

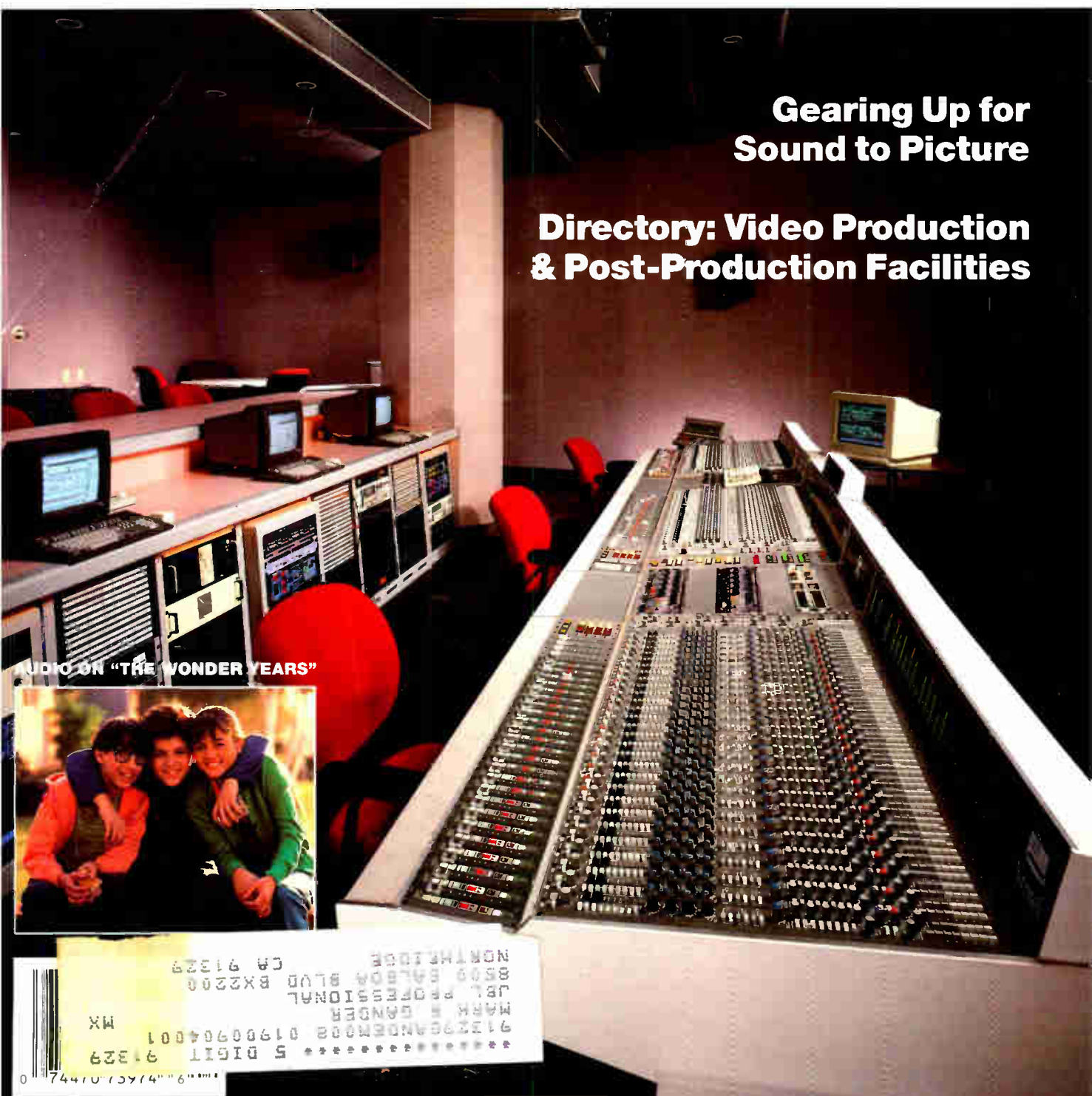
MIX

Timing Is Everything: Issues in Synchronization

Remote Recording and Fiber Optics

Gearing Up for Sound to Picture

Directory: Video Production & Post-Production Facilities



AUDIO ON "THE WONDER YEARS"



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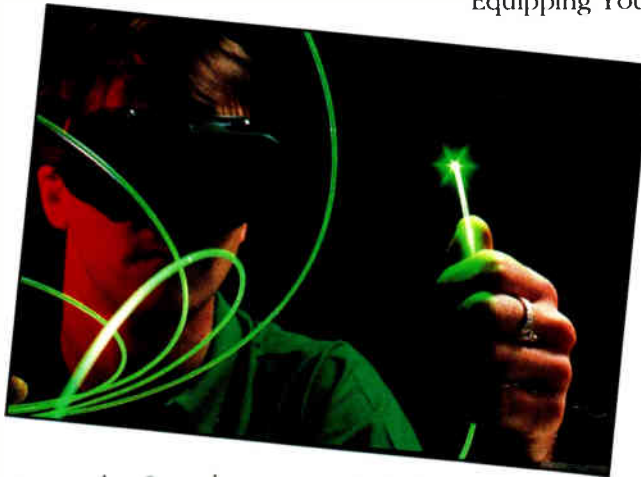
MIX

PROFESSIONAL RECORDING • SOUND AND MUSIC PRODUCTION

APRIL 1991, VOLUME 15, NUMBER 4

AUDIO

- 15 Insider Audio:** More on Philips' DCC Format
by Ken Pohlmann
- 23 The Fast Lane:** Column 35 *by Stephen St. Croix*
- 80 Sound Effects Libraries on CD**
by George Petersen
- 88 Fiber Optics:**
Lighting the Way to
New Dimensions in
Remote/Location
Audio Recording
by Bob Paulson
- 96 International
Update:**
News From
Around the
World
- 100 Studio View:** Hands Across the Console
by Dan Daley
- 103 Artist's Studio:** Trevor Horn Takes His Studio
on the Road *by Iain Blair*
- 124 Music & Recording Notes:**
Three Tenors in Concert *by Paul Tingen*



PAGE 88



PAGE 103

POST-PRODUCTION

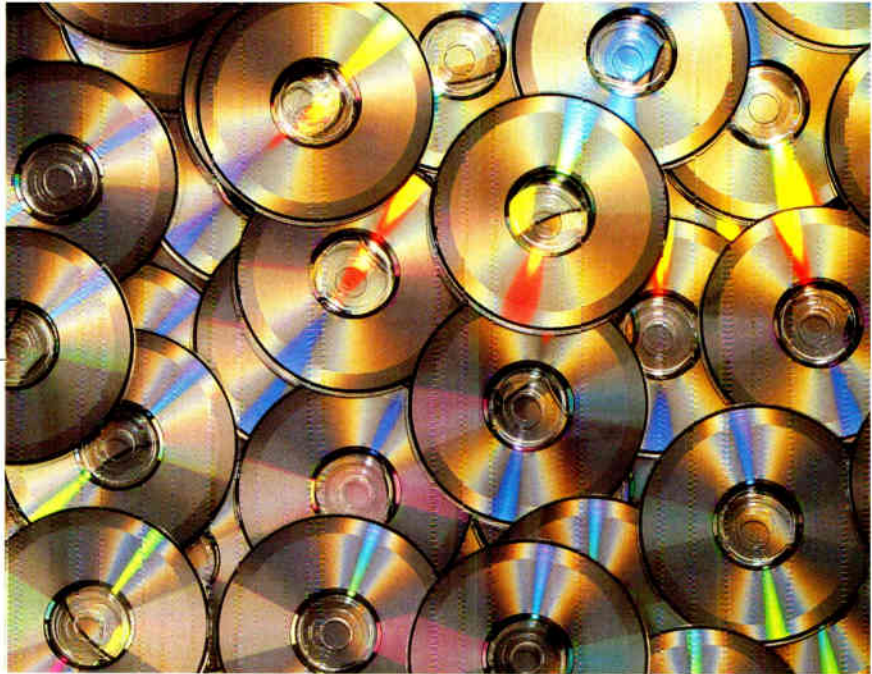
- 29 Juxtapositions:** Stereo & Surround Sound
Advances—Feedback from the Post Industry
by Mel Lambert
- 36 Audio for "The Wonder Years"** *by Amy Ziffer*
- 44 Post-Script:** Gearing Up for Sound-to-Picture—
Equipping Your Facility *by Peter Caranicas*
- 55 Post Notes/Post
Briefs**
- 56 The Byte Beat:
Issues in
Synchronization**
* Timing is Everything
by Paul Potyten
* In Search of the
Unified Time Base
by Mark Miller
* Synchronization and
Machine Control
by Gerry Block

