless features such as automatic timing to an external reference, low frequency digital jitter removal and advanced sync outputs all of which are setting new standards for composite encoders. This is an exceptional product at a surprisingly low price, and, it's available now!

When it comes to talking digital you should be talking with Leitch, the industry's No.1 choice. For more information on these and associated digital products call us today.
At the top of the world you have the bluest skies and the clearest vision.

With that vision and a reputation for innovation, Leitch delivers high performance serial digital technology through an advanced range of Digital Glue™ products.

**A to D and D to A converters**

Any conversion process from analog to digital or digital to analog requires accuracy and stability. With this in mind, Leitch has taken yet another leap forward by launching an A to D with digital filtering.

The new 3511AD component analog to serial converter sets the highest standards of conversion by using custom designed digital filter ASICs and innovative oversampling techniques. There is also an impressive range of practical features such as switchable looping YUV/RGB inputs, timing calibration markers, variable picture blanking and embedded EDH check words on the outputs. The Leitch range of modular 8 bit and 10 bit converters offers you the most choice and guaranteed performance.

When it comes to A to Ds or D to As, insist on precision, insist on Leitch.
Making Right Choices

The benefits of component digital technology are now well established, more and more broadcasters, cablecasters, post houses and facilities are moving over to serial. Sound advice on what to use and implementation comes from experience and technical expertise. Dealing with a 270Mb/s signal is quite different to a 5 MHz carrier. One of the foremost innovators in this area is Leitch, who has been designing and manufacturing serial products since the beginning of serial technology. Close working relationships with users have enabled the company to develop products and arrive at solutions geared to a wide range of applications.

Broadly grouped under the title Digital Glue, Leitch offers an enormous range of interfaces, converters, synchronizers, routing and signal distribution products, typically everything found at the core of technical installation. The DigiBus product line epitomizes the approach taken by the company to centralized functionality: as a single system can accommodate decoders, synchronizers, encoders, format converters and audio processing functions all operating together under an integrated control system. This is the industry's first achievement in open architecture' hardware where groups of modules replace traditional racks of equipment, saving space and power and simplifying installation. An interesting application of this is at WTTG-TV in Washington DC.

WTTG is believed to be the first Fox affiliate to 'go digital'. Weighing up the balance between a new analog installation and digital was initially a risky thing. It became apparent as time went on that serial digital technology was becoming more available and affordable.

Discussions with various manufacturers revealed that the future of signal distribution is serial 4:2:2. With this in mind, when the 'go' button was pressed, WTTG confidently stepped forward into the digital world. The tough decisions were not which choice of switcher or CG, but how to equip the technical infrastructure, particularly as they would need to transition to digital over a period of time. It was important to choose suppliers who could cover the bases, minimize any potential interfacing and signal conversion issues.

Leitch was selected because they met the criteria and, amongst their products, the DigiBus system provided an efficient way to 'bridge' between analog and digital. Their particular problem was to take NTSC feeds, together with analog audio, into and out of a serial island.

"Digital bridges were the key..."

The DigiBus system provided an integrated platform where multiple decoders, video synchronizers and audio synchronizers all operate together and under a common control system. As the facility gradually replaces its old analog equipment then the DigiBus system can be equipped with additional modular products and so the technical infrastructure migrates effortlessly to its serial future.

WTTG's confidence in Leitch was backed up across the board with digital encoders, distribution amplifiers, monitoring encoders, totaling over $400,000.

WTTG-TV facility in Washington, DC

Earlier this year, Arnold Palmer opened the new Golf Channel with all the razzmatazz of a new station. Broadcasting 24 hours a day, means that golfer lovers will now have to decide whether to watch TV or go out and shoot birds. This channel has made a few good scores of its own. It's one of America's first all digital stations and was on the air in record time. Leitch tied it all together as a main supplier of terminal equipment, at the core of the station.

"Leitch was chosen because of its reputation for quality equipment and commitment to customer service."

Typical of the switch to digital is ABC in New York, who built a new component digital graphics suite using Digital Glue to interface with its existing NTSC plant. This was one of the first U.S. installations of Leitch's NTSC to 4:2:2 decoder, which ABC is using to convert NTSC signals between their plant router and the 4:2:2 suite. ABC, like many other users, such as Edilet, Turner Broadcasting, and The Family Channel have turned to Leitch for solutions to their digital installations.

On March 30, 1995, the ribbon will be cut on Home and Garden's new facility. HGT is making its mark not just by its popular programming, but by setting new standards for program production.

By choosing a serial digital infrastructure, HGT made a significant decision to take advantage of the very latest technology. Although editing, graphics, and network origination are serial components, HGT still receives and transmits analog NTSC signals. Leitch was chosen as a major equipment supplier because of its "very solid reputation for reliability" as well as its capability to deliver core key equipment. For the short term the cablecaster will be mixed format, analog and digital. Commenting on their experiences, HGT said that serial was, "surprisingly easy to install and maintain, it even simplified our production process." HGT is very much a leader in its decision and Leitch was delighted to be associated with this successful project.

With so many installations complete, the issue amongst users is how to analyze and verify digital signals in service. The preferred methods with engineers is EDH techniques (Error Detection and Handling). Once again, Leitch is playing a major part in the implementation of this new technology and is working with users on field testing. We will be talking about this subject in more detail in the future. Meanwhile, for more information on serial digital technology, Digital Glue products, EDH, or would just like to talk to Leitch about installing serial digital systems, call any of the numbers below:

Leitch Regional Contacts

U.S. Headquarters: 800-231-9673 or 804-548-2300
Western Region: 800-380-1676 or 714-458-2952
Central Region: 800-861-9440 or 317-861-9440
South Central Region: 800-401-3770 or 214-401-3770
Northeastern Region: 800-623-4824 or 201-226-4933
Western Region: 800-231-9673 or 802-548-2300
Southeastern Region: 800-641-1277 or 404-650-6707
Canada: 800-387-0233 or 416-445-9640

...serial "was surprisingly easy to install..." - HGTV

Circle (45) on Reply Card
Just as a lagoon is separated from the ocean by reefs and sandbars, so your digital facility is separated from a sea of analog signals.

**Audio and Video Synchronizers**

Synchronizing signals with Leitch equipment brings a tranquility and peace of mind that we call ‘Glue lagoon.’ Performance is guaranteed by using innovative and proven technology to perform video retiming functions or to stabilize the most turbulent audio and video feeds.

Therefore, should you require multiple synchronizers operated under a single powerful control system, synchronization of audio to video or simple line synchronizer functions, Leitch offers the complete solutions.

With experience and understanding Leitch applies advanced technology to your applications, bringing the most effective solutions to modern broadcasting.

Call Leitch or your nearest dealer today.

Circle (46) on Reply Card
BE FASTtrack

Microtime - See Digital Graphix 16624
Broadcast Electronic Services 16771
James Grunder & Associates 17436
Videtek 18132
Pixel Instruments 18638
Zaxcom 19069-269
Prime Image 19984
FOR-A Corporation M1529

Technical Aesthetics Operation/TAO 15662-3
Videomedia 15724
Accom 15766
Steenbeck 15811-12
Evertz Microsystems 16045
PEP 16600-701
PROSOURCE/Broadcast Marketing 16658
Broadcast Electronic Services 16771
Amtel Systems 16804
ADCOM 16804
Montage Group 16980
BTS Broadcast Television Systems 17011
EMC/Dynatech Video Group 17124
VideoLab Para Technologies 17322-422
JVC Professional Products 17359
FOR-A Corporation M1529

NOW ISLATRON® "PLUS" ...before the damage is done

A "NEW" Generation of the "Famous ISLATRON®" proven over 20 years of protecting your equipment from the toughest power line problems.

Its high speed "Active Tracking Filter" safely guards both your income and equipment investment.

Your sensitive electronics are protected because "ISLATRON®-P us" continually tracks, attenuates and clamps incoming spikes and transients.

Also, for "Super" Protection of Satellite equipment, Control systems, Computers, Fax and other electronics.

Positive protection for both production and transmitting equipment.

For the Islatron-Plus success story see us at NAB, Booth 16014 and 16015 or call 800-288-6169 toll free.

CONTROL CONCEPTS
A Subsidiary of the Liebert Corporation

WE PUT OUR TECHNOLOGY ON THE LINE™

328 Water Street
Binghamton, New York 13902
607-724-2484 Fax 607-722-8713

Circle (47) on Reply Card

March 1995 Broadcast Engineering 95
Come test our New SERIAL DIGITAL Interconnects!
Almost anywhere you go, you can find reminders of the past.
Media Pool moves you into the future of video one drop at a time or with a big splash. Start small without spending a fortune, expand your pool into multiple applications as budget allows, and save money everywhere disk replaces tape. Real savings - not just lower maintenance costs - save time, manpower, and streamline operations throughout your facility.

With Media Pool in your future, there’s every reason to break with the past.
Most important of all, Media Pool represents video technology from a company who understands the video world. Real 601, real genlocking, real timecode, industry standard protocols, GPIs, GPOs – it's in there. And we didn't forget audio either. Record one to 16 simultaneous AES/EBU digital audio tracks with each file. We understand computer technology too – Ethernet TCP/IP for control and file transfers and Fast Wide SCSI 2 connections to other computers or data storage archives. It's all from the same company that has been bringing you the latest developments in television technology since the beginning of television.

Go ahead, make Media Pool your choice for that first step into the future of television.

**HERE ARE A FEW OF THE NUMBERS ON MEDIA POOL:**

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage Time</td>
<td>40 minutes to 80 hours uncompressed</td>
</tr>
<tr>
<td></td>
<td>3 hours to 480 hours at 6:1 compression</td>
</tr>
<tr>
<td></td>
<td>All media available to all channels at any time</td>
</tr>
<tr>
<td>Compression</td>
<td>Selectable constant bit rate or constant quality Discrete Cosine Transform (DCT)</td>
</tr>
<tr>
<td></td>
<td>2:1 to 40:1 or none, variable at any time on any optioned channel</td>
</tr>
<tr>
<td>Number of Channels</td>
<td>One to Sixteen Video/4 Audio Channels, field expandable</td>
</tr>
<tr>
<td>Video I/O</td>
<td>Serial Component Digital Video</td>
</tr>
<tr>
<td></td>
<td>CCIR 656 8 or 10 Bit</td>
</tr>
<tr>
<td>Video Standards</td>
<td>Software configurable to 625/50 or 525/60 on a channel by channel and file by file basis</td>
</tr>
<tr>
<td>Time Code</td>
<td>XLR LTC input &amp; output and/or VITC</td>
</tr>
<tr>
<td>Audio I/O</td>
<td>AES 48 kHz 24 bit, optional 4 channels per I/O</td>
</tr>
<tr>
<td>Video Reference</td>
<td>Serial Component Digital CCIR 656 or Analog Reference</td>
</tr>
<tr>
<td></td>
<td>Independent reference per I/O</td>
</tr>
<tr>
<td>Audio Reference</td>
<td>AES sync reference or Video reference</td>
</tr>
<tr>
<td>Control</td>
<td>Ethernet LAN, RS-422, and/or GPI</td>
</tr>
<tr>
<td>Storage Medium</td>
<td>Redundant Arrays of Independent Drives (RAID) level 3 with 10 GB standard computer SCSI hard drives</td>
</tr>
</tbody>
</table>
You know the problems of living in the past—high operating cost, growing maintenance problems, worries about equipment reliability.

There's a new alternative that offers you the chance to break away and take a step into the future of television—the Media Pool video server system from BTS.

Leave those tape-based worries behind and move into a whole new world of instant access, absolute reliability, and easy system expansion.

Go ahead, imagine the possibilities for your operation. Broadcast, Post, Satellite—whatever part of the video universe you work in—Media Pool can liberate you and give your operation the competitive edge you're looking for.

Give BTS a call. Let us show you how Media Pool can give you the freedom to move into the future, today.
Media Pool offers the most future proof technology available - full bandwidth capability at every I/O, instant variable compression and unlimited expandability. In Media Pool, we’ve built a video server that combines the best features of VTRs, Disk Recorders, and the newest high speed data technology.

Expandable drive array modules allow this system to start with minutes and grow to hundreds of hours using cost-effective unmodified computer hard drives. A pool of audio and video information is available in one stream, two streams, up to 16 simultaneous record or playback streams.

Expandable Bandwidth gives you compressed or full 10 bit CCIR 601 streams or any combination to fit your needs.

Compressionist™ Quality Composer lets you choose any level of space saving DCT compression every time you go into record. You can even preview the relative quality in E-E.

Impressive software turns a Media Pool channel into a full featured VTR, an automated spot player, or a wide variety of other products through a universe of third party applications. Our open platform philosophy lets this video server link to a growing list of video products from the world of professional video. Powerful system management tools make delegation of hardware resources easy and flexible. All housekeeping functions like adding users, protecting files, monitoring usage, and troubleshooting are done with SPLASH, the Software Program for Logical Administration of System Hardware.

Our advanced RAID architecture gives Media Pool unmatched reliability — parity drives protect from any drive failure with no impact to operation! Fast Swappable hard drive sleds let you replace that failure without missing a beat. Rock solid mechanical design insures reliability against physical assault. Redundant fans and a full failure alarm system are standard in every system. Redundant power supplies, controller cards, hot spare hard drives, even redundant data pathways can be added to any system to create a snug security blanket.
You really don’t need to work in one.
The 8X Sub-carrier, 10 bit processing achieve no visible quantization noise. The matching audio delay can handle the lip sync perfectly. The Analog to Digital format transcode will meet with the needs of the new digital world.

Please see us at NAB Booth #13611

HOTRONIC, INC.
1875 So. Winchester Blvd. • Campbell, California 95008 • USA
Tel: (408) 378-3883 • Fax: (408) 376-3888

Circle (60) on Reply Card
Central Tower  2411  Kay Industries  2307  Fiber-Optic Equipment
Utility Tower  2528  Cortana Corporation  3909  Lightwave Systems  1807-8
LPB  2727  Superior Electric  5113-4  Telecast Fiber Systems  10458-358
CTE International  3201  Professional Sound Corporation  5116-7  C-COR/Comlux  11510
Magnum Tower  4010-11  Alexander Batters  11116  Meret Optical  12748
Hallikainen & Friends  4223  Antoine/Bauer  11210  Mohawk/CDT Broadcast Cables  13404
TWR Lighting  4323  Christie Electric  11608  Fiber Optics  16571-673
Shibev Labs  4425  Ikon Video  12335  Electronics Pty. Ltd.  18169
Hughes & Phillips Inc.  4722-3  Lighting Eliminators & Consultants  12900  Ortel  18377-477
Econco Broadcast Service  4823  United States Broadcast  13412-6  Canon USA/Broadcast Optics  18456
Access Global Communications  5115  Frezoloni Electronics  13421-22  VYVY National Video Network  19763
Svetlana Electron Devices  5313-4  Victory Battery Company  13630  ADC Telecommunications  19935
Phaetek Inc.  5427-8  Control Concepts/Leibert  16014-5  Studio Support Products & Accessories
Gentner Communications  5621  Cinel 60  16253-453  Bradley Broadcast Sales  1903
Advanced Broadcast Systems  10161-261  Paco Electronics USA  16764  Illbruck  2904-5
California Amplifier  10456-556  ENG Mobile Systems  17043  Pacific Recorders & Engineering  3025
Modulation Sciences  11113-8  Band Pro Film/Video  18370-870  Wheatstone Broadcast Group  4709
BURLE INDUSTRIES  12100-1  Pro Battery  19151-251  Tripp Communications  10656-756
Larcan-TTC  12500  BAF Communication  19652  EMCOR Products/Cenlo  11532
Thomson Tubes Electroniques  12505  Pedestal Camera  12701  Clipper Products  11546
Lightning Eliminators & Consultants  12900  StandarD  12705  Uniset Corporation  11600
TR/Information Transmission  12950  GEC Marconi Communications Systems  17010
Richardson Electronics  13100  Garter Systems  13150  Winneted Corporation  11827, M1718
Varian Canada Microwave Products  13805  Dataworld  13810  Beck Associates  12350
Varian Power Grid Tube Products  13805  EDX Engineering  13820  AMCO Engineering  12510
Varian Microwave Power Tubes  13805  Communication Graphics  13830  Stanton  12832
Acrodyne Industries  13821  NDG Phoenix  13840  Hi-Tech Industries  12940
SWR Inc.  14845, 15745  Television Engineering  13850  Pacific Radio Electronics  12946-8
Aydin West  15707  Wadsworth/ITP  15656-7  Acoustic Systems  13417
Tennaplex Systems  15707  AF Associates  16338  Torrey Controls & Engineering  13418
Scala Electronic  15707  Doty Moore Services  16371-471  Acoustic Solutions  13419
MYAT  15714  Rees Associates  17122-222  ESF  13606-B
Dielectric Communications  15720  JBA  19652  Theatre Service & Supply  13637
3Jdm  15745  Lighting/DESMAR  19752  Industrial Acoustical/AAC  14039
LDI Communications/Larcan  15855  Hoodman Corporation  15367
Will-Burt  16114-5  Matthews Studio Equipment  16448  Cinemills  15655
Comark Communications/A Thomcast Co.  16117  Studio Support Systems  15860-66
Thomascast France  16117  DeSisti  15942  Matthews Studio Equipment  16668
Kline Towers  16367  ERGO 90/Ergo Industries  16984  DeSisti Lighting/DSEMAR  16984
Dory Moore Services  16371-471  Total Technical Systems  17043  ERGO 90/Ergo Industries  19052
Electronics Research - ERI  16604  Solidyne  5107-8  Forecast Consoles  19237
Stainless  16608-908  Professional Sound Corporation  5116-7  Electrorack Products  19566-67
Jampro Antennas  16617  Balboa Capital  10459-559  Marco Inc.  15984-6
Cablewave Systems/RF Systems  16643  Media Concepts  11442  AMX Corporation  M1421
Italiana Ponti Radio SRL  16677-777  BCS Broadcast Store  13242  Anthro Technology  M1714-16
GEC Marconi Communications Systems  17010  GEPCO International  13251  Tape, Optical Recording Media & Accessories
EMCEE Broadcast Products  17016  United States Broadcast  13412-6  Apogee Electronics  1601-2
EEV  17136  H.L. Dalis  13430  Fresh/The Music Library  2201
ITELCO spa  18514  Systems Wireless  13634-5  U S Tape & Label  2508-9
Sira Sistemi Radio srl  19359  Antenna Technology  19375  Branson Country Music Network  2712
Antenna Concepts  19375  Micro Communications  19401  Fidelipak  3122
MCI Inc.  19582-3  Antenna Communication  20014  audiopak  4219
Allen Osborne Associates  19877-977  Broadcast Int’l Group  19976-20176  Halland Broadcast Services  5625
Andrew Corporation  19914  Harris Allied Broadcast Division 4416/16001  Killer Tracks Music  10455-755
Broadcast Int’l Group  19976-20176  Harris Allied Broadcast Division 4416/16001  Tripp Communications  10656-756
Power Products - Batteries, Chargers, UPS  2427  Multimedia Accessories/TTL  M1120  Audio Action  11127-8

98 Broadcast Engineering March 1995
When you see this name on a post production range you can expect something special
Digital Switcher - Analog Price

DVS1000
Component Digital Switcher & Router

A unique, compact, cost effective switcher - the DVS1000 is designed for telecine bays and other applications such as graphics, animation or presentation bays outside broadcast vehicles, small edit bays and training organisations.

It provides transparent, component digital quality, without the complexity, expense and space requirements of a conventional digital switcher.

The DVS1000 accepts 8 SDI component inputs and has 4:2:2, 10-bit processing throughout. As the unit is entirely digital it allows maximum performance to be obtained from today's 10-bit DVTRs.

It offers an optional downstream keyer, with external key and fill, and is available in 16:9 aspect ratio.

This is a serious switcher in a small box.
Magus
Digital Video Effects

Magus is a high quality 3D digital effects system, whose unique architecture enables the cost-effective single-channel production of many popular effects previously only available on dual channel DVEs (see overleaf).

The system is modular in concept, going from a 3D digital effects frame-store up to a multi-channel system, with the option of digital component layering mixer, with wipe and transparency.

All processing is done in the industry standard digital 4:2:2:4 domain, using 12 bit internal processing. Supero filtering quality and Dynamic Rounding™ ensure transparent processing quality.

Circle (63) on Reply Card
DVS1000
Component Digital Switcher & Router

- Digital quality without the price penalty
- Designed for telecine, 3D animation, graphics, special projects and simple edit applications in broadcast and post-production
- Eight channel switcher, providing 8x4 serial digital routing matrix
- Downstream keyer option with external key and fill
- Maintains 4:2:2 signal path
- Eight serial inputs of 4:2:2 video processed to full 10-bit resolution
- Multiple wipes with variable edge softness. Auto transitions, internal black and background generators
- Six integral switching busses, four output busses. External control from editor
- 525/625 Switchable
- Available in 4:3 or 16:9 aspect ratio

Magus
Digital Video Effects

- 3D effects with perspective
- Dual image effects on single channel
- Warp effects as standard
- Live, still or matte backgrounds
- High quality filtering and interpolation
- Dynamic Rounding™*
- Still store capability
- False color, quantization, pixelation and defocus which can all be manipulated within the picture
- Linear keying throughout
- Sophisticated trails and sparkles
- Extensive ripple controls
- Lighting and shading effects
- Corner positioning
- Variable strobe with motion blur effect
- GPI and serial protocol interfaces
- Selectable 4:3 or 16:9

Examples of Magus single channel effects**

- True 3D with intersecting planes
- Warp with drop shadow over internally generated background
- Circular ripples with lighting
- Dual source, double-sided pageturn
- Push on / push off with widescreen
- Off screen shots

Snell & Wilcox offices:
USA Tel: +1 408 734 1688 Fax: +1 408 734 4760 UK Tel: +44 (0)81 607 9455 Germany Tel: +49 611 99 0840 Japan Tel: +81 3 3446 3996 Italy Tel: +39 6 66 38 594 France Tel: +33 1 47 89 83 08 Russia Tel: +7 095 1926992

* Dynamic Rounding™ is used under license from Quantel Limited
** Off screen shots

Circle (64) on Reply Card
Choose the right tools... then forget about them!

BMT-75 Series Transmitter
- 50 cubic inches
- High/Low output: 12w/3w
- FCC Type Accepted

BMT-55 Series Transmitter
- 13 cubic inches
- High/Low output: 3w/1.75w
- FCC Type Accepted

BMS Solutions:
- Transmitters
- Receivers
- Antennas
- Airborne Systems
- Mobile Systems
- Manpack Systems
- Camera Transmitters

Breaking news. Special events.
Anything that requires live video coverage. The last thing you should have to worry about is your ENG microwave system.

That's where BMS comes in. With the industry's most versatile and reliable high-performance equipment and systems. Practical solutions for the real world. Where the news is.

And our latest generation of frequency-agile 2GHz radios continues the tradition...

5795 Kearny Villa Road • San Diego, CA 92123-1190 USA
FAX 619/560-1637 • PHONE 619/560-8601

Circle (65) on Reply Card

March 1995 Broadcast Engineering 103
Jensen Tools 16609
Philips TV Test Equipment A/S 16811-5
Veetronix Inc./Reach 16909
Marconi Communications Systems 17101
Magni Systems 17284
ASACA ShibaSoku 17406
James Grunder & Associates 17436
Hamlet 17436
ComTek 17521-721
CAMPLEX/Concept W Systems 17784
Videotek 18132
Vehicular Technologies 18369-569
RE Electronics 18378-478
AAVS/Sencore 19623
Hewlett-Packard 19656
Vehicles & Remote Support Equipment
Shook Electronics A1
E-Z UP International 4821-2
KD Kanopy 5204-5
Telepak San Diego 11102-3
Keystone Communications 11228
Clipper Products 11546
Thermodyne International 13114
Television Engineering 13116
Anvil Cases 13126
Wescam Systems International 15470-570
Professional Label Inc. 15728
Wolf Gauch 15862
Will-Burt 16114-5
AF Associates 16338
Codium Case 16758
Nalpak Sales 16964
ENG Mobile Systems 17043
Hardigg Industries 19351-451
Advent Communications 19377
BAF Communication 19652

Wire, Cable, Connectors
Neutrik USA 2127
Delco Wire & Cable 2204-5
DGS Pro Audio 4605
Switchcraft 5010-11
Professional Sound Corporation 5116-7
RCI Systems Inc. 10361
Canare Cable 11118-22
LEMO USA 11222
Whirlwind/US Audio 12507
Trumper Electronics 12800-1
GEPCO International 13251
Mohawk/CDT Broadcast Cables 13404
H. L. Dals 13430
Wireworks 13602-3
Clark Wire & Cable 13604-5
Connectronics 13627
Nemal Electronics International 13636
United Ad Label 13639-739
Audio Accessories 13642-742
Union Connector 16358-9-459
Mileseik 16445
Insulated Wire 16571
VEAM 16659-759
TECNEC/Technical Necessities 16711
Kings Electronics 17821-921
Belden Wire and Cable 19233
West Penn Wire/CDT 19570
ADC Telecommunications 19935
Extron Electronics M 319

BURLE Remains #1 Supplier for Broadcast Power Tubes.

BURLE has maintained the recognized standard of excellence within the Broadcast Power Tube industry. Although the name has changed, our quality has remained the same for over 50 years.

BURLE’s proud tradition continues with the best warranty and customer service in the industry. In fact, our dedication to customer support continues long after the warranty is over.

BURLE’s Broadcast Power Tubes are the best investment you can make. For more information, call us today in the United States at 1-800-827-8823.

In Europe, 44-93-276-5666.

With Extended Warranty

ISO 9001 CERTIFIED

Circle (66) on Reply Card
What's a Page Turn Without Different Video Front and Back...or a Ripple Without Shading...or a Four-Corner Page Peel That Takes More Than One Pass?

Clearly it's not a Refractor curvilinear effect from Pinnacle. While others in our price range can only make waves we do it all. Harness the power of the Prizm Video WorkStation with Refractor.

See us at NAB, Booth #18380.
The Aphex Air Chain has given stations throughout the world more listeners by increasing fringe area coverage and reducing multipath distortion. After installing the Air Chain, WDRE-FM, a suburban New York City station, is reaching over one million more people! And their listeners are staying tuned in longer. Why? Because the Aphex Air Chain is the cleanest, most natural sounding processing available—regardless of music format—while still maintaining competitive loudness.

If you want to reach more listeners and keep them tuned in longer, call us today for your “Pick Up Listeners Anywhere” package.
Imagine a location with 5.2 billion people, 135 million square kilometers of land and 1.4 trillion cubic meters of water, and it's all yours.

France Telecom proves it at NAB '95. We'll be sending broadcasters' NAB coverage around the world via our ad-hoc digital video services. Come and take advantage of our transmission facilities and see how the world can be yours in the NAB Broadcasters' Executive Lounge sponsored by France Telecom, Room N243, LVCC.

France Telecom

Circle (67) on Reply Card
Exhibitor Highlights

A comprehensive listing by company of product introductions for the 1995 NAB Convention.

Acoustic Systems
Anouncer facilities, voice-over booth. Circle (306) on Reply Card

Acoustical Solutions
Acoustic treatments including AlphaSorb wall panels and hanging baffles; Audio Seal sound barrier; modular recording booth, 4'x3'4"x6'. Circle (307) on Reply Card

Acodyne Industries
Introducing TRU/60KD Diacrod-eqipped 40-60kW UHF transmitters; TLU/100E 100W, TLU/1KE 1kW, TLU/1KE 2kW solid-state LPTV UHF transmitters; TRU/1K 1kW, TRU/2K 2kW, TRU/5K, TRU/10K solid-state UHF transmitters. Circle (308) on Reply Card

Adams-Smith
Augan digital audio workstations. Circle (309) on Reply Card

ADC Telecommunications
Signal distribution products, LightSwitch fiber/coax digital routers and video converters; "true 75O" BNC connector family; S-8 RS-422 patchbay. Circle (310) on Reply Card

ADCOM
NIGHT Suite D-1 non-linear video production system. Circle (311) on Reply Card

Adda Technologies
Circle (960) on Reply Card

ADM Systems
Audio mixing consoles. Circle (312) on Reply Card

Adobe Systems
Adobe Premiere 4.0 for Macintosh and Windows. Circle (313) on Reply Card

Adrienne Electronics
Introducing AEC-Box 30G serial LTC data inserter with LTC generator; AEC-Box-60 video sync monitor, RS-232/422 output; Windows interface for existing PC-based time-code boards. Circle (30) on Reply Card

ADT
Circle (961) on Reply Card

Adtec Productions
Introducing Ad Maestro low-cost network commercial inserter; Lite-Ning automated playback controller (V 2.0); Active Broadcasting System automation system; Operator, on-demand remote-control device. Circle (315) on Reply Card

Advanced Broadcast Systems
10161-251
CST computer supervised IOT UHF TV transmitters with integrated remote control, auto-logging; HEPS BCD pulser to cut power costs with klystron-based transmitters. Circle (316) on Reply Card

Advanced Designs
12905-6
Introducing enhanced 32-bit radar graphics display with street-level mapping, Storm Path Analyzer; 32-bit time-lasing; 32-bit NEXRAD display with street-level mapping. Circle (317) on Reply Card

Advanced Digital Imaging
15169-369
Digital Magic non-linear editing, compositing, special effects and rotoscoping; direct QuickTime control; Adobe Premiere editing interface; CoSA special effects; Photoshop frame-by-frame editing. Circle (318) on Reply Card

Advanced Imaging
Circle (962) on Reply Card

Advent Communications
19377
D-SNG NewSwift motorized/vehicular and NewSwift Flyaway, world's smallest systems; D-SNG C-band Mantis Flyaway; digital and analog products; communications packages; test, monitoring system; remote-control systems; excitors, converters, receivers, modulators; VSAT, DAMA. Circle (319) on Reply Card
Providing the highest quality digital video for desktop video solutions.

Fox Television, NBC, BBC, ITN, Editel, Post Perfect, the 1994 Winter Olympics, and the Academy Awards – broadcast, post production, design, and multimedia companies worldwide depend on the quality and creative flexibility of the Video Explorer system to provide quantifiable broadcast quality video from a personal computer. The core of complete modular video systems, Video Explorer is transforming the professional video industry with advanced solutions for compositing, animation, graphics, character generation and much more.

Animation & Graphics

The broad range of available software such as Electric Image™, Linker Systems Animation Stand™, Fractal Designs Painter™, Crystal Graphics Crystal Topaz™, and Adobe Photoshop™, plus the highest quality video input/output, makes Video Explorer the platform of choice for both animators and designers alike. Employ multiple high-end graphics and animation stations for less than the cost of a single dedicated electronic paint system.

Character Generation and Video Tools

Put a Video Explorer and a Macintosh personal computer in your on-line suite to keep edit sessions moving smoothly:

- Directly import/export computer graphics and logos to your switcher or paint system in real time.

- Perform touch-ups on shots and create complex mattes, right in the edit suite, for a fraction of the cost of traditional methods.
- Make thousands of fonts, textures, filters and more available to your electronic paint system.
- Eliminates slow ethernet and Exabyte file transfers.

System Features

- The Video Explorer system provides uncompromised image quality in:
  - Component Digital (CCIR 601),
  - Multi-Component (including MII, Betacam, SMPTE YUV, & RGB),
  - RGB, and
  - YC/Composite Modules.

- Achieve uncompressed digital video for multiple video inputs and outputs as well as integration with third-party products such as digital disk recorders. All this is possible through VideoBahn®, Intelligent Resources' industry standard real-time video bus.
- Video Explorer configurations support NTSC, PAL, SECAM, and Macintosh video rates.
- Requires a Macintosh personal computer with 12 inch NuBus slots.

Compositing & Rotoscoping

Create high-quality, low-cost multi-layer compositing, special effects and graphics over video by integrating Video Explorer with ADI's Digital Magic™ and QuickTime™ compatible software such as Adobe After Effects™ and Adobe Premiere™.

Computer Images

Effects

Video Clips

Composite

Scrolled Type

Systems start as low as $3995.

Contact Intelligent Resources at 708-670-9388 for more information and the name of your nearest dealer.

INTELLIGENT RESOURCES

INTEGRATED SYSTEMS

3030 Salt Creek Lane, Suite 100, Arlington Heights, IL U.S.A. 60005-5000
Phone: (708) 670-9388  Fax: (708) 670-0585

Circle (68) on Reply Card
AF Associates 16338
Tapeless digital technology; digital server systems; advanced post-production digital technology; turnkey systems design, engineering and fabrication; consulting engineering services; Radamec-EPO camera robotics; digital computer and disk-based solutions for broadcast and post-production.

AfterGlow Inc. 16585

Aircraft Production Music Libraries 19203-4
Music libraries on more than 70 CDs; introducing "Jazzvertising" jazz-based rhythm tracks; "Co-pilot" split tracks for customizing.

AKAI Digital 5021
Digital recorders, including the DR8 hard-disk recorder; MT8 Mix tab, DD1500 digital audio workstation.

AKG Acoustics/Harman Pro Audio 2910

Alamar Electronics USA 11829
Automation control products and software including MC-series station automation systems, Media Manager library database and satellite resource management.

Alcatel Network Systems 18084
Microwave link products; TM 400 series for audio, video.

Alden Electronics 12901
Weather graphics systems; NEXRAD data demonstrations.

Alesis 18372
Digital audio products, ADAT multitrack recorder, remote-control equipment.

Alexander Batteries 11116
Batteries and battery maintenance equipment, tri-analyzers, smart chargers.

Algo Rhythmic Technology 1916-7
Graphics software, Animator, PowerAnimator 3-D modeling, rendering, animation.

Allen Avionics 19211-2
HEC-2000H, HEC-3000 hum eliminators; mini low-pass, CCIR 60 and HDTV filters; VNE-75-3-3-channel video noise reducer; VTE-75-3-3-channel isolation transformer.

Allen Osborne Associates 19677-977
Featuring Hilomasts, telescopic pneumatic-operation masts for remote ENG, field testing, surveillance applications.

Alphard Image/Dynatech Video Group 17124
See Dynatech Video Group.

Alpha Lyracon/Panamsat 10049
Program distribution, global satellite services; syndication services; ad hoc and special events coverage; satellite news gathering.

Altronics Research 15800-2
Model 3500 digital calorimeter for air-cooled dummy loads; featuring standard line of air- and water-cooled dummy loads.

AMCO Engineering 12510
Equipment enclosures; introducing an extended line of enclosures for monitoring applications.

AMEK Consoles 19348
A new console will be shown with 2-input paths, 4-band EQ per input module, routing to 24 buses, 16 aux sends, Supertrue fader/mute automation, Recall, Virtual Dynamics; 9080 console, designed by Rupert Neve; Big by Langley console; 501 and Recall by Langley.

American Broadcast Systems 15729-829
Automation systems.

American Studio Equipment 16361
Motion picture equipment; grip products; rental programs.

Are You Really Ready for Digital Audio?

Have You...

I you're just thinking, or ready to start, NVISION can help. Our catalog of application notes provides valuable design information in addition to complete specifications on all NVISION products. Please call. We'd really like to help.

Circle (69) on Reply Card
The **pro-bel** Group of companies – Pro-Bel, Procion Innovative Control Systems and Trilogy Broadcast combine their resources to bring you complete systems capability.

- ANALOG A/V ROUTERS
- DIGITAL A/V ROUTERS
- INTERCOM SYSTEMS
- TOUCH SCREEN APPLICATIONS
- MODULAR TERMINAL EQUIPMENT
- Protocols CONVERTERS
- SYNC PULSE GENERATORS
- USER FRIENDLY CONTROLLERS

**AND MUCH MORE**

**pro-bel**

4480 North Shallowford Rd.
Dunwoody, GA 30338-6410

Telephone: (404) 396-1971
Fax: (404) 396-0595

Atlanta • San Francisco • Boston • Orlando and growing!

Circle (85) on Reply Card
AmPro
Multimedia video projection systems.
Circle (339) on Reply Card

Amtel Systems
16804
Editing controllers, E-Trax workstations and E-Pix interface products.
Circle (340) on Reply Card

AMX Corporation
M1421
Teleconferencing, multimedia products.
Circle (341) on Reply Card

Anacapa Micro Products
M 819
11504-6
Intercom systems, introducing the 2-channel wired PORTACOM; sound systems, including Voyager PB-3000.
Circle (342) on Reply Card

Andrew Corporation
19914
Introducing vertically polarized Shadowmaster antennas; 6-foot STL grid antennas; 3/4” HRLine rigid line, EW20 elliptical waveguide wideband connectors; top-mount ALP antennas; Digital Valink, 4.5M dual-reflector earth station antennas; MT 050 low-volume automatic membrane, MRS 052 Slim Line manual regenerative dehydrators.

Circle (343) on Reply Card

Angenieux SA
19226
Video camera lens systems.
Circle (344) on Reply Card

NAC Visual Systems/Angenieux
19226
Video camera lens systems including the 3/4” 1.5x8.3 AIF (assisted internal focus) lightweight lens for ENG; the 6.2x9.5 AIF 1/2” OB lens.
Circle (345) on Reply Card

Antenna Concepts
19375
UHF and VHF antennas from low to high power, in slot, panel and corner reflector designs; high gain CP Blaster for LPTV directional patterns; introducing CP FM panel transmit antennas covering the entire FM band; transportable omnidirectional VHF antennas.

Circle (346) on Reply Card

Antenna Technology Corp./ATC/13643-14043
Featuring Vanguardue spectrum analyzer, satellite receiver, monitor; SimulSat multibeam antennas; PROFLine electronics; voice and data systems; satellite videoconferencing equipment.
Circle (347) on Reply Card

Anthro Technology M1714-16
Facilities furnishings; introducing Anthro editing stations, a modular, mobile and adjustable work unit; holds monitors, rack equipment, digitizers, printers, large keyboards.

Circle (348) on Reply Card

Anton/Bauer
11210
Introducing Digital Trimpac, capacity of more than two times OEM slide-in batteries, on-board “fuel computer,” Lifesaver Dual and Q2 2-position chargers; Ultralight Satellite includes Ultralight2 mated with Gold Mount bracket; featuring Logic Series InterActive batteries, Microprocessor chargers.

Circle (349) on Reply Card

Anvil Cases
13126
Transport cases for delicate equipment, A.I.R. isolated rack types.

Circle (350) on Reply Card

Aphex Systems
2125
Model 107 Tulessence tube type 2-channel mic pre-amp; model 722 Dominator includes defeatable pre-emphasis.

Circle (351) on Reply Card

Apogee Electronics
1601-2
Model AD-1000 digital conversion system; Wyde-Eye digital audio cable; Master Digital audiotype; UV1000 super CD encoder; Master Tools mastering software for Digidesign.