PRODUCTS

- 110 Preview/Hot Off the Shelf**
- 115 Auditions:** Summit EQF-100
Tube Equalizer;
"Jingles—How to Write,
Produce & Sell Commercial
Music"; Popless Voice
Screens *by George Petersen*
- 119 Field Test:**
Tannoy System 10
DMT Reference Monitors
by Guy Defazio

PAGE 131





PAGE 80

LIVE SOUND

- 131 **Harlem's Apollo Theatre:**
Changing with the Times
by David (Rudy) Trubitt
- 138 **Soundcheck/News Flashes**
- 142 **New Sound Reinforcement Products**

TAPE & DISC

- 148 **Digital Cable Audio:**
Opportunity or Threat for the Record Industry?
by Philip De Lancie
- 149 **Tape & Disc News/Splices**



PAGE 70

MUSIC

- 70 **Lunching with Bonzai:**
Composer/Musician Mark Isham *by Mr. Bonzai*
- 144 **M.I. Update:**
Product Hits from NAMM
by Craig Anderton

PAGE 144



DEPARTMENTS

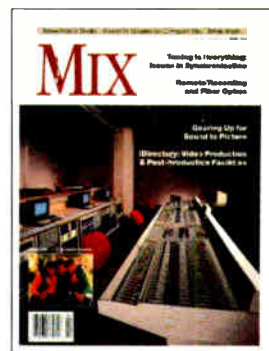
- 6 **From the Editor**
- 9 **Current**
- 10 **Industry Notes**
- 158 **Coast to Coast:** Video Facility News;
Sessions & Studio News;
L.A. Grapevine;
N.Y. Metro Report,
SPARS Beat
- 168 **Ad Index**
- 186 **Classifieds**
- 192 **Feedback**

Cover: Pacific Sound Services (a Laser-Pacific company) is an all-new, all-digital, full-service facility located in Hollywood, providing sound post-production services to the motion picture and television industry. Re-recording Studio C features an 84-input Neotek mixing console with Diskmix automation. Three WaveFrame CyberFrame sound editing system displays are shown on top of the credenza, with the remainder of the CyberFrame system located in a separate area.

Photo: Randy Fugate.

DIRECTORY

- 167 **Video Production and Post-Production Facilities**



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What do you really need in a digital audio hard disk system? Simple operation, total creative control, a high level of recording and editing power, and lower cost?

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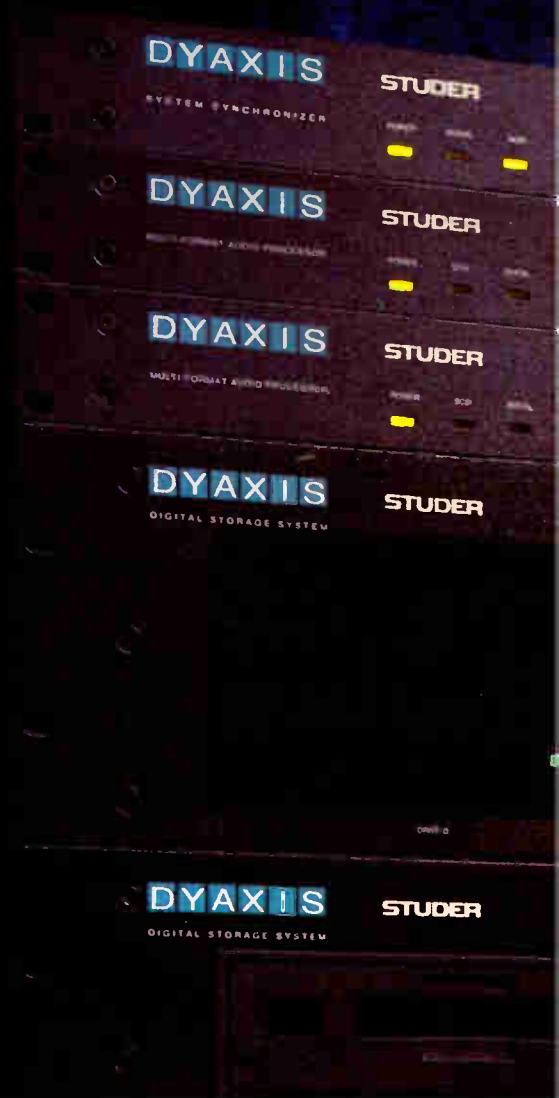
The New Dyaxis 2+2. Building upon the original Dyaxis' overwhelming and continuing success, Dyaxis 2+2 is now providing 4-channel simultaneous playback and many new advanced features, such as overdub, multi-take record and programmable in/out, making it the ideal tool for production and post facilities where multichannel applications are required. (Original Dyaxis owners can upgrade!)

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FROM THE EDITOR

It was sad to hear of the recent closing of the Record Plant in L.A. With all those years as one of the premier names in the recording biz, the venerable studio operation seemed to be here to stay. It appeared, as with the Sonys, Ampexes and Studers of the world, to live forever: here when we started, here after we've gone.

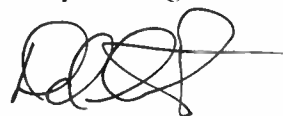
It brings to mind the passing of other recording icons—Wally Heider's in California, RCA Nashville and New York's Media Sound—places that at one time displayed qualities of immortality. And we can't help but wonder if the business is in trouble when the great ones close their doors, if music's heyday has really come and gone.

For every major studio that closes, though, it seems five more spring up—not necessarily five world-class rooms, but studios with the growing power perhaps to be the *next* Record Plant, or Abbey Road, or (your name here). Studios powered by the imagination and resourcefulness of entrepreneurial music lovers with a vision continue to open, whether or not the economic climate favors new business.

In tough economic times it is hard to rationalize the building of anything so capital-intensive or so monetarily risky as a recording studio. Investors rarely return phone calls at times like these. But those who've built great studios over the years learned not to abandon the vision in the face of tough times. They've pulled in their belts, tested their resourcefulness and planned out their dreams. They've hung in there, taking advantage of opportunities that are always present. One seller's slow business day is another buyer's chance to find a bargain.

Looking back on the great studios of our times, we must remind ourselves that things are always changing and that nothing lasts forever. Studios like the Record Plant aren't to be mourned, they're to be remembered. They made history.

Keep reading,



David Schwartz
Editor-in-Chief

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The Saul Zaentz Company Film Center has just completed a major expansion featuring Otari's *Premiere* film post-production console for dub stage 2.

The *Premiere* is the result of extensive collaboration between The Saul Zaentz Company and Otari, and was designed to meet the needs of the Center's new dubbing stage.

The *Premiere* was designed and built especially for film mixing, and is configured for easy operation by one to three Sound Mixers. In addition to

Otari's *Virtual Monitor System*, the *Premiere* features the new DISKMIX 3 Film Moving Faders automation system, providing fader level, mute, and switch automation on each input. This system, while using SMPTE internally, displays cinematic increments of feet and frames, allowing the sound mixer to easily work directly from a film cue sheet or edit decision list.

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World Radio History

CURRENT

NAB and DAB

The emphasis seems to have shifted in the ongoing maneuvering over the adoption of a national digital audio broadcast policy. Over the last six months, the National Association of Broadcasters has urged the Federal Communications Commission to reject proposals for satellite-based systems in favor of land-based systems, in an effort to maintain the concept of localism and establish free service.

Now the hot issue is copyright fees. In December 1990, the NAB said, "It would be premature for the Library of Congress Copyright Office to recommend to Congress the adoption of any home-taping fees or any other restrictions on DAB." Instead, the NAB suggested the adoption of copy-code technology, as long as the copy-code system would not require broadcasters to transmit a digital subcode in prerecorded works.

The NAB recommendation is in response to the Recording Industry Association of America proposals for limiting the number of cuts that could be aired from an album and requiring digital subcodes on music broadcasts. (See "Tape & Disc," page 148.)

In February, the NAB confronted the RIAA head-on in a press release criticizing the "dubious proposals" from the recording industry for new copyright fees. The RIAA is arguing from a financial position that DAB and home taping would cut into prerecorded format sales.

The RIAA and NAB positions on digital audio broadcasting will eventually be resolved by lawmakers in Washington, D.C. In the meantime, you can count on it being a hot topic of conversation at this month's NAB convention in Las Vegas, where the NAB has scheduled free demonstrations of a CD-quality, interference-free radio service called DAB.

Every half-hour during convention week, April 14-18, a 40-passenger coach bus will tour Las Vegas as

part of a mobile demonstration of DAB. Passengers will be equipped with headphones to hear a comparison of FM and DAB broadcasts. The DAB broadcasts will be offered in seven different radio formats, as well as an eighth audio feed from Las Vegas station KLUC AM/FM. An operating DAB receiver will be on display in the east hall of the convention center.

Dolby's New Digital Film Sound Format

Dolby Laboratories of San Francisco is completing the development of SR•D, a new 35mm release format that provides both 6-track digital and standard left-center-right-surround optical stereo sound on the same print. Since the new digital soundtrack does not affect the picture or normal analog soundtrack areas of the film, Dolby SR•D 35mm prints will be playable in any theater; therefore, double inventory or backup prints will not be required. To play the new soundtrack, most of the 16,000 Dolby Stereo-equipped theaters worldwide need only add a scanning adapter and digital decoder to interface with the existing Dolby Stereo processor.

The major attraction of the SR•D system is the provision for 6-channel stereo (LCR, subwoofer and stereo surround) in the 35mm format—the same as today's 70mm magnetic releases, but without the high cost. Another advantage is the automatic switching to the analog soundtrack, in case of any problems with the digital system. Initial demonstrations of the system are planned for this spring, with commercially available theater systems and prints ready by this time next year.

TEC Awards Site Announced

The 1991 Technical Excellence & Creativity Awards will be held Saturday, October 5, at the Grand Hyatt

Hotel in New York City, according to Karen Dunn, TEC Awards executive director. Located at Park Avenue and 42nd Street, the hotel will afford an easy commute for AES convention attendees.

"We are expecting a record turnout," Dunn says, "and the Grand Hyatt ballroom has enough room so that everyone will have a good table, and no one will be turned away."

For information about the TEC Awards or tickets, call (415) 562-7519.

Consolidation Updates

Neve and AMS have begun administrative moves following last September's acquisition of AMS by the Siemens Audio/Video Group (which also owns Neve). AMS has relocated corporate offices from Petaluma, Calif., to Bethel, Conn., and AMS sales/service is now located in the Neve Los Angeles, New York and Bethel offices. A Chicago sales/service office is now being established with Doug Ordon as AMS sales manager.

John Gluck has been appointed president of AMS North America and has relocated from AMS UK to the Neve offices in Connecticut. Graham Murray, AMS technical services manager, and Stuart Hirotsu, product support engineer, have also moved east from the Petaluma offices.

BASF Audio Video Professional Products has announced the restructuring of its staff and product line in the U.S. following the acquisition of Agfa Magnetic Tape Division.

The new BASF will retain all products for duplication and studio recording from the BASF and Agfa product lines. All products will be manufactured in the same factories, by the same production teams. Agfa audio mastering tape will continue to be offered under the BASF name, featuring the same packaging, flanges and formulation as before. BASF is investing \$5 million in the expan-

INDUSTRY NOTES

Spring quarter recording engineering courses begin this month at the **UCLA Extension**; titles include "A Lifetime in the Recording Studio; Bruce Swedien's Sound of Music," "From Fixer to Mixer: Recording Studio Maintenance," "Recording Engineering Practice II," "Studio Workshop in Digital Audio Systems" and "Record Production II: A Studio Workshop for the Producer/Engineer." For more information, call the Extension at (213) 825-9064 ...Professor **Lowell Cross** of the **University of Iowa** may be called for further information on a June seminar in audio recording: (319) 335-1664...**SMPTE's** Australian section (one of the largest outside of North America) has divided to form **Australia North and South**...The acquisition of **AMS** by **Neve** has prompted many changes, among them the establishment of a **Chicago AMS sales/service office** with **Doug Ordon** at the helm, the relocation of **AMS corporate offices** to **Bethel, CT**, the hiring of a new marketing manager, **Frank Massam**, and the appointment of **John Gluck** as president of **AMS North America** ...**NAB** appointed **Susan Thomas Platt** administrative director of government relations. The organization also added four new members to its **Digital Audio and Satellite Broadcasting Task Force**: **David Gingold**, **Scott Ginsburg**, **Randy Odenal** and **Wayne Vriesman**...**21st Century Ltd.** (Los Angeles) is the first North American dealer for **DynaudioAcoustics'** full range of monitors...**Euphonix** has moved into a new 20,000-sq-ft. manufacturing and office facility. New address: 220 Portage Dr., Palo Alto, CA 94306... Australian-based **ARX Systems** chose several reps for the U.S., including **Progressions Assoc. Inc.** (Florida and Puerto Rico), **SC Music** (New England, New York and Northern New Jersey) and **Quad-Tech Inc.** (Kansas, Nebraska, Missouri and Iowa)...**Digidesign** has ceased to market or distribute **C-LAB** products

and its own **Atari** line in the U.S. and Canada... **John Shepherd** of **Altec Lansing** has been appointed chair of the **NSCA** product safety group for 1991... **AKG Acoustics Inc.** (marketer of **AKG**, **dbx**, **Orban**, **Turbosound**, **Quested** and **Precision Devices**) reports several promotions: **David Roudebush**, corporate marketing manager; **David Angress**, director of national sales for **dbx**, **AKG** and **Quested**; **Howard Mullinack**, director of international sales, with additional responsibility for **Orban** stateside and for all product lines in **Central and South America**; and **Jesse Maxenchs**, international sales manager for the **Western Hemisphere** ...**Allen and Heath** announced awards for rep firm of the year (**GMI New England**) and dealer of the year (**Audio Video Research**)... **Matthew Weiner** joins **JVC Professional Products** as professional audio sales rep ...**Atlantic Video** welcomes **Anthony N. Johnson** as marketing director, and adds two new account executives: **Craig Culp** and **Miriam Machado-Luces**... **Alacronics of Wellesley, MA**, was appointed the exclusive authorized national warranty repair center for **Drawmer** and **Genelec** products in the U.S.... **Essential Marketing** (St. Joseph, MO) is now the manufacturer's rep for **Lexicon pro audio** in **Nebraska, Iowa, Missouri, Kansas and Southern Illinois**... **Audio-Technica's** top rep of 1990 went to **Randy Fuchs** of **Crescendo Audio**... **Michael Brown** is onboard **Freed International** as account executive... **Signal processing manufacturer Symetrix** appointed **Pro Tech Market** as its **Rocky Mountain rep**... **Richard Schoenberg** was promoted to director of the **Home Box Office** tape quality control division... **White Instruments** has moved to **Austin, TX**; information can be obtained by calling (512) 389-3800... A sad note: **Bob Haigler**, chief electronics engineer for **Renkus-Heinz**, passed away in early February. He will be missed by many. ■

sion of its **Bedford, Mass.**, manufacturing plant for increased **chrome audio tape production**. The company is also adding a **24-track studio and high-tech tape laboratory**.