Circle (352) on Reply Card

Apple Computer Company
M1403
Personal computers, multimedia equipment.
Circle (353) on Reply Card

Array Microsystems
M1434
Circle (967) on Reply Card

Arriflex
17152
Motion picture cameras, Arriflex 535; support products; ARRI geared head; lighting products.
Circle (354) on Reply Card

Circle (86) on Reply Card

Quick-Frame™
At home in a digital house

At a nearby digital studio, a dozen animation/effects workstations are positively humming, piloted by twelve talented operators, each with their favorite application. And though they’re all working with uncompressed 4:2:2 component digital video—in real time—you won’t find their cubicles cluttered with towers of disk storage. That’s because all the digital material required by the entire team is stored by one Quick-Frame Video Disk System and channeled seamlessly to the workstations via Sierra Design Labs’ new SCSI Frame.

Roomy Storage in Tight Quarters
Quick-Frame revolutionized digital video recording by providing from 3 to 24 minutes of uncompressed B1 in just 5/8 inches of valuable rack space. With Ethernet and SCSI interfaces—plus support from all leading SGI-based applications—Quick-Frame now plays host to animation, paint and 2D/3D effects. No wonder broadcast, telecine and post facilities welcome the Sierra solution.

Architects of Network Storage
Sierra innovation continues with SCSI Frame, a low-cost combination of SCSI, real-time frame buffering, and serial B1. High-speed access to uncompressed COR601 video is provided for 1 to 24 applications with no additional workstation hardware investment. Built-in analog video output supports the display of Quick-Frame video data being recorded or played back.

Remodel Your House with Quick-Frame
Quick-Frame has rapidly become the VDR of choice for post houses, animation and effects software manufacturers, production facilities and television stations worldwide. Video Systems even named it a Pick-It of NAB ’94.

Call Sierra Design Labs today and find out how to furnish your digital studio with Quick-Frame.
LNR offers lightest weight and smallest baggage-transportable "flyaway" and vehicle/trailer-mounted earth stations.

Cost-effective and easily changeable in the field from one band to another.

Available on short delivery!

Sample of available systems configurations from the pioneers of the digital broadcast quality and audio distribution systems via satellite...

<table>
<thead>
<tr>
<th>Model</th>
<th>Service</th>
<th>Format</th>
<th>Antenna Size</th>
<th>Band*</th>
<th>Space Segment</th>
<th>Satellite Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVF-C</td>
<td>Video</td>
<td>Digital</td>
<td>1.3 / 2.4</td>
<td>C</td>
<td>8 MHz</td>
<td>Intelsat</td>
</tr>
<tr>
<td>DVF-K</td>
<td>Video</td>
<td>Digital</td>
<td>1.2</td>
<td>Ku</td>
<td>8 MHz</td>
<td>Intelsat</td>
</tr>
<tr>
<td>AVF-C</td>
<td>Video</td>
<td>Analog</td>
<td>2.4</td>
<td>C</td>
<td>22 to 36 MHz</td>
<td>Regional</td>
</tr>
<tr>
<td>AVF-K</td>
<td>Video</td>
<td>Analog</td>
<td>1.9</td>
<td>Ku</td>
<td>22 to 36 MHz</td>
<td>All</td>
</tr>
<tr>
<td>TRILITE™</td>
<td>Data/Voice/Fax</td>
<td>Digital</td>
<td>1.2 / 1.9 / 2.4</td>
<td>C, X, and/or Ku</td>
<td>All</td>
<td>All</td>
</tr>
<tr>
<td>X-LITE™</td>
<td>Data/Voice/Fax</td>
<td>Digital</td>
<td>2.4</td>
<td>X</td>
<td>5 MHz</td>
<td>DSCS/NATO</td>
</tr>
<tr>
<td>DVF-Cl</td>
<td>Disaster Recovery</td>
<td>Digital</td>
<td>2.4</td>
<td>C</td>
<td>5 MHz</td>
<td>Intelsat</td>
</tr>
<tr>
<td>MVC-10</td>
<td>Data/Voice/Fax/Order Wire</td>
<td>128Kb Duplex</td>
<td>2.4</td>
<td>C, X, and/or Ku</td>
<td>All</td>
<td>All</td>
</tr>
</tbody>
</table>

*Note: All Systems Can be Configured for One Band or Multibands

For your mobile terminal requirements take advantage of LNR's in-depth capability. Contact our Marketing Department for more information.

YOUR DIGITAL AND ANALOG COMMUNICATIONS CONNECTION

COMMUNICATIONS INC. 180 MARCUS BLVD. • HAUPPAUGE, NY 11788-3795 • TEL: (516) 273-7111 • FAX: (516) 273-7119

See us at NAB Booth #2416 Radio Hall.

Circle (55) on Reply Card
Audio Precision 4113
ASACA ShibSoku 17406
Audio analyzers; audio, video routers; multifORMAT, digital control and auto setup monitors; closed-captioning equipment; decoders, encoders; DAS; envelope delay measuring set; erasable rewritable MO disk audio files; still-frames; dropout counters; GCR, HDTV motion picture memory; digital IF demod; HR color monitors; test signal, sync generators.
Circle (355) on Reply Card

ASC Audio Video Corporation 19784
Virtual Recorder (VR) line; VR playlist; VR NLE on-line, non-linear editor; VR Sports slow-motion controller; VR Delay 2-VR switcherless system for simultaneous, variably delayed record/playback; VR Cache 2 VR system combining VR Delay, Playlist; VR MediaNet enables shared storage, multiple VR systems access same media.
Circle (356) on Reply Card

AT&T 15740
Telephone, program transmission services.
Circle (358) on Reply Card

ATI Audio Technologies 16602-702
Small format audio mixers, mic, headphone, line, monitor, turntable, interface, utility amps, audio DAs, metering systems.
Circle (359) on Reply Card

Audi-Cord 4416
Audio cart recorders/players, DL series and S series.
Circle (360) on Reply Card

Audio Accessories 13642-742
Introducing Project Patch reconfigurable interface system for easy, fast studio wiring through pre-terminated patchpaks and cables.
Circle (361) on Reply Card

Audio Action 11127-8
Production music library on CD format.
Circle (362) on Reply Card

Audio Developments 3910-11
Introducing AD006 compact meter bridge for AD116, AD118; AD146 stereo mic module, T powering options; AD148 4-output MS-compatible edit mixer; Portaflex series, ENG mixers, Location mixers, Flexlink system, Flex EQ, Constant Q, Parametric Q.
Circle (363) on Reply Card

Audio Intervisional Design 2203
Microphones.
Circle (364) on Reply Card

Audio Precision 4113
Introducing System Two audio analyzer; APW/Winbased audio test software for Systems One and Two: GAT-1 GPIB interface translator for System One; PCMCIA interface for Systems One, Two.
Circle (365) on Reply Card

Audio Processing Technology Ltd. 4007-9
Digital audio processing units using data compression, apt-X 100 system.
Circle (366) on Reply Card

Audio Services Corporation 3607
Distributor: Audio mixers, speakers; wireless boompole; Stellavox, Fostex DAT recorders; Microtec-Getell microphones.
Circle (367) on Reply Card

Audio Technica US 11206
AT4050/CMS capacitor mic for studio; MX341A SmartMicro automatic mic mic; ATH-M40, ATH-D40 precision headphones; AT7M75 headworn condenser; AT873R handheld condenser, AT10a condenser, MT858 gooseneck mics; AT851b, AT835b linecardioid shotgun mics; COM1, COM21 headsets.
Circle (368) on Reply Card

Audioarts Engineering 2211
Audio mixing consoles.
Circle (369) on Reply Card

audiopak 4219
Tape cartridges A-2, AA-3, AA-4; lubricated audiotape formulas 605, 613, 614.
Circle (370) on Reply Card

Aduionics 2721
Audio mixers, 210 series radio on-air, 900 series TV news/production; 1900 series IFB/mixminus system; Destiny 2000 program management systems with control console, control software and 200MB computer.
Circle (371) on Reply Card

Augan Instruments 3613
Digital audio workstations.
Circle (372) on Reply Card

Aurora Systems/Chyron Group 19401
Freedom series graphic software for SGI platforms, including the Eagle 64-bit 4:4:4 package; Independence paint-only graphics package with paint, roskope tools; Liberty paint, animation, composting tools.
Circle (373) on Reply Card

Autodesk 15184
Graphics software, 3-D Studio animation tools.
Circle (374) on Reply Card

Autogram Corporation 4719-21
Introducing Autogram CYA-3; featuring the AC-8, RT/TV-20, Facemaker and Minimix audio consoles; Autoclock time and temperature device; Autocount counter.
Circle (375) on Reply Card

AVCOM of VA 11502
Portable spectrum analyzers (PSA-65A,-37D); network/spectrum analyzers; SCS, SCBC, video satellite receivers; microwave transmission equipment; portable test receivers PTR-25A; microwave sweep generators; MSG-5,-1000D, -1750A).
Circle (376) on Reply Card

Avid Media Group M 117
AVID Technology 19539, M1515
Introducing Avid/Allgami dockable, disk-based video camera; AvidNews newssroom computer system; featuring Media Composer series; NewsCutter non-linear editor; Airplay playback system; Media Suite desktop video production system; AvidNet ATM; MediaServer production server/library solutions.
Circle (377) on Reply Card

Avitel Electronics 12942-4
DSC 1100 signal corrector; under monitor displays; serial digital terminal equipment with DAs, DAs, serializers, deserializers.
Circle (378) on Reply Card

Axcess Global Communications 5115
Communications products using subcarriers.
Circle (379) on Reply Card

Ayin West 15176-376
High-power amplifiers for satellite uplink; TWT, klystron power amplifiers for S, C, X, Ku bands; magnetic assemblies for broadcast applications; turnkey TV transmitter upgrade service with high-efficiency UHF klystrons.
Circle (380) on Reply Card

B AF Communication 19652
Circle (381) on Reply Card

Balboa Capital 10459-559
Financial institution.
Circle (382) on Reply Card

Balcin 17164
TWINLITE modular lighting fixtures in Fluflite fluorescent line, 2 one-lamp lighthouse operated with remote ballast controller.
Circle (383) on Reply Card

Band Pro Film/Video 18370-870
Introducing Elmo Pen camera UN-411E, "b" diameter color camera; DuoPod compact camera support; featuring CAMS remote-control system, Goblin folding dolly, Genio wireless remote lens control; Crozziel lens mount bracket, idler gears; Micrhoen remote pan/tilt head; Sony XC-999 miniature camera.
Circle (384) on Reply Card

BARCO industries 11450
Circle (385) on Reply Card

Barco-EMT 11450
Digital cartridge recorders, players EMT-460, 461; EMT-710 audio router.
Circle (386) on Reply Card

BCS Broadcast Store 13242
Broadcast equipment sales, brokerage.
Circle (387) on Reply Card

Beck Associates 12350
Introducing flexible, durable knock-down console, ratio mixers; combination VU and phase meter; serial control panel panel; audio level matching unit.
Circle (388) on Reply Card

Belar Electronics Lab 3119
Modulation monitors for radio, TV/FM/AM; The Wizard digital FM analyzer; RFA-4 agile FM amp; digital FM stereo monitor/analyzer.
Circle (389) on Reply Card

Belden Wire and Cable 19223
Introducing #1694A serial digital video cable; #1696 high-flex AES/EBU digital audio interconnect cable; #1800 series NEC-rated single, double-pair digital audio interconnect cable; NEC CM-rated digital audio snakes.
Circle (390) on Reply Card

Benchec 13632
Graphics camera support products, Copymate II, M2, VP200 and VP300 copy stands.
Circle (391) on Reply Card

Broadcast Engineering March 1995
Two years ago NTL set the pace for digital broadcasting with the launch of System 2000, the world's first video compression system based on the MPEG standard.

NTL MPEG systems are now widely in use by television broadcasting operators all around the world giving substantial operational benefits in applications that include broadcast contribution links, distribution to cable headends, satellite news gathering networks, business television and even distribution to terrestrial television antennas.

Now, NTL has launched System 3000, based on the tried and tested technology of System 2000 but enhanced to be compliant with the European DVB standard and the MPEG-2 (Main Profile at Main Level) performance specification.

System 3000 also gives broadcasters additional capabilities including the ability to broadcast up to 18 video channels within a single satellite transponder, statistical multiplexing and various telecom networking capabilities.

This diversity of applications using NTL's established technology means that fully compliant MPEG-2 systems are now being shipped to solve broadcasters' networking problems without the uncertainty of how the system will perform.

When you can't afford to take risks, don't settle for anything less.

Contact Barry Crompton for more information. Telephone +44 1703-498042.
BENCHMARK MEDIA SYSTEMS 10052
Audio equipment including card-based DAs, mic-pre-DA, remote gain cards; router/switcher; MicroFrame Series 1RU chassis for 16-np modules, two power supplies; program meter systems; interface amplifiers.
Circle (392) on Reply Card

BEYERDYNAMIC 11214
Wireless equipment, microphones, headsets; S170H hand-held and S170P pocket microphones and NE170 diversity receivers; head-phones.
Circle (393) on Reply Card

BIRD ELECTRONIC CORPORATION 2901-2
RF measurement instruments, accessories.
Circle (394) on Reply Card

BOGEN PHOTO 19372
Grizo Mountaineer carbon fiber tripod; model S10 fluid video head; collapsible frames and fabrics.
Circle (395) on Reply Card

BOONTON ELECTRONICS CORPORATION 2107
RF test, measurement equipment.
Circle (396) on Reply Card

BRADLEY BROADCAST SALES 1903
Introducing Panascheime studio furniture, racks; Audioarts R-60 audio mixer; Telex 1x6 phone talk system; Tascam portable DAT; Gentner TS-612 phone talk system.
Circle (397) on Reply Card

BRANSON COUNTRY MUSIC NETWORK 2712
Music programming service.
Circle (398) on Reply Card

BREK CONNER GROUP 13832
Production titling systems.
Circle (399) on Reply Card

BRETFORD MANUFACTURING 16364
Expanded line of TV equipment-mounting products for wall and ceiling mounting applications.
Circle (400) on Reply Card

BROADCAST ELECTRONIC SERVICES 16771
Video signal distribution, format conversion products. GPI Network router; Betabox interformat editing unit; TBC remote controllers.
Circle (401) on Reply Card

BROADCAST INTERNATIONAL 19976-20176
Dealer/distributor serving Latin America.
Circle (402) on Reply Card

BROADCASTING MARKETING CORPORATION 16658
Presenting Scriptboy wireless time-code system; Kobold EFP 400 HMI lights; Ikegami HL-V55 ENG camcorder; Red Wing light boom; Coherent wireless A/V and time-code system.
Circle (403) on Reply Card

BROADCAST MICROWAVE SERVICES 12220-3
Microwave radio equipment, BMT125 portable transmitter, BMR120 portable receiver; BMT75 3/12W, BMT55 0.75/3W ENG MW transmitters; Videocam transmitter.
Circle (404) on Reply Card

BROADCAST SUPPLY WORLDWIDE/BSW 1625
Distributors of professional audio, RF/radio products, including Telos Zephyr, Arrakis Diglink, Vox Pro digital editor (Audion Labs) and Roland DM-800.
Circle (405) on Reply Card

BROADCAST VIDEO SYSTEMS/BVS 16348-50
Introducing BUGTRAP, a self-contained logo store, inserter; MASTERKEY 6D digital downstream linear keyer; featuring VM400 video switcher, video proc-amp, safe area generators; EN330 multiformat encoder; D100/101 NTSC decoders; interformat video converters; closed-caption equipment; passive A/V switcher; video delay lines, filters, hum coils.
Circle (406) on Reply Card

BROADCASTERS GENERAL STORE 3007
Distributor for DNF Industries VTR remote controllers; IQS SAW digital audio editing software; Site Systems RKF-1/B Thermal Sentry, Message Board Controller; American Recorder Technology recorder cleaning products.
Circle (407) on Reply Card

BRYSTON 3907-8
Audio monitors, model 7B PRO.
Circle (408) on Reply Card

BTS BROADCAST TELEVISION SYSTEMS 17011
Featuring Media Pool video server; FDL Quadra CCD telecine; MN R11 Median Noise Reducer; Bravo VE Windows-based ABC-roll
Circle (409) on Reply Card

HEWLETT-PACKARD sees the BIG picture. You can, too!

Come to HP’s Booth #19656 at NAB and see...

• HP Broadcast Video Server
• HP Video Disk Recorder
• HP VidJet Pro Print Manager
• HP Test & Measurement
• HP Workstations for Animation/Graphics

Circle (89) on Reply Card

132 Broadcast Engineering March 1995
Ikegami’s HK-366 Wideband Studio/Field CCD Camera System

Our HK-366 camera incorporates many new features demanded by video professionals. For superior studio performance that draws encores, the HK-366 offers a newly-developed Snap-Shot Memory-Card, VF DTL and Picture-in-Picture, Skin Detail including Auto Skin Hue Set-Up, and Six Vector Color Correction.

During the development of the HK-366, every identifiable operating nuance came under close scrutiny. Exceptional image quality was achieved with 450,000 pixel CCDs. Cable runs up to 2,400 meters are handled with the new long-range triax transmission system.

Commitment to essential functions plus production features, combined with exceptional picture quality, results in the HK-366’s superb performance.

The HK-366 achieves a horizontal resolution of 800 lines (Y-ch), a S/N ratio of 62db, and a high sensitivity of 8, while offering startling picture quality typical of the HK-Series Cameras.

When an optional Digital I/F unit is added, the base station can provide a composite serial digital signal (143Mb/s) or a component serial digital signal (270Mb/s). This allows the HK-366 to be interfaced with a variety of digital systems.

The HK-366 and its portable companion are readily upgradeable to a 16:9 aspect ratio.

Take command and lead. To learn more, call the nearest Ikegami Regional Office.
IKON Video is pleased to invite you to our GRAND OPENING
Booth #12335 NAB '95

Witness the unveiling of our new products.... see the future on the floor.

Bring this ad to enter our daily drawing.

IKON Video 1701-B5 E. Edinger, Santa Ana, CA 92705
Phone 714-541-3460 • Fax 714-541-3476

Circle (91) on Reply Card
Diamond-digital puts the power in our production studio

"We built Metropolis Studios from scratch as an all-digital video production studio. Our operation 'talks' digital, from cameras to VTRs. It takes a special switcher to give us the flexibility to handle the demands of this unique operation.

"That's why I'm so delighted with our Diamond-digital switcher.

"Architecturally, it's the most competent switcher we've found. For example, it has a user interface that can emulate the operating characteristics of other popular switchers.

"Since freelance operators use our facility every day, they can set up the Diamond the way they want it, and go to work almost immediately. Saving those setups is a snap, via Diamond's setup card feature.

"The keying is fabulous. In the past, we needed a separate special effects keyer. With the Diamond's built-in Chromakey, it works as well or better than a stand-alone system. It also offers an auto-setup feature which makes it a 'no-brainer' to operate.

"I'm also impressed with its ability to switch instantly between 4:3 and 16:9 aspect ratios. Because our facility is set up to produce shows daily in both standard and wide-screen formats, we needed a switcher that could change modes as quickly as our projects dictate. The Diamond was the only switcher we found that could do it well.

"To say we're pleased with our Diamond-digital is an understatement. Thanks, BTS, for this terrific switcher."

Question: How can I replace my antenna system TODAY and still prepare for tomorrow's Advanced HDTV future?

Answer:

More stations have chosen Dielectric for HDTV adaptable antenna systems. Why?

Because Dielectric's antenna engineers, the most experienced staff in the industry, translate your custom requirements into products only Dielectric can deliver.

Looking to replace your antenna system? Call TODAY and put Dielectric's expertise to work for you!

DIELECTRIC COMMUNICATIONS
RAYMOND, MAINE 207-655-4555 FAX: 207-655-7120

Circle (71) on Reply Card
This road leads to a bold, new frontier.

A revolutionary technology created by JVC that will empower you with practical video solutions.

Get a glimpse of JVC's new Digital-S technology at NAB.
Tally Display Corp. offers the technology to keep track of all your sources. Automatically. With interactive alphabetic displays that continually change messages, color and intensity in response to different status. It's a clear display of intelligence.

Whether programmed to interface directly with your router, automation system or from a stand-alone PC, TDC displays continuously update themselves for accurate and efficient operation. In addition to source ID, the displays provide source status, machine assignment status, tally and multiple message capabilities.

TDC displays feature 1" high characters and are available in 18, 13 and dual 9-character widths. Economical static displays are also available for less demanding applications. And for when space is an issue, TDC offers displays that are only 0.7 inches deep.

Display intelligence in your control room. With interactive displays from TDC. For more information call 914-365-6393, or fax 914-359-7078.

Circle (126) on Reply Card

See us at NAB Booth #13259
transmission system permitting on-the-fly bandwidth change; ABR700 digital audio receiver (for NPR system); RCA DSS1 satellite receiver.

**Comtech Antenna Systems**

Introducing EC8 microprocessor control system with optional IBM-compatible software, 3½" floppy drive, controls Comtech antenna with local or remote control; stationary and motorized satellite antennas from 35° to 7.3 meters; transportable, flyaway systems.

**Connectronics**

Introducing Big Ears parabolic reflector with accessories, shoulder straps, transport cases, sport handles, wind muff.

**Control Concepts/Leibert**

Introducing Isolatron Plus, AccoVar power line protection for broadcast and communications; featuring patented Islatrol, Islatran active Tracking Filters.

**Corporate Computer Systems/CCS**

CCS Audio Products: audio transmission codes, Micro 76+ 7.5kHz and Micro 66i 7.5kHz dual rate units.

**Cortana Corporation**

Featuring Stani-Cal lightning prevention systems for tower protection through charge dissipation.

**Countryman Associates**

Microphone products, the EMW series.

**Crestron**

Introducing VisionTouch, ColorTouch, VideoTouch, PCVision, VGVision remote multimedia device control facilities.

**Crown International**

CM-312 head-worn mic; full line of microphones, amplifier products.

**Crystal Graphics**

Circle (747) on Reply Card

**CSI/Camera Support International**

Circle (471) on Reply Card

**CTE International**

FM broadcast transmitter products, exciters, power amplifiers.

**Cycle Sat**

Program distribution services, transmission security equipment, Cyclecypher.

**Couse-Kimzey Company**

Audio distributors; Otari Prodisk 464 Digital workstation; Denon DN970FA CD player; “Come to our Convention Oasis!”

**Crouse-Kimzey Company**

Building quality cases to carry and protect tools and equipment is our business — since 1902. Strong durable cases in all sizes, shapes and materials. Some so tough and dependable they can be dropped from helicopters without damage to their contents. All have superior features developed from years of Ellis experience.

Our cases are used in communications, electronics, medical, the military, and more. Perhaps we are the oldest company that you have not met. Call to request our catalog, Rototrans literature or discuss your needs. We have the case and experience you can depend on.

See us in Las Vegas at NAB ’95

2432 Southeast Ave. • Indianapolis, IN 46201
(317) 636-3351 or (800) 466-3351 • FAX: (317) 635-5140
“A case of quality since 1902”

**Crouse-Kimzey Company**

Circle (75) on Reply Card

See us at NAB. Booth #S246

March 1995 Broadcast Engineering 139
Distributor for Belden Wire & Cable, Neutrik and SwitchCraft connectors, Fluke meters; distributors for Sony, JVC and Denon DAT and S-VHS videotape.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.

Head Portable decoder FM solid mixing consoles Audio recording for applications information; equipment a newsroom automation for distributed Circle listing Circle Circle Circle Circle Sony, intelligentes: Belden -END.
Fujinon's 70X Lens.

There's just no substitute for experience.

Fujinon's new Ah70X9.5EM has the highest zoom ratio of any TV production lens. And with a focal length of 9.5 to 665 mm (1330 mm with 2X extender), the Ah70X is also one of the most versatile. All of this with the optical performance you expect from Fujinon.

Admittedly, an achievement like this would be a big stretch for other lens manufacturers, but it's the next logical step for Fujinon. Our popular Ah66X has become the standard in long focal length production lenses. Now the Ah70X continues this tradition of leadership.

So when your reputation is on the line, choose the company with the most experience...Fujinon.

For more information, contact Fujinon at 1-800-553-6611.
Routing
Digital audio
HDTV line
Featuring professional magneto-optical dio
Magnetic recording media, MQ Digipath DIC Satellite DH
Digitally coded tape, Microfinity Digital 18385 for today's NTSC channels, tomorrow's PAL frequencies.

Circle (503) 626-8400
Beaverton OR 97008 USA
(503) 626-6225 FAX

Circle (489) on Reply Card
Circle (976) on Reply Card
Circle (977) on Reply Card
Circle (495) on Reply Card
Circle (494) on Reply Card
Circle (493) on Reply Card

Circle (496) on Reply Card
Circle (978) on Reply Card
Circle (500) on Reply Card
Circle (499) on Reply Card
Circle (498) on Reply Card

Circle (497) on Reply Card
Circle (490) on Reply Card
Circle (491) on Reply Card
Circle (492) on Reply Card
Circle (493) on Reply Card

Circle (494) on Reply Card
Circle (495) on Reply Card
Circle (496) on Reply Card
Circle (497) on Reply Card
Circle (498) on Reply Card
Circle (499) on Reply Card

MAGNI SYSTEMS, INC.
9500 SW Gemini Drive
Beaverton OR 97008 USA
(503) 626-8400
(503) 626-6225 FAX

Circle (78) on Reply Card

Two Steps Toward Better Video Quality

Two products from Magni simplify your video monitoring. Start with a precision VITS inserter (PAL or NTSC). We've included Philips Ghost Cancelling Reference signal, so viewers will enjoy cleaner reception of your broadcasts. Finish with WVM-710 for the most affordable automated video measurement device on the market today. You also get waveform, vector, PictureGuard™, PC logging, and hard copy printout capability. Best of all, the two units together will cost you less than $7,000. Contact Magni today to see how affordable better video can be.

Making Technology Useful
Vinten TSM's New Robotic Camera System.

The SP-2000/X-Y is a freely navigating servo pedestal designed to operate with the HS-2010M pan/tilt head. Utilizing many of the features found in our industry standard SP-300/X-Y servo pedestal and HS-310P pan/tilt head, the SP-2000/X-Y also features a lower profile, sleeker design and new brushless servo motor technology. It is designed to support new lighter weight CCD studio or portable cameras with any combination of lens or teleprompter.

The HS-2010M Pan and Tilt Head is a post head which provides perfect balance and features dual remote/manual operation. Excellent acceleration is achieved by high gain digital/analog servo amplifiers, which combined with an extremely rigid mechanical design, means tight damping without oscillation or overshoot. When in manual operating mode, Vinten's Lubricated Friction (LF) drag system, incorporated in both the pan and tilt axes, means the ultimate in continuously variable drag.

The ACP-8000S Touch Screen Control System is a comprehensive camera command center that provides simultaneous control of the pan/tilt, zoom and focus, as well as the X,Y, and Z axis movements of up to eight cameras.

For additional information, call Vinten TSM today.

NAB Booth #18939

Vinten TSM Inc.
705 Executive Blvd.
Valley Cottage, NY 10989
Phone: 914-268-0100 Fax: 914-268-0113
Motion picture films; HDTV processing systems.

Echolab 13423-26
Introducing a 20-input modular switcher using composite, Y/C, component formats, advanced multilayer keys, aux inputs, M/E key outputs, re-entrant effects; featuring MVS5, MVS6 modular analog switchers with key matrix.

Echocon Broadcast Service 4823
Rebuilt power transmitting tubes, klystrons.

Edac Inc. 1703

EDX Engineering 4325
Engineering software, MCS v1.2, SIGNAL v.2/0/v.2/3 International; MSITE v.2/0/v.2/5 International; SHDMAP v.6/0/v.6/5 International; TPATH v.2/0/v.2/5 International; RPATH v.7/0/v.7/5 International; U.S., international terrain data; U.S. land use/land cover data.

EEG Enterprises 16801-901
VBI data products, VDR-2 data receiver, TVCD100 line-21 encoder.

EEV 17136
Introducing low-power, air-cooled IOT (type IOT17320R) for 20kW common amplification TV transmitters; STELLAR lightweight range of Ku-band TVI amplifiers for satellite uplink systems.

Elantec Inc. 16574
Low-power amplifiers with outstanding video performance; video instrumentation amplifiers; faders; precision current-mode feedback amplifiers.

Elastic Reality 15168, M1220
Elastic Reality software, version 1.01 for Windows and Windows NT on Power PC, MIPS or DEC Alpha; version 2.2 for SGI; version 1.2 for Mac native Power Mac; TransJammer 1.0 for Mac/native Power Mac.

Electric Works Corporation 16088

Electro-Voice 15717
Microphone products, including RE27N/D, TE36N/D dynamic cardioids; S-40 compact monitor system.

Electrogig USA Inc. M1731

Electrohome M1134
Video projection systems, including ECP series with ACON 3-minute auto convergence, input module; ShowStar projectors and Stereographics 3-D visualization systems.

Electronic Associates 13613-4

Electronics Diversified Inc. 16577
Lighting control systems, dimmers.

Electronics Research - ERI 16604
FM transmission antennas; introducing ARS-1003 auto transmitter recycler; RFS-3125 Safety Switch for worker protection; SKIP Site Keeper Integrated Pager monitors and reports status of 16 site conditions.

Electrorack Products 19566-57
Equipment rack systems.

Electrosonic Systems 15366
Featuring large screen video displays with ProCube AC41" projection cube, PIBLOC multisource control system; options for HDTV, computer, workstation graphics, ImageMag (monitors), ImageStar (monitors or cubes) controllers.

EMC/Dynatech Video Group 17124
See Dynatech Video Group.

EMCE Broadcast Products 17106
Solid-state transmitters for UHF and VHF-rated 100W and 1kW; wireless cable transmit-ers; Signal Bender, Site Controller for PC; Direct Digital synthesizer.

EMCOR Products/Crenlo 11532
Featuring modular electronic enclosure systems, modular console configurations; air movement devices; custom fabrication capabilities.

ENG Mobile Systems 17043
Products for remote production, camera transport cradle and NITEK NiCad battery maintenance products.

Engineering Animation M 907

Ensemble Designs 12646-746-7
MultiBuffer DS1 (component), DS2 (composite) framestores for Mac to Video; TC400D TBC control; Catalyst - digital composite keyer; Serial Box I, II, III A/D, DA converters.

Enterprise Systems 13253
Broadcasting business systems.

The Equipment Broker 19070-370
Broadcast, production equipment brokers.

Equi-Tech Corporation 4503

ERGO 90/Ergo Industries 19052
Monitor mounts; slides for JVC; ballbearing slides for Panasonic; rack-mount kits for Sony, Pioneer, Panasonic, JVC.

ESE 13606-8
Introducing ES-181 moderm-based master clock, time-code generator; ES-126/127 time/date displays with .53", 1" display heights; ES-996 2", 6-digit time or date display; ES-217...
Fiber-optic tal video subsystem. 20/20 audio digital video subsystem; produces verted increases

Introducing VP400 for testing

Fiber Options 16573 -673

Fidelipac 3122

Fideli...tpac to produce using magnet optical drive; Dynamax MXE series audio console modules, studio talkback monitor, telephone interface, 5-band EQ and panpot.

FirstCom/Jim Long Companies 13623-25

FirstCom/Jim Long Companies 13623-25

Flash Technology 1819

Flash Technology 1819

Florid...al Systems 13102

Florid...al Systems 13102

Focal Press 13617-8

Focal Press 13617-8

Folsom Research 15177-255

Folsom Research 15177-255

Foster 10952

Foster 10952

Fujinon 19599

Fujinon 19599

Fuz...ozzi Electronics 13421-22

Fuz...ozzi Electronics 13421-22

Fut...ute Network Inc. 11219

Fut...ute Network Inc. 11219

Futuretel M1633

Futuretel M1633

FWB M1713-5

FWB M1713-5

Gamer Industries 13621-2

Gamer Industries 13621-2

GE American Communications 17706

GE American Communications 17706

GE Lighting 12807-8

GE Lighting 12807-8

GEC-Marconi Communications Systems 17101

GEC-Marconi Communications Systems 17101

Gefen Systems 2304-5

Gefen Systems 2304-5

Fiber Options 16573-673

Fiber Options 16573-673

Fairlight ESP Pty. Ltd. 19920

Fairlight ESP Pty. Ltd. 19920

E-Z UP International 4821-2

E-Z UP International 4821-2

Eldraite... 30-5

Eldraite... 30-5

EDC/Electronic Theatre Controls 18348

EDC/Electronic Theatre Controls 18348

Euxoph... 3603

Euxoph... 3603

Euros... & Sullivan Design Software M1727

Euros... & Sullivan Design Software M1727

Eventide 2707

Eventide 2707

Ever... Microsystems 16045

Ever... Microsystems 16045

Extron Electronics M 319

Extron Electronics M 319

E-Z UP International 4821-2

E-Z UP International 4821-2

Eldraite... 30-5

Eldraite... 30-5

EDC/Electronic Theatre Controls 18348

EDC/Electronic Theatre Controls 18348

Euxoph... 3603

Euxoph... 3603

Euros... & Sullivan Design Software M1727

Euros... & Sullivan Design Software M1727

Eventide 2707

Eventide 2707

Ever... Microsystems 16045

Ever... Microsystems 16045

Extron Electronics M 319

Extron Electronics M 319

E-Z UP International 4821-2

E-Z UP International 4821-2

Eldraite... 30-5

Eldraite... 30-5

EDC/Electronic Theatre Controls 18348

EDC/Electronic Theatre Controls 18348

Euxoph... 3603

Euxoph... 3603

Euros... & Sullivan Design Software M1727

Euros... & Sullivan Design Software M1727

Eventide 2707

Eventide 2707

Ever... Microsystems 16045

Ever... Microsystems 16045

Extron Electronics M 319

Extron Electronics M 319

E-Z UP International 4821-2

E-Z UP International 4821-2

Eldraite... 30-5

Eldraite... 30-5
tender; CD changers from NSM, Denon, Sony, Pioneer; SFX libraries from Digifeet, The Hollywood Edge, Canford, etc.

Circle (964) on Reply Card

**General Instrument**  
M 600  
HDTV Grand Alliance.

Circle (565) on Reply Card

**Genesis Microchip**  
M 817  
Acuity series image resizing engines for projection systems, broadcast equipment, videographic workstations, teleconferencing, scan conversion; gm2242b half-band filter with (sin x)/x.

Circle (566) on Reply Card

**Gennum/Videobroadcast**  
16385  
Featuring GENLINX specialized IC devices; GS9004B cable equalizer with improved jitter performance; GS9010A receiver with improved noise performance; GS9102A low-power digital filter; GM4570, GM4571 wideband video buffers; GT4123 low-power 2-channel video mixer.

Circle (567) on Reply Card

**Centner Communications**  
5621  
Introducing enhancements for TS6212 multline telephone talk show system; enhanced ET100 portable teleconference; featuring digital hybrids, teleconference interfaces, acoustic echo cancelers, VRC-2000 transmitter remote control.

Circle (568) on Reply Card

**GEPCO International**  
13251  
Introducing VSD2001 video serial digital coax cable; VA-1/3 video/audio composite cable; multi-pair digital audio cable; packaged cable assemblies; video snake cable; flexible stranded cables of triax video.

Circle (969) on Reply Card

**Getris Images**  
15985  
Introducing Broadnews computer system for automatic news broadcasting; Digitoon PC software for scanning, painting and exposure sheet for animation production; upgrade software releases for Eclipse, Venice and Hurricane, adding real morphing, multilayer autotracking.

Circle (570) on Reply Card

**Gorman-Redlich Mfg Company**  
1913  
EBS and weather service equipment, model CEB EBS encoder and decoder, model CRW weather radio.

Circle (971) on Reply Card

**Graham-Patten Systems**  
11454  
Featuring D/ESAM 820 digital edit suite audio mixer, new master processor board, audio output module, digital input card, version 4.0 software, D/ESAM 400 digital edit suite mixer.

Circle (972) on Reply Card

**Grass Valley Group**  
18117  
Introducing VideoDesktop-personal production suite; series 6000 compact router; model 2200 component digital switcher; model 3000T composite digital switcher; J-series multichannel DS3 codec.

Circle (573) on Reply Card

**Great American Market**  
13120  
Lighting products, including GamSpin/FX variable speed effects wheels; GamTube, F12 correction gels; GamLit soft box; GamFusion - 10 degrees of diffusion materials, new Micro patterns.

Circle (574) on Reply Card

**Grey Matter Response**  
M 1335

**Group One Ltd.**  
4601-3  
KRA K-ROK shielded audio monitors; Focusrite RED 6 Mic/Pre/EQ; EXA DP100 audio delay (DSP).

Circle (575) on Reply Card

**Habitech/Smith System**  
M 1802-1821  
Circle (990) on Reply Card

**Haller Professional**  
3903  
Circle (991) on Reply Card

**Halland Broadcast Services**  
5625  
Music libraries on CD, including “Country Gold” country classics, “Best of ’94” updates for A/C and country CD libraries.

Circle (576) on Reply Card

---

**Telemetrics**

**TM9250**

Triax/Coax Connected Camera Control Systems

Available only from Telemetrics

**Triax Camera Control Systems for any Betacam™, Hi8™, MII™ or S-VHS™ format camera**

Increase programming flexibility and eliminate cumbersome, costly and unreliable multiconductor cable

---

**Telemetrics Inc.**  
6 Leighton Place, Mahwah, NJ 07430 USA • Tel (201) 848-9818 • Fax (201) 848-9819

Made in U.S.A. Betacam and Hi8 are registered trademarks of Sony. MII is a registered trademark of Panasonic. S-VHS is a registered trademark of JVC

Circle (94) on Reply Card
EEV's Satcom Amplifiers have always provided leading edge technology. Our new range of rugged Stellar lightweight Ku band amplifiers incorporate the latest TWT, power electronics and cooling technologies to create the highest performance. Compact 3u high units weighing only 50 lbs, having flange powers of 350W or 500W, are available NOW. Stellar is exceptionally user friendly and provides auto diagnostics, remote interfaces, EMC compliance and automatic power factor correction as standard features. And Stellar is digital satcom proven too!

Contact us today to find out how Stellar can fit into your plans.