Also, **BASF** has expanded distribution to six "strategically located" cities: **L.A., Chicago, San Francisco, Dallas, Woburn, Mass., and Enka, N.C.**

Convention News

The big news this month is the **National Association of Broadcasters convention** in **Las Vegas**, **April 14-18**. In conjunction, the **NAB** is sponsoring the **HDTV World Conference & Exhibition** from **April 15-18**, also at the **Hilton** but in its own venue. One of the sure-fire features is the **NHK 1991 Technology Open House**, consisting of approximately **25 displays** of new broadcast technologies from **Nippon Hoso Kyokai**, Japan's public broadcast network. It's the first time **NHK** has displayed in such force in the U.S., and many of the prototypes will be seen for the first time outside of Japanese labs. Contact **NAB** at (202) 429-5350.

The third annual **Multimedia Expo** will be held at the **New York Hilton**, **May 14-16**. Call (212) 226-4141 for more information.

Video Expo and **The CAMMP Show** have been combined into **Image World**, a new exposition and seminar program. **Image World** will be held annually in **San Francisco, Los Angeles, Chicago, New York and Florida**. For information, call (800) 800-5474 or (914) 328-9157.

Corrections

Our February product column listed the incorrect phone number to get a demo CD of the **apt-X™ 100 Music Coding System**, which compresses 16-bit audio into the equivalent of 4-bits per sample. Free copies of the CD are available to qualified personnel by calling (818) 753-9510.

Contrary to our previous report, the **1992 International AES conference** will be held **March 24-27** at the **Austria Center** in **Vienna**. Contact (212) 661-8528 for more information. ■

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THE 'ULTIMATE AUTOMATION' SYSTEM

ULTIMATION is an entirely new concept in console automation, designed to let engineers choose the type of system most appropriate to the task in hand.

It can work as either a dedicated VCA system, a dedicated moving fader system, or in a way that combines the best features of both systems. The engineer is free to decide.

By using SSL's unique dual signal path circuitry, ULTIMATION really is the ultimate in console automation.

Main features include:

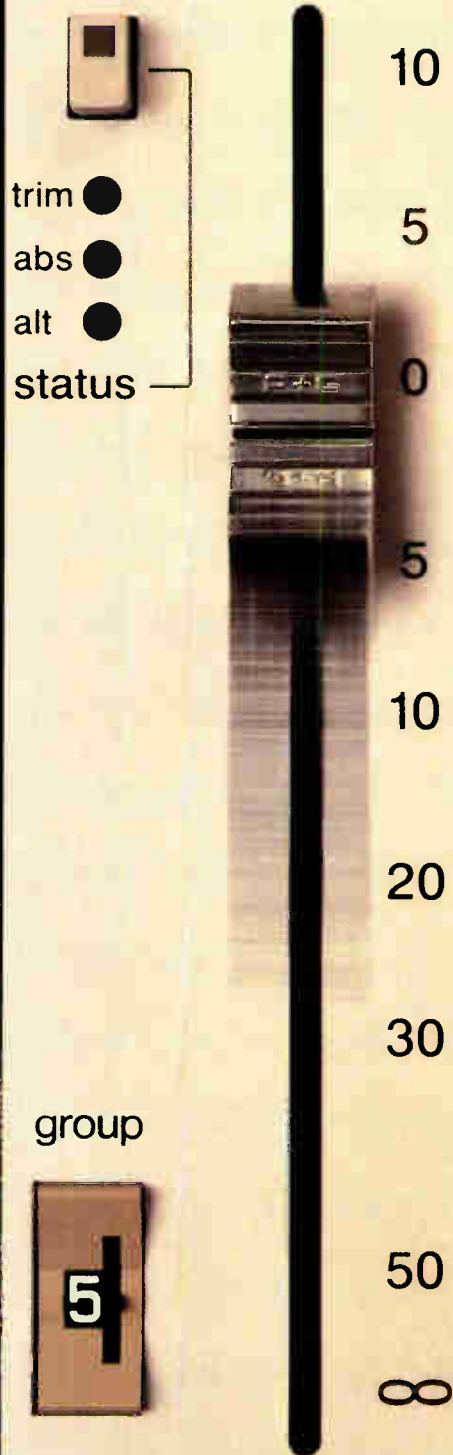
- ▶ Works as standard G Series VCA system, or as a full moving fader system
- ▶ Dual signal path technology allows *combined* operation, providing the benefits of both systems
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- ▶ Reads existing G Series mix data

In keeping with SSL's commitment to system compatibility, ULTIMATION reads all existing G Series mix data, and can be retrofitted to any console using the G Series computer.

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Time Code. It's about time someone perfected time code for DAT. And Sony's new PCM-7000 DAT recorders have done just that. They make time code based editing easier than you ever thought possible. They allow you to read and generate SMPTE, EBU or film rates which can be prestriped, poststriped or recorded simultaneously with your audio. They even let you translate from one time code rate to another during playback. All of which means if you're not using a Sony professional time code DAT recorder, you may want to take a closer look at what you're missing.

Speed and Size. When speed counts the PCM-7000 recorders are the tools you want. They have a shuttle speed 175 times play speed, which lets you locate cues or lock to other equipment faster than with open-reel systems. They also come with helpful menus and self-diagnostics for fast set-up and easier maintenance. But speed isn't the only issue. Size is also important. Unlike reel-to-reel recorders, you can fit any of our new DAT recorders into just 5 1/4" of rack space. In addition, each DAT tape can fit two hours of stereo digital audio into a package smaller than a standard audio cassette, saving you plenty of storage space. And since DAT tape costs about one-third of analog open-reel tape, most facilities could save enough in the first year to pay for the recorder.

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Chase Synchronization. With the internal Chase Synchronization option of the PCM-7050 and 7030, you can press a single button to lock to any time code based equipment—whether it's a VTR, ATR or a second Sony PCM-7000. You can also enter or capture an offset instantly and maintain synchronization with the time code data or from an external reference.

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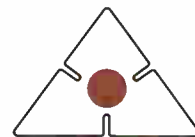
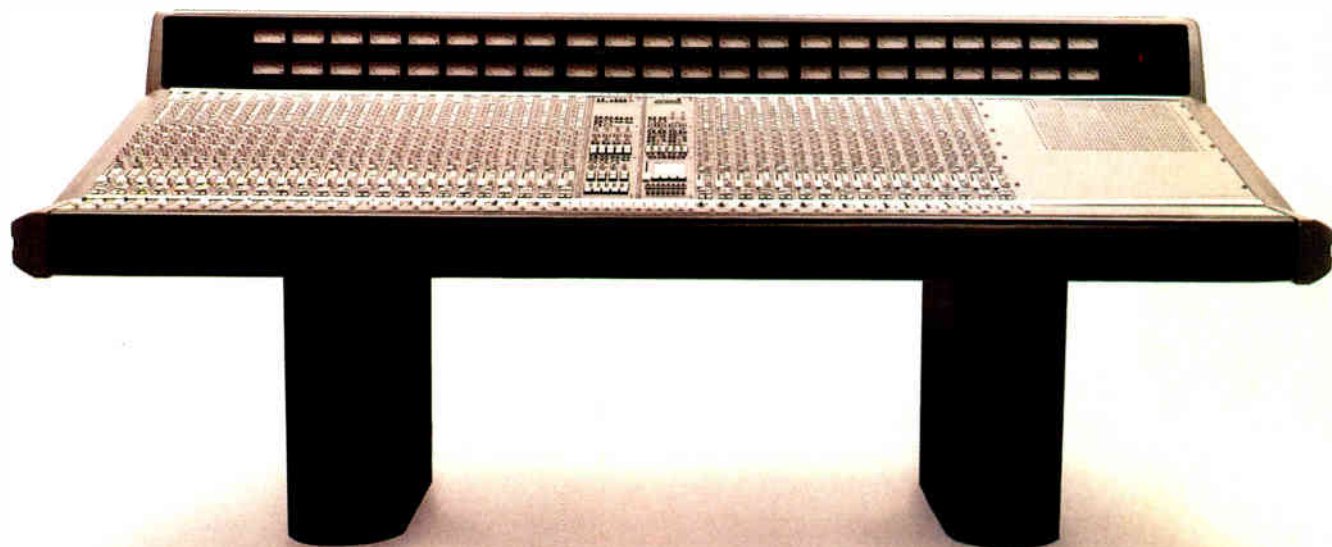
Professional Inputs and Outputs. It goes without saying that you can connect these DAT recorders with a variety of I/O's—like balanced XLR analog I/O's or optional digital I/O's, including AES/EBU. This enables you to transfer audio to digital VTR's and just about any other professional audio equipment you desire.