EEV SATCOM AMPLIFIERS

USA: EEV Inc., 4 Westchester Plaza, Elmsford NY 10523
Tel: (914) 592 6050 or ‘Toll Free’ 1-800-DIAL EEV  Fax: (914) 692 8922
CANADA: EEV Canada Ltd., Tel: (416) 745 9494  Fax: (416) 745 0618
UK: EEV Ltd., Tel: (01245) 493493  Fax: (01245) 492492
Subsidiary of the General Electric Company plc of England

Circle (95) on Reply Card
See us at NAB, Booth #17136.
Hallikainen & Friends
Audio mixers, TVA series, programmable transmitter control systems, DRC190.
Circle (577) on Reply Card

Hamlet
Featuring waveform, vector, stereo audio measurement and monitoring devices including 301WVA and 302WVR video scopes; 503AR stereoscope; PLM1 program level meter; AFM2000 PVM/UVM AFM kit.
Circle (578) on Reply Card

Hardigg Industries
19351-451
Equipment transport cases; ProRack 19" EIA enclosure.
Circle (579) on Reply Card

Harris Allied Broadcast Division 4416/16001
Introducing Platinum series HL5HS, EL10HS 5kW, 10kW VHF transmitters; Platinum III VHF modules; 1kW FET hot-pluggable units; DX series EPAC high-power digital solid-state medium-wave transmitters; DSE 1400 digital satellite exciter, DSR 1400 studio grade receiver; Audio-Metric CD-10E CD cartridge machine; OKTAVA microphones with Russian heritage.
Circle (580) on Reply Card

Harrison by GLV
12110
Featuring Series Twelve, K-Series, AP-100, Pro-790, MPC audio mixing consoles.
Circle (581) on Reply Card

Hash Inc.
M 308
Featuring Animation MASTER 3D motion picture studio with spline-based modeling, animation, designed for classic character animation.
Circle (582) on Reply Card

Henry Engineering
5625
TELESTOR digital actuality recorder for automatic recording of news stories, weather updates and other material via dial-up phone line; Fast Trac II voice-over audio workstation; Stereoswitch audio switcher.
Circle (583) on Reply Card

Hewlett-Packard
19656
Introducing HP VidJet Pro - with new software capabilities and enhanced resolution; HP broadcast video server; 4:2:2 video disk recorder; HP workstations; various test and measurement products.
Circle (584) on Reply Card

H&B Communications Ltd.
1604-5
Accessories for PORTADAT portable DAT recorders; MCA 1000 AC/DC-powered 4-bay fast charger; Cedar DH1 DeHisser from Cedar Audio.
Circle (585) on Reply Card

Hi-Tech Industries
12940
Work area furnishings.
Circle (586) on Reply Card

Hitachi Denshi
18127
Introducing digital triax, optical fiber, studio robotics for SK-2600 digital camera; studio adapter, camera adapter with D-1 output for SK-2600P portable digital camera; SK-2020, SK-2020P digital camera systems with 400,000-pixel CCDs, RU-Z2 control, studio adapter for Z-2000 portable camera; Shot-Finder with PC to show image and time code of scenes on videotape.
Circle (587) on Reply Card

Hi-Tech Enterprises
Circle (902) on Reply Card

Holaday Industries
12908
Magnetic field, RF radiation hazard instruments; HI-3702 induced current meter; EMF instrumentation.
Circle (588) on Reply Card

Hoodman Corporation
16376
Sunshades, monitor hoods for glare-free viewing of monitors; Video Chariot video cart.
Circle (589) on Reply Card

Horita
12650
Introducing BG-50 gen-locked multi-output blackburst generator; AN-50 on-screen audio meter; CSG-50, TSG-50 color bar, subcarrier generators; PGS-MTG time-code system.
Circle (590) on Reply Card

Hotronic
13611-2
Introducing AT61 10-bit frame synchronizer with 20-bit audio delay; AK71 dual-channel TBC/frame synchronizer; ATSU 20-bit stereo audio delay; AE-21 TBC, switcher, effects; AL82 video/audio delay; AT41 8-bit TBC synchronizer; AP41 PAL TBC, synchronizer, effects system.
Circle (591) on Reply Card

NEW!
With digital option prepared for mixed signals

A2
Audio Test System
14 Instruments in one
easy to operate
storage capabilities
highest performance
large graphics display
AS03 software-package for remote-control and automatic tests
comprehensive two-channel system
PC-and printer communication

Circle (96) on Reply Card
"At TCI's National Digital Television Center, we have adopted D-3 as our primary format for on-air playback. Sixty Panasonic AJ-D340 D-3 recorder/players are used for our Pay-Per-View services—PrimeStar and Request TV—that the Center distributes.

"We had budgeted 2,000 hours of head life on the Panasonic equipment; clearly it has performed well beyond that. Our head wear and general maintenance requirements with D-3 are virtually nil.

"TCI purchased the D-3 VTRs for their digital video quality, serial digital interface and four-hour tape recording time to record movies more than three hours in length.

"The AJ-D340 is simply a great movie-playing machine."

Panasonic engineered the D-3 format with a low tension tape path to enhance head life, a specification that is more than delivering on its promise at TCI. Just the sort of performance in critical applications that you can expect from Panasonic. First in Digital Video.

Peter Douglas
Vice-President of Operations & Engineering Tele-Communications Inc.

Twenty-one AJ-D350 D-3 studio VTRs are used for editing and mastering all promotional/interstitial programming for Request TV.

"TCI SEES 6,000 PLUS HOURS OF HEAD LIFE WITH PANASONIC D-3.

What we had not anticipated was the dramatic cost-savings we are realizing with the 3000-6000 hours of head life the AJ-D340s are averaging.

"Many of the AJ-D340 VTRs are in use 15 hours a day, seven days a week. No AJ-D340 video heads have worn out since putting them into service more than 18 months ago. Several AJ-D340s have more than 6,000 hours of head life. One machine has more than 8,500 hours on its original head! While the AJ-D350s are not as forgiving as the -340s because of the different application, we're seeing terrific longevity with their heads as well.

For more information call: 1-800-528-8601 (Upon request enter product code 04) One Panasonic Way, Secaucus, NJ 07094.
IT without Introducing DNG

Computer and remote monitoring

Hughes & Phillips Inc.
FAA-approved obstruction lighting, controllers and remote monitoring for tall towers.

Circle (593) on Reply Card

IBM Power Visualization Systems
Computer equipment, software

Circle (594) on Reply Card

Ikemari Electronics

Circle (595) on Reply Card

Ikon Video (IDK)
Introducing NP-23dx NiCad batteries for Sony cameras, accessories, LED charge status indicator; IXT-7 Super Seven single, dual-channel full-frame, infinite-window time base corrector.

Circle (596) on Reply Card

Image Design Film

Image Logic Corporation
Featuring Log Producer, Auto Caption, Vidi Caption, Studio Caption.

Circle (597) on Reply Card

Image Video
Signal routing, distribution equipment; 9501 20x30 video, dual/mono audio router; 9520/21 20x10 video, dual/mono audio router; model 8010 master control switcher.

Circle (598) on Reply Card

Imagine Products
Editing and related products for DOS, MAC, Windows and laptop PCs.

Circle (599) on Reply Card

Immersion Corporation

ImMIX
Introducing TurboCube and VideoCube version both available in NTSC and PAL for non-linear on-line finishing; also featured, Media File Exchange software.

Circle (600) on Reply Card

Industrial Acoustic/AC
Acoustic, sound control products.

Circle (601) on Reply Card

Innovision Optics
Introducing Probe II camera lens system; Mini Mover Motion Control Lift and Linear/Curve Track; fiber-optic lighting systems; high-definition camera lenses.

Circle (602) on Reply Card

Inovonics
Featuring #716 David-ll second generation FM processor, generator; #708 digital synthesis FM stereo generator; #540 AM modulation monitor; RBDS encoder, decoder with full computer interface.

Circle (603) on Reply Card

Insulated Wire
Various types of cable products including composite, triax, low-loss microwave, twisted pair, shielded twisted pair, Tuff-Flex (internally ruggeded), Re-Flex (semi-rigid).

Circle (604) on Reply Card

Intelligent Resources
Fully integrated systems for media authoring, storage, delivery; systems development using advanced technology, MPEG authoring and playback, digital disk recorders, compositing and rotoscoping, animation and graphics, video tools for on-line editing.

Circle (605) on Reply Card

Intervideo
NTSC color encoder #ENC7A; enhanced impulse noise reducer # INR-ES; Ghost Buster model GB.

Circle (606) on Reply Card

---

GEPCO INTERNATIONAL
Audio, Video & Broadcast Cable Products

2225 W. HUBBARD ST., CHICAGO IL 60612-1613
(312)733-9555 FAX(312)733-6416 (800)966-0069

Circle (98) on Reply Card

See us at NAB, Booth #13251

---

Henry Engineering
563 Key Vista Drive
Sierra Madre, CA 91024 USA
TEL (818) 355-3698
FAX (818) 355-0077
FAX-on-Demand Doc #116 (818) 355-4210

Circle (99) on Reply Card

See us at NAB, Booth #5625

---

Studio Overload?

Use Fast Trac II to eliminate all those pesky chores from your main production studio!

NEW: Fast Trac II is a compact production system that's perfect for routine production tasks. Dub a spot to cart or hard drive, record a line, add a tag to a spot, make a cassette, copy a CD.

Take all those pesky production chores out of your main studio...use Fast Trac II instead!

Fast Trac II - It's a 'Studio-In-A-Box'.

Circle (99) on Reply Card

See us at NAB, Booth #5625

---
When it comes to toughness, these new lightweight belt packs from Telex walk the talk.

When you need your voice to come through loud and clear, Telex Audiocom® BP-1000 and BP-2000 Belt Packs deliver rock-solid performance. Their high-impact, extruded metal cases ensure long-lasting reliability. They’re built to be sturdy, and smart too. Microprocessor-controlled and compatible for either balanced or unbalanced lines, the BP-1000 and BP-2000 Belt Packs feature exclusive Telex innovations. Like the convenient volume control with 30 distinct positions. The attention-getting, audible call alert. And the remote microphone kill feature that shuts off microphones inadvertently left on.

The message is clear: The single-channel BP-1000 and dual-channel BP-2000 have the options, flexibility and toughness to meet your needs. For more information on the new Telex Audiocom Belt Packs, call 1-800-392-3497. You’ll like what you hear.

Telex
THE COMMUNICATION INNOVATOR.

Circle (79) on Reply Card
trigdes; expanded integrated mixer with virtual console, event-driven input switching; enhanced traffic, music interfaces; virtual scheduler; audio routing switchers.

Circle (616) on Reply Card

Intertec Publishing 4322, 15669-60
Broadcast Engineering-TV, Broadcast Engineering-Radio, Video Systems, WBN.

Intralinx 3904-5
Series 4400 ISO/MPEG audio codec integrating ISO/MPEG II and G.7222 encoding/decoding, ISDN adapter, multiconfiguration storage; for remote broadcast.

Circle (611) on Reply Card

IPC Technologies M1122-4
Introduction PX6400 series Video Commander graphical routing system with 64x64 audio/video capability; PX128 series 128x128 router; ideal for cable headend.

Circle (612) on Reply Card

IRIS Technologies 11529
Introducing PX6400 series Video Commander graphical routing system with 64x64 audio/video capability; PX128 series 128x128 router; ideal for cable headend.

Circle (613) on Reply Card

International Datacasting Corporation 4122-23
Reception equipment for satellite data transmission, SR250 and IDC FM/FM receivers.

Circle (614) on Reply Card

International Tapetronics/ITC 1410
DigiCenter digital audio management system with audio database management toolbox, WAV file support; multitasking operations; multivolume HDD backup with DAT car-

Circle (615) on Reply Card

James Grunder & Associates 17436
Extensions to FERAL EFFECT, including new software and digital video compression features; Compact LC 4:2:2 low-cost TBC synchronizer for studio or portable use; The Advantage standard converter, HFT timing, higher-definition graticules, external reference, audio measurement enhancements for Hamlet signal monitors; 302WWR microscope with enhanced input facilities; 503AR stereoscope.

Circle (617) on Reply Card

Jampro Antennas 16617
Rigid coaxial transmission line and components; HFC low-power FM combiner; common aperture/simulcast antennas; UHF broadband panel antennas; hybrids, harmonic filters, channel combiners, rigid transmission line, patch panels; directional couplers; UHF/VHF bandpass and notch filters.

Circle (618) on Reply Card

Hear Digital Here

Digital-to-analog conversion now inside Wohler 1U and 2U powered stereo monitors.

EMBEDDED AUDIO IN SERIAL DIGITAL VIDEO - Serial Digital Audio Extractor (SDAE) strips embedded audio from serial digital video signal and converts it to AES/EBU format.

AES/EBU DIGITAL INPUT - Accepts AES/EBU signal from SDAE or other external source and converts to analog.

SEE DIGITAL HERE

AES/EBU LEVEL METERING MODULES - 1 to 8 stereo channels in 1U. “Mix & match” digital and analog metering modules in the same unit.

AND SWITCH DIGITAL TOO!

AES/EBU ROUTING SWITCHERS - 8x1 to 16x2 in one rackspace.

Circle (81) on Reply Card
Look who's going to improve your image.

You've heard a lot about Switchcraft, a leading manufacturer of quality audio components for more than 40 years. Now, see what we can do. Because Switchcraft can supply you with video components, too.

Look to us for standard video broadcast equipment, all made with the reliability and high quality you expect from Switchcraft. When it comes to our video insulated patch panels, you'll find our eye for detail is second to none. Each one can accommodate up to 26 jacks for a variety of requirements. Dual jacks provide a normal-through signal path without the use of looping plugs or patch cords. And, each panel comes with large designation strips for your own labeling.

Our video patch cords are available in popular lengths and colors — all built for efficient video signal transmission. Our patch cords come with rugged metal handles and optional rubber "boots" for a better grip. The "boots" offer enhanced flex relief and are available in your choice of colors — red, black, green or blue. Switchcraft is dedicated to making your studio time as productive as it can be.

So whether you're thinking video or audio components, think Switchcraft. We've always done wonders with sound. Now we can improve your image, too.

For more detailed information, phone or FAX our Marketing Communications Department and ask for New Product Bulletins 426 and 427.

Switchcraft, Inc.
5555 N. Elston Avenue
Chicago, IL 60630
(312) 792-2700
(312) 792-2129 (FAX)

See us at NAB, Booth #5010-5011.

Circle (62) on Reply Card
JVC receiver 2.5GHz featuring microwave
JNS tone source.

Numerous broadcast and telecommunications professionals, broadcast technicians, broadcast engineers; various microwave, signal source testing, computer maintenance engineering, video and audio equipment.

Jefferson Pilot Data/JDS 13810
Broadcast business systems, software.
Circle (618) on Reply Card

Jensen Tools 16609
Numerous tools and toolkits for video, audio technicians, broadcast engineers; various microwave, signal source testing, computer maintenance kit; Fluke model 87 DMM.
Circle (620) on Reply Card

JNS Electronics Pty. 1627-8
Featuring microwave links DRFL 700 with 1.5-2.5GHz range, RFM 8323 FM broadcast receiver module for 8000 system.
Circle (621) on Reply Card

JVC Professional Products 17359
Circle (623) on Reply Card

K

K5600 15368
Daylight-balanced location lighting kits including Joker 200, 400, 1200 instruments; 12V 800W-1500W Sliminverters; 30V 200W Slimverter.
Circle (624) on Reply Card

Kavarrus 12332
Weather radar products, displays, RADAC 2100 color radar accessing system and TRITON Doppler radar; Dramatic Triton surround weather graphics, version 3.0 software; WxAdvisor storm tracking software; TDR series radars.
Circle (625) on Reply Card

Kay Industries 2507
Power conversion products.
Circle (626) on Reply Card

KD Kanopy 5204-5
Shelter products for outdoor radio productions.
Circle (627) on Reply Card

Keystone Communications 11228
Production services.
Circle (628) on Reply Card

K&H Products 16343-5
Introducing Polar Bear camera case; Nagra case for Nagra 4ST, 4.2; The Hiker camcorder transport backpack; monitor case for Sony PVM-8044; recorder case for Fostex digital system; Shoulder, Carry-On, Quick Draw cases, Rain Slickers.
Circle (629) on Reply Card

Killer Tracks Music 10455-755
Production music libraries.
Circle (630) on Reply Card

Kings Electronics 17821-921
Connectors, including fiber-optic Tri-Loc, video jacks; BNC connectors, terminators, adapters, video jackfields, breakaway panels, patch cord assemblies; video patch plugs, terminations, adapters.
Circle (631) on Reply Card

Kimtronic Laboratories 2119
Introducing RFC150-50-1 single-pole, double-throw 150A 60kV RF contactor; RFC250-30-1 single-pole, double-throw 250A 30kV RF contactor.
Circle (632) on Reply Card

Kline Towers 16367
Design, fabrication and erection of guyed, self-supporting, platform and multi-array towers, space frame structures and special-type antenna structures for broadcast and military applications; new tower designs, analyses of existing structures, inspection, maintenance service since 1953.
Circle (633) on Reply Card

Knox Video Products 16346
Introducing modular audio/video matrix router for up to 64x64 configuration; VFAK video information display system with integrated VCR control, full graphics capability.
Circle (634) on Reply Card

---

STOROOL

Yes.
WE HAVE THE ANSWERS TO ALL YOUR TAPE STORAGE PROBLEMS!

Storeo! Systems offer optimum flexibility, maximum efficiency for storing broadcast tapes and films. Customized systems of top-quality steel or high-impact plastic.

Whatever the size...Worldwide, Storeo! can help!

Other Space-Saving Storeo! Systems Include:
- Room Stretcher®
- Stor-Max®
- Railrider®
- Room Stretcher Express®
- Set-Up Trucks
- The Maxi Cart

If it deserves to be stored, it deserves Storeo!®
Call for Free Consultation
3337 W. Hospital Ave. • Atlanta, GA 30341 • (404)458-3280
Circle (83) on Reply Card

---

Clark listens to its customers and designs its complete line of audio/video cable accordingly. Now you can listen to Clark's new 700 Series snakes that are designed, as usual, with the customer in mind.

Why not give Clark a listen?

Cables available cut to length and terminated to your spec.

1-800-CABLE-IT!
1801 Holste Road • Northbrook, IL 60062

Listen to Clark!
DISCOVER THE NEW POTENTIAL IN BARCO'S GROWING MONITOR FAMILY

BARCO's standard, yet flexible, CVM 3000 Series broadcast monitors offer the highest quality broadcast solution for any application - be it viewing, control or master control. Its full interchangeability of boards and its easy to use set-up commands and menus quickly put you in control. The CVM Series allows you to customize your monitor solution based on: size, resolution or input. All CVM 3000 monitors support multiple standards and formats as well as accommodating optional serial digital component inputs.

Meet the BARCO Family at NAB, BOOTH 11450 or call (404) 590 79 00

4:3 and 16:9 scan formats with guaranteed equal light output for both over and underscan.

Multistandard by design
BARCO's broadcast monitors have been designed to cover every known color standard. The relevant standard can be displayed on-screen.

Backlit keyboard
Push button control adjustments let you feel and see what you are doing. On-screen menus help for easy set-up.

VITC and Source ID
keep you informed on each frame and show the source displayed.

Automatic illegal color detection when equipped with the optional digital 10-bit decoder.

Infrared remote control up to 48 CVM 3000 monitors.
Larcan-TTC 12500
System controller or HDR series IOT transmitters, voice response remote control; aural corrector for HDR series IOT transmitters; FMS500/5 dual 500W FM transmitters; introducing a new line of LT transmitters ranging from 100W to 1kW.

Circle (635) on Reply Card

LDL Communications/Larcan 15855
Featuring 30kW VHF, 10kW UHF fully solid-state TV transmitters; 30kW IOT UHF transmitter; remote diagnostic system for Larcan transmitters; Alan Dick HDTV broadband panel or center-fed slot antennas; analysis demo to determine existing tower can withstand additional load of HDTV antenna.

Circle (636) on Reply Card

Leader Instruments 12803-6
Test equipment, including LV-5100D D-1 waveform monitor with ID1, picture, component vector, stereo displays; LF-425D D-1 generator, serial, parallel, analog with EDH, digital audio; model 953 CATV spectrum meter.

Circle (637) on Reply Card

Lectrosonics 11232
Wireless mic systems; introducing UDR200 UHF synthesized receiver, UM200 synthesized belt-pack transmitter; UMC16 modular UHF multicoupler (8 diversity, 16 non-diversity receivers), 4-channel UHF, VHF receivers with integral RF, power distribution; 187 series VHF narrowband wireless system.

Circle (638) on Reply Card

Legasys International M1028-30

Circle (639) on Reply Card

Leightronix 18577-777
Time event controller for automated playback, recording, switching; telephone remote equipment control; PC-based VHS/VHS commercial insertion control software; interactive video equipment control; custom control engineering, design, development.

Circle (640) on Reply Card

Leitch Inc. 15745, 5204
Introducing a digital disk recorder; distribution equipment.

Circle (1046) on Reply Card

LEMO USA 11222
Audio, video connectors.

Circle (641) on Reply Card

Lighthouse Digital Systems 12337
Featuring the Pathfinder series, SFX series, DCA series, Fiber Links series routing switches.

Circle (642) on Reply Card

Lightmaker Company 16665-765
Manufacturers and marketers of AC ballasts for flicker-free HMI lighting instruments rated 200W to 12kW.

Circle (643) on Reply Card

Lightning Eliminators & Consultants 12900
Lightning prevention systems, Spline Ball Ionizer and Dissipation Array systems; Chem-Rod chemically activated grounding electrodes; transient voltage surge-suppression devices for power, communications lines.

Circle (644) on Reply Card

Light Wave Systems 16709-809

Circle (999) on Reply Card

Lightwave Systems 1807-8
FBDO-M, FBDO-SL digital audio modules for Fibox audio transmission system; IMS passes SMPTE 259M digital video, AES digital audio through a 20-bit analog audio signal.

Circle (645) on Reply Card

Lightworks 19054
Featuring Heavyworks One non-linear editing systems able to play and edit multimedia material from one hard drive in real time; other products include Turbo, the Fader Box audio console, Digitstation and Assistant.

Circle (998) on Reply Card

Link Communications SA 5110-1

Circle (1000) on Reply Card

Link Electronics 18676-778
Signal distribution products; video processing equipment; captioning products; signal converters.

Circle (647) on Reply Card

Linker Systems Inc. M 813
The Animation Stand on Silicon Graphics platform.

Circle (648) on Reply Card

NEW Belden® DIGITAL AUDIO CABLES...
110 OHM IMPEDANCE DESIGN PROVIDES ERROR-FREE TRANSMISSION OVER EXTENDED DISTANCES.

Suppose you need a digital audio cable that meets the latest AES/EBU standard? Simple! It has to be high flex? Or NEC® rated? You got it! A path cable? Or snake? No problem when you specify Belden® from Belden.

Belden has developed these new Brilliance cable lines to meet the digital audio needs of your television, radio, post-production or recording studio. And each offers tight impedance tolerance and low capacitance unbalance to minimize signal reflections and jitter.

- High Flex Cable (Belden No. 1696A)
- Cables available in 1 pair CM rated (Belden No. 1800A), 1 pair CMP rated (No. 1801A), and 2 pair Zip-style CM rated (No. 1802A)
- NEC Rated Snake Cables in 4 pair (Belden No. 1803A), 8 pair (No. 1805A), and 12 pair (No. 1806A)

Get winning results every time. Call 1-800-BELDEN-4 and request New Product Bulletin No. 105.

© Copyright 1994, Belden Inc.
* Trademark of the National Fire Protection Association, Quincy, MA

Circle (101) on Reply Card

See us at NAB, Booth #19223

156 Broadcast Engineering March 1995
Lipsner-Smith Company

Motion picture film cleaning equipment; featuring Multisolvent Excel 900, CF-3000 Mk VII for film-to-tape transfer houses.
Circle (649) on Reply Card

Listec Video

Full range of prompter displays, A-6000 PC prompter DOS software.
Circle (650) on Reply Card

LNR Communications

2416
LVM series low profile data-quality video exciters; single-chip HMI 2.5/4kW combo; Brazil 1694A; TSG 700 NTSC/C; 16561/1 digital video flyaway system with new patented Unifold pedestal; LNA/B, MVC-10 mobile voice communication package.
Circle (651) on Reply Card

Logitek

2725
Featuring Ultra-VU audio meters with simultaneous VU, PPM, peak hold, 64dB range, high resolution zoom mode phase display; Mini RateCage low-cost digital audio sample rate converter.
Circle (652) on Reply Card

Loral Microwave-Narda

5425
Microwave products for ENG, STLs.
Circle (653) on Reply Card

Louth Automation

10158
Broadcast automation, machine control systems; featuring B-100 time banking; Autoshow show timing; ADC-100 disk interfaces; TurboDisk disk preparation.
Circle (654) on Reply Card

Lowel-Light

17155
Featuring Softcases for Softlight series; Fren-L 6.50 lighting instrument; Rifa-lites.
Circle (655) on Reply Card

LP8

2727
Signature III and series 7000 stereo linear fader consoles; low-power AM transmitters meeting Part 73AM nighttime, Part 90 TIS/HAR and Part 15 unlicensed limited area broadcast; carrier current systems; radiating coaxial cable, limited area FM systems.
Circle (656) on Reply Card

LSI Logic

M1205-7
Encoder, decoder chipsets for DlS, cable markets; channel decoding products including QAM, QSPK demodulation, 16VSB demodulation, Viterbi Reed-Solomon FEC; decoding products including MPEG-2, integrated audio/video, single-chip decoders, single-chip transport; encoder chipsets; JPEG compression chipsets.
Circle (657) on Reply Card

LTM Corporation of America

16561
Lighting products, including: Benzi 200W HMI light; HMI lights from Concast 2.5/4kW combo and 6kW spot; Moonlight HMI, tungsten, fluorescent lights.
Circle (658) on Reply Card

Macrosview

16576-776
Introducing Starshaker, a low-cost satellite scrambling system.
Circle (659) on Reply Card

Magic Teleprompting Inc.

16559
Prompting systems.
Circle (660) on Reply Card

Magni Systems

17284
Video test equipment, including model WMV0710 automated video signal monitor; VIT-700 VITS inserter with GCR; TSG-700 NTSC/Y-C test signal generator; RG-400 NTSC/Y-C reference generator; SDA-100 S-video DA; STC-100 NTSC-S-video transcoder.
Circle (661) on Reply Card

Magnum Tower

4010-11
Manufactured radio, TV and communications towers.
Circle (662) on Reply Card

Management Graphics

15477-577
Solitaire Image Recorders used in post-production for animation, special effects, digital compositing, supporting VisiDynamics, Academy offset, full-frame, etc. for file formats from D-1 to SGI bitmaps to numerous PC and Mac files.
Circle (663) on Reply Card

Manhattan Production Music

13633
Production music libraries, including Apple Trax CD, Chesky Records Classical series; Manhattan production music, Audiophile sound effects series.
Circle (664) on Reply Card

Marco Inc.

19584-6
Video edit suite furniture; production control

NEW Belden® DIGITAL VIDEO CABLES
SUPPORT EXTENDED DISTANCE TRANSMISSIONS UP TO 400 METERS.

Looking for a new interconnect cable for component or composite Serial Digital transmission? One that exceeds the SMPTE distance requirements of 300 meters? And provides exceptional picture definition as well as eliminates problems resulting from periodicity?

Well, look at new Brilliance® Low Loss Coax Cables from Belden.

Belden No. 1694A and No. 1695A (plenum version) are 75 ohm precision cables specially designed to handle the high data speeds of Serial Digital video distribution at 270 or 360 Mb/s, allowing you to experience the full benefit of digital technology. They are also suitable for interconnection from camera to monitor and for analog video distribution.

The cables are RG-6U size, so they’re smaller, require less space, and weigh less than standard precision video cables. They also offer 20% lower loss at Serial Digital frequencies, and 33% lower loss at 1 GHz than standard precision video cables.

Specify the cables that will go the distance for you. Call 1-800-BELDEN-4 and request New Product Bulletin No. 105.

Belden

6 Copyright 1994, Belden Inc.

See us at NAB, Booth #19223

March 1995 Broadcast Engineering 157
Marconi Communications Systems 17101
Test, measurement equipment, radio/TV transmitters.

Circle (666) on Reply Card

Mark IV Audio Group 15717
Introducing Klark Teknik DN3600A stereo programmable graphic EQ, DN 782RM remote control for DN 728 delay; Malas XL-200 console; featuring Klark Teknik 300, 400 series equalizers; 500 series compressors, gates; 700 series digital delay, 800 series cross-overs; DDA Profile, FMR and Forum MUTE consoles.

Circle (667) on Reply Card

Matco Mfg. & Test 18937-19137
Video record/playback automation, MA-201 playback system, MA-300 tape duplication control.

Circle (668) on Reply Card

Matthews Studio Equipment 16648
Camera support products, ITE pedestal, pan/tilt series; MC 88 crane; SPAGS spacer baggage.

Circle (669) on Reply Card

Maxell Corporation of America 18136
Featuring Digital Betacam videocassettes.

Circle (570) on Reply Card

MBNA Marketing Systems 4326

Circle (1001) on Reply Card

McCurdy Radio Industries 13110
DCS 3000 serial digital and Microcompact digital intercoms; M2000 automation system; McCart digital audio storage, multi-channel playback; UMD-32 3-color 32-character under monitor display; ATS-100 audio test set; AT 2676 stereo audio monitor; ULO-80 serial/parallel machine control interface; series 9000 A/V DAs, accessories.

Circle (671) on Reply Card

MCL/Inc. 19582-3
Introducing Maxxim series - klystron/TWT high-power amps for satellite uplink communications, including MX2000 TWT medium-power cabinet (C/-/Ku); MX3000 TWT medium-power cabinet (C/-/Ku); MX500 TWT high-power cabinet (C/-/Ku/DVS); MX9000 klystron high-power cabinet (C/-/Ku/DVS).

Circle (672) on Reply Card

M C Lights and Manufacturing 13162

Circle (1002) on Reply Card

Measuring Marketing 4803

Circle (1003) on Reply Card

Media Computing 11105-7
Broadcast automation packages, PROtec and ANGS systems; Angs companion.

Circle (673) on Reply Card

Media Concepts 11442
Used broadcast TV production equipment.

Circle (674) on Reply Card

Meret Optical 12748
Fiber-optic products; LL500-G serial digital video FO card, to three TX or RX per card; LL700 laser-diode-based FM video link, meets short-haul specs over long distance; WFMS-3000 multichannel broadcast video FO system.

Circle (675) on Reply Card

Meson Technical Press Pty. Ltd. 18578

Circle (1004) on Reply Card

Micro Communications 19401
Transmission line; HDTV/NTSC UHF antennas, HDTV absorptive filters, LPTV all-band UHF antennas; transmitter output coax breakaway section; HDTV/NTSC line couplers.

Circle (676) on Reply Card

Micro Technology Unlimited M 313, 412
Transmission line; HDTV/NTSC UHF antennas, HDTV absorptive filters, LPTV all-band UHF antennas; transmitter output coax breakaway section; HDTV/NTSC line couplers.

Circle (1005) on Reply Card

Micron Audio Products 16448-51
Wireless microphone systems, accessories; including model TX-505 hand-held transmitters, SDR range portable diversity receivers; SQN-110 portable stereo mixer, Tram lavaliere mics.

Circle (677) on Reply Card

Micron Tool & Mfg./Cammate 17570-570
Camera support systems, Black Magic boom extensions with remote head, pan/tilt control.

Circle (678) on Reply Card

We don't call 'em LIGHTNING for nothing!!! How about six NP1 B's fully charged in under an hour? How about a broadcast battery charger that does 90's and bricks as well as NP's ... AT THE SAME TIME? How about strong, lightweight, and auto 90-250 volt operation? How about a price that doesn't burn your wallet?

PUT SOME LIGHTNING IN YOUR BATTERIES!!!

UNITED STATES BROADCAST
PHONE: (606) 282-1802, FAX: (606) 282-1804
This year the spotlight is shining on Extron's new Super High Resolution Cable, the System 4LD Switcher/Line Doubler, and the Matrix 200 Routing Switcher—three high-powered products sure to meet the heavy demands of any A/V user or video production house.

Visit us this year at the NAB Multimedia World in the Las Vegas Hilton and see these and Extron's full line of high resolution video products in action!

COME SEE US AT BOOTH #319 (HILTON)
MicroNet
Video transmission services - terrestrial linking New York, Philadelphia, Washington DC, Dallas, Austin, Houston, San Antonio; earth stations in Dallas and New York for domestic and international services.
Circle (679) on Reply Card

Micropolis
Introducing AV Gold Series high-capacity, high-performance drives for multimedia applications; 4MB/s transfer rate; from 2.1GByte to 9.1GByte capacities.
Circle (680) on Reply Card

Microsoft Corporation
PC computer software.
Circle (681) on Reply Card

Microtime - See Digital Graphix
Microvideo Ltd.
Digital interfacing with NTSC/PAL to D-1 module; digital test pattern generator with EDH, embedded digital audio; digital proc-amp; digital logo generator for station ID; digital data inserter for closed-captioning; VITC, etc.
Circle (682) on Reply Card

Microwave Filter/Comband
Interference, bandpass, bandstop filters for cable TV, microwave, earth station signal applications.
Circle (683) on Reply Card

Microwave Radio
Featuring portable microwave transmitters for ENG, fixed radio systems for STLS, ICRs, backbones; antennas, controllers.
Circle (684) on Reply Card

Milestek
Connectors, cables for analog, digital video; cable tools; computer network adapters, cabling, connectors; distributors for Trompeter, North Hills, ADC Telecommunications.
Circle (685) on Reply Card

Miller Fluid Heads
Introducing Miller System Z5 ENG camera support package, redesigned counterbalance, pan handle, above-ground spreader for 2-stage models, new rubber feet; accessories for series II ENG/FPD tripods, ground spreaders, suction-grip rubber feet, carry strap, accessory hook; Pro-Jib arm with 6-foot extension, dual bubble level, stainless steel, alloy construction, folds to four feet for transportation.
Circle (686) on Reply Card

Minolta
Color analyzer CA-100 with probe holder and training video; XY-1, Cl.-100 incident colorimeters; CS-100 spot colorimeter; CC-110 convergence meter.
Circle (687) on Reply Card

Miratelike Communications
Satellite communications products, 7900 LNB; Space Line digital telephone service system.
Circle (688) on Reply Card

Miranda Technologies
Introducing Espresso integrated computer video interface; ISO-101i: 1:2:2 detail enhancer; SOLO desktop housing for Miranda imaging series converters; Windy serial 4:2:2 input module for SGI Indy.
Circle (689) on Reply Card

Mira Vision
Circle (690) on Reply Card

Modulation Sciences
Audio processors, spatial image enlarger; modulation measurement equipment, digital FM peak deviation monitor; diversity subcarrier receiver for ENG/mobile crew communications; RDS/RBDS analyzer and RDS/RBDS data receiver.
Circle (691) on Reply Card

Mohawk/CDT Broadcast Cables
Water-resistant triaxial cable with waterproof boot; serial digital D-1, D-2, D-3 video coax; parallel digital D-1, D-2, D-3 data cable; digital audio cable; Ultral flex video cables; composite camera cables; fiber-optic video link; cables conform to SMPTE, NEC code.
Circle (692) on Reply Card

Mole-Richardson
Lighting products, lamps, fixtures.
Circle (693) on Reply Card

The longest lasting battery* for the home...

*Comparison of leading non-rechargeable battery brands.
Montage Group 16980
Non-linear videotape editing systems, Montage Picture Processors; Montage for the Video Toaster and Amiga AGA.
Circle (694) on Reply Card

MSE Video Tape Services 13046
Videotape products
Circle (695) on Reply Card

Multidyne Electronics 12262
Signal distribution products, VPDA-2 video/pulse/subcarrier DAs with EQ; test products, TS-16 NTSC V/A test generator; solid-state audio recorders; video distribution tray.
Circle (696) on Reply Card

Murry Rosenblum Sound Assoc. 2428
Audio Ltd. diversity wireless microphones systems.
Circle (697) on Reply Card

MYAT 15714
Rigid coaxial transmission line components and accessories; 1/4" to 9/16".
Circle (698) on Reply Card

Nady Systems 11226
Wireless mic systems using VHF and UHF frequencies.
Circle (699) on Reply Card

Nagra Kudelski SA 11805
Analog, digital audio recorders; introducing NAGRA AREA, solid-state recorder with PCMCIA support; single-channel records 40 minutes on 20Mbyte card; editing, G722 or MUSICAM compression; standard telephone output, ISDN, time-code options.
Circle (700) on Reply Card

Najpak Sales 16964
TuffPaks tripod cases; RP series molded rack cases; Travel Kart series; Magliner series.
Circle (701) on Reply Card

NDG Phoenix 13043
OMS v1.5 upgrade to operations management software, increases performance with multiple sessions, work orders; LMS v1.6 upgrade to library management system with laser label option, improved interface, barcode and tape logging.
Circle (702) on Reply Card

L E Nelson Sales 13615-6
Stage and studio lamps by Thorn, GF.
Circle (703) on Reply Card

Nemal Electronics International 13636
Precision audio, video cable; flexible mic cable; Kings products, Cat wire and cable, Switchcraft, Amphenol, Blonder-Tongue, Belden Alpha, Cablewave.
Circle (704) on Reply Card

Neotek 1907-9
Featuring the Élana Extra, the Elite and Esprit audio mixing consoles, a multimedia module, Sytek microphone pre-amp line.
Circle (705) on Reply Card

Neutrik Instrumentation 2127
Portable and programmable audio system measurement products; 3301, 5300 test systems.
Circle (706) on Reply Card

Neutrik USA 2127
A and B series XLR receptacles, small size, many configurations, tuning fork contact principle, optional pin 1 direct to ground; MiniCon 12-pin connector, for PCB mounting, fully metal polarizing guides, unique strain relief, EASY PATCH series of patchbays and panels.
Circle (707) on Reply Card

NewsMaker Systems 18585
Newsroom automation interface products for titlers.
Circle (708) on Reply Card

NewStar/Dynatec Video Group 17124
See Dynatec Video Group.
Circle (506) on Reply Card

Newswire 2000 15165
Circle (1007) on Reply Card

...is also the longest lasting battery on the job.

That's because PROCELL® PROFESSIONAL® batteries are DURACELL® batteries — the longest lasting alkaline batteries available. PROCELL is Duracell's line of alkaline and specialty batteries made for professionals. They deliver DURACELL dependability, DURACELL value and DURACELL performance.

PROCELL's superior performance is the result of a new Duracell alkaline battery design with features so unique they're patented.

See for yourself that PROCELL is the longest lasting battery you can buy. For more information or a distributor referral, call 1-800-548-5489.
No More Twist and Shout, Just Rack and Roll.

No more jammin' the ball bearings or dancin' with 100 lbs of heavy metal. Stop breakin' your back trying to align the rack slides when mounting your VTR's. Simply place the VTR feet in the cutouts on the RMA Mounting Shelf and slide it on home.

Available for most broadcast and professional VTR's.

AVTEL ELECTRONICS CORP. 3678 West 2100 South Salt Lake City, Utah (801) 977-9553

See us at NAB, Booth #12942
Big News About Something Small.

The Varian Compact Satcom MPA.

Our new Compact Medium Power Amplifier (CMPA) is big news in the portable satcom market. It’s ideal for SNG, flyaway and small earth terminals.

The CMPA packs high efficiency in a 5.25” single rack drawer. It’s also easy to use, featuring microprocessor control. Digital and analog control interfaces make the CMPA a snap to integrate into the system. Plus, it’s easy to maintain with modular construction and built-in fault diagnostics—all in a rugged design that can stand up to a world of conditions.

And, as with all Varian amplifiers, the CMPA is backed by the industry’s largest sales and global service network.

No matter where in the world your story breaks, Varian’s CMPA will be there transmitting the news.

Give us the opportunity to tell you more, call us:
Tel: (408) 496-6273  Fax: (408) 496-6235

Varian Microwave Equipment Products
3200 Patrick Henry Drive
Santa Clara, CA 95054 USA

Circle (118) on Reply Card
NiCad battery products; Precut holes - for every signal type between the antenna pedestal and control room.

Orson Atlantic

Featuring international satellite communication services for audio, video, data via Ku-band covering North America, Europe.

Ortel

Audio mixers and recording equipment; introducing STATUS RP, a digitally controlled console; the BR-10 broadcast console; and CDC-600 CD changer; featuring MR-10 minidisc recorder and RADAR random access digital audio recorder.

Oxberry

Animation equipment.

Pacific Bell

Multimedia CD publications.

Pacific Radio Electronics

12946-8

Racks, panels; prefact holes accommodating various manufacturers' connector products.

Pacific Recorders & Engineering

3025

Audio mixing consoles, including BMX, AMX, STX, RMX and production mixer systems; ADX Ensemble and ADX Eight digital audio workstations; custom studio cabinetry.

Paco Electronics USA

16764

NiCad battery products; DP series.

Panasonic

18101

AJ-D351 D-3 VTR, LQ-D550 digital optical disc recorder; Smart Cart automation system; WJ-MX100 Postbox non-linear editing system; AQ-235W as a digital studio camera; cost-effective digital component video system.

Parallax Graphics Systems

M1720-1

Video graphics, paint, animation software, including ADVANCE digital compositing, effects and sequence editing; DIPPS digital ink and paint software system.

P & E Photon

M1329

Featuring DVD-A1 digital disk array; O逊-BOX video frame capture box; PRIMATTE advanced chroma-key software.

Penna & Giles

3004-5

Signal controls, faders; M3000 linear, MF11 rotary motorized series; T-bar controls; precision controllers; Audio Control Module precision faders and control devices, including the PGF 8000 and 3000 series of linear faders.

Penta Laboratories

1525

Transmission power devices, klystrons.

PEP

16601-701

Videotape editing products, Shotlist software; DigiSpot digital recorder, player cart replacement.

Peta Switching Systems

19401

Introducing Cougar routers based on 32x32 matrix for audio, video, digital and widebandwidth; Lynx series routers for small-size video, audio and wideband matrices at low cost; Bobcat family of routers in 16x2 for A/V, wideband, D-1, RGB and Y/C; Route 66, Windows-based router control system for 6600E controller line; Panther control system on single board for stand-alone or in-router installation; model 2400E/EX/EXS control for simple routing requirements at effective cost; featuring RM5000, RM4000 routers, RC5300/5000, 6600E/EX/EXS control systems.

Phaseal Inc.

5427-7

Manufacturers of AM antenna phasing equipment, antenna tuning units, RF components and RF inductions.

Philips Consumer Electronics

18982

Circle (1013) on Reply Card

Philips TV Test Equipment A/S

16811-5

Introducing PM 5639/01 CRT color analyzer with PC software; PM 5639/02 auto color alignment for Barco monitors; PM 5639/21 industrial CRT color analyzer with double sensors.

Photomart Cine-Video

17121-221

Distributor, video products.

Pinnacle Systems

18380

Featuring Prizm video workstation with latest software; Alladin component video I/O option (52.5/625-line); introducing FlashFile, 3rd channel option to FlashFile still-store system for two independent program outputs with separate preview capabilities; FlashFile network via HP 100VG-AnyLAN.

Pioneer New Media Technologies

19771

Real-time MPEG-2 encoder; high-capacity removable worm digital video disk (20GByte); digital video disk record, playback system; digital video disk archive changer with 252 disk capacity; multichannel video disk cart system, 500 disks, 12 drives.

Pixel Instruments

18638

DS4200 10-bit serial digital video frame synchronizer; AD3100 digital audio delay, synchronizer; DD2100 video delay detector; AD2100 audio delay, synchronizer tracks variables in video delay; DA-300 digital DA.

Pixel Power Ltd.

13348

Circle (1014) on Reply Card

Posthorn Recordings

1526

Circle (1015) on Reply Card

Potomac Instruments

2510-11

RF test/monitoring products; 1900 series directional array antenna monitors; FIM series MF/VHF/UHF field-strength meters; AA-51A automatic audio analyzer, AG-51 generator; QA-100 program audio analyzer, tower light monitor; remote-control systems.

Power Productions Software

M1531

Circle (1016) on Reply Card

Prime Image

19984

TBC/synchronizer systems; standards converters, delay unit with separable audio and video capability; self-contained logo inserter; plug-in TBC/synchronizer for computer-based effects systems.

Pristine Systems

2903

Circle (1017) on Reply Card

Pro Battery

19151-251

Premium nickel-cadmium battery packs for professional TV; NP1As, NP18s, 12V, 13.2V, 14.4V bricks types; VP-90s, belts; full line of chargers, primary batteries; rebuilding services.

Production Garden Library

13346-7

Production music libraries, Broadcast 100 and AV/Video 200 series.

Professional Label inc.

15728

Label Producer label printing software for Windows; video status label sheets; MII, D-3, CD label sheets; packaging products.

Professional Sound Corporation

5116-7

Production audio equipment distributor; MilliMic/lavalier microphones; VDB boompoles; audio distribution amps; battery supplies; mic power supplies; RF antennas; PSC sound carts, custom cables; headset microphones; omnidirectional microphones; universal shock-mount systems; solar panel/rechargeable power supplies.

Progressive Image Technology

19926

Computer-to-video scan converters.
Did You Say Odetics Disk Systems?

The CacheMachine™ From Odetics.
The Automated On-Air System for Today and Tomorrow.

You've heard lots of promises about play-to-air disk systems. But only Odetics, a world leader in on-air presentation, gives you the first real-world disk solution for today's television station. With a new system called the CacheMachine.

The CacheMachine overcomes the barriers to successful on-air play from disk — without forcing you to go backward in station automation. It allows you to play programs as well as commercials automatically and cost effectively. It provides support for multiple channels from a single system. You don't have to abandon your present technology or change your format. And you don't need a crystal ball to tell you which data compression format will become standard.

How is this possible? Because the Odetics CacheMachine uses a technique called disk caching to maintain your valuable commercials on archive tape in an uncompressed format for a fraction of the cost of archiving them on disk. Then the spots are automatically loaded into a disk recorder, which later plays them to air on one or two channels — with all the speed and flexibility that disk provides.

Experts agree the CacheMachine is today's only real-world disk automation solution. But there's not enough space here to tell you all its great benefits. One thing's for sure. You can't afford to make a decision or an assumption about on-air automation until you talk to Odetics.
Q-TV 

Executive speech prompters; CueMac Macintosh-compatible computer prompter program; 9"-17" on-camera prompters; FDP-95 flat panel display; 15" prompter/monitor; upgrades for models QCP-IT, QCP-Mark 1,5; QCP Mark II.

Circle (763) on Reply Card

QSI Systems 15828-16028 

Featuring 908 series multi-image inserter with time/temperature option; 808 single image inserter; model 1500 RS-232 control modem.

Circle (764) on Reply Card

Quality Video Supply 13246-6 

Kramer video encoders, decoders, correctors; computer to video interface; video/audio switches, DAs; digital TV standards converters.

Circle (765) on Reply Card

Quanta/Dynatech Video Group 17124 

See Dynatech Video Group.

Circle (766) on Reply Card

Quantel 18151 

Presentations: Editing - the Post-Production House of the Future; News - the News Operation of the Future; new developments for Paintbox, Hal digital compositor; Optical effects for Henry, Hal, Domino; enhancements to Picturebox still-store.

Circle (767) on Reply Card

Questar Systems (Farpoint Systems) 28662 

AccuPrompt software for Macintosh desktop, PowerBook series computers; NTSC output.

Circle (768) on Reply Card

Quickset 11527 

Introducing Apollo II tripod; Samson Husky leg locks; electromagnetic pan/tilt head QF-15 for Telecommunications; joystick remote controllers.

Circle (769) on Reply Card

R-Columbia Products 13044 

Wireless intercom products, TR-470/R1-60 IFB/ENG headphones; 6059/PFT ENG/IFB pocket telephone; wireless IFB headset/receiver; miniature dynamic headset; full-duplex intercom headphones; replacement intercom headsets and beltpacks.

Circle (770) on Reply Card

Radamec EPO Ltd. 

TCP Touch Control Panel for full-shot storage, recall with SVGA touchscreen monitor; displays montage of frame-grabbed shots for eight cameras; RP4 pedestal drive unit for full XY control; FK435 VR pan, tilt head for Virtual Studio application.

Circle (771) on Reply Card

Radians Circle (772) on Reply Card

Raffles Trade Press Pte. Ltd. 17869 

Introducing audio mixers, intercom systems, switchers, switchers, jackfields and on-air lights.

Circle (773) on Reply Card

Ramsa Audio/Panasonic 18101 

Professional audio mixers, monitors; R-DAT systems, SV-3700, SV-3900 with RS-422 control.

Circle (774) on Reply Card

Rank Cintel 12340 

Analog flying spot, all-digital, and HDTV telecine systems, including Ursa Gold, Turbo 2 and Mk III HD.

Circle (775) on Reply Card

Rapco International 5413 

Circle (1020) on Reply Card

Rasterops 19952, M1309 

Featuring the Targa 2000.

Circle (776) on Reply Card

RCI Systems Inc. 10361 

AVD series A/V wall plates, panels; BRO active/passive audio mult. boxes; CT-2 cable tester; introducing BMV series video multi. box and custom silk screening services.

Circle (777) on Reply Card

RE America 18378-478 

Circle (1021) on Reply Card

Review 

Text, measurement equipment for audio, RDS data transmission products.

Circle (777) on Reply Card

Rean Products 5414-5 

Circle (1022) on Reply Card

Recognition Concepts 16712-3 

Featuring low-cost videodisc recorders, portable HD disk recorders, XVDR software package.

Circle (778) on Reply Card

Rees Associates 17122-222 

Broadcast architecture.

Circle (779) on Reply Card

Research Technology Int'l./RITM 13845-14054 

 Videotape evaluation and clean up systems; TapeChek 4100 for evaluating, reusing digital Betacam tape; DXA digital tape dropout counter; Capacitive discharge deuggers.

Circle (780) on Reply Card

RF Technology 13128 

High performance heterodyne fixed links 1.5-15GHz; UPL series transmitters 1.5-15GHz; D-series portable systems, 1.5-15GHz; HCR series ENG central receive systems; SVX series analog/digital SNG systems in C, X and Ku bands.

Circle (781) on Reply Card

RGB Computer & Video M1321 

AmiLink Pro Desktop video editing system; IBM-PC-compatible; V-LAN universal control features; CMX 3600 edit list compatibility; support for various peripherals including NewTek Video Toaster.

Circle (782) on Reply Card

RGB Spectrum M 310-2 

Introducing Superview, RGB/Videolink 1700.

Circle (783) on Reply Card

Richardson Electronics 13100 

Power transmitting tubes, NL347 1kW UHF device, UL1057 power tetrode to 960MHz.

Circle (784) on Reply Card

Roland Corporation 4713 

Audio workstations, including the DM-800 and expandable DM-80; AR-2000 audio announcement recorder; AFP-700 anti-feedback processor; RSS-10 Roland Sound Space 3-D sound processor.

Circle (785) on Reply Card

Rosco Labs 16714-5 

Lighting modification and control materials; chroma-key paint, material.

Circle (786) on Reply Card

Ross Video 18632 

Introducing RVS 316 video production switcher; Enhanced Border Generator option package; digital distribution products; SR-8001 auto-clocking EQ amp; SRW-8002 re-clocking, EQ amp, SEA-8003 serial EQ amp, DLL-8000 digital delay line, CMA-8011 component monitoring amp, DFR-8110 mounting frame, PS8101 power supply; analog distribution ADA-7801 mono, AD-7802 stereo DAs; AFR-7812 audio DA mounting frame; PS-7801 power supply.

Circle (787) on Reply Card

Rules Service Company 1528 

FCC rules, regulations published monthly in loose-leaf and computer formats; copyright, patent, trademark rules.

Circle (788) on Reply Card

M S Russin Group 11612-3 

Camrrobics systems for automated camera support system control.

Circle (789) on Reply Card

Sachtler 

19526 

Camera support, pan/tilt and tripod products; lighting equipment.

Circle (790) on Reply Card

SADIE 1207 

Digital audio workstation.

Circle (791) on Reply Card

SAIC-Information Display Systems 13405 

Featuring Eddiopher 5171B with signal converter; runs at 44kHz with flicker-free images, total H & V size control at 9,500 lumens.

Circle (792) on Reply Card

Samson Technologies 12829 

Stage 33, install wireless mic systems; Behringer Combinator compressor; Soundtracs Solitaire consoles.

Circle (793) on Reply Card

Sandor Electronics 15661 

Featuring V2000 video router with 64x64 6RU or 32x32 3RU configurations; 9644 audio router 32x32 3RU; VD2000 16x16 and 32x32 140 and 270MHz routers; systems to 300MHz bandwidth; ACS4000 audio conference system; PES 2.2 software for PC control of routers.

Circle (794) on Reply Card
That's the way most audio test equipment is designed... The instrument maker chooses analog or digital, lays out a front panel, builds in a fixed level of internal processing power and adds a display from today's choices. They'll never adapt to the future like System One and System Two from Audio Precision.

First a comprehensive selection of digital and analog measurement capabilities and options allows you to tailor your initial purchase to an exact fit for your needs of today. Tomorrow you benefit from continuous product and technology improvements, as System One and System Two grow with your needs. Both System One and System Two allow you to later add options not originally fitted.

DSP versions gain new functions and features by simply downloading different and newer versions of our DSP software.

You get better and faster system performance as well as higher resolution displays by upgrading PC technology without buying new audio measurement hardware. Upgrade to the popular Windows™ graphical user interface.

We introduced our first System One audio test sets in 1985. Today over 4000 of our PC and GPIB-based System One and System Two analyzers are in service worldwide, testing everything from aircraft to automobiles, satellites to cell phones, hi-fi to hearing aids.

Our customers who purchased System One in 1985 are still enjoying the benefits of our open-ended design philosophy. Those who purchase System Two in 1995 will enjoy the same benefits well into the next millennium. You can join them by contacting one of our worldwide Audio Precision representatives today for information and an onsite demonstration.

P.O. Box 2209
Beaverton, OR 97075-3070
(503) 627-0832, 1-800-231-7350
FAX: (503) 641-8906

The recognized standard in Audio Testing

INTERNATIONAL DISTRIBUTORS: Australia: IRT Electronics Pty. Ltd., Tel: 2 439 3744 Austria: ELSINCO GmbH, Tel: (1) 815 04 00 Belgium: Trans European Music NV, Tel: 2 466 60 00 Brazil: INTERWAVE LTDA., Tel: (21) 325-6221 Bulgaria: ELSINCO, Blvd. Bulgari, Tel: 2 18 61 01 Canada: GERRAUDIO Distribution, Tel: (416) 988-0779 China, Hong Kong: H.E. (Int) Co. Ltd., Tel: 2549-0397 Canada: A.V. Audio Video Consulting, Tel: (416) 924-6221 Czech Republic: ELSINCO Praha spol. s r.o., Tel: (2) 49 66 89 Denmark: H.B. Elektronik aps., Tel: 86 57 15 11 Finland: Genelec OY, Tel: 77 1331 France: ETS, Aisnel, Tel: (1) 45 65 86 41 Germany: RTW GmbH, Tel: 221-709150 Greece: KEM Electronics Ltd., Tel: 01-65785145 Hungary: ELSINCO KFT, Tel: (1) 226 18 50 India: HINDITRON Services Pvt., Tel: 225 456 4560 Israel: Dan-Ei Technologies Ltd., Tel: 256-7921 Japan: Link Engineering Ltd., Tel: 0356 45 1471 &P Ltd., Tel: 0354 63 24 71 Malaysia: Test Measurement & Engineering Sdn. Bhd., Tel: 3734 1917 Netherlands: HJH, Tel: 09051-56300 New Zealand: Audio A Video Wholesalers, Tel: 7 847-9414 Norway: Lydconsult, Tel: (47) 66 883933 Poland: ELSINCO Polska sp. z o. o., Tel: (22) 56 67 79 Portugal: Acustica Eletronica LDA, Tel: 341 6567/8420862 Singapore: TM Systems Pte Ltd, Tel: 747-7204 Slovakia: ELSINCO Bratislava spol. s r.o., Tel: (2) 794-1589 South Africa: SOUNDFUSION Broadcast, Tel: 11 477-1315 Spain: Testo Electronics, S.A., Tel: 1531-7101 Sweden: TTG Test & Tun Skaldfors, AB, Tel: 31-903 620 Switzerland: Dr. W.A. Gunther AG, Tel: 1 910411 Taiwan R.O.C.: Cha Wei Electric Trading Co., Tel: 2-5862211 Thailand: Massawor Company Ltd., Tel: 662-294-4930 United Kingdom: Thrifty Thandal Instruments Ltd., Tel: (1483) 412451

Windows is a trademark of Microsoft Corporation.
Sanders Media Adventures/C MAC  M1709
OEM video filter manufacturer.
Circle (796) on Reply Card

Sanke/Developing Technologies  12802
Lavalies, hand-held and other microphone products.
Circle (796) on Reply Card

Sanyo  M 201
Circle (1023) on Reply Card

Scala Electronic  15707
Broadband UHF TV panel antennas; wireless MMDS transmission antennas; base station antennas for communications; STL, RPU antennas, pre-amps; LPTV, translator antennas.
Circle (797) on Reply Card

ScheduALL by Visual Inc.  16340-41
Introducing ScheduALL facility management systems for Windows; ScheduALL library systems, ScheduALL personal manager.
Circle (798) on Reply Card

Schmid Telecommunication  1815-17
Audio test, measurement systems; RESCO network monitoring, control systems; SLAT audio test systems.
Circle (799) on Reply Card

Scientific Atlanta  13828
Satellite communications equipment, earth station antennas, video receivers, antenna controllers; MPEG-based digital video compression system.
Circle (800) on Reply Card

Seem Audio A/S  4604
Studio and portable audio mixers.
Circle (801) on Reply Card

Selco Products  4121
Equipment replacement components, introducing Locking knobs, Soft Touch slider knobs and 3-shot push-on knobs.
Circle (802) on Reply Card

Sennheiser Electric  12035
Headphone, microphone and wireless RF products; TLM 193 large diaphragm cardioid condenser mic.
Circle (803) on Reply Card

SESCom  13600
Rackem 'n' Stackem Electronics; Audio SPLs and transformers; in-line audio devices.
Circle (804) on Reply Card

Sharp Electronics Corporation  M 103-5
Circle (1025) on Reply Card

Sheriff Systems  16374-474
ProVideo 24 TV graphics composer.
Circle (805) on Reply Card

Shively Labs  4425
Broadcast antennas and related equipment; introducing MMOS and UHF series antennas.
Circle (806) on Reply Card

Shook Electronics  A1
Remote operation vehicles, including model 48-63 sports trailer, network sports vehicle; model 16-24 EFP Cube Van for 4CAM field production; model 960 ENG/EFP van for 2-3 camera production; model Ku-band uplink trailer combo production, uplink unit.
Circle (807) on Reply Card

Shotmaker Dollies/Camera Platforms  10949
Camera support equipment, Super Panther, Mini Panther camera dolly; Super Aerocane remote head crane, Super Jib II mini crane; Moviemaker portable motion control system.
Circle (808) on Reply Card

Shure Brothers  11800
Introducing the M367 mixer with 6-input portability for ENG/EFP using mic or line level signals; the VF3 Wireless System including the VF3 portable receiver and associated T2/58, T1P bodypack/WL 93, or L11 bodypack transmitter.
Circle (809) on Reply Card

Siemens Audio  13813
Neve audio mixing systems; Mitsubishi digital audio recorders; AMS mics, automated mixers, workstations; Siemens analog, digital routers.
Circle (810) on Reply Card

Sierra Automated Systems  2710
Routing switchers.
Circle (811) on Reply Card

Sierra Design Labs  16585
Circle (812) on Reply Card

Sierra Video Systems  11650
Featuring a serial digital video keyer; 3232D 32x32 and 8x8 serial digital video router; 84VS 8x4 video with stereo audio routing switcher.
Circle (813) on Reply Card

Sigma Electronics  19059
Introducing series 2100 switching, processing, distribution for multiformat systems; series 2100 serial digital video switcher; series 2100 control router (RS-422).
Circle (814) on Reply Card

Signal Technologies/ST Keltec  11500-1
Circle (1026) on Reply Card

Silicon Graphics/ST Keltec  15779
Introducing Silicon Studio Live on-line support, training, industry information service; featuring Challenge network servers; Onyx Reality Engine graphics supercomputer; Indigo workstations with Galileo video; Indy desktop systems with digital camera.
Circle (815) on Reply Card

Sinar Bron  16773
Lighting products
Circle (816) on Reply Card

Sira Sistemi Radio srI  19359
FM, TV transmission antennas, UTV-01 and 3VTV panel antenna designs.
Circle (817) on Reply Card

SMPTE  13400-1
Professional organization.
Circle (818) on Reply Card
Meet the hottest...

...UHF wireless

Red hot performance and solid reliability...

The UCR190 narrow-band UHF receiver utilizes the proven UNICHANNEL© design with helical resonator front-end filtering and narrow band crystal IF filtering. An all new dual-band compandor provides low distortion and a high signal to noise ratio. Aimed at broadcast ENG applications, the UCR190 receiver provides unmatched interference and IM rejection.

The 195 Series wide-band UHF system utilizes ±75KHz deviation for outstanding dynamic range and signal to noise ratio. An exclusive dual-band compandor and pulse counting detector provide audio quality well suited to the most demanding digital recording techniques. The balanced audio output is adjustable from mic level up to +8dBm studio levels.

More transmitter output power, plus higher receiver sensitivity than any other brand we've tested, all adds up to more operating range than you will probably ever need.

Belt-pack and plug-on transmitters are available in both narrow-band and wide-band UHF versions. Audio outputs are balanced XLR types with separate monitor outputs. All housings and panels are made of machined aluminum for a precise fit and lasting ruggedness.

Shock mounted crystals and surface mount components withstand the toughest field use.

Inside Lectrosonics UHF products you will find advanced RF engineering, superb mechanical design and the very latest in surface mount technology. This is the present state of the art in wireless systems.

We invite you to compare these systems with any other wireless system, at any price.

Call for more information

800-821-1121

and a free copy of the 50 page "Wireless Guide"

Distributed in Canada by MILLER CANADA

LECTROSONICS

581 Laser Rd., Rio Rancho, NM 87124 USA

Ph: (505) 892-4501  FAX: (505) 892-5243

Circle (107) on Reply Card
You rely on V-LAN* to control Multiple Devices...

If you use an AVID, EMC, Montage, Ediflex, Amtel, RGB, Strassner, Videomedia, or any SGI based video editing workstation, you’re already using the industry standard V-LAN Universal Control Network. V-LAN enables each workstation to control and synchronize up to 31 videotape and digital disk recorders.

...Now the V-LAN HUB® controls Multiple V-LAN Networks!

Videomedia has developed the V-LAN HUB Network Control Router. Up to eight video editing workstations can share up to 64 video devices, without the need to reconfigure hardware with each device change. Control of any device is quickly routed to any workstation via the HUB routing software.

With over 60,000 V-LAN units in the field worldwide and hundreds of developers writing the V-LAN protocol into their software, V-LAN has become the industry standard in machine control and synchronization.

Visit Booth 15724 at NAB '95 for a Demo or Call (408) 227-9977

[Ad for various products and companies]
Cash In On a Digital Audio Codec!

Intraplex is Making You an Offer You Can’t Refuse.

HOW CAN YOU REFUSE?

Have your fax call our fax. For a digital audio codec that does it all:

- CD Quality
- Full Duplex 7.5 kHz, 15 kHz, & 20 kHz
- ISDN S/T & U Interfaces
- MPEG II & G.722
- Musicore® Compatible
- Portable, Self Contained
- Plug and Play

Hurry. Like All Good Offers, Ours Expires Eventually.

(In this case, on May 31, 1995).

Circle (109) on Reply Card

Intraplex, Inc.
3 Lyberty Way
Westford, MA 01886-3636
Tel: (508) 692-9000
Fax: (508) 692-2200
Stainless 16608-908
Tower guy materials, towers.
Circle (633) on Reply Card

Standard Communication 19923
Introducing CAM830 Omni VU control access module, complete on-site, off-side control of all satellite receiver functions; Continental MT620 international satellite receiver; SMATV/CATV, special network receiver, ICM470 VSB AM TV modulator; MT900, MT830BR satellite receivers.
Circle (634) on Reply Card

Stanton-Video Services Unltd. 16373-473
Camera support products.
Circle (635) on Reply Card

Stantron 12832
Modular equipment racks, consoles and cabinets.
Circle (636) on Reply Card

Steenbeck 15811-12
Introducing Video-Solution, V-Mod 100 instant access digital video recorder using removable magneto-optical disks; COMBO BFL-35 studio quality film-to-video transfer, 24-side holoscope, shipping case.
Circle (637) on Reply Card

StereoGraphics Corporation M1711-1807
Circle (1029) on Reply Card

Sterling Technology M 200
Circle (1030) on Reply Card

Storel 18114
Tape storage systems, including mobile and static designs for all formats.
Circle (838) on Reply Card

Strand Lighting 13817
Lighting fixtures, control products.
Circle (839) on Reply Card

Strassner Editing Systems 19633
SES Version 7 professional editing controllers for analog or digital devices, single-source offline to high-end on-line; EdiQit Windows-based editing controller, single source and A/B roll with Fin-nacle Alladin API control.
Circle (840) on Reply Card

Strata Inc. M1315
Circle (1031) on Reply Card

Studio Technologies 3003
StudioComm series model 60 central controller, model 61 control console; Studio Tools model 80 stereo analog audio DA; Studio Tools model 85 AES/EBU digital audio DA.
Circle (841) on Reply Card

Superior Electric 5113-4
Electronic, electrical control equipment; STABILINE power protection equipment;
uninterruptible power supplies, power conditioners, transient suppressors, RFI filters; voltage regulators; AC disturbance monitors.
Circle (842) on Reply Card

Superscope Technologies/Marantz 5426
Circle (1032) on Reply Card

Sure Shot Teleproductions 16029
Ku-, C-band transportable earth station; production facilities and transportable equipment.
Circle (843) on Reply Card

Svetlana Electron Devices 5313-4
RF power devices.
Circle (844) on Reply Card

Swintek Enterprises 11064
Intercom products, including Mark 200/MD, full-duplex transceiver; Mark 200/RPL base, 20-channel full-duplex remote system; Mark 200/DRJ base system; UHF, dual-channel ENG system.
Circle (845) on Reply Card

Switchcraft 5010-11
Featuring solderless 280D/RJ plug; black Tini Q-g connector; 188 heavy duty 1/2", phone plug; 299 heavy duty 1/2" stereo phone plug; 3.5mm single mono jacks.
Circle (846) on Reply Card

SWR Inc. 14845, 15745
RF feed-line products; complete line of broadband TV antennas, FM antennas featuring economical performance, Field Engineer Service, 5-year limited parts, labor warranty; MMDS antennas.
Circle (847) on Reply Card

video accessory corporation

Cable Equalizing
Brick™ Distribution Amp.

Corrects cable induced frequency and phase errors to preserve resolution and color phase (SC/H). Compensates 0 to 1000 of 8281 cable.

Differential input fights ground-loops that can cause hum-bars.

Other VAC Bricks include a new Black Burst Generator as well as distribution amps for S-Video, ENG, Audio, Clamping, & Loop-thru.

120V Plug & Chug from Weircliffe

120V Plug & Chug from Weircliffe Released on April 1995 is our new LiTE DOM™ / DTE in 120V AC designed from Weircliffe. The unit offers all the benefits associated with a high power degaussing unit without being restricted to a heavy duty 200V AC power.

- Operates from a standard 120V 60Hz socket outlet
- Erases metal tape formats including BetaCam SP/Digit Betacam, SP/DV
- Erases 8MM or 1500 On Video
- Accepts two SPW, cassette per operation
- Great Shading - External shielded magnetic field below 0.5mT
- Energy efficient: 120V 60Hz current draw 114A
- 120V 50Hz or 60Hz units available
- Rack mountable with optional rack
- Double thermal protection
- Weight only 11lbs.

Weircliffe International Ltd
St. Andrews Road
Exwick, Exeter
Devon, EX4 2AG, UK.
TEL: USA PRECO INC TOLL FREE 1-800 227 8887
INTERNATIONAL: 44 (0) 1392 72132

Circle (110) on Reply Card

Circle (111) on Reply Card

Circle (112) on Reply Card

Circle (113) on Reply Card

Circle (114) on Reply Card

Circle (115) on Reply Card

Circle (116) on Reply Card

Circle (117) on Reply Card

Circle (118) on Reply Card
The 21st Century is just around the corner and the time to prepare is now. Decisions that are made now will have tremendous impact on your company's competitive position in the next century.

With this in mind, MCL developed the MAXXIM Series HPAs. These HPAs give you the technology and performance to open the door now to the 21st century, giving you the edge that will be needed to succeed in the competitive satellite communications market.

Whether your uplink needs are for a fixed or transportable application, MAXXIM Series TWT and Klystron amplifiers will provide the technology and performance to take you into the 21st century.

For more information about these revolutionary new amplifiers, contact MCL today.

MCL INC.
501 S. Woodcreek Road.
Bolingbrook, IL U.S.A., 60440-4999
708-759-9500 • FAX: 708-759-5018
24-HOUR CUSTOMER SUPPORT NUMBER IN THE USA: 1-800-743-4625
OUTSIDE THE USA: (312) 461-4536
Circle (112) on Reply Card

Please come see us at NAB—Booth #'s 19852 and 19853.
Tactile Technology Tactile Display Corporation Interactive and static under-monitor display systems; slim-line interactive and static displays; error detection displays; messaging and scoreboard display systems. TAO/Technical Aesthetics Operations 15662-3 Edit controller and editing systems, including Editer Macintosh versions. Technical Aesthetics Operations 15662-3 Video editing control systems. TECNEC/Technical Necessities 16711 Cables for camera to CCU, camera to VTR, digital composite video, digital balanced audio, composite video, component video, S-VHS video; DAs; routers; standards converter; S-VHS/composite patchbays. TEM/Technologie Elettronica Milano 1813-4 Introducing solid-state UHF/VHF amplifiers rated 30W-1kW; SlimLine analog microwave links for all frequency bands; portable links for all microwave bands; solid-state FM transmitters rated 20W-1kW. Technosystem Spa 17770-18170 Mobile microwave links; transmitter remote-control systems; introducing transmitters for FM, a solid-state system rated at 5kW; for VHF, a solid-state 10kW system; for UHF, a solid-state 5kW system and a 60kW rated system using IOT technology. Tekskil Industries 19048 Introducing WinPrompt full-function prompting application for Windows 3.1 with selectable font style, size with NTSC or PAL video using Windows word processor; 12" Prompting Buddy mid-size camera prompting system. Tektronix 16528 Introducing TG2000 multiformat analog, digital signal generation platform; #764 digital audio monitor with measurement, analysis capabilities; VM100 economy version of VM700A video measurement set; featuring PRD100 Profile recorder; numerous signal generators, monitors, sync generator and change-over switch; oscilloscopes, spectrum analyzers; TDRs, demods. Tel-test 12107 Automation products, MC*25S master control switcher; ACC air control channel automation. Telecom Fiber Systems 10458-558 Introducing Adder 882 - fiber-optic (FO) audio snake; Cobra - fiber-optic triax camera interface; TX/RX 259 - digitized video module set for Viper system; featuring Viper modular FO A/V/control snake; Sidewinder - A/V FO video/audio snake. Telemetrics 18932 Introducing fiber-optic camera control system; outdoor weather/traffic reporter camera system; heavy-duty pan/tilt system; desktop camera preset control panel; computer control system with video insert.

If You Liked Mark Antennas Before, Wait Till You See Us Now.

The good news for you, our customer, is we are now a part of COMSAT RSI, a worldwide telecommunications leader.

COMSAT RSI's resources will strengthen our ability to manufacture new microwave and wireless products for the industry. Access to new technical capabilities will boost our R&D efforts, bringing you newer products faster.

So we invite you to get reacquainted with us under our new name; COMSAT RSI, Mark Antennas.

We think you'll like what you see.

Circle (113) on Reply Card

Full-service telecommunications services.
"We've been delivering MPEG digital video over T1 lines 24 hours a day for 8 months."

Craig Porter, KRON TV, San Francisco

"FutureTel" made it possible for us to quickly get the BayTV channel out to remote cable headends without investing a lot of money. It can multicast and it's fault resilient. I don't know of anyone else that can do that.

Using FutureTel's exclusive digital video distribution technology, Craig avoids the problems of transmitting video over ISDN/T1 lines. He uses our PrimeView encoder to digitize the video which is multicast via an ethernet card to our TeleMux T1 cards.

Everything Craig uses to keep BayTV up and running over T1 lines is available today from FutureTel, including a Software Developer's Kit that you can use to customize your solution.

For more information on publishing and transmitting digital video, call FutureTel at 1-800-658-5868 now.
We'll put you in touch with one of our authorized resellers, who will help you put together a complete digital video solution.

FutureTel
1092 E. Arques Avenue
Sunnyvale, CA 94086
stand-alone or remote; closed-captioning systems.

**Television Engineering** 13116
Design and assembly of ENG mobile units; TEC IFB 19A communications IFB system; Eagle-Eye mast-mounted camera, control unit.

Circle (871) on Reply Card

**Television Equipment Associates** 13410-411
Introducing a stand-alone active delay DA box; The Line-Labeler checks line integrity in digital equipment; 2500 series delay/video DAs, to 2s delay, 7 outputs; 1-line delay 1.5-75; video filters for CCIR-610 signal processing.

Circle (873) on Reply Card

**Telex Communications** 18827
ADAM intercom system; mono and stereo listen-only keypans; user stations; line monitor speakers; heltpacks; FMR-150, 450 wireless mic systems; log periodic antenna, antenna splitters.

Circle (873) on Reply Card

**Telos Systems** 4203
Zephyr ISDN transceiver, Zephyr Net ISDN network hub; Telos 100 Delta and ONE telephone interfaces; Direct interface, ONE-X-Sx talk show system; Link intercom to phone line interface.

Circle (875) on Reply Card

**Tennaplex Systems** 15707
Broadcast antenna products for FM, TV, HDTV offering omnidirectional and custom patterns.

Circle (876) on Reply Card

**TenTel** 13407-408
Test products for VCR maintenance; Tentelometer tension meters; torque, reference plane, head protrusion and drum eccentricity gauges.

Circle (877) on Reply Card

**Texscan MSI** 20068
2-series character generator; PRIZM digital commercial insertion system.

Circle (878) on Reply Card

**Theatre Service & Supply** 13637
Studio furnishings, studio cyclorama curtains, track systems; scenic supplies, grip equipment.

Circle (879) on Reply Card

**Thermodyne International** 13114
Equipment transport cases.

Circle (880) on Reply Card

**Thomson Broadcast** 16117
Featuring series 1657 high-performance 16:9, 4:3 portable EFP camera, SPORTCAM and high-end PSC camera; #1270 digital Betacam camcorder; 9200 small/medium and 9500 large 4:2:2 digital component visual mixers; 9920 continuity mixer; Fixtore Graphics video storage system; Evolution interface series; MPEG encoder; DBSS digital satellite system; DVB specification digital receiver, decoder.

Circle (881) on Reply Card

**Thomcast France** 16117
Tube or solid-state technology radio, TV transmission equipment; 1W-240kW VHF and UHF TV; 1W-10kW FM radio; 50kW-1000kW AM radio; antennas; world-wide design, installation, maintenance program.

Circle (882) on Reply Card

**Thomson Components & Tubes** 12505
Circle (1036) on Reply Card

**Thomson Tubes Electroniques** 12505
RF power devices for all broadcast applications; introducing TH610 Diacorde; air-cooled tube for UHF amplification in 10kW combined configuration.

Circle (883) on Reply Card

**3dbm** 15745
Lower power TV transmitters rated 100W, 1kW, 2kW, 5kW.

Circle (884) on Reply Card

**3M Pro A/V Products** 16312
Audio, video recording media.

Circle (885) on Reply Card

**360 Systems** 2116
Featuring AM16 routing switches, DigiCartll digital audio hard disk recorder, Instant-Replay hard disk audio player.

Circle (886) on Reply Card

**Tiesseci SNC** 4819-20
Circle (1037) on Reply Card

**Tiffen Manufacturing** 16365-565
Featuring FILTERFLEX matte boxes; warm polarizing filters.

Circle (887) on Reply Card

**TimeLine** 1821
Time-code products; transport synchronizing systems; LYNX digital audio workstations.

Circle (888) on Reply Card

---

**DATA TRANSMISSION IN VERTICAL BLANKING**

**PUT YOUR VBI TO WORK**

The VBI232 allows any RS232 data to be transparently inserted and recovered from a user selectable line in the vertical blanking interval of a baseband video signal - THINK OF THE POSSIBILITIES!

**broadcast video systems ltd.**

40 West Wilmot St., Richmond Hill, Ontario L4B 1H8
Telephone: (905) 764-1584  Fax: (905) 764-7438

Circle (122) on Reply Card

See us at NAB, Booth #16348

---

**WHEN ACCURACY COUNTS... COUNT ON**

Call (610) 687-5550 or write for more information on Belar Am, FM, Stereo, SCA and TV monitors.

SCA and TV monitors.