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TRIDENT

by Ken C. Pohlmann

MORE ON PHILIPS' DCC FORMAT

Following years of speculation by the world press, last October Philips confirmed its intention to introduce a new consumer audio format: Digital Compact Cassette, or DCC (see "Tape & Disc" in the Jan. '91 *Mix*). At January's Winter Consumer Electronics Show, the company publicly unveiled working prototypes of DCC for the first time.

DCC is similar to DAT in that audio data is recorded digitally onto a magnetic tape housed in a protective shell. However, DCC differs considerably in terms of technical details and, apparently, the reaction from record labels. Most significantly, DCC is designed to

For a wide variety of reasons, ranging from dissatisfaction over the low potential profitability of DAT hardware and software, to a case of NIH (Not Invented Here), Dutch electronics conglomerate Philips has never been comfortable with the R-DAT format as the successor to the compact cassette, which is a Philips-invented format. Approximately 30 months ago, Philips began researching the viability of a more cost-effective digital tape format.

Because electronics are cheap, whereas mechanical parts are not, Philips focused its efforts on shifting

the technical emphasis to chips rather than rely on moving parts. This resulted in a transport with a simple stationary-head design, using standard 1/8-inch width chromium dioxide tape, moving at the standard speed of 1-7/8 ips. To provide sufficient recorded data density, 16 parallel data tracks are required for stereo audio channels, as shown in Fig. 1. However, this is not sufficient capacity to record linear PCM data,

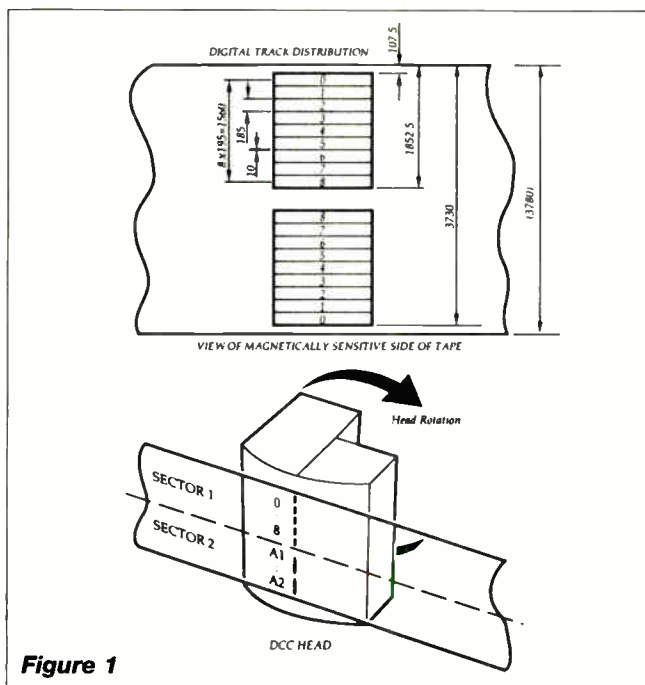


Figure 1

be backward-compatible with existing analog cassettes. A DCC recorder could play back either DCC tapes or analog tapes with equal facility. Looked at in another way, DCC would extend the lifetime of the venerable cassette—currently selling at an annual rate of 2.6 billion units—well into the 21st century.

so Philips developed a sophisticated data compression algorithm to reduce the data flow to 384 kilobits/second.

The face of a DCC cassette is the same size as an analog cassette, though it is somewhat slimmer. A sliding metal cover protects the tape from the environment. The top face does not have spindle holes, allowing maximum sur-

face for artwork. The split head design contains both digital data heads and analog heads. Thin-film, magneto-resistive technology is used for the digital playback heads, and magneto-inductive technology for the digital record heads.

Recording track width is 185 microns and playback track width is 70 microns, allowing a wide tolerance in transport and cassette manufacturing. The smallest recorded wavelength is 0.96 microns, so low-coercivity (620 Oersted) tape may be used. No erase head is required; data is overwritten. A second head would be required for read-after-write. As in the CD standard, a Reed-Solomon error correction code is employed in the DCC format, with

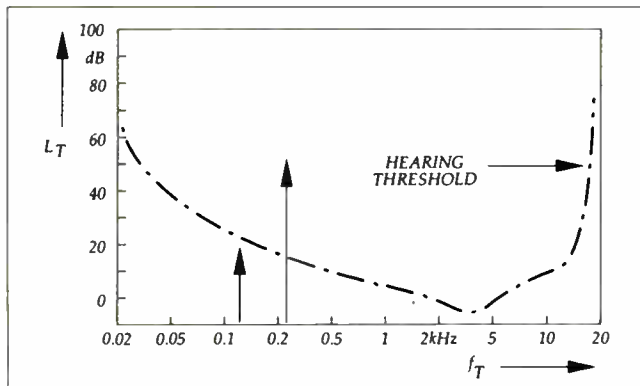


Figure 3

47% redundancy. The modulation code, as in DAT, is an 8-to-10 code. Because data is buffered, as in any digital audio format, wow and flutter are unmeasurable.

Subcode in two auxiliary tracks contains non-audio information such as song titles, artist's names and even lyrics, up to a rate of 400 characters per second. A table of contents is written continuously along the length of the tape. A digital tape records in two sectors (A and B) in different tape directions. However, because auto-reverse is dictated by the format, a DCC digital tape is not physically turned over to switch sectors. A playing time of 90 minutes is available, with future-generation tapes of 120 minutes possible. As noted, a DCC deck is designed to play back both analog and digital tapes. Dolby B and C noise reduction is specified as part of the analog DCC standard. Although not specified in the standard, a DCC deck could contain analog record heads.

The data compression algorithm

called Precision Adaptive Sub-band Coding (PASC) is similar to those methods developed for use in future digital audio broadcast (DAB) systems. PASC uses the ear's audiology performance as its model for audio encoding. Average and minimum thresholds of hearing were established, as shown in Fig. 2. Generally, sounds louder than the threshold are audible, and thus must be encoded, whereas sounds softer than the threshold need not be encoded, as shown

in Fig. 3. These conditions must be dynamically analyzed. For example, Fig. 4 shows a soft tone that would normally be audible. But when a louder tone is present, the threshold is shifted up, masking the soft tone, as shown in Fig. 5. Since the soft tone no longer needs to be encoded, more capacity is available for more precise encoding of the loud tone. PASC relies on principles such as amplitude and temporal masking to achieve a fourfold increase in coding efficiency over linear PCM, with equal audible quality.

Specifically, using standard sampling frequencies of 32, 44.1 and 48 kHz, the encoder analyzes the content of the audio signal with a 24-bit fixed-point filter, separating the signal into 32 frequency bands with fixed centerfrequencies. The number of bits applied to encode each band depends on the content of the band and masking properties of the signal. A band is analyzed as full or empty, and bits are

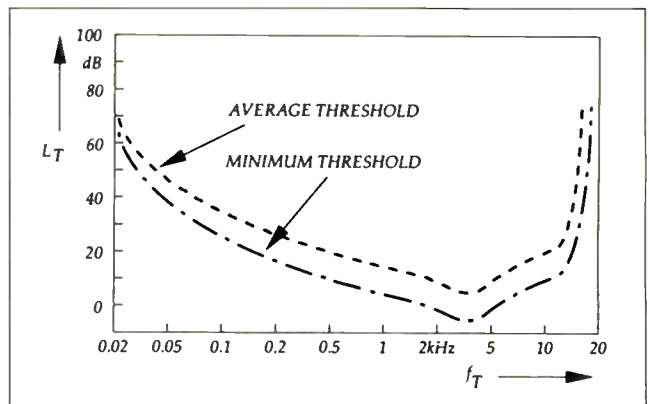


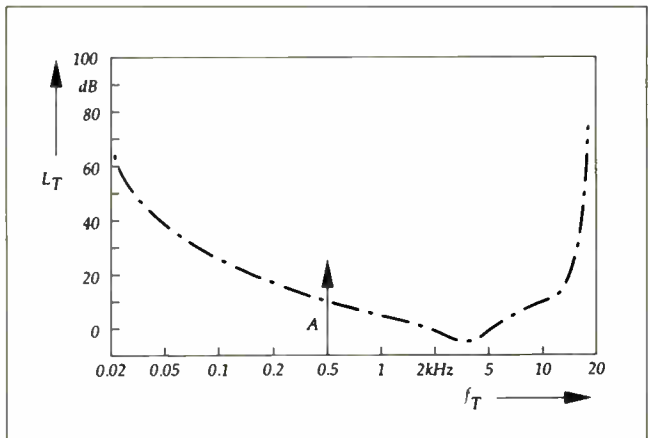
Figure 2

allotted as required, using a floating-point representation with variable-length 15-bit mantissa and 6-bit exponent.