FAX: 610-687-2686

Circle (164) on Reply Card
Advanced wireless intercom system

Vega Q600

- Rugged, reliable, metal beltpack remotes
- Hybrid UHF/VHF operation to conserve scarce VHF frequencies
- Inexpensive VHF monitor receivers to lower system costs
- High-quality, low-noise, low-distortion audio
- Up to six beltpacks per master station
- Designed specifically for broadcast and production
- Directly compatible with all standard wired intercoms
- Many advanced circuit and system design features

In the studio or on the set, Vega's wireless intercom systems are the choice of professionals who demand ruggedness, reliability, broadcast-quality audio, and a full set of professional features. Designed from the ground up for broadcast and production work, the Q600 UHF/VHF system provides all the functions and technical capabilities required for these demanding applications.

The Q600 system provides continuous, full-duplex, hands-off communications between up to six people plus an unlimited number of "listen-only" users.

The QTR-600 beltpack remotes are extremely easy to use and provide operation similar to that of hard-wired intercom beltpacks. They are compatible with popular dynamic or electret headsets, such as Beyer, Clear-Com, and Telex. The cases are welded aircraft aluminum alloy with a high-impact, molded Cycolac (ABS) control panel that will withstand the roughest use.

One QX-600 master station supports up to six QTR-600 remotes with "hands-free" two-way communications, and an unlimited number of PL-2 receivers for listen-only users. Circuitry is provided to interface external line audio with the system or to link two QX-600s into a 12-user system. The master station is directly compatible with all standard wired intercom systems such as Clear-Com, RTS, ROH, Telex, and many others via internal programming switches. A local headset position and extensive control, adjustment, and monitoring provisions are also included.

The PL-2 VHF mini-receiver provides a high-performance, low-cost solution to providing one-way "listen-only" communications. Very often, individuals need to receive instructions but are not required to speak. Using PL-2 receivers for this application saves the expense of additional full two-way remotes and can significantly lower the cost of a typical system. The PL-2 is fully compatible with the Q600 system and is designed to provide reliable communications in the most demanding RF environments.

When the job demands hands-free, full-duplex operations in the most demanding environment, go with the Vega Q600, the system recommended by professionals worldwide.

a MARK IV company

9900 East Baldwin Place
El Monte, California 91731-2294
Telephone: (818) 442-0782
Toll-Free Telephone: 800-877-1771
Fax: (818) 444-1342
FaxBack: (818) 444-2017
Toll-Free FaxBack: 800-274-2017

Circle (123) on Reply Card
Trompeter Electronics 12800
Tripp Jingles. Acoustic equipment; tools, audio distributors.
TTL/Multimedia Accessories TMT 11740
Torpey M/Multimedia Accessories
Toshiba Corporation 11740
Toko MMC
TMT Ultimatte Video Production
Trident Audio USA 10656-756
Trident Audio
TRF Production Music Libraries 13427-8
Trompeter Electronics 18669-869
Tape & Label
Tape and video products.
Ultimate Video Associates Labs 13840-040
Ultimate Video Associates
Ultimate Lighting 4323
Ultimate Lighting products.
Ultimate Vision 12780
Ultimate Video systems, introducing the Ultimate 8 digital unit; also Ultimate 300, FORMATTE, SYSTEM 6, Ultimate 45; Matte Shading system; Memory Head motion control; Ultimat 7 digital compositing system. Circle (895) on Reply Card
Union Connector 16358-9-459
Power distribution equipment, including the Location Box and 20-2P+G.
Unique Business Systems 16558
Productivity, business software; RentaTrace rental equipment availability tracking.
UniSet Corporation 11600
Studio furnishings, sets.
United Ad Label 13639-739
Tape format labels (for Inkjet printer); special event and library tape packaging; paperboard slipcases; Designer series printed labels; labels to automated labeling equipment; splicing tape; custom flexographic label printing.
United Media 18914
Multivision system (MVS) desktop editing products; MVS linear editor with custom interface for Pinnacle Alladin; directly linked by software for complete remote control; runs under Windows, controls any RS-422 machine.
United Press International 2508-9
Used equipment source; batteries.
TR Tape & Label
Labels, promotional products.
Utility Tower 2528
Tower products and services for AM, FM, TV, microwave and other communications.
Victory Battery Company 13630
Battery products.
Video Accessory 11126
Video distribution, synchronization, utility products; BBG-2 blackout generator; YCDA-1 S-video distribution amp.
Video Associates Labs 615
Video keying, capture devices; MicroKey/A with gen-lock; DigiView.
Video Data Systems 15578
Automated text/message systems; #900, multicolor text keyer; #3000 real-time image capture display; #840C color DG with color preview; #EAS emergency alert CG; #CC closed-caption CG.
VP/Video Design Pro 13840-040
Computer software, hardware for computer-aided design.
Video Int'l. Development 11200
Video standards conversion systems including DTC 1600 series models P5 and P6; DTC 1640 digital TV broadcast converter; DTC 4600 motion vector compensation standards converter.
Video Matic Group 11446
Audio, video recording tape, tape containers.
VideoLab Para Technologies 17322-422
Time-code processors, ICLX-108 Logichron generators, reads, regenerates LTC, VITC code; auto log, edit list, error log; MIDI, GPI, RS-232, RS-422, LTC phase meter; NTSC/PAL, SMPTE/EBU; time-code upgrade retrofits for series 5000, 7000, 9000, 9000/2. Sony VTRs allows address track time-code capability.
Vetergin Technology Inc./Reach M
Vertigo Animation Machine offers high-end animation and modeling; fully integrated RenderMan; expanded distribution product delivery.
Vertigo Technology Inc. 10955
Design, engineering, manufacturing of earth station antennas and related components; tracking control systems; dual-reflector antenna systems (1.8m to 32m) for C-, Ku-, X-band frequencies, some L-band; turnkey installations, site testing and maintenance services.
Veetronix Inc./Reach 16909
Push-button and panel switches, illuminated, non-illuminated types; hermetically sealed; keycaps in various styles and colors.
Vega/Mark IV Audio 15717
Wireless microphone systems, intercom components.
Versawire Communications 27th Dimension Inc. 111846
Production music libraries.
Vertigo Technology Inc. 10955
Design, engineering, manufacturing of earth station antennas and related components; tracking control systems; dual-reflector antenna systems (1.8m to 32m) for C-, Ku-, X-band frequencies, some L-band; turnkey installations, site testing and maintenance services.
Vertigo Technology Inc. 10955
Design, engineering, manufacturing of earth station antennas and related components; tracking control systems; dual-reflector antenna systems (1.8m to 32m) for C-, Ku-, X-band frequencies, some L-band; turnkey installations, site testing and maintenance services.
Vertigo Technology Inc. 10955
Design, engineering, manufacturing of earth station antennas and related components; tracking control systems; dual-reflector antenna systems (1.8m to 32m) for C-, Ku-, X-band frequencies, some L-band; turnkey installations, site testing and maintenance services.
Vertigo Technology Inc. 10955
Design, engineering, manufacturing of earth station antennas and related components; tracking control systems; dual-reflector antenna systems (1.8m to 32m) for C-, Ku-, X-band frequencies, some L-band; turnkey installations, site testing and maintenance services.
Vertigo Technology Inc. 10955
Design, engineering, manufacturing of earth station antennas and related components; tracking control systems; dual-reflector antenna systems (1.8m to 32m) for C-, Ku-, X-band frequencies, some L-band; turnkey installations, site testing and maintenance services.
Vertigo Technology Inc. 10955
Design, engineering, manufacturing of earth station antennas and related components; tracking control systems; dual-reflector antenna systems (1.8m to 32m) for C-, Ku-, X-band frequencies, some L-band; turnkey installations, site testing and maintenance services.
Vertigo Technology Inc. 10955
Design, engineering, manufacturing of earth station antennas and related components; tracking control systems; dual-reflector antenna systems (1.8m to 32m) for C-, Ku-, X-band frequencies, some L-band; turnkey installations, site testing and maintenance services.
Vertigo Technology Inc. 10955
Design, engineering, manufacturing of earth station antennas and related components; tracking control systems; dual-reflector antenna systems (1.8m to 32m) for C-, Ku-, X-band frequencies, some L-band; turnkey installations, site testing and maintenance services.
Vertigo Technology Inc. 10955
Design, engineering, manufacturing of earth station antennas and related components; tracking control systems; dual-reflector antenna systems (1.8m to 32m) for C-, Ku-, X-band frequencies, some L-band; turnkey installations, site testing and maintenance services.
Another Breakthrough!
from élantec

Performance You Expect From the Supplier that Delivers

Introducing the EL2176C and EL2186C
Low Power Amps for Signal Processing
and Cable Driving Applications

Advantages of the 1mA, 70 MHz & 3mA, 250 MHz CMF Amplifier Family

- Lowest Supply Current (as low as 1mA/Amplifier)
- Low Voltage Operation (as low as 3V)
- Outstanding Video Performance
- Packaged in P-DIP, SO
- Single, Dual and Quad Versions Available
- Pricing begins as low as $1.99 in 1K units

For Samples Call (800) 333-6314 ext 311 • For Literature Only ext 234
or e-mail your request to: sales@elantec.com

Circle (124) on Reply Card
ELANTEC, INC. • 1996 Tarob Court • Milpitas, CA 95035 • (408) 945-1323 • (800) 333-6314 • FAX (408) 945-9305
e-mail: sales@elantec.com • European Sales: 44-71-482-4596 • FAX: 44-71-267-1026
Distributed by: Marshall Industries • Nu Horizons • Insight Electronics • Gerber Electronics
Videometrics Inc. 17722-922
Refurbished video/audio heads for 1" C format Ampex,Sony,Hitachi;2" heads for Quad machines; manual, belt degaussers for high-density metal tape; refurbished lower scanner machines; refurbished upper drum assemblies for Sony BVM-60,-65,-70,-75.
Circle (930) on Reply Card

Videomedia 15724
Hardware, software for frame-accurate transport control via PCs, workstations; V-LAN universal control network/HUB control system; machine controllers; videotape editing controllers; VLAN products for multimedia, animation, video editing; OZ-PRO on-line video workstations.
Circle (901) on Reply Card

Videoguip Research 5315-17
Signal routing switchers, distribution products.
Circle (902) on Reply Card

Videotek 18132
Combo waveform/vector monitors, TVM-100 displays waveform/vector on picture monitor; video production switchers; synchronized; sync, timing equipment; signal generators; Omniframe R5-61F video switcher; Omniframe ADS-24F stereo audio DA; audio program monitors; DM-154 agile stereo, cable-ready demodulator.
Circle (903) on Reply Card

VIDESENSE 10059-61
Studio 2000 - 125 products in fixture, modular and specialty families; Vid-Lite portable studio or location lighting.
Circle (904) on Reply Card

Viewgraphics 17321-421
Information display products, including the Dataview serial/digital adapter and Sony GWM-3000 monitor.
Circle (905) on Reply Card

Vinten Broadcast/TSIM 18939
Camera support products, MicroSwit robotic systems, Classic and Vision pedestals, tripods and pan/tilt heads.
Circle (906) on Reply Card

VistaCom Inc. M1029-1031
Circle (1042) on Reply Card

Vistek Electronics 13835
Circle (927) on Reply Card

VVX National Video Network 19753
Switched fiber-optic TV transmission services.
Circle (928) on Reply Card

Wadsworth/ITP 15656-7
Publisher of text materials for journalism.
Circle (939) on Reply Card

Ward-Beck Systems 15704
Renaissance series radio consoles; M40SP portable extended range VU meter; D8212 audio DAs.
Circle (940) on Reply Card

Wavefront Technologies 16379
Videographics software packages, including Composer V3.5, Kinematix V2.5, Explore and IPR Interactive Photorealistic Rendering.
Circle (941) on Reply Card

Wegener Communications 18335
Digital video compression products, including MPEG-2 decoder, MPEG-1 encoder, MPEG-2 audio workstation; digital video file server.
Circle (942) on Reply Card

Wenger Corporation 4001-2
Circle (1043) on Reply Card

Wescam Systems International 15470-570
Helicopter, aircraft camera support systems; installation on all types of moving vehicles and cranes.
Circle (943) on Reply Card

Will-Burt 16114-5
Telescoping masts, TMD-7-42-367 microwave antenna support; 25' Hurry Up; AC Alert live power-line detectors for telescoping masts.
Circle (944) on Reply Card

Wiredwinds/JS Audio 12507
Audio mixers, MIX5-8B 4-channel mixer; audio, video cabling, distribution products; transformers.
Circle (945) on Reply Card

Winsted Corporation 11827, M1718
Special-purpose video, studio furnishings, model E4835 dual pedestal editing desk and K8643 editing console; Cabinet Design kits; Locking rack shelves; Avid and Matrox desks; black mini consoles for multimedia use; recessed monitor consoles; WELS software program for designing modular Winsted furniture.
Circle (946) on Reply Card

Wolf Coach 15862
Mobile production vehicles.
Circle (951) on Reply Card

WSI 12956
Featuring WEATHERspectra 9000 workstation, merging color art and animation with advanced feature forecasting; introducing WORLDScape, 3-D weather graphics, animation; operating on Silicon Graphics for fly-through view of weather.
Circle (952) on Reply Card

Xaos Tools M1114
Videographic, digital effects software for SGI, Macintosh PCs.
Circle (954) on Reply Card

Yale Electronics 15029
Distributors; components; racks; panel, cable connectors.
Circle (955) on Reply Card

Yamaha Music 2425
Audio mixers; DMC 1000 digital automated recording console; YPDR 601 compact disc recorder.
Circle (956) on Reply Card

Yamashita Engineering Mfg./YEM 12810
Video processing equipment, scan converters; digital EDTV decoder, sync generators; distribution amplifiers; CG switchers.
Circle (957) on Reply Card

Y/C Plus M1806
Products for use with Video Toaster.
Circle (958) on Reply Card

Zaxcom 19069-269
HUB/HCP series TBC/machine controllers; DMX1000 hard disk audio storage; RTR100 stereo audio router; SRC100 sample rate converter; VTR100 VTR control system; DMX500 low-cost digital mixer for post-production, broadcast; digital proc-amp.
Circle (959) on Reply Card

Send your comments to the editors of Broadcast Engineering via on-line mailboxes:

be@intertec.com

CompuServe: 74672,3124
IFplus: The Future Is Now.
Having pioneered IF technology, Canon takes another step forward with IFplus, the latest breakthrough in Internal Focus that provides important features and benefits that meet the requirements of new wide screen formats. Now for the first time ever, you can shoot as close as .65m with a wide angle of 8mm (57.6°) using Canon's J15ax8B IRS lens. Enjoy higher resolution, higher MTF, reduced chromatic aberration and improved optical performance.

Unsurpassed Optical Quality.
Consistent with Canon's reputation for outstanding lens quality, the IFplus utilizes a new and improved glass, which is stronger by design and able to provide extremely low dispersion, while correcting chromatic aberrations. Wide angle images, with substantially reduced distortion, is just one benefit of this technology.

Meets The Demands of 16:9.
You can depend on Canon's IFplus technology to meet the challenges of new formats that require increased screen line density (Outstanding performance is also achieved in 4:3). Offering the highest MTF required, the J15ax8B IRS will meet and exceed your expectations.

Canon's J15ax8B IRS features:
- The shortest MOD in a standard ENG lens: .65m
- The longest focal range: 8-120mm
- The widest standard lens, with a wide angle of 8 mm (57.6°).

It all adds up to a lens you can rely on to let you get up close to the subject. We'd like to tell you more. Please call us at 1-800-321-4388.
(In Canada, call 905-795-2012)

Circle (125) on Reply Card
**Exhibitor Highlights**

**S-6 Exhibition Hall**

Too many exhibitors for too small of space is the case for this year’s show. In February, NAB opened additional exhibit space for those exhibitors who could not get space in the main or audio halls. The solution was the S-6 hall, which is located south of the main exhibition center, across Desert Inn road.

Although it may be a long trek, it’s worth the journey. This exhibit space contains some of the more innovative companies in the industry, so don’t forget to allocate some time there.

Because of the lateness in announcing the new exhibit hall, it was impossible to provide complete information on the companies who will be there. The following represents the companies NAB has announced will be in the hall along with their booth number if known. The information was current as of press time. Please check the program for the latest information.

---

**Geneva Aviation** ........................................... $249
Circle (1900) on Reply Card

**Globeset Corporation** ................................... $938
Circle (1907) on Reply Card

**Grassey Optronica** ..................................... $551
Circle (1909) on Reply Card

**Herman Electronics** .................................... $399
Circle (1831) on Reply Card

**High End Systems** ....................................... $433
Circle (1815) on Reply Card

**Horizon Music** ........................................... $518
Circle (1845) on Reply Card

**ICEX-ANIEL** ............................................. $348
Circle (1815) on Reply Card

**Imates Communications** ................................ $128
Circle (1833) on Reply Card

**Inscriber/Mainframe Graphics** ......................... $223
Circle (1830) on Reply Card

**Insync Corporation** ..................................... $233
Circle (1827) on Reply Card

**Intesis Sistemas Inteligentes** ......................... $832
Circle (1830) on Reply Card

**International Memory Products** ....................... $338
Circle (1839) on Reply Card

**IPITEK Inc.** ................................................ $1046
Circle (1903) on Reply Card

**IRTE SpA** .................................................. $624
Circle (1901) on Reply Card

**Kart-A-Bag** ................................................ $1043
Circle (1814) on Reply Card

**Keith Austin Enterprises** ................................. $239
Circle (1823) on Reply Card

**KFRO-TV** .................................................... $750
Circle (1839) on Reply Card

**Kino Flo** ..................................................... $130
Circle (1829) on Reply Card

**KUB Systems Inc.** ........................................ $724
Circle (1837) on Reply Card

**LightShe** .................................................... $1027
Circle (1828) on Reply Card

**Litton** ...................................................... $941
Circle (1833) on Reply Card

**J Custom Supply** ......................................... $152
Circle (1812) on Reply Card

**J L Fisher** ................................................... $632
Circle (1828) on Reply Card

**LM Engineering** .......................................... $847
Circle (1827) on Reply Card

**Losmandy/Hollywood General Machine** .............. $349
Circle (1901) on Reply Card

**Lucasyss Mig** ............................................. $240
Circle (1827) on Reply Card

**Matrox Electronic Systems** ............................ $304
Circle (1834) on Reply Card

**Minerva Systems** ........................................ $324
Circle (1829) on Reply Card

**Mirror Image Teleprompting** ............................ $1031
Circle (1828) on Reply Card

**Mobile Media** ............................................. $743
Circle (1829) on Reply Card

**Nebit Systems Inc./Mon** ................................ $1013
Circle (1830) on Reply Card

**New Avenue Communications** ......................... $656
Circle (1833) on Reply Card

**News/Sports Microwave Rental** ........................ $318
Circle (1833) on Reply Card

**Non-Stop Productions** .................................. $550
Circle (1800) on Reply Card

**Northern Telecom** ....................................... $614
Circle (1800) on Reply Card

**NTL** ......................................................... $504
Circle (1802) on Reply Card

**Nurad Technologies** .................................... $144
Circle (1802) on Reply Card

**Pike & Fischer** ........................................... $451
Circle (1815) on Reply Card

**Pixel Control** ............................................ $932
Circle (1838) on Reply Card

**Prodelin** ................................................... $136
Circle (1830) on Reply Card

**Pulzili Engineering** .................................... $1038
Circle (1827) on Reply Card

**Raytheon/semiconductors** ............................... $1001
Circle (1810) on Reply Card

**Roll 'Em Productions** ................................... $346
Circle (1826) on Reply Card

**Rorke Data** ................................................ $524
Circle (1828) on Reply Card

**Russ Bassett** .............................................. $489
Circle (1803) on Reply Card

**SoftTouch** .................................................. $947
Circle (1815) on Reply Card

**Specialty Connector** .................................... $1033
Circle (1828) on Reply Card

**Spencer Technologies** ................................... $457
Circle (1828) on Reply Card

**Sumitomo Electric** ...................................... $949
Circle (1829) on Reply Card

**Sundance Digital** ........................................ $100
Circle (1830) on Reply Card

**SVS** ........................................................... $453
Circle (1804) on Reply Card

**Teracon Components** ................................... $841
Circle (1828) on Reply Card

**Teknliche/Avs** ............................................ $103
Circle (1800) on Reply Card

**The Brughielli Corporation** ............................. $824
Circle (1800) on Reply Card

**This Town** .................................................. $1053
Circle (1800) on Reply Card

**Topham Audio** ............................................. $442
Circle (1824) on Reply Card

**Transcripts** ............................................... $651
Circle (1829) on Reply Card

**Tron-Tek** ................................................... $749
Circle (1828) on Reply Card

**Ultex** ........................................................ $1047
Circle (1815) on Reply Card

**Vela Research** ............................................ $814
Circle (1810) on Reply Card

**Video Design** ............................................ $350
Circle (1810) on Reply Card

**Video Engineering** ...................................... $414
Circle (1810) on Reply Card

**Videowics** ................................................ $113
Circle (1810) on Reply Card

**Weather Central** ........................................ $314
Circle (1810) on Reply Card

**Weathernews** ............................................. $340
Circle (1810) on Reply Card

**Wicom** ..................................................... $238
Circle (1800) on Reply Card

---

*A Broadcast Engineering March 1995*
LV 5100D, a 4:2:2 component digital and analog waveform monitor, operates in both 525/60 and 625/50 systems and handles two serial digital inputs and one analog three-channel input for use in mixed digital/analog facilities. An EDH system based on SMPTE RP-165 provides transmission-error monitoring and analysis of signal status using the equivalent line-length technique. Full waveform monitor functions include overlay, parade and timing displays, component vector, line select, an X-Y mode for stereo monitoring, and a picture display of Y or G for program ID purposes. An active serial output is provided for retransmission purposes. Cursor measurements and preset/recall operations store up to 10 front panel setups.

LT 425D, a 4:2:2 digital video generator that operates in 525/60 and 625/50 systems. It features EDH functions conforming to SMPTE RP-165 as well as embedded, internally-generated audio test tones. A full range of component test signals include an SDI pathological test field. Three serial outputs include menu-selected EDH and embedded AES/EBU audio. Parallel digital video and serial audio outputs are also provided. A fourth serial video output is digital black. Digital genlock and programmable 20-character source ID calendar and clock add to operating flexibility.

Call toll-free
1 800 645-5104
In NY State
516 231-6900
### The New S-6 Exhibit Hall

<table>
<thead>
<tr>
<th>S100</th>
<th>S200</th>
<th>S300</th>
<th>S400</th>
<th>S500</th>
<th>S600</th>
<th>S700</th>
<th>S800</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>GEN</td>
<td>MICROWAVE SVCS</td>
<td>103</td>
<td>203</td>
<td>304</td>
<td>504</td>
<td>704</td>
</tr>
<tr>
<td>8</td>
<td>B&amp;H PHOTO VIDEO</td>
<td>113</td>
<td>213</td>
<td>314</td>
<td>414</td>
<td>514</td>
<td>614</td>
</tr>
<tr>
<td>24</td>
<td></td>
<td>123</td>
<td>223</td>
<td>324</td>
<td>424</td>
<td>524</td>
<td>624</td>
</tr>
<tr>
<td>28</td>
<td>IMATEX</td>
<td>233</td>
<td>333</td>
<td>433</td>
<td>532</td>
<td>632</td>
<td>732</td>
</tr>
<tr>
<td>30</td>
<td>KINO FLO</td>
<td>39</td>
<td>49</td>
<td>59</td>
<td>69</td>
<td>79</td>
<td>89</td>
</tr>
<tr>
<td>32</td>
<td></td>
<td>41</td>
<td>51</td>
<td>61</td>
<td>71</td>
<td>81</td>
<td></td>
</tr>
<tr>
<td>36</td>
<td></td>
<td>42</td>
<td>52</td>
<td>62</td>
<td>72</td>
<td></td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>CADEX</td>
<td>43</td>
<td>53</td>
<td>63</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td></td>
<td>44</td>
<td>54</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42</td>
<td></td>
<td>47</td>
<td>57</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>44</td>
<td></td>
<td>48</td>
<td>58</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Exhibit hours:**
- Monday - Wednesday 9:00am - 6:00pm
- Thursday 9:00am - 2:00pm
SPECIAL EVENTS

Broadcast Engineering Conference

Saturday:
1:00pm - 5:00pm Digital radio broadcast transmission

Sunday:
9:00am - 9:30am Keynote address: James Quello, Commissioner, FCC
9:30am - 12:00pm The all digital radio station, Part 1: Digital audio broadcasting
1:00pm - 5:00pm The all digital radio station, Part 2: Digital audio production

Monday:
9:00am - 10:30am All industry opening featuring Eddie Fritz, President, NAB
10:30am - 12:00pm Radio data broadcasting: Present and future technologies
1:00pm - 5:00pm Computer technology for broadcast support: BBSs, LANs, WANs and the Internet

Tuesday:
9:00am - 12:00pm Digital audio encoding: Concepts and realities
1:00pm - 5:00pm Radio remote broadcasting: The latest technologies

Wednesday:
9:00am - 12:00pm Technical regulatory issues: Radio and TV Part 1
12:30pm - 2:00pm Engineering awards luncheon, speaker: Lewis Platt, Chairman/CEO of Hewlett Packard
2:00pm - 5:00pm Technical regulatory issues: Radio and TV Part 2
6:00pm Ham radio operators reception

Thursday:
9:00am - 12:00pm Radio RF workshop: Maintaining the signal

Radio Management Conference

Sunday:
2:00pm - 4:00pm Small/Medium market idea swap
2:00pm - 4:00pm Raise Ratings and rates with better radio copy
4:00pm - 5:30pm Radio opening reception

Monday:
9:00am - 10:30am All industry opening featuring Eddie Fritz, President, NAB
11:00am - 12:15pm 25 management techniques to take you to the top
11:00am - 1:45pm Radio production workshop
12:30pm - 1:45pm Newsroom technologies
2:00pm - 3:15pm Managers look at digital broadcasting
2:00pm - 3:15pm Making satellite programming sound local
3:30pm - 4:45pm Managing people new to radio
3:30pm - 4:45pm Best of the best radio promotions

Tuesday:
9:00am - 3:30pm RAB sales & marketing sessions
12:00pm - 1:30pm Radio luncheon, Crystal awards
3:30pm - 4:45pm Commissioners’ regulatory dialogue

Wednesday:
9:00am - 4:00pm RAB sales & marketing sessions
1:00pm - 2:30pm Station acquisitions
2:00pm - 5:00pm Radio station tours (sign up early, space limited)

Thursday:
9:00am - 10:30am Round table Session: Cross promoting on radio and TV
10:45am - 12:00pm Round table session: Money-makers, winning sales promotion ideas

March 1995  Broadcast Engineering  185
AKG C3000 condenser microphone

Temporary internal electronics provide a wide dynamic range. The C3000 comes with an internal shock-absorption feature and a degree of wind protection. A stand adapter and a padded carrying case are also supplied. An external wind-screen and an elastic suspension mount are offered as optional accessories.

Eclectic design
The C3000 is an interesting combination of classical design and distinctive new features. It retains the radial or “side-firing” transducer alignment found in AKG’s other large-diaphragm microphones (dating back to the Austrian manufacturer’s C-12, originally produced in the 1940s), but with a rounded grille, are reminiscent of more recent models from other microphone manufacturers. The shape of the microphone housing can have a significant effect on a microphone’s sonic character.

Traditional large-diaphragm, multipattern microphones use two identical capsules facing in opposite directions. The outputs are combined in various phase relationships by the microphone’s internal electronics to create the desired directional patterns. The C3000 uses a novel approach with one large and one small capsule, presumably as a cost-saving measure. Both are of the backplate electret design, permitting lower-powering voltages. Another innovative feature is an internal spider-type shock-mount that suspends the capsules in place within the mic while effectively absorbing most vibration transmitted from the stand or mount.

Physically, the C3000 exudes quality. The matte-black finish and distinctive shape are pleasing to the eye. This makes it attractive on stage or on camera. It’s a fairly hefty (11.3 oz) unit that seems much more likely to stand up to the rigors of remotes than its more delicate studio cousins. One thoughtful design feature is a little flange around the edge of the connector-end of the C3000, which helps prevent the mic from slipping out of its stand adapter clamp when mounted upside down (i.e., connector-end up), as it would be placed for typical announcing use.

Electronically, the C3000 uses a fairly conventional FET pre-amp design and features a transformerless output. It operates via phantom (simplex) power from 9VDC to 52VDC, which must be supplied by the mixer or an external power supply. There is no provision for internal battery powering.

The C3000 is equipped with three 2-position selector switches, readily visible in red, but recessed and shaped in such a way that a small tool, such as a pocket screwdriver, is required to operate them. One of the switches selects between cardioid and hypercardioid patterns. Omnidirectional and figure-eight patterns (the latter useful in M-S recording techniques) traditionally found on multipattern mics are not available. However, they will not be missed for applications such as announcing and vocal recording. The other switches select -10dB attenuation and low-frequency rolloff.

In use
Perhaps most notable when first using the C3000 is its extraordinarily high output level relative to the typical condenser microphone. (It is nearly 20dB hotter than most dynamic microphones.) This certainly helps reduce noise, but take care that the microphone pre-amp driven by the C3000 can accommodate such a level. For example, if adequate mic pre-amp headroom is not available, a vigorous air personality might well cause clipping on a broadcast console, even with the C3000’s -10dB switch engaged. Although not a line-level microphone, the C3000 can certainly be considered a hot
Introducing Our New Single Tube 40kW-60kW System. High Efficiency With High Reliability.

If you’re considering a new 40kW to 60kW UHF television transmitter, Acrodyne has exciting news! The success of our tetrode equipped water-cooled transmitters from 10kW to 30kW output has spurred the development and introduction of a new transmitter featuring a Diacrode® (double-ended tetrode) capable of producing up to 60kW in common amplification using just one tube.

Our high efficiency tetrode transmitters perform superbly and are the lowest cost transmitters to operate and maintain. The tetrode is the most linear UHF amplifying device type and, combined with our high-end TR Series exciter and "super linear" solid state driver, makes it an excellent choice today and ideal for future digital broadcasting. Water-cooled tetrodes have routinely exceeded 20,000 hours of life. The Diacrode, constructed of the same grid material and similar, yet improved cooling system, will meet and exceed these life times.

If you have concerns over the reliability of other high efficiency transmitters, or their complexity, or their cost to operate, consider the Acrodyne alternatives—Diacrode and tetrode transmitters. All Acrodyne high power transmitters are built and fully tested at our factory in Blue Bell, Pennsylvania.

microphone.
The internal shock-mount feature is effective. There are probably few applications where the optional external suspension mount is necessary.

Although an internal windscreen is included, the manufacturer recommends use of the optional external windscreen for close vocal or outdoor work. In station announcer tests, plosives were often problematic with only the internal windscreen, especially when using the hypercardioid pattern. Of course, proper placement and announcer microphone technique also can make a big difference.

AKG's claims of low self-noise are borne out. This is a quiet microphone, and its high output level further minimizes noise in quiet settings. The claimed 1% distortion point is at 137dB. This is well above the level at which human hearing can be compromised. The microphone's internal circuitry provides a separate FET pre-amp stage for each of its two capsules. Interestingly, the -10dB switch operates after these first stages. This is unlike many other condenser mics that use the attenuator to guard the first-stage electronics from high capsule levels. The microphone's rated source impedance is 200Ω, but minimum recommended load impedance is 2,000Ω. This might be a problem for older consoles that terminate their mic inputs with a low impedance.

So how does it sound?
The published frequency response for the C3000 is rather smooth — within 2dB between 70Hz and about 4kHz. Like many such mics, there is a rise above 5kHz, peaking at about +4dB at 7kHz. Above this, the response heads back down, however, crossing the 0dB line at about 10kHz, and falling to -4dB at 15kHz. The plot also shows a bit of a presence range dip of about 2dB between 4kHz and 5kHz. This dip is even more pronounced in the hypercardioid mode. Low-end response falls off smoothly, reaching -4dB at 50Hz, and staying there down to 20Hz.

The C3000’s sound is warm and generally smooth.

Sonic results are as might be expected. The sound is warm and generally smooth. The presence dip seems more noticeable than the response plot would suggest, however, and the falloff at the high end means the C3000 lacks much of the sizzle or airiness that are the trademarks of large diaphragm condensers. This is partly because other popular mics tend to have a more prominent high-end peak. (The capsule materials used in classic tube-era mics tend to age in a manner that further accentuates the high-end rise.)

Like most directional mics, the C3000 exhibits a noticeable low-frequency proximity effect. For some announcing applications, this may be desirable. In this test, the resulting output sound was considered a little bass-heavy, especially in the hypercardioid mode at close range. On the other hand, the C3000’s low-frequency rolloff feature is a steep -10dB at 100Hz. Using it to counteract proximity effect in an announcing situation can make the mic sound quite thin. A less dramatic rolloff — or a second “in-between” position — would be advantageous, and make the C3000 a more desirable announce mic. For several
The Adventures of Prof. Warhol from Ultimatte

The Professor Pays a Visit to the Producer of a Local Station's News Department...

Hey - Why the long face?

I just got the ratings. People hate the new set I had built for our newscasts.

And with our budget, it'll be two years before I can afford to replace it!

It's a shame you didn't spend that money on a virtual studio. Then you could replace the set instantly!

A "virtual studio"?

I really thought people wanted more "happy news!"

C'mon, this is science fiction stuff!

This is real today and would save you thousands!

So I could have had unlimited sets for what it cost me to build one stupid one? Just one question...

Can it do virtual costumes?

Ready for the 5 o'clock noozcast!

Stop clowning around with budget-busting sets!
"Call for info on the Ultimatte Virtual Studio today!"

Ph: 818-993-8007 Fax: 818-993-3762

© 2005-2006<br>Ultimatte, Inc.<br>20554 Plummer Street<br>Chatsworth, CA 91311
voices the C3000 gave decent results, but most users wished for a bit more high-end airiness. Using the hypercardioid pattern allowed greater working distance from the mic to reduce proximity effect, but slight movements of the speaker’s head then became noticeable.

In the recording studio, the C3000 was tested on vocals, where it sounded much more pleasing for singers than it did for announcers. Tests on an assortment of acoustic instruments such as guitar, folk fiddle and cello exhibited competent performance. The mic captured the sound of the instruments with a smooth midrange and low-end, though an occasional EQ adjustment was required to add a bit of top-end. In a remote classical recording, the C3000 was used as a spot mic. Again, the result was clean, quiet and hot.

A stereo-pair orchestral test of the C3000 was not included in these evaluations. Based on experience, however, it would probably provide a well-rounded, slightly “dark” quality to an orchestra. This could be just right for an especially reverberant hall.

**Conclusion**

After careful listening, the C3000 could be characterized as “the perfect ribbon microphone.” Its frequency response characteristics — and even its proximity effect — are like those of an idealized ribbon mic, but without the typical midrange roughness and low output common to that transducer class. Those looking for the sound of a U-87 or C414 may be a bit disappointed, but the C3000 is a versatile mic. It is attractive, well-made, relatively rugged, and includes a mix of design elements that can make it useful in many situations. Some may come to love it as a mellow announce microphone. The C3000’s features, price and performance could make it an ideal microphone for TV production work.

**The C3000’s features, price and performance could make it an ideal microphone for TV production work.**

Graham is studio engineer and producer/host for WVIA, Scranton/Wilkes-Barre, PA. Respond via the iF Feedback line at 913-967-1905 or via e-mail to beconference.com.

Editor’s note: Field reports are an exclusive BE feature. Each report is prepared by the staff of a station, production facility or consulting company. These reports are performed by the industry and for the industry. Manufacturer’s support is limited to providing loan equipment, and to aiding the author if requested. It is the responsibility of Broadcast Engineering to publish the results of any device tested, positive or negative. No report should be considered an endorsement or disapproval by Broadcast Engineering magazine.

For more information on the AKG C3000, circle (307) on Reply Card.
Whether you are in television broadcasting, program distribution, or corporate communications, video pirates cost you a bundle. Protect your video and your business with Macrovision's VES and StarShaker scrambling systems. For transmission and recordable security in PAL or NTSC format, Macrovision has a product for you.

*Macrovision Scrambling Systems:*
- StarShaker: **NEW!** Fully addressable, low cost transmission system
- VES-TX: Fully addressable, professional transmission system
- VES-TP: professional transmission
- VES-TS: surveillance transmission
- VES-TD: industrial transmission
- VES-C1: videocassette security

For your total video security needs, call or fax Macrovision for details and distributor contacts.

Macrovision U.S.A.
Tel: +1 (415) 691-2909 Fax: +1 (415) 964-4735

Macrovision UK, Ltd.
Tel: +44 1895 251602 Fax: +44 1895 256951

Macrovision Japan K.K.
Tel: +81-3-5496-0466 Fax: +81-3-5496-4066

See us at NAB '95, Booth #16576.
Broadcast Engineering Conference at NAB '95

See Table 1 (below) for session topics.

The NAB Convention's unequaled educational programs give participants an unparalleled opportunity to explore new ideas. Furthermore, the 900+ exhibitors displaying the most innovative equipment, technologies and services will provide you with the best ways to equip your operation technically for success in the digital age.

At NAB '95 you will also benefit from unlimited networking opportunities in the technical sessions, during the exhibition and at any one of the many social gatherings. This one event provides the best opportunity to meet your peers from around the globe, make important contacts and learn from other members in the broadcast industry.

Convention planning services

Through an arrangement between SBE and NAB, SBE members can register at the NAB member rate, a savings of $300. Register early, and book your hotel and airline reservations as soon as possible. The following convention planning services are available. (See box at top right.)

Change is accelerating in the broadcast industry. Digital radio, advanced television and interactivity will profoundly affect how stations do business in the years to come. Staying on top of the latest developments is important. NAB '95 is the leading international conference and exhibition for the broadcast, production, post-production, multimedia and corporate communication marketplace. The full spectrum of industry professionals will be represented from around the world.

The joint NAB/SBE Broadcast Engineering Conference committee has worked hard to provide attendees with a wide range of topics and speakers. We hope you can take advantage of this opportunity and attend the show.

Numbers to know

1. NAB '95 Fax-On-Demand: 301-216-1847 (call from the handset on your fax machine)
2. General registration information: 800-342-2460 (ask for Justine Laccetti)
3. General registration information via Internet: register@nab.org>
4. Fax completed registration forms to: 301-694-5124
5. Mail completed registration forms to: NAB '95, P.O. Box 3379, Frederick, MD 21705, USA

Table 1. 49th NAB Engineering Conference April 9-13, 1995

<table>
<thead>
<tr>
<th>Date</th>
<th>Sunday April 9</th>
<th>Monday April 10</th>
<th>Tuesday April 11</th>
<th>Wednesday April 12</th>
<th>Thursday April 13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning</td>
<td>Advanced TV: Part I</td>
<td>TV On-Line: Interactivity and New Media</td>
<td>Designing the All-Digital Video Facility: Broadcast and Prod.</td>
<td>Engineering Luncheon</td>
<td></td>
</tr>
<tr>
<td>Noon</td>
<td></td>
<td>Computer Technology for Broadcast Support: BBSs, LANs, WANs and the Internet</td>
<td></td>
<td>Luncheon Speaker: Lewis Platt, CEO of Hewlett-Packard</td>
<td></td>
</tr>
<tr>
<td>Afternoon</td>
<td>Advanced TV: Part II</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2:00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6:00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Jerry Whitaker is editor of Video Systems magazine and chairman of the SBE Conference Committee. Respond via the BEFAXback line at 301-967-1905 or via e-mail to westmtnec.com.
When you purchase a transmitter for LPTV or translator service, you should expect the same quality and performance that the higher power stations receive in their transmission equipment — it's just as important to you as it is to them. At ITS, we manufacture all of our products to the same exacting standards that the largest, full service broadcast stations require! Some of the many features include:

- Broadcast quality, ITS built modulator for exceptional signal performance.
- Built-in protection from external and internal disturbances.
- Extensive diagnostic indicators — available locally and remotely.
- Solid-state, broadband amplifiers.
- High gain, parallel amplifiers above 500 watts for redundancy. Each amplifier has its own power supply and cooling.
- Conservative design and advanced signal processing for outstanding reliability and performance.
- Full product line from 10 watts to 2 kW for LPTV and translators.

In addition, every product is backed by ITS' deep commitment to customer service after the sale — we simply won't let you down! Join the many broadcasters who are turning to ITS for the best transmitters for both low power and full service requirements.

"Visibly Better Technology"

See us at NAB, Booth #12950.
**Television STL systems**

Low priority use according to Section 74. Unfortunately, some chief engineers consider any frequency that their transmitter might cover to be theirs for exclusive use. This can cause problems in coordination. However, the commission expects the local stations to work problems out, if possible. If coordination cannot be worked out, file your application and obtain a license for use of a frequency.

If you receive interference from lower-priority services, make an interference complaint and the commission will resolve it. Fixed links, including STLs, for full-service broadcast stations have the highest priority when considering interference protection. The second layer of priority includes TV remote pickup stations. The third priority is fixed or mobile stations serving translators or LPTV stations. The fourth level of priority includes backup facilities and TV pickup stations used outside of a licensee's local service area. Therefore, if one station needs a particular frequency for its TV pickup truck and there is no other frequency for your fixed STL system, the STL has priority. The trick is to work out this frequency usage between stations. In any case, you do not have to accept the claims by an existing station concerning the use of a frequency for remote pickup. In the case of equal priority uses, the first licensee will be preferred.

In several of the larger markets, the channels from 1.99GHz to 2.1GHz have been semi-reserved for mobile unit use by gentlemen's agreement. The 6GHz frequencies have been more heavily used for STLs with the 12GHz frequencies used when the 6GHz band overflows. A much better working relationship can be maintained by adhering to local custom.

Frequencies are also available in the 18GHz and 23GHz band for use as STLs. However, those frequencies are shared with other services and require more extensive coordination. The coordination required is fully explained in Part 21 of the rules and requires a study of all users in the area as well as notification to give other users the opportunity to object or comment. Coordination is best done by firms offering commercial frequency coordination services because it is complex and requires an extensive database.

### Antenna systems

The sole criteria for picking an STL system used to be based on the minimum dish size providing the necessary fade margin. That is no longer the case. Part 74 contains some definite antenna criteria limiting the minimum dish size. A summary is shown in Table 1. As an example, in the 6GHz band, the minimum transmitting antenna size would be six feet in non-frequency-congested areas and eight feet in frequency-congested areas. There is no clear definition of what constitutes a congested area. In general, it may be assumed that you are in a frequency-congested area if frequency coordination is difficult. If plenty of frequencies are available, you are in a non-congested area and can use Type B antennas. It is left to the individual user to select the size of the receiving antenna. Obviously, receiving antennas don’t send off signals that could cause interference to other stations. However, if you receive interference from another station due to the fact that you are using a small receiving antenna with a broad beam, it is the station’s responsibility to go to a larger antenna to eliminate the interference.

Old periscope antenna systems consisting of dish transmitting antennas with tower-mounted reflectors are generally frowned upon. However, it is possible to obtain a new periscope antenna system if the request is accompanied by a certification that the radiation from the entire system meets the antenna standards for Type A or Type B antennas. Realistically, that is difficult to do. The best way to design a new system is to start with a tower-mounted antenna.

Transmitting antennas are available on the market that meet the criteria for Category A antennas while not being full dishes. The entire surface of a round parabolic dish is not uniformly illuminated by the dipole feed structure. Some manufacturers have simply cut off that portion of the antenna that is not contributing heavi-
Brilliant new products for digital system integration.

Videotek is ready to deliver the brightest solutions to your 601 digital system problems. At NAB '95, we'll show you better ways to test your digital signals, distribute them, and make analog connectivity a lot easier. Our TAD-101 transcoder is the first with EDH-error detection and handling. Our innovative series of digital distribution amplifiers outshines the competition. And our VIM-10CD test instrument revolutionizes the way you'll look at serial digital video. Call now or see us at NAB booth #18132 for details.
ly to the total output signal. In this fashion, they have been able to construct antennas that meet the beam width and pattern restrictions for either Type A or Type B without going to the full windload associated with a round reflector. The gain and pattern shape are essentially the same but the weight and windload are reduced due to a reduction in the actual size of the structure.

**Path and power**

In a further effort to attempt to reduce interference on the STL frequencies, the commission has established minimum path lengths for full-power STL transmitting facilities. These range from 17km at 1.9GHz and 6GHz to 1km at 12GHz. Above 17.7GHz, there is no limit. This means the power must be reduced below the maximum permissible if the path link is less than the minimum specified in Section 74.644 of the FCC rules and regulations. If you are running a 7GHz STL on a path only 1km long, your maximum EIRP would be 19.37dBw as determined by the following equation:

\[ \text{EIRP} = 30 - 20 \log (A/B) \]

EIRP = equivalent isotropic radiated power in dBW
A = minimum path length in kilometers
B = actual path length in kilometers

This effective radiated power still permits stations to obtain a 40dB fade margin with reasonable size antennas. At the same time, it limits the overall amount of RF being propagated in the market area in an attempt to lower the overall interference to other auxiliary broadcast users.

**Transmission lines**

The preferred transmission line for 1.9GHz systems is still the old reliable 1½-inch coaxial cable. At these frequencies, it is relatively efficient and is inexpensive and easy to install. For higher frequencies, coaxial cable tends to become too lossy in anything other than short runs. The preferred transmission line at 6GHz and 12GHz is semi-flexible elliptical waveguide. It is also easy to install and comparatively inexpensive while providing adequate efficiency. The need for more efficient line comes in situations where the path is long and the transmission line at one or both ends is also long. In those cases, better efficiency can be obtained by going to rigid waveguide. The best efficiency is found using circular waveguide, which tends to present its own set of problems. Circular waveguide can be difficult to install and tame. Once properly adjusted, it provides an efficient transmission line system. However, it is not recommended except in cases where the losses in elliptical waveguide are excessive.

**Standby systems**

It is highly advisable to use a 100% redundant system for a primary STL link. These systems include hot standby transmitters and receivers with automatic switchover if either unit fails. While the mean time between failures for modern microwave transmitters and receivers is long, they will fail and the station will be down until a backup system is found or until repairs are completed. Because most stations do not have the equipment necessary to repair these systems, the downtime could be significant. It is permitted to use the remote pickup system as an STL during periods when the STL fails. However, you may have to contend with an inrate news department.

An option for difficult STLs makes use of redundant receivers. Most STLS are simple, straightforward systems with reasonable path links over normal terrain. However, some STL systems require fairly long paths,
Since 1960 EMCEE has set world standards for performance and quality in broadcast and microwave products. Our research and development commitment and continued emphasis on refinement and product upgradability will provide EMCEE users with value and obsolescence protection well into the future. Consider our technology and the long term advantages of EMCEE ownership.

WORLD STANDARD PRODUCTS - WORLDWIDE DISTRIBUTION

EMCEE Broadcast Products P.O. Box 68, White Haven, PA 18661
800-233-6193 or 717-443-9575 FAX 717-443-9257

See us at NAB, Booth #17106.

Circle (146) on Reply Card
especially when dealing with distant mountain-top sites. In other cases, the STL path may extend over large bodies of water where inverse beam bending may occur during some times of the day or under some unusual weather conditions. In those cases, severe fades can cause the received signal to dip into the noise level for extended periods of time. If two receivers are used, a second receive antenna can be mounted on the tower at different heights. There is no absolute value for the spacing, although at least 100 feet is desirable. Both receivers are operated continuously, with the better signal selected by automatic change-over equipment. This space diversity can add 10dB or more to the apparent fade margin because fades due to atmospheric conditions or inverse beam bending would not be expected to occur at both antennas simultaneously. This technique is not necessary for most systems but it can be a real lifesaver in those systems where the path terrain is less than optimum.

The basic physics of the STL path have not changed. That is, the path should clear all obstacles with nothing imposing on the 0.6 fresnel zone. For the high reliability needed, a fade margin of 40dB is required. The actual signal level depends upon the specific equipment used in the system, the actual EIRP, the noise threshold of the receiver and the receiving antenna gain with system losses.

Remember, establishing a good STL system starts with adequate frequency coordination with other users to avoid interference. Wading through the coordination process without stepping on any toes and getting the paper work prepared in accordance with the commission's requirements can be more difficult than actually selecting the equipment. The main point to remember is that a TV STL has the highest priority of all the auxiliary broadcast services. Although this doesn't mean that you should ignore other users, you have a good shot at obtaining a clean usable frequency, even in metropolitan markets.

For more information on STL equipment, circle (305) on Reply Card. See also "Antennas" on p. 82 and "STL Components & Electronics" on p. 84 of the BE Buyers Guide.
Digital Compositing and VideoGraphic Workstations
Dimensional Video Typography
Open Platform Character Generator Solutions
Affiliate I.D. Systems
True 3D Multi-Channel Digital Video Effects
Digital Video Function Modules

COMPOSION II
HALO
TYPEDEKO
PRESTO
PRONTO
IMPACT
DM/FS SERIES

DIGITAL GRAPHIX Incorporated

6 Forest Avenue, Paramus, NJ 07652
Tel: 201-845-8900  Fax: 201-845-8063  Service: 800-433-2979
• HALO • TYPEDEKO • PRESTO • PRONTO

1280 Blue Hills Avenue, Bloomfield, CT 06002
Tel: 203-242-4242  Fax: 203-242-3321 Service: 800-243-1570
• COMPOSION II • IMPACT • DM/FS SERIES

See us at NAB '95 Booth 16624

Circle (131) on Reply Card
Louth Automation intelligent video disk control software for on-air presentation

During the past 18 months the major computer manufacturers have increased their efforts to market broadcast video servers for on-air presentation applications. Even though they are using proven computer technology, the storage and retrieval of video segments for broadcasting have proven to be far different from their core data processing applications.

Many manufacturers are on a learning curve to fully understanding those differences in order to produce the required broadcast operational software. This was apparent to us when last year in a joint meeting, the chief developer from a major computer vendor asked us, “What’s an ID?”

A similar challenge is also facing the traditional broadcast product manufacturers who are announcing hard-disk products. Dubbing material into a disk while structuring a database that allows for instant retrieval of that material by ID requires a different approach than the processes used in a linear-tape environment. After all, do the commands “thread,” “standby” or “eject” have any meaning with disk technology? They are now dealing with new terms, such as “archiving,” “scalability” and “multistream management!”

Computer-based video disk system hardware is available today, but fully developed control software in the hard disk is still maturing. In some instances, the software doesn’t take full advantage of the disk's random access capabilities as some vendors' software mimic controlling a VTR. In addition to basic control software, the industry needs disk software integration with older products, such as cart machines, and software integration with external broadcast applications, such as automation systems.

Since inception, Louth's ADC-100 software-based system has automated on-air presentation by integrating a diverse array of serially controlled devices. Hard-disk video servers and buffers are no exception. The system's video disk software activities provide an open-system disk-control protocol, a disk device "object," a tape-to-disk media management system, and software for caching from cart machines to video disk buffers.

The Louth disk control protocol

Late in 1993, it became apparent that many of the video disk vendors would be developing proprietary or closed systems. Experience shows that it would be more beneficial and cost-effective if there was an open, non-proprietary control protocol with a command structure enabling flexible and effective use of disks. The key was to get such a protocol adopted by all disk system developers.

With industry input, Louth engineers developed a control system protocol and distributed it to disk systems vendors. This protocol is in the public domain and Louth has proposed it as a SMPTE standard. It has currently been implemented or committed to be implemented by Acom, ADT, ASC, BTS, Digital, Dynatech, Hewlett-Packard, Silicon Graphics and Tektronix.

The protocol allows full use of hard-disk random access capability for broadcast presentation applications. Unlike a VTR protocol that uses linear addressing (time code), the disk protocol uses a file naming convention (ID) for random access and efficient storage space management. In addition, the protocol provides a mechanism to address multiple input and output ports. The protocol is based on a well-proven cart machine protocol structure, but implements commands specifically for control of video disks. Each command is simple and direct. Commands may be easily added to the protocol when new functions are required.

The protocol identifies media for record and playback by a simple ID and duration. A recorded ID may be played back in its entirety by requesting the ID. Or if a portion of the ID is to be played, then an offset start and duration time may be specified.

For multichannel applications, the protocol allows a control port to open multiple I/O channels. These may be opened as locked (not available to another controller) or unlocked as needed. Once a controller has opened multiple I/O ports, individual ports may be issued commands when selected. When multiple control ports are used by different controllers (e.g., a controller is recording into a disk while another is playing), the protocol provides a mechanism to examine changes to the directory. For example, changes that occur when spots are inserted or deleted from the traffic schedule.

The Louth protocol also allows the user to set specific disk parameters, such as video compression ratios and audio sample rates. These commands are useful for systems that need to provide scalable presentation quality for different elements. The protocol supports deferred or timeline commands. This concept was added for instances when the data transport mechanism is indeterminate (e.g., Ethernet). The

![Figure 1. The ADC-100 automated master control caching from cart machine to disk.](image-url)
Now Available to Developers and OEMs

Digital Video Building Blocks

Choose the pieces you need to build your application.

- Broadcast-quality Digital Video
- CD-quality Digital Audio
- Realtime, 60 Field Motion-JPEG
- Industry-standard DV-MCI Software Toolkit
- GUI Accelerator with Live Video
- 32-bit Videographics
- CVE, Switching, Mixing, Keying
- Nonlinear Random Access
- Machine Control

Digital Video Building Blocks deliver the superior performance required in demanding applications like: real-time nonlinear editing, commercial insertion, video-on-demand servers, digital video broadcasting, digital disk recorders, digital video archiving and retrieval, CGs, 2D and 3D graphics paint, animation recorders and medical imaging.

We know the Digital Video Building Blocks work. We've used them to create two blockbuster products of our own — Matrox Studio, the only desktop video editing system with nonlinear productivity and linear production power combined and Matrox Animation Xpress (MAX), a professional real-time digital animation recorder.

Tap into our expertise. Some of your competitors are probably using these tools. You owe it to yourself to check out our PROVEN state-of-the-art hardware and the best software development tools in the business.

To speed your product to market, Matrox Digital Building Blocks are backed by the outstanding technical support team that has made Matrox a leading supplier of graphics, video and imaging solutions to OEMs the world over.

For more information call 1-800-361-4903 or (514) 685-2630

Matrox is a registered trademark and Matrox Studio, Matrox Digital Video Building Blocks and Matrox Animation Xpress are trademarks of Matrox Electronic Systems Ltd.
Matrox Electronic Systems Ltd. 1055 St-Regis Blvd., Dorval (Quebec) Canada, H9P 2T4
Fax: (514) 685-2683

See us at NAB 95 Booth S304

matrox

Circle (132) on Reply Card
Denon's MD Cart™ Recorders and Players are the modern choice for any application that requires repeated recording and playback of audio, from broadcast to post-production. Why? Compared to NAB tape carts, the MiniDisc is free from wow, flutter, jamming, stretching, wrinkling, drop-outs and shedding.

MiniDisc's advantages (including full inter-machine, inter-brand compatibility) are quickly making it the universal standard. Compared to other digital formats, Denon's MD Cart technology offers the lowest cost per Megabyte of storage, shirt-pocket transportability, and non-contact, optical media reliability.

Obviously, once you've chosen MiniDisc, your next decision is which MD to buy. Features like serial and parallel interfaces, digital and analog signal inputs and outputs, external synchronization, and MD Remote™ software (see side bar), make Denon MD Cart the obvious choice.

See us at NAB, Booth #4004.
command structure also provides a sequence of archive commands, such as send to archive, get from archive, delete from archive. The protocol is concise and direct, and provides comprehensive status reporting from the controlled devices.

Vendor implementation of the protocol allows the customer to choose the disk product and the application software separately. Because the capabilities of announced disk products vary widely (price, storage, channels, compression), having a flexible yet common protocol allows the right disk to be interfaced with the customer's application, all transparent to the end-user.

**Object-oriented programming**

Object-oriented programming (OOP) is used to develop the automation software solutions. A software object has been developed as the software interface module to disk devices under control of the ADC-100 automation system. This disk-driver module supports the disk as a peer with all the other supported devices (cart machines, switchers, etc.) under automation control.

This interface allows an operator to view the video disk as a cart machine equipped with two VTRs that have a thread and cue time of a second or two. The object supports all the functions available on a standard cart machine, but eliminates tape and VTR usage conflicts. The object also uses the system protocol to communicate with the disk.

The object status display appears to the operator as a cart machine with two VTRs. Normally, one status line (VTR-1) would be showing the current spot being played while the other status line (VTR-2) would show the status of the next spot to be played. This allows continuous monitoring of both the disk status and the spots to be played.

The key to media management for on-air presentation is closing the status and the control loop between the operator and the automation controller. This cart machine object keeps the list display accurate to the second as to the available spots and needed spots in the cart machine. The process is accomplished through 1D added and 1D deleted status and requests commands. Disk resources are displayed in blue, and those items needed are displayed in red. As spots are recorded into the disk, the display automatically turns blue indicating that the spots are available for playout. Additionally, the operator can bring up a window that lists all of the IDs currently in the video disk.

Each copy of the disk object supports one video disk input or output stream. Multiple copies of the disk object may be used for controlling multiple video ports from the same video disk. They can also control multiple video ports from different video disks. This allows the automation system to control several on-air outputs from a single disk. It also allows several outputs to play media from several different video disks (such as a commercial disk, news disk and program disk).

The ADC-100 system also interfaces the disk to Autocompile, the Louth automated tape compiler, for pre-compiled back-up tape. This is done as a background function directly from the disk in advance of airing the media.

**Disk media management system**

Turbodisk is a PC-based system for dubbing media into broadcast video disk products. It automates the labor-intensive tasks of dubbing, screening, and verifying media on video disks. It also creates a database where all dubbed media is logged including titles, station-specific information and notes. This database may be shared with other tape preparation products. Turbodisk also provides manual control of a disk recorder via a VTR-like control panel. The autocopy feature simplifies and automates the entire dubbing process. The operator only has to load and unload source tapes. After the spot master has been cued and the spot information selected from a dub (record) list, the automated dubbing requires only a single keystroke. The system automatically rewinds the source VTR for tape preroll, prepares the video disk for the recording session, and prerolls the tape. Additionally, the system starts disk recording at the first frame of the video and stops both devices at completion. All spot information is automatically entered into the media database for use by the automation system. When the dubbing process is completed, a preview feature allows for automatic review of the entire spot, or the first or last three seconds of the spot.

Multiple PCs can be networked to share the same database. The database can reside on the Turbodisk PC or a network file server. Database retrieval and viewing are then available directly in Turbodisk. Deletion of the correct database entry is made automatically when a spot is deleted from a disk. The system can retrieve the complete spot inventory from a disk for display, or save it on a PC hard disk. This spot list may be sent to traffic or used for other verification purposes.

The current disk status and status of the current ID are always displayed on the PC screen. Complete disk status is available, such as the number of spots residing in a particular disk and the amount of free space available. A menu is provided to allow the operator to change the record.
The problem is obvious.

The solution is simple.

No more studio clutter! Reduce overall costs and simplify monitoring needs by letting one unit do all the work.

The VIEWPLEX-2000 is the ultimate video signal multiplexer. It will display up to 16 different channels on one screen with excellent clarity, making applications virtually unlimited.

VIEWPLEX-2000 is ideal for monitoring in a closed circuit set-up, broadcasting multiple images in a collage, or broadcasting sequential images for instructional formats.

If you’re thinking of upgrading, don’t get more equipment; just get the one you really need.

Features include: • Video signal format NTSC. • High quality 8 bit picture resolution. • 16 maximum input channels. • 40 different display configurations. • Completely programmable. • Real time picture refreshing at 30 frames/sec. • 8 color character generator built in. For dealer inquiries and further information, contact: SUMITOMO ELECTRIC U.S.A., Incorporated.

Telephone: (310)782-0227 Facsimile: (310)782-0211

See us at NAB, Booth #S949.
The Turbdisk media management system can be used for dubbing in source material.

parameters supported by the disk manufacturers. Recording parameters, such as video compression factors and audio channel usage can be set for all recordings or changed for individual elements.

Turbdisk supports simultaneous access to the disk media for both recording and playout. This allows last-minute dubs with preview and editing functions independent of on-air schedules. This permits rushed schedule changes to be made quickly and is well-suited for a news environment where last-minute production is routine.

The system provides a fully functional disk control panel on the PC monitor complete with all the functions of a traditional VTR front panel. Manual commands include cue, play, stop, record, still, reverse play, fast forward, fast reverse, step, jog and shuttle. Because disks are randomly accessed, a playing spot can be stopped and a new spot selected, cued and played in seconds. Begin and end markers can be placed while inspecting a spot in any play mode (including still). A new spot can be created from any segment of an existing spot without video encoding or decoding and the associated loss of quality. And this newly created spot is independent of the original spot. Either spot may be played or deleted without affecting the other. This simple editing feature allows fast and accurate news cuts, program segmenting or spot trimming.

Caching from cart machine to disk buffer(s)

Some video disk servers may provide sufficient storage to contain the user's entire spot inventory. If this is the case, they can work as cart machine replacements. Other disk systems are well-suited as on-air caches or buffers when interfaced to a tape library source. When news and program material are also included for video disk playout, an external archiving system is often required. Archiving is a task well-suited to tape, and digital tape storage technology ensures that the process maintains image quality.

The standard cart machine is an excellent device for storing spots for eventual video disk cache. Louth's Adplay system automates cart machine/disk buffer integration using caching and list management. Adplay is a stand-alone spot playout system, but it can be upgraded to total master control automation. This system allows the cart machine and disk buffer to act as peers of all the other devices (VTRs and switchers), all operating under automation control.

With either Adplay or ADC-100 control, the cart machine is converted from a direct-to-air device to a source library system. Both the cart machine and the disk must be under the control of the same automation software to manage the timely transfer of material. All of the inventory is contained in multispot tapes (up to 100 per tape) with the cart machine running proprietary control cart machine software. Control software for all Sony and Odetics cart machines is available now, and by March 1995, the Panasonic MARC family will be supported.

Disk caching has several advantages over the traditional direct-to-air cart machine application: 1) the workload on the cart is reduced as spots with multiple playouts are transferred only once to the disk buffer; 2) spots may be rearranged and/or replaced with greater ease and reliability; 3) redundancy is enhanced because the cart machine can be used as an emergency back-up; 4) in multichannel applications, several channels can be presented to air from a cart machine with a limited number of VTRs; and 5) tape handling is reduced by directly dubbing from source tapes into the cart machine multicut cassettes.

The Louth software module that manages this transfer as a background function is called Autocache. The interface is dedicated to buffering audio/video material from a cart machine to a disk cache. Because the ADC-100 can simultaneously support up to eight asynchronous channels, Autocache will also support multichannel copying to disk.

The transfer to disk is done prior to air with a user-defined number of events in the look-ahead of each schedule. Depending on the amount of disk storage available, the look-ahead of a disk server could be as long as 48 hours. Typically, a disk cache contains only a few hours of storage.

Assuming 16 minutes of break material every hour, a 2.5 hour disk drive can store

Continued on page 219
Over the past few years, technological advancements in new digital VTR formats, disk-based editing systems and compression algorithms have been stealing the headlines. But what about cameras? Although the number of new breakthroughs is not at the level it was five to eight years ago when CCDs were in their infancy, the steady pace of advancements is nonetheless noteworthy. This article looks at some of the recent advancements in CCD technology.

**Horizontal resolution**

When 3-CCD cameras were introduced, camera designers were plagued with the problem of controlling aliasing or moiré patterns. These patterns were generated whenever the camera was aimed at finer detail than Nyquist criterion would allow. Soon, the spatial offset technique, which displaces the green CCD horizontally by one half of a picture element (pixel), was incorporated into most 3-CCD cameras. The result of spatial offset is that aliasing is substantially reduced, which together with the appropriate shifting of the optical low-pass filter, permits the resolution that the CCD is capable of, to actually be seen.

One problem with spatial offset is that to be completely effective, the green signal must equal the sum of the red and blue signals. The formula for the luminance channel is:

\[
Y = 0.59G + 0.30R + 0.11B
\]

Because green represents 59% and the sum of red and blue is only 41% of the signal, spatial offset is not completely effective in canceling aliasing. The mixing ratio for the luminance signal must remain constant, because it affects color accuracy and luminance is a key component in deriving the color-difference signals. Recently, several manufacturers have adopted a frequency-dependent method for altering the luminance equation. Aliasing is a problem only at high frequencies and colorimetry is less critical at high frequencies because the color-difference signals are bandwidth-limited. Therefore, the following luminance equation is substituted only at high frequencies:

\[
Y_{high} = 0.50G + 0.25R + 0.25B
\]

The ideal mixing ratio of 50-50 is achieved, and color reproduction is not altered. The drawback of this technique is that the mounting accuracy of the green CCD becomes even more critical. At this level, even chromatic aberrations caused by the lens must be taken into account. Otherwise, resolution will be reduced due to signal cancellation rather than alias cancellation. This technique, together with high-speed sample-and-hold circuits allows a horizontal resolution of at least 750 TV lines with well-controlled aliasing.

**Continuous auto black balance**

Color cameras have always suffered from color imbalances and drift in the dark portions of the picture. Cameras have high gain in the dark portions as a result of the required gamma correction. Small signal drifts are multiplied by the high gain. For this reason, most cameras incorporate an automatic black balance function. The automatic black balance calibrates the black clamping circuits for true black (lens iris fully closed).

Many camera manufacturers ease the design burden by reducing the gain of the gamma circuit in the dark portions. Although this may reduce the amount of drift, it also has negative consequences on reproduction in dark portions of a scene, including loss of shadow detail and color hue shifts. (For more information, see “The latest in CCD Camera Technology,” p. 26, *BE,* July 1993.) A new circuit has recently been introduced which, for the first time, totally eliminates the need for an external automatic black balance switch. Dubbed continuous auto black (CAB) it uses optically masked pixels at the edge of the CCD to maintain an absolute black reference.

In the past this optical black portion has been used as relative, rather than absolute, reference. Due to noise and spikes generated by the sample hold function of the first clamping stage, the optical black portion was cut and replaced with an electrically generated black reference. Hence the absolute optical black reference was lost and could not be used by subsequent stages. The only way to acquire an absolute black reference was to close the iris and perform a traditional automatic black balance, which takes time and could upset the flow.

Continued on page 209
In videotape, quality is everything.

Processes that introduce dropouts — whether they are in manufacturing, shipping, storage, or usage — need to be identified and the sources of dropouts removed. THAT'S why we at Ampex Recording Media Corporation have never taken our eyes off one goal: No Dropouts.

Every day, 365 days a year, we're identifying — and removing — the causes of dropouts wherever they are. This includes a world-class Quality Improvement Program within our manufacturing facility — but it also includes helping our customers improve their storage, handling, and usage of tape, to minimize dropouts.

AMPEx Recording Media

Circle (150) on Reply Card

PLEASE CALL OUR TOLL-FREE NUMBER

800/240-7042

AND REQUEST A COMPLIMENTARY COPY OF OUR BOOKLET:

ACHIEVING EXCELLENCE IN VIDEO PRODUCTION — VIDEOTAPE QUALITY IS EVERYONE'S BUSINESS.

THIS BOOKLET PROVIDES THE AMPEx APPROACH TO REACHING THE GOAL OF "NO DROPOUTS."
AHEAD OF THEIR TIME

1900  
TERM TELEVISION COINED  
CONSTANTIN PERSKY

1902  
COLOR TELEVISION PATENT FILED  
OTTO VON BRONK

1926  
FIRST TELEVISION TRANSMISSION  
VIA PHONE LINES  
JOHN LOGIE BAIRD

1928  
PHONOVISION — FIRST VIDEO DISK  
JOHN LOGIE BAIRD

1936  
2:1 COMPRESSION BROADCAST  
(INTERLACE)

1953  
6:1 COMPRESSION BROADCAST  
(NSC)

1994  
MPEG-2 STANDARD ADOPTED  
JANUARY 1995  
REAL TIME MPEG-2  
ENCODING SYSTEMS SHIP  
DiviCom

ALL AHEAD OF THEIR TIME. NOT ALL HOUSEHOLD NAMES,  
YET EACH AN HISTORIC MILESTONE.

NOW DiviCom HAS MADE HISTORY THE FIRST WITH FULLY  
INTEGRATED RISC BASED MPEG-2 COMPRESSION . . . THE  
FIRST WITH ATM OUTPUT . . . THE FIRST WITH MPEG-2  
TRANSPORT . . . AND, THE FIRST WITH MPEG-2 SYSTEMS  
THAT ARE HIGHLY AFFORDABLE, EFFICIENT, RELIABLE,  
INTEGRATABLE AND ELEGANT.

DiviCom  
LEADERS IN DIGITAL MEDIA COMPRESSION

800.286.1600  
1709 McCarthy Boulevard  
Milpitas, CA 95035

At NAB, visit us at Booth 1603 Multimedia World  
In Dallas, visit us at NCTA
of a shooting sequence.

The first camera to use a continuous auto black circuit is the JVC GY-X2B camcorder. First, noise has been reduced to a minimum through careful design at the front end including proprietary signal detection methods. Next, high-speed sample-and-hold circuits have been developed that allow the original optical black to be retained through all clamping stages. This optical black is replaced with system blanking at the output of the signal processing circuit after all clamping is complete. The result is that black balance is maintained without drift continuously, and without the need to take a black balance in the middle of a shoot.

**Improved automatics**

Automatic functions not only make the cameraperson's job easier, they also can improve the picture quality and allow shooting in situations that could not otherwise be captured.

Full-time auto white is a function often associated with consumer cameras. But, if accurate, it allows the continuous shooting of a subject moving from incandescent to fluorescent to outdoor lighting without missing a single frame for white balance. In the past, the accuracy of the typical full-time auto white has been less than what is required for professionals. Recently, JVC applied some novel techniques to all of its cam-

eras, greatly increasing the accuracy of the full-time auto white circuitry. All white balance circuits measure the green channel relative to red and blue, and adjust the gain of the red and blue channels until they equal the green channel. Applying this same method to a full-time auto white circuit indiscriminately can produce serious inaccuracies. It can make a red rose turn gray and make faces completely colorless. To prevent this, a look-up table contains the red to blue gain relationship of every color temperature from roughly 2,600K to 9,000K. This prevents the white balance circuit from responding to colored objects, only to changes of color temperature. (See Figure 1.)

In addition, a hysteresis loop is established for low saturation objects along the I-axis. This prevents the circuit from incorrectly responding to skin tone. Although still not as accurate as taking a white balance on a white card, it is...
A broadcast console designed for operator comfort with the flexibility and durability to last for years. That’s the hallmark of custom-designed communications furniture from STS, Inc.

Modular consoles by STS fit a variety of configurations so they can be modified as your needs change. And they’ll outlast many changes because, beneath the high-quality laminates and the finest natural hardwood trim is a welded tubular steel framework. That means it can handle your heaviest equipment loads.

STS has earned a reputation for thoughtful design and rugged dependability in the public safety, utility and transportation industries. To learn how the complete line of STS consoles and racks can meet your communications needs, call 800-879-1787 and see the difference for yourself.
certainly superior in those situations where continuous shooting in multiple color temperatures is required.

Auto-iris problems
The accuracy of auto iris circuitry is another problem that has plagued shooters. Problems usually arise under high contrast, harsh lighting circumstances typical of field shoots. The subject of interest may be bright relative to the rest of the scene causing overexposed pictures. Or, a bright light or candle may be in the scene causing the subject to be underexposed. A multizone iris weighting system allows exposure priority based on a series of zones whose positions correspond to natural areas of interest.

Future camera technology
The question arises as to what the future holds for camera development. Technically, expect to see even greater improvements in sensitivity, signal-to-noise ratio, and perhaps further reductions in vertical smear. Operationally, expect to see cameras that are even easier to use, with even better performing automatics so that the pros will not sneer at the thought of using them. Despite the advances of the past, there is little doubt that cameras will continue to improve in the future.

Jerry Cohen is product marketing manager for JVC PROFESSIONAL PRODUCTS COMPANY, Elmwood Park, NJ. Respond via the BE FAXback line at 913-967-1905 or via e-mail to be@intertel.com.

For more information on CCD cameras, circle (306) on Reply Card.
**BUSINESS**

BTS, Simi Valley, CA, has earned worldwide ISO 9000 certification with the ISO 9002 qualification of BTUS, its marketing, sales and service headquarters for the Americas and Far East.

Harris Allied's Broadcast Division, Quincy, IL, has earned ISO 9001 certification, joining the October 1994 certification of its Cambridge, England facility.

Abekas Video Systems, Redwood City, CA, has shipped its ASWR8100 component digital switcher to CNN and Video Wisconsin.

Nvision has named several international sales representatives and distributors including: Boxner Systems Ltd., St. Albans, North London, UK; C.V.E., Seregno, Italy; i.d Vertriebsgesellschaft, Munich, Germany; Gerrit de Jonge by Axel, Axel, Holland; IMMAD Broadcast Services, Markham, Ontario, Canada; LYNX SA, St.-Prex, Switzerland; REA/Elda Video, Châtillon, France; VideoCad AB, Vallingby, Sweden.

Videssence, Inc. has relocated its headquarters to a larger facility in Burlingame, CA Tel: (415) 579-7777; Fax: (415) 579-7579.

Quantel has delivered its complete digital compositor, Hal, to Hammer & Pixel, Chicago, KTVU, Oakland, CA, and S.O.S., Columbus, OH. Its still-store system, Picturebox, has been installed at KNBC, Burbank, CA, and WWL-TV, New Orleans. Also, Quantel has installed Picturexes, Picturexes, Pictureenes and Hal for Scripps Howard.

Louth Automation, Menlo Park, CA, has delivered LT8-100 time delay systems. The network version, Time Banking, is currently undergoing final shadow testing at ABC headquarters in New York and will provide the west network delay feed.

Avid Technology, Inc., Tewksbury, MA, has announced that New Hampshire Public Television and Maine Public Broadcasting will use Avid’s AirPlay system to broadcast promos, spots and station identification directly from disk.

The Network, Rainier, WA, has announced that Crow Film and TV are now using the Soundcraft DC2000 digitally controlled console.

Microwave Solutions, National City, CA, has received a $96,850 contract award from the U.S. Army Electronics Command, Fort Monmouth, NJ, for hardware and software for high-power microwave amplifiers and specialized testing.

Synergistic Technologies Inc., Pittsburgh, PA, has been chosen to provide international transmission services for the Texaco Metropolitan Opera International Radio Network.

ASC Audio Video Corporation, Burbank, CA, has supplied KOTA-TV, Rapid City, SD, with the Virtual Recorder system.

Advent Communications Ltd., has been awarded a contract from European News Exchange, Luxembourg, to supply all the complete fixed satellite earth stations for its new digital TV satellite network.

FilmCore Editorial, Los Angeles, has added the digital 8-track audio recording system Tascam DA-88 to its headquarters in Hollywood.

Siemens Audio, Inc., New York, has announced the sale of the first Capricorn digital recording console to Right Track Recording, New York.

Matthews Studio Equipment Group, Burbank, CA, has entered into a letter of intent to acquire all of the outstanding stock and operating rental assets of Studio Rentals, Inc., Chicago, for $3.5 million in cash and restricted common shares.

Otari Corporation, Foster City, CA, and TG Systems have agreed to give Otari worldwide exclusive rights to market and distribute PicMix products.

Graham-Patten Systems, Grass Valley, CA, has supplied the D/ESAM 400 Digital Edit Suite Audio Mixer to Desert Productions, Phoenix; Editel, Hollywood, CA; Foto-Kern, Burbank, CA; Lackland Air Force Base, San Antonio, TX; and Peachtree Post, Atlanta, GA.


Morning Studios, Inc., a division of Fox Circle Productions, has purchased more than $500,000 of JVC professional cameras, S-VHS camcorders and S-VHS editing systems to equip its new F/X cable network.

Audio Processing Technology Ltd., Los Angeles, has delivered more than 250 Digital Codec 3D2 systems to JDB, Culver City, CA.

Solid State Logic has installed two custom SL 8000 film consoles at the Warner Bros. Studios Post-Production Facility, Burbank, CA.

TimeLine Vista Inc., Vista, CA, has announced the purchase of 12 DAW-80 digital audio workstations and 13 Version 6.0 software upgrades for existing Waveframe 1000s by Sony Pictures Entertainment's Sound Production Department, Culver City, CA.

Pinnacle Micro, Inc. (NASDAQ:PNCL), Irvine, CA, has announced price reductions of more than 30% for its Ornay optical disk storage system.

Nesbit Systems Inc., Princeton, NJ, has signed a license agreement with USA Networks to develop a software package that will streamline the marketing, selling, scheduling and billing of commercial spots.

Scripps Howard ordered $2 million-plus of Quantel graphics technology comprising Picturebox still-stores, Paintboxes, Picturenet networking systems and Hal. The first installation was at KJRH, Tulsa with Paintbox and Picturebox Twin. Other stations include KNXV Phoenix, WEWS Cleveland, WFTS Tampa, WMAR Baltimore, WPTV West Palm Beach and Home and Garden TV in Knoxville.