The success of PASC depended on newly developed DSP chips. During development, a VAX minicomputer required eight hours to encode ten seconds of audio; with the VLSI chips, this is done in real time, with only a modest processing delay time. The PASC algorithm was developed with critical listening panels as the design criterion. The algorithm was finalized only when a large sample of trained listeners, listening to a wide variety of music, were unable to differentiate between source CD and recorded DCC. Although it is difficult to measure a psychoacoustically derived recording system with linear system measurements, Philips claims 18-bit performance from DCC. Measured figures include dynamic range of 108 dB, THD+N of 92 dB, and flat frequency response from 5 Hz to 22 kHz.

Because a DCC recorder plays back both analog and digital tapes, it will be relatively easy to develop a market for both the hardware and software. A consumer could purchase a DCC deck,

Figure 4



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 - 500 watts, Mono into loads of 2 ohms or 8 ohms
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- Distortion:
 - Less than 0.01% from 20-20kHz at 500 watts, 1M or THD
- Slewing rate:
 - Greater than 60 Volts/Microsecond, parallel.
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play back an existing analog library, and buy digital tapes as they become available. Gradually, the digital format will take over both the prerecorded and home-recorded tape markets, pushing analog cassettes aside. Duplicators should not encounter problems with DCC. Unlike DAT, it can be duplicated at 64-times speed using existing equipment.

Also at the WCES, Tandy Corporation demonstrated a prototype DCC recorder and announced its willingness to manufacture both hardware and blank software. Reportedly, Matsushita has agreed to become a co-licensor of the DCC format. Record labels PolyGram, A&M, Island, Capitol EMI, BMG/RCA and WEA all announced support of the DCC format and willingness to issue software in

that format. Their support for DCC, in contrast to their non-support for DAT, can be attributed to a variety of reasons.

Philips has been careful to include the labels in the format's development. A DCC recording is a high-quality digital recording, but not a data clone

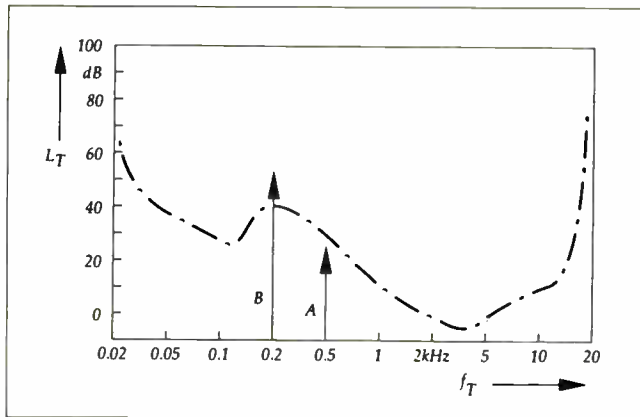


Figure 5

as in DAT. (The DCC format also includes a SCMS stipulation.) And philosophically, DCC is akin to the analog cassette, a cash cow that record labels are anxious to continue to promote.

In short, record labels may not want another new format (DAT), but they may well embrace a greatly improved existing format (DCC). Philips has announced a product launch for early 1992, with a projected price of \$500 to \$600 for a "high-end" DCC recorder and 500 initial software titles in the \$10 range. Portable and car DCC recorders and players are already under development. Because of the inherently simple mechanical design of DCC, units much smaller and cheaper than the smallest and cheapest DATs are envisioned.

Will DCC nail the coffin lid shut on consumer DAT? Will DCC die on the vine, entangled in the same legislative/political/economic/copy-code/tariff problems as DAT? Will record labels really support DCC? To promote DCC, would Philips support tariffs on blank tape? The answers are yes, no, yes, yes, but not necessarily in that order. ■

Ken Pohlmann is the author of Principles of Digital Audio and The Compact Disc: A Handbook of Theory and Use, and editor of a forthcoming book of selected papers on digital audio topics.

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mix•er

(mik'sēr) *noun*. An electronic device used to *mix* music. Must be clean, transparent and punchy. See Alesis 1622 Mixer. Better yet, listen to it.



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* Total Harmonic Distortion + Noise: too low to measure. Keyboard Magazine July 1990.

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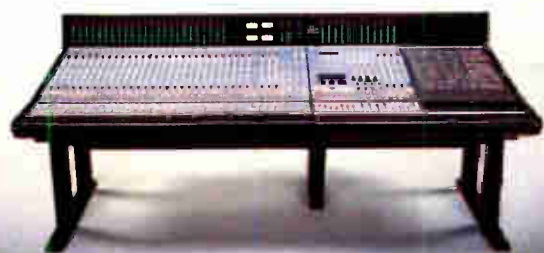
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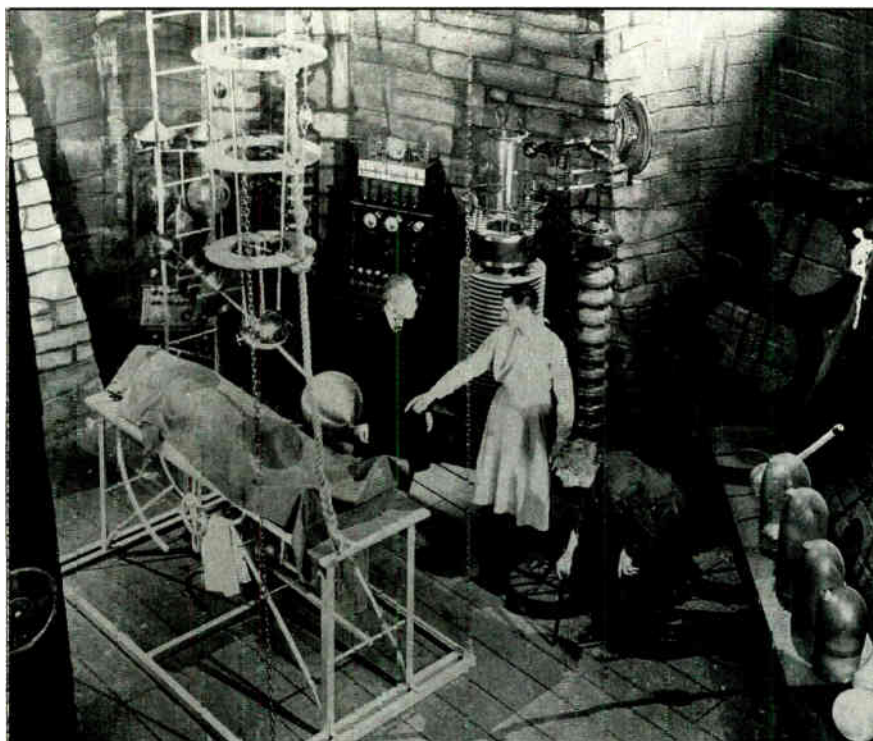


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by Stephen St. Croix



COLUMN 35

It was a dark and stormy night. There have been more and more of these nights in the last few years, I guess due to weather pattern changes caused by greenhousing. But somehow this was even more strange than anything the new weather brought before. There was a different *feel* to this storm. Even the cats felt it. They were restless and edgy, as if some unwanted visitor was sitting in the shadows of their living room.