Chyron Corporation, Melville, NY, signed a Memorandum of Understanding to acquire all of the outstanding stock of Evolving Video Technologies Corporation, Arvada, CO. The total purchase price for the acquisition is $3,750,000 payable in a combination of cash and Chyron securities over a 5-year period.

Fujinon Inc., Wayne, NJ, has announced the use of its Ah66X9.5ESM lens by WSJK, Knoxville, for maximum focal length and close-up shots in sporting events.

Mobile Satellite Products Corporation, Baldwin, NY, has announced that its LynxX Transportable Inmarsat-B Terminal became the first transportable Inmarsat-B terminal to receive Inmarsat-B type approval for high-speed data.

Respect Productions Limited has recently installed a Solid State Logic SL 4000 G plus console at its newly opened recording studio, Westpoint Studios.

212 Broadcast Engineering March 1995
Has Your Studio Phone System Become Talk Sick?

Clean it up with the easy-to-use TS612.

Every day radio and television stations are airing more and more talk shows. Unfortunately, they aren't upgrading their studio telephone equipment. The result is a virtual waste dump of operational errors and bad caller audio.

The solution is the TS612 from Gentner. Designed specifically for talk show formats, the TS612 features six phone lines (expandable to 12), Gentner's newest Superhybrids with internal mix minus generation, automatic caller level control, and digital audio enhancement for consistently clear caller audio.

Your talent will love the TS612's unique talk show features like VIP caller, four-line conferencing, and call screening. Plus, its built-in handset and key pad will make your talk show run as smoothly as your callers' mouths.

Don't wait a day longer to clean up your "talk sick" phone system with the affordable TS612. Contact your Gentner dealer today and order your TS612, before your studio is designated as a Superfund site.

Gentner
1-800-945-7730 • 1-801-975-7200
Call Gentner for all of your telephone interface solutions, including conference calling services.

Circle (93) on Reply Card
WHY BRANSON'S CABLE CHANNEL IS JUST AS IMPORTANT TO US AS KNBC-TV, TIME WARNER, TCI AND DIRECTV.

P

roviding smooth, seamless station automation for all of our customers, regardless of size, has been Alamar’s charter for the past 10 years. That’s why our system at Branson, Missouri’s Vacation Channel is just as important to us as KNBC-TV, Hughes DIRECTV, Time Warner, TCI and some of our larger installations.

No pie-in-the-sky dream systems with exotic custom gadgetry. You tell us where you want to start. Often as not it’s with your existing equipment, supplemented by standard off-the-shelf items, plus Alamar’s incomparable know-how in automation software. Alamar’s in-house engineers start with system design and stay with you on site—past completion. That’s what makes us the experts in total facility automation. We treat each installation with special care regardless of size.

As a result we’ve done more broadcast/cable installations than anyone else. Over 300. One at a time. All over the world. Let us help you with your needs.

Alamar USA, Inc.
1711 Dell Avenue
Campbell, Calif. 95008
408 866/9373 Fax 408 370-4861

LPB, Frazer, PA, may now be reached via electronic mail or Internet at lpbinc@aol.com.

Truevision, a subsidiary of RasterOps Corporation and Avid Technology, Inc., has entered a 3-year OEM relationship whereby Avid will continue to incorporate leading-edge technology developed by Truevision in its full product line. The agreement has an estimated value of $40 million over its term.

Microwave Networks Inc. (MNI), Houston, TX, has won the President’s “E” award from the U.S. Department of Commerce for excellence in export standards and improving the U.S. balance of trade. Nationwide, MNI is one of 28 companies to win the award so far this year.

Panasonic, Secaucus, NJ, has announced the purchase of two Panasonic AJ-D350 D-3 digital studio recorder/players and an AS-D700 digital composite switcher to Branson Teleproductions, Branson, MO.

Also purchased from Panasonic were two AJ-D350 D-3 VTRs and four AG-A300 slow-motion controllers by Starliner Mobile Video, Primos, PA.

The Public Broadcasting Service (PBS) recently took delivery of 12 Panasonic 1/2-inch component digital VTRs for use in its National Program Service.

Computer Prompting & Captioning Co. (CPC), Washington, DC, was presented the “Distinguished Vendor of Accessible Technology Award” at the Washington D.C. headquarters of the U.S. Department of Commerce by Secretary of Commerce Ronald H. Brown.

ImMix, Grass Valley, CA, has announced the installation of two digital video post-production workstations, the VideoCube and the VideoCube PLUS, at CBS-affiliate KRQU-TV, Albuquerque, NM.

EEV Inc., Elmsford, NY, has appointed Enders and Associates, West Hills, CA, to represent EEV in the front line representation of the company's broadcast products in the states of Alaska, Arizona, Colorado, Hawaii, Utah and Wyoming. The company will also be responsible for LEDicon camera tube sales to all non-call-letter TV facilities in California and Nevada.

Xymox Systems, Inc., Van Nuys, CA, has been ranked 361 in Inc. magazine’s 13th annual ranking of America’s 500 fastest growing private companies.
Waiting for the future? Vela Research — a subsidiary of Home Shopping Network, Inc. — has the technology solutions you need, and has them today. Vela has a complete family of innovative MPEG-based compression and video server equipment designed to offer the cable industry a solid migration path to the future. **VIDEO SERVERS**

The flagship of the Vela product line, the Perspective 2000™ Video Server answers the need for an interactive multimedia playback solution. It stores digitized video clips, such as movies or commercials, in an MPEG-compatible form, then decompresses the data in real time to support near video-on-demand, ad-insertion and other applications. **MPEG ENCODERS**

Vela Research's MPEG Encoder is capable of taking NTSC video and compressing it to MPEG-1 and MPEG-2 video bitstreams. The bitstreams can then be transmitted through a cable TV system, or they can be stored on a digital storage medium (like the Perspective 2000™) for later on-demand playback. **DECODERS**

Rounding out the Vela Research line is a complete family of MPEG decoder board solutions that can decode MPEG bitstreams at SIF and CCIR-601 resolutions. **SYSTEMS SOLUTIONS**

Vela can also provide intelligent systems to help you with centralized management and administration of client sites and other facets of your business. **CHECK US OUT**

Call Rick Chile at (813) 572-1230, ext. 7171, for an opportunity to explore the innovative “solutions beyond tomorrow” that Vela Research can offer today — or write:

Vela Research, Inc. • P.O. Box 9090 Clearwater, FL 34618-9090

Meeting Tomorrow’s Needs — Today™
Remember how you felt the last time your system gave you more performance than you thought possible?

The Public Broadcasting System (PBS) has become an authorized Panasonic repair center, offering any TV outlet, including commercial broadcasters and cable networks, videotape machine maintenance and repair services.

Manhattan Transfer/Edit's new Manhattan Digital Center was used to produce a 3-D animated phone bill jet in a U.S. Sprint commercial. The image was created on a Macintosh then texture wrapped onto a 3-D wire airplane model generated by Softimage software on a Silicon Graphics Inc. system.

Lightworks, Hollywood, CA, has announced the purchase of its Heavyworks One systems, a multicamera digital nonlinear editing system, by Complete Post, Hollywood, CA.

JAMPRO Antennas Inc. has announced its expansion with the creation of JAMPRO RF Systems Inc., a new division of the company to specialize in the design and manufacture of passive RF components. Its product line will include harmonic filters, directional couplers, UHF RF systems, MMDS filters and channel combiners, and TV intermode filters.

ColorGraphics, Salt Lake City, UT, has announced the purchase of two DP/MAX machines by Atlanta Olympic Broadcasting, a division of the Atlanta Committee for the Olympic Games.

Channel One, London's first round-the-clock news cable TV station, is using Parallax Software's Matador 2-D and Acrobat 3-D software systems.

Sony, Park Ridge, NJ, has announced the purchase of two DVW-A500 digital betacam VTRs and two DVW-A510 players by Vision Video, Winston-Salem, NC.

Also purchased were two digital edit suites by ABC, New York, for on-line digital production of Turning Point.

Corporate Computer Systems, Inc., Holmdel, NJ, has announced the purchase of more than 140 CDQ-2012 codecs by Swedish Broadcasting. The codecs are being used to establish a nationwide digital audio network between Swedish Broadcasting's headquarters in Stockholm and its 25 regional offices.

Digipath Video Inc., Pointe-Claire, Quebec, Canada, is a new manufacturer of analog and digital broadcast equipment.
PEOPLE

Lucie Fjeldstad has been named president of Tektronix Video Systems Division, Wilsonville, OR.

Sam Cercone has been appointed vice president, sales, for Videssence, Inc., Burlingame, CA.

Chris Horne has joined Lawrence Behr Associates, Inc., Greenville, NC, as project engineer.

Richard Zabel has been appointed eastern sales manager for Tekniche, Northvale, NJ.

Patrick Griffis has been named vice president and general manager for Panasonic Broadcast & Television Systems Company, Secaucus, NJ. Other additions at Panasonic include Joseph Videtti as product marketing manager for optical memory disk recorders (OMDR) and Robert Caniglia as product specialist for switchers.

Beth Simon has been promoted to senior vice president at Audio Plus Video International (APVI) Inc., Northvale, NJ. Also, Leonard Schwartz has been appointed vice president in charge of the New York facility.

Don Lefebvre has been promoted to vice president of North America Sales for Dynatech Video Group’s Production Business Unit, Salt Lake City, UT. Also, Michael Guess has been named product manager of the Production Business Unit.

Paul Burnham has been appointed field service manager for EEV Inc., Elmsford, NY.

Kim Wright has been named director of sales and marketing at FilmCore Distribution/Vault Services in San Francisco, CA.

Steven J. Spradlin has been promoted to sales application engineer for Harris Corporation's Broadcast Division, Quincy, IL.

Louis J. Doctor has been named president and CEO of RasterOps Corporation, Santa Clara, CA.

Larry S. Jefferson has been named director of the technical maintenance center at the Public Broadcasting Service.

Mishele Vieira has been promoted to director of marketing for Xymox Systems, Van Nuys, CA.

YOU KNOW THE FEELING. It's the confidence that comes from knowing that the tools you work with every day will deliver all the performance you expect—and more—every time.

And that's exactly the feeling you'll get from the Model 1200, our serial component digital switcher that delivers "big-system" 4:2:2:4 performance in a familiar, affordable design. With chroma-keying ability that is unmatched by any other system in its class. Not to mention superb video quality, stability, and reliability. The Model 1200's advanced control system makes setup and operation simple, fast, and intuitive. And best of all, its versatile design allows it to be used effectively in broadcast, post-production, and telecine environments.

If you'd like more information on the Model 1200, call us today at 1-800-474-8889, ext. 300.

The Model 1200 from Grass Valley. Nothing else feels like it.

Grass Valley
A Tektronix Company

Circle (138) on Reply Card

March 1995 Broadcast Engineering 217
IMTRAN® applications include Broadcast Video, CATV, Distance Learning, Security and other uses requiring high video and audio quality over long distances. Call our Application Center for more information.

Call today to discuss your IMage TRANsmision needs.
approximately 9.4 hours of scheduled break material. With an average of eight breaks per hour, containing four spots each, there would be 32 list elements per hour for the automation system to air. Material for 10 hours of breaks requires a 320-event look-ahead. All needed media within the look-ahead period is automatically copied to the disk. If the disk system does not have the media at airtime, the media will be automatically played from the cart machine. The system keeps the operator informed of all media that is unavailable to air within its look-ahead time-frame. This allows time for manual preparation of the media if required.

Disk-storage management will normally be done automatically. If there is enough disk space, Autocache will leave media on the disk after it has aired even though it’s no longer required in the look-ahead. This will automatically save the media from removal. It may soon reappear on the look-ahead and will not have to be recopied to disk. When the disk is full and new media is needed, the system removes the oldest elements that are no longer required.

Elements used frequently can be tagged delete protected and can only be deleted by the operator.

**An efficient system**

Using the Louth Automation’s disk software means a station can replace VTRs or cart machines with video disk recorders. This can result in a maximum return on the investment.

Video disks can also be used in place of VTRs. The time delay products (Timebanking and Autocycle) and Louth’s automated satellite record program segmenting system (Autoshow) all integrate with ADC-100, Turbodisk, and the disk object interface providing an effective solution to stations’ automation.

Louth manages state-of-the-art disk storage and retrieval technology, and couples it with existing technologies that allow for future expansion to more digital services — all integrated into traffic and master control.

---

George Fullerton is vice president of sales and marketing for Louth Automation, Menlo Park, CA. Respond via the 8F FAXback line at 913-967-1905 or via e-mail to info@interetc.com.
**NEW PRODUCTS**

**Multichannel video codec**

**Grass Valley**

- J series multichannel DS3 video codec: features full-motion and full-color resolution video as well as CD-quality audio; package provides up to four channels of video and up to four channels of CD-quality audio per video channel, per module; 10 modules can be configured on a single 6-rack unit chassis for a total of 20 channels of video; modules can be configured in a mix-and-match manner to meet the exact requirements of the application; modules are based on a single board called the Main Add Drop (MAD) module; the coder and decoder are plugged onto the MAD board or onto one another in a variety of configurations to change the number of channels or function of the module; when fully populated, a MAD module is one inch wide.

*Circle (2000) on Reply Card*

**Fiber-optic transmission system**

**Opticomm**

- Model FMX-47000 series: fiber-optic transmission system transmits multiple RS-170 composite video, subcarrier audio or digital signals over one multimode fiber; pulse frequency modulation (PFM) video transmission provides adjustment-free operation over distances up to 4km; wavelength division multiplexing (WDM) techniques enable each channel to transmit in either direction; system offers full electrical isolation against noise, lighting, and ground loops; modular transmitters and receivers permit custom configurations; front-panel indicators display the status of each channel.

*Circle (2003) on Reply Card*

**Jack connector**

**Re an**

- PerpJack: a 1/4-inch jack connector featuring the “quick fix nut;” pin-for-pin compatible with existing market standard; pin design pops into place for rapid flow soldering.

*Circle (2003) on Reply Card*

**Non-linear digital video editing software**

**Radius**

- Radius Edit: non-linear digital video editing for QuickTime with integrated titling and special effects capabilities; features dual monitor display, built-in titling, built-in professional transitions and multiple key frames; Do-It-Once FX feature permits the saving and storing of original effects and style shots for future use and collaboration with other designers.

*Circle (2004) on Reply Card*

**UHF panel antenna**

**Jampco**

- JUHD broadband UHF panel antenna: designed to broadcast any channel within the UHF band channels 14-69; antenna offers equal performance on any channel and is available in horizontal, vertical, or elliptical polarization; design allows new channels to be added to the existing system at any time; available for low, medium, or high-power applications; can be configured to produce directional or omnidirectional azimuth patterns.

*Circle (1001) on Reply Card*

**Audio/video cable tester**

**Sescom**

- CT-6 cable tester: designed to test various combinations of audio and video cables; tester will advise the user of cable shorts, improper phasing, opens and intermittents; unit is constructed in a rugged aluminum housing; three switches with integral LEDs test XLRs 1/4-inch stereo, 3.5mm, RCA, “F”, BNC and 5-pin DIN for midi; unit operates on two “AA” batteries.

*Circle (1002) on Reply Card*

**Surge protection catalog**

**MCG Surge Protection**

- Surge Protection for AC Power Lines: 24-page full-color catalog includes a coordinated surge suppressor selection guide that enables the user to select an appropriate protector based on the National Electrical Code's service entrance, panel board and branch panel designation; also features full technical specifications and installation instructions for MCG’s complete line of AC power line protection devices as well as an explanation of ANSI/IEEE C62.41-1980; AC line protectors range from wall plug-in units and 6-outlet strips to computer room and complete facility protectors.

*Circle (2005) on Reply Card*
**Advanced digital audio editor**

*Antex Electronics*

> NuWAVE: Microsoft Windows-based digital audio editor designed to support multiple .WAV compression formats including Dolby AC-2, MPEG Layer I/II and MS-ADPCM, as well as standard 8- and 16-bit PCM; all file formats are transparent allowing user to handle multiple compression formats within a single edit decision list (EDL); features non-destructive editing and “drag and drop” interface; user can add to the EDL by importing existing audio files or recording new files in real-time from the editor.

Circle (2006) on Reply Card

---

**Vehicle mount**

*Cinema Products*

> Vehicle mount: film and video camera support system designed for use with Cinema Products’ line of Steadicam products; versions available for use with the Steadicam Video SK or the Steadicam EFP, Steadicam III A and Steadicam Master series; features precision aluminum construction and scratch-resistant powder coat exterior coating.

Circle (2007) on Reply Card

---

**STUDIO AUTOMATION**

**I/O BOARDS**

- Sony 9-Pin RS-422
- 1, 2, 4 & 8 Port RS-232/422
- Parallel / GPI / Relay I/O
- Windows™, DOS and OS/2™ Compatible
- Made in USA
- Free Technical Support from the Leader in PC Communications

**SEALEVEL COMMUNICATIONS & I/O**

**SEALEVEL SYSTEMS, INC.**

PO BOX 830
LIBERTY, SC 29957
(803) 843-4343

Circle (165) on Reply Card

---

**Graphics overlay module**

*Pivotal Graphics/Primagraphics*

> Valiant: a graphics overlay generator that provides superimposition of text and graphics over full color images from any manufacturer’s imaging or graphics display system; configured as a 6U VME-compatible printed-circuit card; incorporates a Texas Instruments TMS34020 32-bit graphics processor and dual Brooktree Br459 RAM-DACs with hardware cursors; monochrome or RGB signals can be simultaneously acquired from one or two genlocked sources via Valiant’s dual video input channels; two 8-bit pseudocolor or gray scale outputs are refreshed from an on-board, dynamically allocatable, frame buffer.

Circle (2008) on Reply Card

---

**TH 760 IOT**

60 kW vision
40 kW combined

The TH 760 IOT has been designed for ease of installation in its input and output circuits. The simple plug-in design means you can change the tube on its roll-in rack unit in a matter of minutes. Simplicity of use combined with stability of operation and full compatibility, the TH 760 is the best choice for your IOT transmitter.

**THOMSON TUBES ELECTRONIQUES**

FRANCE - BP 121 - 78148 Velizy cedex - Tel: (33-1) 30 70 35 00 - Fax: (33-1) 30 70 35 35
USA - Po Box 540 - Totowa - 07511 New Jersey - Tel: (1-201) 812 9000 - Fax: (1-201) 812 9050
The Frezzolini NP Bracket System is an external battery holder designed to attach to the Sony NP battery box. When the Frezzolini NP Bracket is attached, it enables a second NP battery to be mounted on the camera for powering a Frezzolini Mini-Fill light. The advantage of this system is to allow the use of NP batteries to power both your light and camera without a side battery pack or external cables getting in the way. NP batteries are lightweight and relatively inexpensive. With the NP Bracket attached, the camera will easily fit into its carrying case. Frezzolini NP Bracket system is a perfect choice for camera operators to fully utilize their originally supplied equipment by adding the Frezzolini Mini-Fill quickly at minimum effort and cost.

Frezzolini Electronics Inc. 5 Valley Street Hawthorne, NJ 07506
Orders 800-345-1030 • 201-427-1160 • Fax 201-427-0934
Batteries
Ikon Video

NP-23dx: NiCad NP-type professional video battery with LED charge status indicators; the NP-23dx is a direct replacement for all common NP-type batteries including the NP-1B; compatible with all standard NP-type battery chargers.

Circle (2009) on Reply Card

Headsets
Noise Cancellation Technologies

ProActive 1000 series: line of active industrial headsets; product consists of two lightweight open-back active noise reduction headsets (ProActive 1000 without communications, ProActive 1500 with a boom microphone for communications); headsets electronically reduce noise in 30 to 1,200Hz range by up to 15dB; powered by a rechargeable NiCad battery; one charge lasts 12 hours.

Circle (2010) on Reply Card

MPEG encoding system
Minerva Systems

Compressor: an integrated system consisting of the Minerva encoding engine, a Macintosh-based host system, and the MPEGmaker application software; the real-time, scalable video processing engine is capable of digital or analog video input, high-quality audio capture, and MPEG audio and video encoding and multiplexing at bit rates up to 4mb/s; the platform can simultaneously encode and decode audio and video so user can instantly preview the MPEG encoding process and adjust the engine parameters based on the visual feedback.

Circle (2011) on Reply Card

Send your comments to the editors of Broadcast Engineering via on-line mailboxes:

Internet:
be@interfc.com

CompuServe:
74672,3124

TH 760 IOT
60 kW vision
40 kW combined

The TH 760 IOT and its cavities are mounted on a roll-in rack unit which offers full electrical and mechanical compatibility with existing IOT transmitters. So you can benefit immediately from the advanced features of the TH 760 IOT.

Full compatibility combined with stability of operation and simplicity of use, the TH 760 is the best choice for your IOT transmitter.

Circle (161) on Reply Card

COMPATIBILITY

March 1995 Broadcast Engineering 223
Uninterruptible power supplies
Superior Electric

> SL series Stabiline series provides a reliable source of clean, continuous sine wave AC power for mission-critical, voltage-sensitive electronic equipment; offered in 12 models with power ratings between 400-2,200VA; available in North American styles that permit user selectable 110, 120 or 127VAC, 60Hz operation and international configuration that permit user selectable 220, 230 or 240VAC, 50/60Hz operation; units use a “boost/buck” tap system for tight output regulation and control over chronic low or high input voltage conditions; bidirectional surge diverting/filtering circuitry is used for protection of electrical noise generated from either the AC input or the protected load; front panel features a self-diagnostic routine on start-up and indications for site wiring fault, battery service, communication operation, input line condition, battery and percent load levels; “battery sleep” feature prolongs battery life.

Circle (2012) on Reply Card

Graphics workstation
Silicon Graphics

> Reality Station: newest member of the Onyx family is a single-processor graphics workstation; features a single 200MHz MIPS R4400 microprocessor and includes RealityEngine graphics; also features a real-time 3-D graphics feature set including real-time texture mapping; full-scene anti-aliasing of polygons, vectors and points; quad buffering for interactive high-resolution stereoscopy; hardware support for image processing; standard NTSC/PAL/S-video output; and broadcast video options.

Circle (2013) on Reply Card

Digital time base corrector
Ikon Video

> IXT-7 “Super Seven” digital time base corrector available in single and dual channel modes; unit is contained in a one U metal rack frame or table-top configuration; this family of TBCs will include NTSC or PAL and will accept and transcode composite, Y/C, component, and RGB formats; correctors will also include a full 3-field synchronizer.

Circle (2014) on Reply Card

FM switchless combiners
Jampro Systems

> FM switchless combiners: ensures maximum output power availability at the antenna at all times; allows full power on-air transfer between active and standby transmitters as well as multiple transmitter combining; available in 1 ¼-inch to 6 1/8-inch coax line sizes with power ratings up to 125kW; high levels of isolation between the transmitters are maintained for all positions of the phasing line by the input hybrid.

Circle (2015) on Reply Card

Interface
United Media/Pinnacle Systems

> API/DLL interface: a direct software link between United Media’s MultiVision system (MVS) linear editor and Pinnacle’s Alladin media printer; with the flexibility of sync rolling from 2-7 VTRs from a single plug-in card, the MVS linear editor uses all four inputs of the Alladin’s switcher by sync rolling A/B/C/D/E and F rolls; both the MVS editor and the Alladin run under Windows and can reside in the same computer or on different computers.

Circle (2016) on Reply Card
If you want to make the move from tape to disk, Ira Goldstone has a few quick words of advice:

Q: As Director of Engineering at Tribune Broadcasting, you're in the midst of updating your entire system. How do you deal with the pressure?
A: Carefully.

Q: Right. So did you choose the Louth ADC-100 automation system to bridge to disk or give you future flexibility?
A: Yes.

Q: Meaning you liked Louth's ability to control all types of different devices?
A: Yes.

Q: And you weren't worried about any problems with proprietary automation software or choosing any disk vendor you wanted?
A: No.

Q: So if you were to give advice on how to make the transition to disk, without worrying about where your station goes in the future, what would it be?
A: Louth.

Q: And what about the multi-casting environment?
A: Louth.

Q: Of course, you'd still need a media management and traffic interface system to tie it together. Any final words of advice?
A: Louth.
Control access module
Standard Communications

Omni Global VU CAM830/830I series control access module: designed as an upgrade solution to Standard’s Omni Broadcast MT830 satellite receiver; offers access and adjustment of all essential features and functions of the receiver manually or by remote control; allows user to operate up to 30 receivers located at multiple off-site locations; CAM830 module is easily field retrofitted in any existing Omni Broadcast MT830 satellite receiver installation.

Circle (2017) on Reply Card

Software
PatchLabel: software for accurate and neat labeling of all patchbay connectors; can be used with Apple Mac or IBM-compatible PC; allows user to select position of headings for perfect alignment with designation strips.

Circle (2018) on Reply Card

Video titling software
McRoberts Software Inc.
Comet/CG 3.0: professional video titling software for compositing high-quality anti-aliased text and graphics over digital or analog video; features added text and graphic options including PowerPC native code for fast rendering, general-purpose interface control, and soft edge shadows with variable softness, depth, color and transparency; also features beveled rules and bars, style palette, thumbnail palette, storyboard importing, super-fast sequencer and alignment controls with seven object alignment options.

Circle (2019) on Reply Card

AV disk drives
Micropolis
AV Gold series: new generation of drives offering a minimum sustained transfer rate of 4MB/s; drives are optimized for continuous and sustained delivery of data; eliminates the possibility of delays in the datastream that cause frame dropouts and jerkiness in digital audio/video playback or recording; disk drives feature a 650,000-hour mean-time-between-failure (MTBF).

Circle (2020) on Reply Card

KEEP YOUR VIDEO & AUDIO IN SYNC!

D1 Serial Frame Synchronizer/Proc Amp
- Synchronizes D1 signals to a local analog or digital reference
- Digital proc amp for Local/Remote level control
- Local/Remote freeze control

Video Delay Detector
- Interfaces directly with frame sync, color correctors etc. from any manufacturer
- Controls AD2100 for automatic lip sync correction
- Measures up to 8.99 fields of video delay
- NTSC/PAL compatible

Stereo Audio Synchronizer/Delay
- For lip sync correction, pitch shifting, obscenity screening and other audio delay applications up to 6.14 sec
- Variable pitch shifting plus automatic correction during delay changes
- Analog and AES/EBU input and output
- Digital Sample Rate Conversion

To learn more about our complete range of video and audio processing products, call Pixel Instruments, or your local distributor today.

Australia/ New Zealand
Magna Systems
Phone 04-1217 111
Fax 04-1247 2340

China/Hong Kong/Taiwan
Mediotech
Phone 852-2667 1289
Fax 852-2607 0509

South Korea
A.T.I.
Phone 82 02 574-4011
Fax 82 02 574-5800

Italy
C.V.E. S.p.a.
Phone +39 362-226643
Fax +39 362-226642

South Africa
Teledema (PTY) Ltd.
Phone 071-801-3619
Fax 071-801-3619

United Kingdom
GEE Broadcast Systems
Phone +44 256-810123
Fax +44 256-810061

See Us at NAB Booth #18438

Circle (179) on Reply Card
EEV has always accepted the Broadcast Industry's continuing challenges to lower energy consumption resulting in technologies such as high efficiency external cavity klystrons, BCD pulsing, higher efficiency wideband klystrons and high power compact OTs. The results are now in. Since their introduction: Over 2 million IOT Operating Hours achieved! Over $7 million* saved in Energy Costs! EEV's IOTs are continuing to set complete new standards in design, efficiency, and lower energy consumption. And, of course, all EEV's IOTs are digital AT/HD™ ready.

Start saving today!
Call us to find out how you can start enjoying your share of these energy savings.

EEV Power Tubes

USA: EEV Inc. 4 Westchester Plaza Elmsford NY 10523
Tel: (914) 592-6050 or 'Toll Free' 1-800-DIAL-EEV Fax: (914) 682-8922

CANADA: EEV Canada Ltd., Tel: (416) 745-9494 Fax: (416) 745-0618

UK: EEV Ltd., Tel: (01245) 493-493 Fax: (01245) 492-492

Subsidiary of the General Electric Company plc of England

Circle (166) on Reply Card
See us at NAB, Booth #17136.
Now available...

The Society of Broadcast Engineers is introducing the new

Television Operator's Certification Handbook

The Handbook will prepare television operators to handle their day-to-day responsibilities. It includes basic information and procedures typically used at most stations. FCC rules that apply to all stations and an outline of a typical station operations manual are also included. Completion of the Handbook will prepare the reader to take a 50-question exam offered by SBE. Successful completion of the exam will earn the candidate certification from SBE as a Certified Television Operator.

Price is $35.00

For your copy of the Television Operator's Handbook write, fax or call to place your order:

Mail to:
SBE, 8445 Keystone Crossing,
Suite 140, Indianapolis, IN 46240

Fax: 317-253-0418

Phone: 317-253-1640

PAL/NTSC decoders
Faroudja
- DFD-U series: makes use of digital adaptive comb filter technology to convert PAL, NTSC or Y/C inputs into RGB, component, or D-1 serial and parallel outputs; all models make use of 10-bit processing, ACC and APC, and digital chroma enhancement; options include frame synchronizer with full time-base correction and remote control via a RS-232 terminal.

Circle (2021) on Reply Card

MMDS transmitters
ITS
- 1700A series: line of MMDS transmitters accommodating NTSC or PAL TV standards; packaged in an upgradable configuration permitting 10W or 20W transmitter to be upgraded to 50W; features include low phase noise oscillators, phase locking capability, and offset frequency control; also features advanced multilevel diagnostics with local or remote monitoring capabilities.

Circle (2022) on Reply Card

Fluorescent lighting
Strand Lighting
- Videolux fluorescent softlights: designed around 6x26W and 2x36W compact fluorescent lights, Videolux provides a smooth, wide spread; this spread is concentrated by its intensifier attachment that collects the light from the edge of the beam and re-directs it toward the center; the high lumens-to-watt ratio means low power consumption and low heat generation; can be used in conjunction with Strand Lighting's dimming control products for full control of studio lighting.

Circle (2023) on Reply Card

Tower lighting controls guide
SSAC
- Tower and Obstruction Lighting Controls Application Guide: 16-page applications and product selection guide; new guide includes lamp outage and beacon flasher monitoring relays that are now required to meet new FAA lighting inspection procedures; also features controls for beacon flashing, synchronous flashing of beacons, dusk-to-dawn operation, lamp outage and failed flasher alert modules, 3-phase voltage monitors and more.

Circle (2024) on Reply Card

Enclosures catalog on disk
Equipto Electronics
- CAB-NET: catalog available on IBM-compatible PC disk; features a full line of modular electronic cabinets and computer furniture.

Circle (2025) on Reply Card

Satellite earth station interfacing link
Ortel
- Remote RF monitoring via fiber: service previously available as an option for the System 8000 interfacing links, this capability is now available as a stand-alone item; capability allows for the remote spectrum monitoring of radio frequency (RF) uplink signals; monitoring maintains the proper effective isotropic radiated power (EIRP), intermods, spurious emission and frequency stability; allows operators to add microwave fiber options to systems at earth stations already in place and interconnected with waveguide and coaxial cable.

Circle (2026) on Reply Card
WHEN THE NEWS IS HOT...

...COUNT ON MILLER FOR SUPPORT

Experience counts for everything in news. Experienced professionals count on Miller camera support.

MILLER. The ENG experts.

See us at NAB on Booth #16967

Miller Fluid Heads (USA) Inc. Tel: (201) 473 9592 Fax: (201) 473 9693
Miller Tripods Canada Tel: (604) 685 3331 Fax: (604) 685 5648
Non-linear digital video editing system
Interactive Images
➤ Plum: Plug `n Play, PC-based system produces broadcast-quality video (CCIR 601 video sampling at 720x480 NTSC or 720x576 PAL at 59.94/50 fields/second); the design features an on-board rendering engine that reduces rendering time by approximately 95% compared to more conventional cards; using the superfast PCI bus, Plum supports a databurst rate of up to 132MB/s and sustained compressed frame sizes of 125kB without expensive RAID disk arrays; Plum is bundled with a high-quality audio card, a fast SCSI-2 card, and the Adobe Premiere 4.0 editing software.

Circle (2027) on Reply Card

Automatic line voltage regulators
Phenix Technologies
➤ SBL series: line of regulators offering improved performance through the use of Phenix's CTR linear variable transformers and roller-type contacts; features include single-board computer control, individual phase regulation, input circuit breaker, output contactor, no break bypass, and digital meters.

Circle (2028) on Reply Card

the NEW VISION GROUP
A Division of WESCAM U.S.A., Inc.
Specialists in Wireless Broadcast Equipment Rentals & Services

FDC. C.C. Licensed Providers of Portable, Remote Microwave Systems and P.O.V. Camera Equipment
• Entertainment
• Business
• Security
• News
• Sports

As you can see, our credits speak for themselves.

For further information, contact:
Karl Smith
Director of Operations
800.550.9006
407.951.0219

Circle (180) on Reply Card

Products catalog on disk
Remee
➤ Master Catalog: Remee's complete electronic wire and cable product offering for PVC, plenum, fiber-optic and composite cables available on computer disk; a built-in assistant guides the user through the computer program.

Circle (2029) on Reply Card

Video production system
Radius
➤ VideoVision Telecast: a BetacamSP-quality video capture and playback system for Quick-Time-based digital video editing; includes professional-level digital audio and time-code support; features comprehensive video I/O offering component (YUV and RGB), S-Video, and composite connectors; also features high-quality 16-bit, 48kHz stereo sound locked to the video signal; front-panel LEDs show current input/output selections; system has full gen-lock capability for flicker-free video mixing; other features include longitudinal and vertical interval SMpte/EBU time code for both audio and video, RS-422 device control, GPI trigger, and built-in adaptive JPEG video compression/decompression engine.

Circle (2030) on Reply Card

DON'T MISS THE JUNE ISSUE OF BROADCAST engineering

featuring extensive coverage of NAB 1995
• Exhibitor Highlights
• Pick Hits
• And Much More!
GET THE COLORS RIGHT

With the increasing interchange of programme material from different sources such as studios and production houses, ensuring high standards of picture quality has become even more important.

Enter the Philips CRT color analyzer. There's simply no faster way to adjust black level, gain, or color tracking, with such high accuracy. And to extend its potential even further, you can also couple it to a Philips color alignment generator, which supplies you with all the signals needed for adjustment of monitors, projectors or video walls.

As leaders in color monitor alignment, we have built up a store of knowledge and practical advice on the subject. It's all in our popular book "The Color Truth", available free from Philips TV Test Equipment. Ask for your personal copy now.

85 McKee Drive, Mahwah, NJ 07430, Phone (201) 529 2188, (800) 421 0888, Fax (201) 529 2109

Philips
TV Test
Equipment
It takes a pioneer to invent the future.

What makes a pioneer different? Vision. Plus the ability and resources to act successfully on that vision.

HCI's determination to think years ahead of the curve has made us the world's largest commercial satellite operator.

Our fleet of GALAXY® and SBS satellites has set the pace for the future of today's broadcast, cable, radio and data transmission industries. HCI developed DIRECTV®, the first high-powered digital DBS system, and is now working with partners around the globe to establish regional direct-to-home systems.

We are a partner in AMSC, North America's first satellite mobile phone system, and are working with various partners to establish similar systems internationally. And in 1998, we will launch SPACEWAY™, a broadband global network.

If telecommunications are vital to your company, chances are we're inventing your future right now.

See us at NAB, Booth #17548.

Hughes Communications
A unit of GM Hughes Electronics
Circle (175) on Reply Card
Fiber feed module

Imtran

10-bit professional line: high-speed digital fiber delivery for the broadcast chain; offers better than RS-250C short-haul video and audio performance; four or eight discrete NTSC composite analog video feeds may occupy a single fiber; each video channel may optionally have up to four CD-quality balanced audio lines and one simplex RS-232 data line; standard Imtran frame occupies 3RU of vertical rack space.

Digital TV broadcast standard and format converter

Video International

DTC 1600P6: based on the DTC 1600P5 "Worldwide Problem Solver," features 4-field/4-line motion adaptive interpolation, up to 20dB noise reduction, 4:2:2 processing and digital encoder/decoder; stand-alone unit requires no additional TBC or synchronizer for operation; serves as an analog-to-digital as well as digital-to-analog format converter when equipped with the optional D-1, 4:2:2 serial or parallel interface.

Stereo audio tone generators

Link Electronics

Model PTG-616 and Model 6160: high-quality audio tone generators designed for the Link PFM-600 mounting frame and the Starflex 3000 frame respectively, both models feature simultaneous 1kHz and 400Hz balanced, low impedance outputs; a third output is provided for 1kHz or 400Hz, selectable from the front panel; units are designed as a stereo tone source with independent A and B channel outputs; total harmonic distortion is <0.06% for all outputs; output amplifiers feature a cross-coupled feedback configuration for the precise phase and level matching of the balanced output.

Major Technologies is proud to introduce the Collage family to the Americas.

Collage is...

FAST & FLEXIBLE

- 4:4:4:4 architecture
- 64 bit RISC microprocessor
- Ethernet networking
- Easy file exchange with other systems
- Optional remote stations available
- Menu selectable RGB/YUV I/O
- Optional serial D-1 interface
- Compact 3RU chassis

ANIMATION

- Smooth rolls & crawls at any speed
- Page transitions including; wipe, push, slide, page curl, and cross-fade

TEXT GENERATION

- Uses Postscript type 1 fonts
- Unrestricted text placement
- Full control of edge, shade, & shadow

STILL STORE & PAINT

- Polyphoto browse
- Picture load with key in <1 second
- Large selection of graphic shapes
- Real time sizing of shapes & images
- Lumakey & chromakey
- Rotoscoping with full VTR control

Call 1-800-461-7814 for the location of your nearest dealer.

See Collage at NAB '95

Affordable & Powerful

Collage 2D

Collage CG

See us at NAB Booth #12562

Manufactured by

Pixel Power Ltd.
Cambridge, England
Tel 44 1223 423999
Fax 44 1223 423868
Measurement products catalog

**Tektronix**

- 1995 Measurement Products Catalog: 596-page, soft-cover catalog featuring a full-color product section with new form-factor measurement solutions; 900 products are featured including additions to the color printing and imaging, network displays, and video systems divisions. Catalog also includes Tektronix partnerships/alliances solutions offered by Advantest, Japan, and Rohde & Schwarz, Germany.

Circle (2041) on Reply Card

Digital audio monitor

**Tektronix**

- 764 Monitor: operates as an audio phase and level meter and as a digital data monitor; uses interpolation to calculate accurate audio levels; the passive loop-through inputs allow the 764 monitor to be installed in-line with the signal of interest; has the ability to compile statistics associated with an audio passage; also displays English language descriptions of digital information in its channel status decode screen; can accept balanced or unbalanced format signals.