Frozen trees creaked and cracked outside my windows, over my head. Occasionally, I heard the torturous wail of splintering wood as a nearby tree gave in to the overwhelming forces of wind and ice.

I had actually thought of packing up the cats and leaving, but that was not possible, for a 60-foot tree fell across my driveway even as I watched. Three deer scrambled around the tree in a desperate sprint of panic, only to lose their footing on the glassy, iced tarmac.

The fire in the living room hearth

was becoming unsteady as huge gusts of wind cavitated around the chimney, causing smoke to billow out every now and then so that I was compelled to let it burn down to a little ghostly glow. The embers reminded me of what a huge city sometimes looks like when approached by plane at night.

The phone rang—no one on the other end. It did it again, and yet again. As I reached to turn it off, I lost all power. One of my cats jumped up on my lap and asked for reassurance in the heightened isolation of darkness. “Funny,” I thought. I was just going to see if I could find her for the exact same reason.

As I sat powerless in the black void that was now my home, caught in the grip of the awesome wailing whiteness outside, not knowing how long my meager shelter would withstand the ravages of the very breath of the Earth herself, I realized there was nothing that I could do. Well, *almost* nothing.

Though my very castle was reduced

to a hollow shell by the simple cessation of power for my technology, if the batteries in my portable were charged... Yes, if they were charged, I could at least do *something*. Yes, I could...I could write my column.

Well, it turns out that they were charged. So here is my column.

As I sit alone, I wonder...what went wrong...with our love (of technology)...a love that was so strong.

I reflect on the observation that *none* of the existing technology is actually very good at all (or I wouldn't

be sitting here in the dark), while at the same time it seems that almost *all* of it is better than we would have dared dream possible only five years ago.

Examples of my point? Let's see now, what shall I start with? Should it be...converters?

Yes, converters. You know, there is a huge industry converter secret, one that is so well kept you probably won't even believe it when I tell you, but here it comes. Almost nobody's A/D converters can really convert a full 16 bits. Really. Covert maybe, but not convert. Most may catch 14 bits, and a few of those may deliver the equivalent noise

figures of 15 or maybe 16 bits, but not the actual data.

The brand new 18-bit (and the soon to come 20-bit) A/D converters also look like they will squeak out 14 or 15 bits, but with trick noise-shaping schemes that make them seem very *quiet*, so that the published dynamic range figures are impressive.

So. Not very good at all, but still far beyond anything we could have imagined a few years ago, when we were still listening to a tiny sliver of fused coal being dragged across the surface of a spinning disc of tar-based vinyl.

Now computers. All of us who actually use these things know that we spend a considerable portion of each hour that we share with our machines in waiting. Waiting for a file to save, a program to open, a picture to draw. Some of us have even developed a new sort of techno-disease: the uncontrollable need for speed. We will continually spend large sums of money to upgrade our computer's Furbisher 7 to a Turbo-Furbisher 8, and trade in its 40 megahertz Clyde 030 engine to this week's newer, better designed, wider data path, larger "caching" 45 megahertz Clyde 040.

All of these go-fast products help. They don't stop the waiting; they just shorten it a bit. Actually, they never will stop the waiting, because as soon as you begin to get your computer up to an impressive speed, somebody comes along with a new application ("program" for you IBM types) that uses up all that newly bought power and speed. It's natural that as these machines become faster, uses that were once too demanding become realistic, even though they will tax the machine to the point where it again seems slow. So now your desktop wonder is slow again, but it is processing full color photographs for your next album cover. Speed for power. Money for nothin', bits for free.

So, we can feel their limitations. Consider how fast *this* technology has grown. Only a few years ago the United States of America sent up a space shuttle full of astronauts who used HP 41s (a small pocket calculator) to compute flight paths! Not only that, but today's typical desktop is many times more powerful than the computer that put the entire shuttle up there in the first place. See?

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chance if you try 35 miles an hour, and a *much* better chance if you give it a go at 80. At the same time, we already have developed the answers here. Today's race cars hit walls, real hard ones, at 120, 140 and even 160, and the drivers walk away. Pretty good. It would be great if we could get a bit of that protection out on the street. After all, it's much more dangerous out there than on the track.

Microphones. Oops.

Wire. It still hums and buzzes. It still rings and trashes transients. It still reaches out for RF. It still breaks. But you should listen to a hundred feet of today's Monster or Mogami or the other super wires and compare it to 100 feet of the very best wire from the '70s. As bad as today's stuff is, it sure beats the hell out of the last two decades' best.

Epilogue

One thing, and one thing only, feeds the advancement of technology: money. Well, money in the free world, and power elsewhere. It's really the same thing, of course. It's just that in the free

world, power translates instantly to money and vice versa.

Even benevolent acts such as the development of new medicines for new diseases are possible solely because of the profit potential. Don't get me wrong. It's usually the case that the actual people working late into the night year after year on these research

*Some of us have
developed a new sort
of techno-disease: the
uncontrollable need
for speed.*

projects *are* doing it for the betterment of humanity. The organizations, schools or drug companies that are providing the equipment, supplies and support staff for this work, however, are doing it strictly for the money: Medicine is a business.

Space shuttle technology, commercial air safety technology, automotive

crash survivability improvements—all the same thing. They evolve as the profit potential evolves. As disgusting as this may seem at first, there is really nothing wrong with it. In fact, when you consider the alternatives it's really quite a deal. Capitalistic technology certainly develops much faster, within its environment of small factions of the private sector independently funding research projects driven by the profit motive, than any "pure research" or government-driven work. Technology is a business.

So that's the system, that's how technology has gotten as far as it has, and that's how it's going to continue. The small, high-tech companies often develop the leading edges, while the huge corporations have learned how to make compromised iterations of these devices available to the masses.

Don't give either of 'em a break until they get it right, but when they do, vote with your wallet. Show them that you care, and they will keep trying, keep improving. ■

Mr. St. Croix declined to offer a bio this month. He feels that they are generally a pain.

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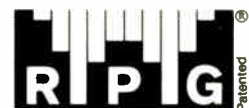
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A black and white studio mixer is positioned on a rocky ledge, overlooking a vast, deep canyon with layered rock formations under a blue sky with scattered clouds. The mixer is the central focus, with its numerous knobs and sliders clearly visible. The scene is dramatically lit, suggesting a sunset or sunrise, with long shadows cast across the rocks.

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stereo to mono (or surround sound, if that's the format being mixed), and should pay particular attention to L/R phase stability for centrally panned sources.

3) The audio must *enhance* rather than compromise and/or distract from the visuals. Put more prosaically, picture is king, and we should pay at least lip-service to that old adage: "See a dog, hear a dog."

Ron Estes is deservedly well-respected for his 15 years of work on *The Tonight Show*, where he introduced stereo mixing well ahead of the competition, and he has also had extensive experience with surround sound mixing. A multiple Technical Excellence & Creativity Award nominee—he won the coveted prize in 1986—Estes mixed and recorded *The Tonight Show* in stereo for three years prior to its being aired in 2-channel format during the mid-'80s. He also handled mixing duties for *The Byron Allen Show* and a wide cross-section of variety specials and cable productions.

"From the very beginning," the engineer recalls, "I felt that stereo offered

a greater sense of 'realism' for the viewer. During Johnny's opening monolog, for example, I used to pan Ed [McMahon] left, to reflect his physical location stage-right, and Doc [Severinsen, orchestra leader] to the right. During musical sections, I could provide a realistic stereo soundstage for the orchestra or visiting act, with the audience's applause also being picked up in stereo.

"When we began surround sound tests of *The Tonight Show* in 1989—first with the Shure Stereosurround system, and then Dolby Surround units—I had an additional dimension. To provide sufficient panning and assignment flexibility, I used the 48-input SSL 6000 console in Studio 1 to generate the left and right inputs to the surround sound encoder from the main stereo bus outputs, while a separate stereo auxiliary bus fed the center (or front-mid) and surround inputs. This way, I had complete control of left-right panning, as well as front-back location to any position within the surround sound field.