Circle (2042) on Reply Card

Switcher

**DNF Industries**

- SW1X8 RS-422 switcher: allows the ST200 and ST100 Universal VTR controllers, an edit controller, or any other RS-422 VTR controller to control up to eight VTRs; operator can select one out of eight VTRs for individual control, select a group of VTRs to control, or gang roll all eight VTRs at the press of a button; two or more switchers can be connected to control more than eight VTRs.

Circle (2043) on Reply Card

Digital video system

**Truevision**

- Targa 2000: a QuickTime-compatible digital video system that allows users to digitize, compress, store, edit and playback digital video on Macintosh and Power Macintosh computers; system delivers full-screen, full motion, 60-field video recording and playback; system also outputs high-quality video streams directly to tape or video monitor while simultaneously displaying a resizable video-in-a-window image on the Macintosh desktop.

Circle (2044) on Reply Card

Continued on page 239
EVW-300 3-CDD Hi-8 Camcorder

- Equipped with three high density 1/2" Hi-8 Type II video heads.
- Excellent for all types of video recording.
- Takes 1.5 hours to record 2 hours of video material.

EVW-300 with Canon 13:1 Servo Zoom Lens, VCT-12 Tripod Mounting Plate and Thermodyne LC-422TH Shipping/Carrying Case

Quick-Draw Professional for Camcorders or Stand Alone Cameras

The Quick-Draw Camera Case provides a convenient way to carry and protect your camcorder and accessories from any kind of ground, in your car or in the air. With lightweight, high-strength composite materials and a zippered lid, it makes sure your camcorder is safe and secure. It is specifically designed for working out of the car in a variety of situations. The Quick-Draw Case has a wide range of camcorders and accessories that can be used for quick opening or secure with a seat belt. It is a versatile Anton/Bauer charger.

Logic Series Digital Gold Mount Batteries

The Logic Series Digital batteries are designed to provide optimal performance and long life. The Logic Series Digital batteries are tested under high current loads and are designed for extreme conditions. The Logic Series Digital batteries are tested under extreme conditions and are designed to provide optimal performance and long life. They are designed to provide optimal performance and long life.

Digital Pro Pacs

The Digital Pro Pac is the ultimate professional video battery and is recommended for all applications. The Digital Pro Pac has an industry leading 3.41 Ah, 12.8V, 28W 3000 cycle life. It is perfect for use in professional applications. The Digital Pro Pac is lightweight and compact and is ideal for use in professional applications. The Digital Pro Pac is perfect for use in professional applications.

Digital Compac Magnum

Extremely small and lightweight (less than 1 lb) yet powerful, the Digital Compac Magnum (DCM) is the smallest and lightest battery pack on the market. The Digital Compac Magnum is perfect for video production and is ideal for all professional video production.

Digital Compac Magnum 1

- 4.8 Volt, 3.2 Ah
- 14 watts
- 3.2 hours of video
- 4 hours of audio

Digital Compac Magnum 2

- 4.8 Volt, 3.2 Ah
- 14 watts
- 3.2 hours of video
- 4 hours of audio

Digital Compac Magnum 3

- 4.8 Volt, 3.2 Ah
- 14 watts
- 3.2 hours of video
- 4 hours of audio

Digital Compac Magnum 4

- 4.8 Volt, 3.2 Ah
- 14 watts
- 3.2 hours of video
- 4 hours of audio

Digital Compac Magnum 5

- 4.8 Volt, 3.2 Ah
- 14 watts
- 3.2 hours of video
- 4 hours of audio

Digital Compac Magnum 6

- 4.8 Volt, 3.2 Ah
- 14 watts
- 3.2 hours of video
- 4 hours of audio

Gold Mount Batteries

The Logic Series Gold Mount batteries are designed to provide optimal performance and long life. The Logic Series Gold Mount batteries are tested under high current loads and are designed for extreme conditions. The Logic Series Gold Mount batteries are tested under extreme conditions and are designed to provide optimal performance and long life.

Pan and Tilt Heads with Serial Drag

Pan and Tilt Heads with Serial Drag are manufactured with high-quality components and are designed to provide optimal performance and long life. They are designed to provide optimal performance and long life.

Vision 2 Stage ENG and LT Carbon Fiber Tripods

The Vision 2 Stage ENG and LT Carbon Fiber Tripods are the ultimate in lightweight and high-quality tripods. They are designed to provide optimal performance and long life. They are designed to provide optimal performance and long life.

Vision 2 Stage ENG and LT Carbon Fiber Tripods

- 2 Stage ENG Tripod
- 132 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
- 128 lbs.
RF SERIES CONDENSER MICROPHONES

(For a traditional condenser microphone, the capacitor is first tuned in a circuit, then the frequency is determined by the resistance to the movement of the diaphragm. Fostex has long had a reputation for making excellent quality studio condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.

The audio itself is a perfect example of the precision and accuracy that is characteristic of Fostex condenser microphones.
SVP-5600 and SVO-5800 S-VHS Player/S-VHS Editing Recorder

**NEW**

- By combining the high resolution (400 horizontal lines) of S-VHS with dual VTRs, the 5800 Series provides the perfect solution for Digital Field 100 and On Screen Process improvement. They dev-  

- elt incorporate a wide video head angle of 2 degrees and include a solid state color picture reproduction. Each has a build in CRT voltage  

- on shaped, 3:3:5:3 signal generator, which replaces signal display  

- with color bars. They also incorporate On-chip error correction systems to eliminate color bars and other defects. These circuitry  

- for high quality improves the chroma balance, thus enhancing the S-VHS color picture reproduction.

**ADVANCED EDITING FUNCTIONS**

- For fast accurate editing, both machines employ a built-in time code generator and display. The time code found in  

- in time very useful for editing and computer graphics, where a frame-synced frame editing is indispensable.

- When synchronized to an RS-422 equipped edit controller, the VTR-5850C and VTR-5860C time code will be updated  

- with the input signal's time code and output the updated time code to the another VTR-5850C an 120 frame rate editing is  

- possible. For more efficient operation they have an on-screen setup menu. This setup menu eliminates the necessity of custom VCR edit equipment. For  

- example, the VTR-5850C and VTR-5860C can be configured so that they come with the optional UVR-50 SVP Remote. The UVR-50 SVP  

- has a total of 100 fields for storage. The UVR-50 SVP can be used with any VTR-5850C and VTR-5860C and is available for  

- the domestic market only.

**SVP-5600 and SVO-5800 S-VHS**

- When using Analog Digital Noise Reducer (ADNR) the non-drop frame of time code is preserved. Therefore, any  

- information such as time and date is preserved. This is especially true for the SVP-5600 and SVO-5800 which has a built-in  

- digital readout of time. Time code is usually 8-bits, but the SVP-5600 and SVO-5800 are equipped with  

- 12-bits of time code which is input to and output from the VTR. This is especially true when using SVP-5600 and SVO-5800 which has a  

- built-in 12-bits of time code which is input to and output from the VTR. This is especially true when using SVP-5600 and SVO-5800 which has a built-in  

- digital readout of time. Time code is usually 8-bits, but the SVP-5600 and SVO-5800 are equipped with 12-bits of time code which is input to and output from the VTR. This is especially true when using SVP-5600 and SVO-5800 which has a built-in  

- digital readout of time. Time code is usually 8-bits, but the SVP-5600 and SVO-5800 are equipped with 12-bits of time code which is input to and output from the VTR. This is especially true when using SVP-5600 and SVO-5800 which has a build-in  

- digital readout of time. Time code is usually 8-bits, but the SVP-5600 and SVO-5800 are equipped with 12-bits of time code which is input to and output from the VTR. This is especially true when using SVP-5600 and SVO-5800 which has a built-in  

- digital readout of time. Time code is usually 8-bits, but the SVP-5600 and SVO-5800 are equipped with 12-bits of time code which is input to and output from the VTR.
Application for Membership
Society of Motion Picture and Television Engineers
595 West Hartsdale Ave., White Plains, NY 10607
Phone: (914) 761-1100  Fax: (914) 761-3115

I wish to apply for SMPTE Membership. The grade I desire is:
☐ Active Member  ☐ Student Member
Dues: $80.00  Dues: $25.00
☐ Transfer in grade

Payment by (check one)  ☐ Visa  ☐ MasterCard  ☐ American Express  ☐ Check (Payable in U.S. Bank)
Card No. ___________________________  Exp. Date Mo.  ______  Yr. ______

Name. ___________________________ (First/Given)  M.I.  (Last/Family)
Mailing Address ___________________________  City ___________________________
State ______  Country ______  Zip Code/Postal Code ___________________________
Employer ___________________________  Title/Position ___________________________
Business Address ___________________________  City ___________________________
State ______  Country ______  Zip Code/Postal Code ___________________________
Date of Birth ___________________________

School Attending (students only) ___________________________  Date of Graduation ______

If elected to membership, I agree to be governed by the Society's Constitution and Bylaws as long as I am a member.

Dated _____________  Signed _____________

This form may be duplicated. Confidential. This form is for SMPTE records.

MAIL WITH PAYMENT OR CREDIT CARD NUMBER TO SMPTE MEMBERSHIP DEPT.
$20.00 of dues is allocated for a subscription to the SMPTE Journal and is non-deductible therefrom.

Requirements for Membership
A clearly defined interest in any phase of motion-picture and television imaging is the principal requirement for membership in the SMPTE.

SMPTE JOB CLASSIFICATION

Job Function
Please check the one category that best describes what you do.

01 ☐ Management
02 ☐ Engineering/Technical
03 ☐ Production
04 ☐ Post-Production
05 ☐ Consultant
06 ☐ Sales/Marketing
07 ☐ Educator
08 ☐ Other (specify) ______

Business Category
Please check the one category that best describes the company you work for.

09 ☐ TV Station/Network
10 ☐ Non-broadcast TV (cable, industrial, etc.)
11 ☐ Production Facility
12 ☐ Post-Production Facility
13 ☐ Manufacturer, Dealer, Distributer, Rental House
14 ☐ Educational Institution, Gov't., Research Facility
15 ☐ Satellites, Telecommunications
16 ☐ Computers, Multimedia
17 ☐ Other (specify) ______

"If you are interested in any phase of motion pictures, television, and advanced technology for motion imaging, there is a place for you in the Society of Motion Picture and Television Engineers."

238  Broadcast Engineering  March 1995
Lens
Fujinon
> S15X6.1ESM: studio production lens for 1/2-inch format 3-CCD cameras; features Aspheric Technology (AT) which provides control over spherical aberration and better overall optical performance than lenses employing only spherical lens elements; lens also features a built-in 2X extender that can be deployed via a remote demand unit or shot box; focal length is 6.1 to 91.5mm and zoom ratio is 15X; maximum aperture is F1.4 to 82mm and F1.6 at 91.5mm while the minimum object distance (MOD) is 0.75m.

Circle (2045) on Reply Card

Test and measurement instruments
Tektronix
> TekBench portfolio: more than 40 different basic test and measurement products; portfolio includes oscilloscopes, function generators, universal counters and counters/timers, bench-top multimeters, power supplies and measurement accessories; all instruments are compatible, fully integrated and have a uniform look and feel.

Circle (2046) on Reply Card

Stereo audio router
Dynair Electronics Inc.
> Series 36 stereo audio router: 36x36 audio switcher in 3 rack units featuring a high crosspoint density (864 crosspoints per RU); router uses Dynair's new proprietary integrated crosspoint circuit (ASIC); control features include actual switch closure and switch status verification from the crosspoint, external control through Ethernet, source preview-before-take, MS DOS-based system control software programs, and critical-function alarm system.

Circle (2047) on Reply Card

Catalog
B & H Photo-Video
> The Professional Video SourceBook (2nd edition): 446-page catalog featuring video products; catalog features cables, tapes, tripods, camcorders, editors, VCRs, night vision lenses, wireless microphones with space diversity reception and more; expanded audio section features professional grade mixers and CD players, DAT machines and high-performance microphones; catalog also features products for the computer-based video market such as Truevision's Targa 2000 ISA, TouchVision's Cineworks, and Fast's Video Machine Lite.

Circle (2048) on Reply Card

GPIB computer port option
Thurby Thandar Instruments (TTI)
> PIP-488: interface available from TTI for the Audio Precision Portable One Plus audio test set; complies with most recent IEEE-488 recommendations for programmability; enables the test set to be used for automated testing and computer-controlled monitoring; features a National Instruments LabWindows software driver to simplify program generation.

Circle (2049) on Reply Card

PROFESSIONAL SERVICES

CONSULTING ENGINEERS
2104 West Motts Ave.
Peoria, Illinois 61604
(309) 673-7511
FAX (309) 673-8128
Member AFCCE

JOHN H. BATTSOON P.E.
CONSULTING BROADCAST ENGINEER,
FCC APPLICATIONS AM, FM, TV, LPTV
Antenna Design, Proofs, Fieldwork
2684 State Route 60 RD #1
Londonville, OH 44434
419-394-3849

DANE E. ERICKSEN, P.E.
Box 280068
SAN FRANCISCO, CA 94128-0068
415/342-5200 Ph. 415/342-8482 Fax

BIGGER HALF MEDIA SYSTEMS INC.
CORPORATE AND COMMERCIAL VIDEO AND MULTI-MEDIA ENVIRONMENTS
DESIGN - INSTALLATION - CONSULTATION
TEL. (919) 489-5580 JOEL APPELBAUM PRESIDENT

NETCOM
STATE OF THE ART ENGINEERING FOR AUDIO AND VIDEO
ENGINEERING/DESIGN • CAD DRAFTING SERVICES
CABLE FABRICATION • PRE-WIRED PATCH PANEL RACKS
SYSTEM INSTALLATIONS • EQUIPMENT SALES
(201) 837-8424
1853 PALISADE AVE., TEANECK, NJ 07666

CHAND & ASSOCIATES
BUSINESS DEVELOPMENT • STRATEGIC MARKETING • PUBLIC RELATIONS
CURTIS J. CHAND
PRESIDENT
2212 HERITAGE WAY
FULLERTON, CA 92633
PHONE: (714) 578-4284
FAX: (714) 504-1357

PATCHPRINTS
VIDEO TIE LINES IN 1 2 3 4 Aux
Custom Patch Bay Labeling
PATCH BAY DESIGNATION COMPANY
P.O. Box 290270, Glendale, CA 91226
4742 Sun Fernando Road
Glendale, CA 91204
Telephone (818) 241-5555
FAX (818) 507-5506

March 1995  Broadcast Engineering  239
Special prices on Ikegami Ikegami HL-Sony Fiber Systems TDR's, Power Meters, Spectrum Analyzers, Frequency Counters CAMERAS
FOR Used COPAPU JNsN Test Equipment. Guaranteed to meet/exceed manufacturers specs. 90 Digital BVP BVP Phone (407) 747-9647 -Linear PROUD
ownik 715 KSP 347-3170 747-9647 HP, 747-3647 TEST EQUIPMENT Grass Valley SPECIAL Tektronix Video SWITCHERS
FOR Sony BVP-7-9,500 Sony BVP-50-7,500 Sony BVP-5-5,000 Ikegami HL-55-18,000 Ikegami HC-540-6,500 Non-Linear Special prices on Avid, Lightworks, and Digital Magic.

BROADCAST STORE
BUY CONSIGN SELL SERVICE & TRADE

CAMERAS
Sony BVP-7-9,500 Sony BVP-50-7,500 Sony BVP-5-5,000 Ikegami HL-55-18,000 Ikegami HC-540-6,500 Special EFFECTS Video Toaster-2,500 Sony PXE-100 Call Ampex ADO-100-17,500 TEST EQUIPMENT Leader LBO-5860-A-1,400 Tektronix 1420-1,200 Tektronix 528-1,100 MONITORS Sony PVM-1220-750 JVC-TM-13-U-325

BROADCAST ENGINEERING
Test & Maintenance

- Cables/Connectors - Tools/Tool Kits - Cases/Shipping Containers - Test Equipment ... and more!

Make one call for quality products from many major manufacturers. Working on site? Need just-in-time delivery? Your satisfaction is guaranteed. Request your free catalog today.

800-426-1194

FREE Catalog
JENSEN 7815 S 46th St, Phoenix, AZ 85044 602-968-6231 FAX: 800-366-9662

Circle (251) on Reply Card

New to our warehouse.

JVC S-VHS EDIT SYSTEM BR-S811U S-VHS Edit/Rec. BR-S611U S-VHS VTR, & RM-G810U Edit controller. $4,700

PANASONIC S-VHS CAMERA WV-F250B Cam w/ Fujifilm S127x7.5 BOMAG AG 7450 S-VHS, AG-B600 AC Adapt. AG-B745 Batt Chgr w/3 batt., and Bogen 3068 head w/ tripod and spreader $6,500

SONY BVX-10 Component Color Corrector with BVR-58 remote $2,500

VINTEN Vision-20 with 4-stage tripod $3,200

MCOR VIDEO EQUIPMENT CHICAGO 312 334 4300

KurlyTie Spring Coil Cable Wraps FREE SAMPLE! DIAL 1-800-587-5984 The Kurly Tie Company 3580 Morse Dr. Stone Park, IL 60165 Use Pocket Tool converts VHS decks to S-VHS

Did you know...

Broadcast Engineering now reaches 32,000 television-only professionals who make decisions? They specify, recommend and buy your products and services.

Be sure they see your ad message in the industry's leading publication. Call Renée Hambleton at 913-967-1732 or fax your ad to 913-967-1735 today. We make it easy!
Sony Interface for your VPR-2 or BVH-1100

- Convert Sony serial to parallel control.
- Complete editing capability.
- RS-422 Interface for editon and automation.
- Controls ATR's and VCR's.

Phantom II VTR Emulator

For INFORMATION
Call 1-800-331-9066

THE 6X GPI MATRIX

- 6 GPI's: 24 Devices
- Gold State Relays
- One Rack Unit High
- Easy to Gang

OEI ELECTRONIC SYSTEMS INC.  908-735-0543

Circle (250) on Reply Card

HAVE CABLES ASSMELED  BULK  CUSTOM

HAVE PROFLEX

Belden

WEST PENN WIRE
MOGAMI

FREE CATALOG of Audio/Video Tape, Cable, Equipment, Accessories, Supplies

518/828-2000
309 POWER AVE, HUDSON, NEW YORK 12534

Circle (254) on Reply Card

EDUCATIONAL TRAINING

BETACAM

WORLD'S MOST COMPLETE TRAINING CLASSES

• YOUR PLACE OR OURS
• LEARN FIELD TRICKS, SHORTCUTS, THEORY AND PRACTICE
• LANDS OF "HANDS ON"

TENTEN® CORP.
4475 GOLDEN FOOTHILL PKWY.
EL DORADO HILLS, CA 95762
(916) 939-4093 / 800-538-8894

Circle (253) on Reply Card

Adolph Gasser, Inc.

VTR, 1" Sony BVH-1100A
TBC Sony BVT-2000
Production Switcher
Grass Valley, 1600-1X

- Cables, Manuals, Extender Boards included for each of the above.
- All equipment in good operating condition.
- Package deal or will sell individually.
- Available for inspection & check-out on the premises.

CALL FOR DETAILS AND PRICING!
ADOLPH GASSER, INC.
P.O. BOX 429420
SAN FRANCISCO, CA 94142
(800) 994-2773 Ext. 158

For Ms. Hulme or C.B.

Machine Control Patching System
RS-422 NORMALLN PATCHING

Machine Control Patching System

Circle (255) on Reply Card

STUDIO EXCHANGE  BURBANK
(818) 840-1351 • FAX (818) 840-1354

NEW & USED VIDEO EQUIPMENT
BUY, SELL, CONSIGN; 25 YRS EXP

WANTED

Medical - Manufacturer Representatives
For line of medical and test equipment
Exclusive territories available for direct sales in broadcast and video production industry.
Contact: ComSonics, Inc. Randy Estep
Ph: 800-336-9681 / Fax 703-434-9847

WANTED

USED VIDEO EQUIPMENT
Systems or components. PRO VIDEO & FILM EQUIPMENT GROUP: the largest used equipment dealer in the U.S.A. (213)986-0011.

WANTED: Hitachi FP605 studio cameras, lenses, CCU, cables, extenders, any parts, any condition. (818) 556-5030.

FCC GENERAL LICENSE. Cassette recorded lessons for home study. Our 30th year preparing radio technicians for the license. Bob Johnson Telecommunications Phone (310) 379-461

March 1995 Broadcast Engineering 241
Monitor Service Center

Varitek specializes in high resolution broadcast video monitors. Digital or analog. In all formats NTSC, PAL, SECAM.

IKEGAMI, SONY, HITACHI, MITSUBISHI
JVC, PANASONIC, CONRAC, NEC
BARCO, TEKTRONIX, And More...

We at Varitek have been providing quality service to our clients throughout United States since 1982.

(800) 346-4380 Ext. (16)

VARITEK
415 W. Taft Ave., Orange, CA

Circle (257) on Reply Card

WE PLACE
(Technical Engineers-Post Production Editors & Colorists)

- All Levels, Locations, & Disciplines
- Employer Paid Fees
- Guaranteed Confidential
- 15 Years Service
- FAX and/or Mail your Resume to Mike Kelly

KEYSTONE INT'L, INC.
16 Laffin Road
Pittston, PA 16640

Fax 717-654-5765 • Phone 717-655-7143

KCCN-TV
CENTRAL COAST NEWS

TRANSMITTER/STUDIO ENGINEER

Full time position. Experience with television transmitters, preferably UHF. Experience with Beta SP, GVG, Sony 3/4 inch. SBE certification or FCC preferred.

MAINTENANCE ENGINEER

Full time position. Some transmitter experience would be preferred. We have 3/4 inch Sony, Beta SP and a GVG 300 switcher. SBE certification a plus.

Send Resume to:
Personnel Department,
KCCN-TV, 2200 Garden Road
Monterey, CA 93940.

No phone calls accepted.

KCCN-TV is an equal employment opportunity employer and does not discriminate on the basis of race, color, religion, national origin, sex, age or other factors prohibited by law.

Classified Advertising

Advertising rates in Broadcast Engineering Classified Section are $119.00 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 $1.75 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 $40.00. Reader Service Numbers are available for $50.00 per insertion. Ads 4 inches or larger receive a Reader Service Number free.

Spot color, determined by Broadcast Engineering, is available at $95.00 per insertion.

No agency discounts are allowed for classified advertising.

Call Renée Hambleton at 913-967-1732 to reserve your classified ad!

WOLF COACH

BROADCAST SYSTEMS ENGINEERS

We are seeking broadcast professionals to join our expanding systems division. Full time salaried positions in our New England office. Expected qualifications include extensive experience in the design, implementation and test of television broadcast systems. Candidates must be adept at AutoCad drafting, systems design, operation of traditional test equipment, and be well versed in current broadcast equipment. Experience with satellite and terrestrial microwave systems, in addition to broadcast television and audio is desired. High quality standards a must.

Send resume and salary history. Written responses only.

Wolf Coach, Inc.
7 B Street
Auburn, MA 01501
FAX 508-799-2384

MAINTENANCE TECHNICIAN WABU-TV, Boston, the engineering department is seeking an individual with five plus years of experience to act as a bench technician. Responsibilities include component level repair and operation of Sony Beta tape machines, Betacam and broadcast studio equipment. Assist in transmitter maintenance, and emergency response. Knowledge of analog and digital technology, computer programming experience a plus, and limited RF experience related to microwave and broadcast transmitters. FCC general class license required, SBE certificate preferred. Please send resume and salary history to Kathryn Barnicle, Manager of Human Relations, 1660 Soldiers Field Road, Boston, MA 02135. An equal opportunity employer.

242 Broadcast Engineering March 1995
APLICATIONS ENGINEER (SAN DIEGO)

General Instrument is the pioneer and recognized world leader in the ongoing development of high-definition television. In response to the increasing demand for our technology, we have an opportunity for an Applications Engineer on our business development team.

You will develop customer-specific system overviews and provide support in the following areas: development team, new business development, proposal generation, and tradeshows.

Requires a BS/BA, understanding of competitive system configurations, strong technical background (satellite or cable industry related), strong presentation skills, good interpersonal skills and ability to work in a team atmosphere. Technical sales experience is a plus.

Send your resume with salary history/requirements to: General Instrument, HR Dept., CODE JOKBE, 6202 Lusk Blvd., San Diego, CA 92121. EOE.

GI General Instrument

STUDIO MAINTENANCE ENGINEER Prefer five years experience in installation, testing and maintenance of TV broadcast related equipment. Must have computer knowledge a plus. Resumes to: Capitol Broadcasting Company, WEAL-TV, P.O. Box 12,800, Raleigh, NC 27606. Attn: Human Resources

SENIOR VIDEO ENGINEER Medium sized video production company looking for Sr. Video Engineer familiar with systems, maintenance for both production & post equipment and live video operations. Send resumes to E. Zalk at Com-Tech, 570 Lexington Ave., NY NY 10021 or Fax 212-688-4264.

QUANTEL PRODUCT APPLICATION ENGINEERING QuanTel is seeking Engineers for its Product Support Department based in Connecticut. It is preferable that the successful candidate have engineering experience in the Broadcast and Post Production industry. Please forward resume and salary history to Vice President Product Support, QuanTel, 85 Old Kings Highway North, Darien, CT 06820.

MAINTENANCE TECHNICIAN Immediate opening for an experienced technician at an ABC affiliate. Must have a minimum of five years experience in TV broadcast maintenance, including systems troubleshooting and repair of studio video and audio equipment, digital equipment, television systems, Electronic News Gathering equipment, video and audio recording equipment. FCC General Class License or SBE Certification desirable. Send resume to Human Resource Department, KOMO TV, 100 Fourth Ave N, Seattle WA 98109. No phone calls please. KOMO is an EOE. Women and minorities are encouraged to apply.

MAINTENANCE ENGINEER Immediate opening for Broadcast Maintenance Engineer in desirable Pacific Northwest area. Applicants should have a minimum of four years experience in daily maintenance of video, audio and digital broadcast devices. Strong emphasis placed on communicative and team skills. Must be CDL licensable. Send cover letter, resume and salary requirements to Tim Anderson, Chief Engineer, KXLV TV, 500 W. Boone Ave., Spokane, WA 99201 or fax to: (509) 328-3214. No phone calls please. KXLV is an Equal Opportunity Employer.

GO WHERE NO ONE HAS GONE BEFORE.

DIRECTV, the nation's premier direct broadcast satellite service, delivers 150 channels to American homes that are equipped with the DBS™ home receiving unit, which features an 18-inch satellite dish. We are seeking the following professionals for our state-of-the-art, 24-hour a day broadcasting facility near Castle Rock, CO.

SPORTS CENTRAL SUPERVISOR

Will supervise on-air broadcast and sports operations activity. Desired qualifications include a 2-year college degree, technical training (or equivalent); 6+ years experience at TV station, cable master control operation, TV network operation (or equivalent); and experience with TV coverage formats of various sports.

BROADCAST OPERATIONS SHIFT SUPERVISOR

Will supervise on-air activity within the broadcast center. Desired qualifications include a 2-year college degree, technical training or equivalent work experience and 6+ years experience at major station, cable master control operation, TV network operation (or equivalent).

Both positions will be responsible for resolving all major broadcast and plant related problems, directing operating personnel, implementing procedures, providing feedback to employees and communication to upper management regarding operations. Both positions require computer literacy, experience supervising TV broadcast and satellite operations personnel, knowledge of broadcast automation systems, digital and analog broadcast signals, fiber and satellite receive/ transmit systems, quality measurement devices. Excellent vision (including color perception) and hearing essential. Must be willing to work all shifts, including early morning, late night and/or weekends.

DIRECTV offers an exciting compensation and flexible benefits package, along with a rare opportunity to make a major impact in a developing industry. For immediate consideration, please send your resume with salary history to: DIRECTV, Inc., Attn: Employment-DJ, 5454 Gardon Rd., Castle Rock, CO 80104, Fax (303) 660-7199.

An Equal Opportunity/Affirmative Action Employer. We foster a culturally diverse workforce and strongly encourage women and minorities to apply for this position.

March 1995 Broadcast Engineering 243
TRANSMITTER ENGINEER WPWR-TV has an immediate opening for an experienced transmitter engineer to maintain primary UHF transmitter, station STL, and other microwave equipment. This position requires a minimum 5 years experience maintaining high power UHF transmitters. FCC General Class license required. Knowledge of analog and digital equipment very beneficial. Must work evenings, nights and weekends. Send resume to Christine Young at the address below.

FIELD DIRECTOR: WPWR-TV is seeking a Field Director to manage communications, video and audio equipment for all remote broadcasts. Must have a minimum of 3 years experience. A college degree in Communications or Audio-Visual Field is desirable. Must be able to work independently and in a team environment. Must have a valid driver's license. Must be able to obtain FCC Class A license. Send resume to: WPWR-TV, PO. Box 1419, EVANSVILLE, IN. 47701. All replies confidential. EOE.

ENGINEER/PRODUCTION: WPWR-TV is seeking an experienced Engineer/Producer to handle all aspects of production. Knowledge of audio and video equipment is essential. Must be able to multi-task and work independently. Experience in television production required. Computer skills very helpful. Send resume to WPWR-TV, PO. Box 1419, EVANSVILLE, IN. 47701. All replies confidential. EOE.

MAINTENANCE ENGINEER: WPWR-TV is seeking an experienced Maintenance Engineer to maintain all equipment and facilities. Experience in all facets of facility maintenance required. Must be able to work independently and in a team environment. A college degree in Communications or Audio-Visual Field is desirable. Must be able to obtain FCC Class A license. Send resume to WPWR-TV, PO. Box 1419, EVANSVILLE, IN. 47701. All replies confidential. EOE.

SONY BROADCAST BUSINESS AND PROFESSIONAL GROUP

Sony Broadcast Business and Professional Group has several opportunities for Broadcast Professionals in the following areas.

Field Engineers

Engineering Specialists - Depot Engineers
(San Jose and Cypress, CA; Chicago, IL; Teaneck, NJ; Norcross, GA; and Irving, TX)

We have openings for Engineers with a background in installation, service, and troubleshooting. Positions are available for full-time and temporary positions. Candidates must have experience with audio-visual and telecommunications equipment. An AA degree in Electronics or equivalent and 3+ years experience are necessary. Positions will be filled on a first-come, first-served basis. Send resume and salary requirements, along with portfolio, to: Catherine Borders at the address below.

Sr. Video Systems Design Engineers

Contract/Temporary

We're looking for very seasoned Engineers to start immediately and work on designing large scale digital audio and video facilities. Candidates must have strong system level design engineering, technical problem solving, team building and communication skills. Responsibilities will include the design of floor plans, equipment rack elevation layouts, and detailed signal flow and communication diagrams. Fluency in Microsoft Excel and Windows is required: AutoCad, MS Word and MS Access software knowledge a plus. The ability to work with multiple facilities and expansion and training will also be key.

These contracts positions require 5+ years professional experience in the design, operation, maintenance and testing of large scale state-of-the-art audio and video systems. Responsibilities will include the design of floor plans, equipment rack elevation layouts, and detailed signal flow and communication diagrams. Fluency in Microsoft Excel and Windows is required: AutoCad, MS Word and MS Access software knowledge a plus. The ability to work with multiple facilities and expansion and training will also be key.

These contracts positions require 5+ years professional experience in the design, operation, maintenance and testing of large scale state-of-the-art audio and video systems. Responsibilities will include the design of floor plans, equipment rack elevation layouts, and detailed signal flow and communication diagrams. Fluency in Microsoft Excel and Windows is required: AutoCad, MS Word and MS Access software knowledge a plus. The ability to work with multiple facilities and expansion and training will also be key.

SATELLITE ENGINEER The Disney Channel, strong background in Telecine Engineering Department. This position requires knowledge of digital & analog equipment; component level, and trouble-shooting. Send resume to: The Disney Channel, 1141 Vine Street, Los Angeles, CA 90036. Attention: Catherine Borders at the address below. No phone calls.

MAINTENANCE ENGINEER Top broadcast/production facility based in New York City seeks full-time staff Maintenance Engineer. Experience with Ikegami studio monitors, Betacam, Sony tape machines and good bench skills. Several years experience in maintaining component level repair required. Knowledge of component level electronics advantageous. Send resume with references and salary requirements to: Broadcast Engineering, Dept. 754, 9800 Metcalf, Overland Park, KS 66212-2215.

WFIE-TV STAFF ENGINEER Variety of technical & mechanical skills requested knowledge of digital & analog equipment; component level, and trouble-shooting. Broadcast experience helpful. Send resume to: WFIE-TV, PO. Box 1414, Evansville, IN 47701. All replies confidential. EOE.

MAINTENANCE ENGINEER FCC General Class license required. Must have 3 years experience trouble-shooting component level in RF, video and audio equipment. Experience in maintaining digital & microprocessor based equipment required. SBE certification desirable. Resume and salary requirements to: Emerson Chancellor, WFHT-TV, P.O. Box 25, Evansville, IN 47701. Fax 502-826-6823, EOE, M/F.

ENGINEER/SUPERVISOR Editel Chicago is looking for a Master Engineer for our Engineering Post Production Department. Experience in digital and analog switching & effects equipment desired. Computer skills very helpful. Send resume to: Editel Chicago, 301 E. Erie, Chicago, IL 60611. Attn: John Stevens. No phone calls please.

Chief Engineer KETA-TV, Oklahoma City is seeking a hands-on leader with a strong maintenance background. Supervisory and organizational skills will be essential in guiding our technical team in planning and implementing projects. Please send your resume and salary history to the Personnel Department, Oklahoma Educational Television, 501 S. Washington, P.O. Box 14190, Oklahoma City, Oklahoma 73113. AA/EOE.

BROADCAST EIC/MAINTENANCE ENGINEER Description: Turner Broadcasting is seeking an experienced maintenance engineer to work in our Field Shop. Maintenance requires troubleshooting and repair to component level on all Mobile Unit related equipment. Responsibilities include: maintaining equipment; training and supervising entry level Maintenance Engineer and also providing engineering support as a team member. This position requires an EIC with complete responsibility for all technical aspects of remote technical support. This includes coordinating engineering based issues, major troubleshooting, and repair required. Qualifications: Five years experience as a Remote EIC and/or Maintenance Engineer. Must be experienced in on-field troubleshooting. Completion of 25+ classes in the School of Broadcast Engineering is desirable. Some college degree is helpful. Customer interface skills a must. Salary competitive. Send resume and salary requirements to: Turner Broadcasting System, 501 S. Washington, P.O. Box 14190, Oklahoma City, Oklahoma 73113. AA/EOE.

ATLANTA, ASST...CHIEF ENGINEER: Trinity Broadcasting is seeking a qualified Engineer with SBE certification or FCC General Class license, or 2 years of studio experience, UHF, RF familiarity a big plus. Submit resumes and salary requirements to: Chief Engineer, WHSG TV/WS/63, 1550 Agape Way, Decatur, GA 30035. M/FEOE.

ENGINEER, SNG ENGINEER, AND ENGINEERING TECHNICIAN: Experience required. Send application to: KSTW-TV, PO Box 11411, Tacoma, WA, 98411. Telephone number 206-572-5789 EOE.

ENGINEER - Questel, a leader in Digital Broadcast Engineering seeks a Broadcast Engineer for a Field Services position. Experience working for a Field Services Engineer is a must. Knowledge of microwave and satellite equipment is desirable. A college degree in Electrical Engineering or related field is required. A strong background in trouble shooting and repair required. Send resume to the following address:

Chief Engineer/Maintenance Engineer combination for full broadcast station. UHF experience a must. KNAT-TV 23, 1510 Coors Rd NW, Albuquerque, NM 87121. EOE.
WHEN THE ICE CAME,

OUR PiRod TOWER DIDN'T EVEN SHIVER.

"With more than two feet of ice at the antenna of our 1,000-foot PiRod tower, and guy wire ice eight inches in diameter, our tower bent like a banana. I recall my engineer saying that the tower wouldn't last five more minutes. But our solid rod PiRod tower stood there and straightened as the ice melted. No damage. No stress fractures. No problems. I guess that's when the quality of a solid rod PiRod tower comes through."

Solid Rod, Solid Service, Solid Value

Gave Turner
WMCC TV, Channel 23
Indianapolis, Indiana

For a free guide to tower selection and fast, courteous response to your requests for quotation, contact:

PiRod INC.
P.O. Box 128
Plymouth, Indiana 46563-0128
Telephone (219) 936-4221
You Only Have A Few Seconds To Make A Lasting Impression.

LogoMotion™ Makes Every Frame Count.

LINEAR KEYING
LogoMotion™ features a high quality linear keyer giving transparency and soft edges to your logos.

ANIMATED LOGOS
LogoMotion™ real-time playback capability can be used to display animated logos.

MULTIPLE LOGO STORAGE CAPACITY
LogoMotion™ stores up to 50 individual logos allowing you to tailor your logo for specific programs.

Now you can bring on-air logos to life. LogoMotion™ is the first logo generator to store and playback animated logos, opening up a new world of creative options for on-screen presentation. With LogoMotion™ logos make a lasting impression.

LogoMotion™ combines a comprehensive range of features in a simple, easy-to-use package. New solid-state technology allows static and animated logos to be recorded directly from a video signal. LogoMotion™ stores any combination of up to 50 static and animated logos totalling up to 13.4* seconds. Logos may be positioned anywhere on screen, repeated on timelines or looped to other logo sequences to create stunning effects. LogoMotion™

integral keyer allows transparency and fade rates to be controlled separately, giving you the flexibility to tailor the "look" of your logo to the program material. The possibilities are endless!

Whether a station "bug," apology caption, sponsorship message, rating warning, program animation, or public announcement, LogoMotion™ is the ideal tool for the job. What's more -- it's simple to use and is a great value!

LogoMotion™ is loaded with sophisticated features that can add life to any program. Call Leitch today and find out how LogoMotion™ can make a lasting impression for your station.

Leitch Incorporated, 320 Corporate Lane, Chesapeake, VA 23320, U.S.A. - Tel: (800) 231-9673 or (804) 548-2300 FAX: (804) 548-4098

Leitch Technology International, Inc., 25 Dyas Road, North York, ON, Canada M3B 1X7 - Tel: (800) 387-0233 or (416) 445-9640 FAX: (416) 445-0595

Leitch Europe Limited, 24 Campbell Court, Breamley, Basingstoke, Hants, U.K. RG26 1EG - Tel: +44 (0) 1256 880845 FAX: +44 (0) 1256 880428

*NTSC only, PAL and Digital sources only

See us at NAB ’95, Booth #15748