"The advantages of using surround sound were immediate," Estes says. "I could place the home audience in the

center of the studio environment by having the dialog placed across the front soundstage, music routed in stereo left and right, and the audience mics fed to the surrounds."

Mono-compatibility was monitored continuously, using the image of an oscilloscope displayed on a large 21-inch monitor located right in front of Estes' mix position. "That LR 'scope was particularly important for surround mixing. Any sound source that was routed totally to the surround channel would disappear completely in mono. I needed to know how the sources were being routed via the stereo and auxiliary-send pan pots and faders."

Late last year, Estes quit NBC Television and moved to 20th Century Fox, where he now handles music and Foley mixing duties in the North Re-Recording Room, working alongside dialog mixer Robert Appere and effects mixer Gary Rogers. Although one of the series they worked on, Steven Bochco's adventurous and music-laden *Cop Rock*, has been canceled, the three-man team is currently busy mixing *L.A. Law* and other shows.

"Life at Fox is very different from NBC," Estes concedes. "Aside from

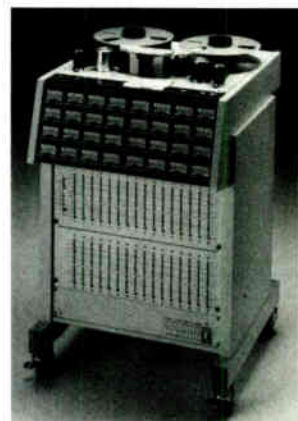
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having two days to mix and sweeten a one-hour show, the concept of a 'team spirit' here with dialog and effects means that we all work together to produce the best stereo mix we can.

"In contrast to my having to handle everything on *The Tonight Show*—and the inevitable compromises in terms of the level blends and dynamic moves I could handle, not to mention EQ and processing—being part of a three-man crew means that I can concentrate fully on the music and Foley elements and how they blend together in the stereo

sound field. Mixes are becoming so complex that there is no way just one person could handle everything in a single pass."

Estes says that the majority of dialog, ADR, sound effects and Foley elements are supplied in mono, with stereo music plus some stereo effects. "We don't use any stereo synthesis to create 2-channel from the mono elements. Instead, we might use stereo reverb to match production and ADR ambiences. Most mixes are left reasonably static, although we did pan a helicopter across the sound field for an episode of *Cop Rock*. We always have

to bear in mind how the effect will play in mono. Any full left-right panning might cause a level buildup in mono when the source is central, and be distracting to mono audiences.

"We did experiment with ambience changes to complement medium and close-up shots during a jail scene, for example," he adds. "But eventually the director decided to scrap it during the final mix."

Jerry Clemens' career has been no less illustrious. With a production background that spans almost 25 years, this Emmy Award-winning engineer has plied his post-production art at a variety of West Coast houses, including Glen Glenn, Compact Video, Modern Videofilm and, most recently, Columbia Pictures (the former MGM/Lorimar lot in Culver City, south of Los Angeles). Clemens currently works as a dialog re-recording engineer in Room #112, on such shows as *Midnight Caller*, *Parker Lewis Can't Lose*, *Going Places* and *Full House*.

"All of those shows are mixed here in stereo," Clemens explains. "Surround mixing would offer another dimension, and provide us with more space to move sources into the surround channel. We could also place dialog into *very* realistic environments, while during music specials we could locate the viewer into the center of the real audience!"

"The down side is that we would need more dubbing time to handle a surround sound show," he adds. "During a stereo mix, we also produce stereo music, effects and dialog submixes, so that foreign dubs, for example, can be taken from the M&E [music and effects] elements. We can easily track those submixes to 6-channel mag for film-style productions, or 8-track analog with time code.

"If the same show is mixed in surround, the submixes need 12 channels: L-R-C-S dialog, effects and music. To do a really good job on the submixing and blending, I estimate that we'd need an extra day, which we don't often have within the budget. But in a room set up for surround mixing, the amount of additional hardware would be minimal."

In terms of current stereo productions, Clemens concedes, the majority of elements are mono, with the exception of stereo music and (sometimes) audience tracks. "I use a variety of processors to provide stereo ambiences," he says, "while stereo effects are

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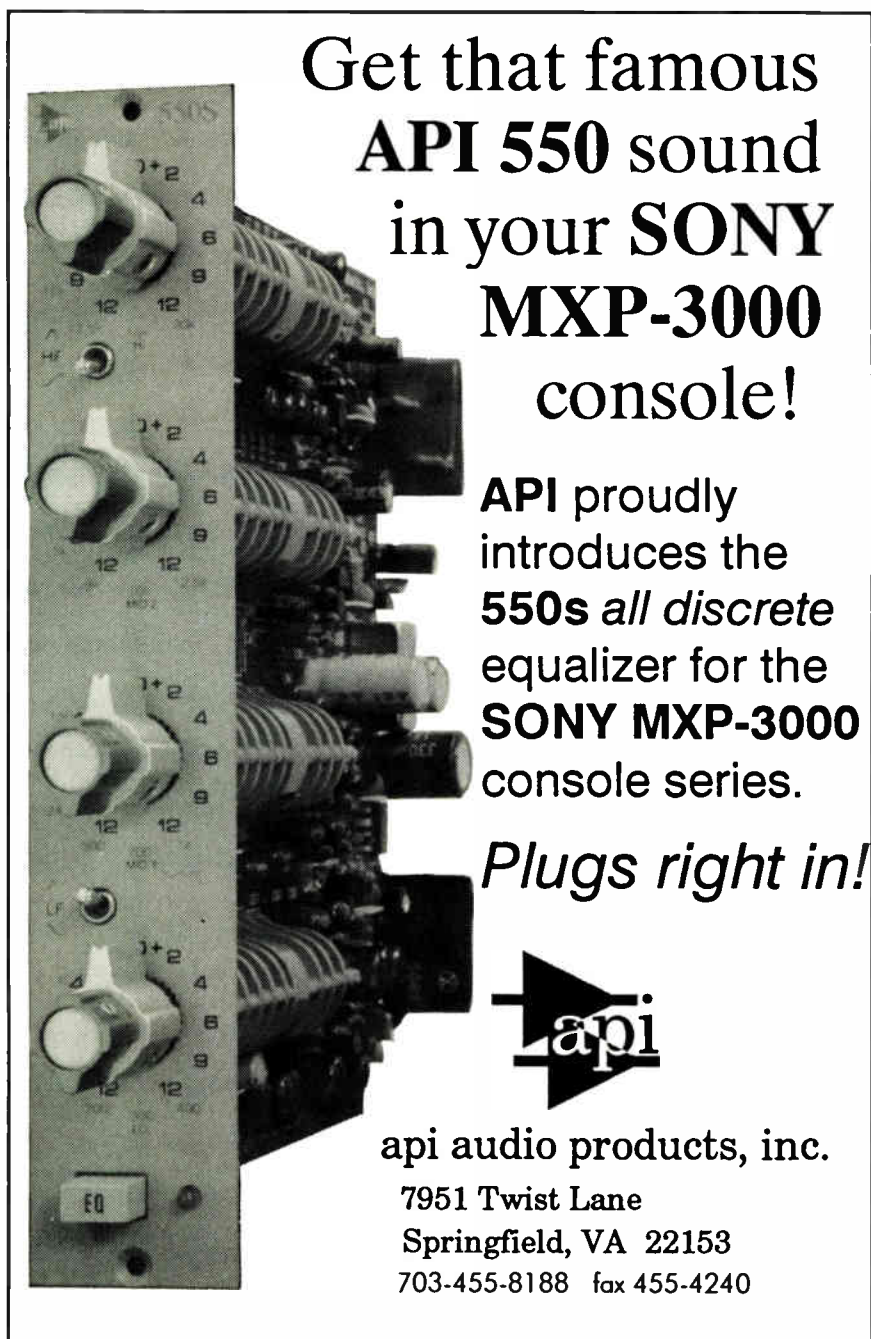
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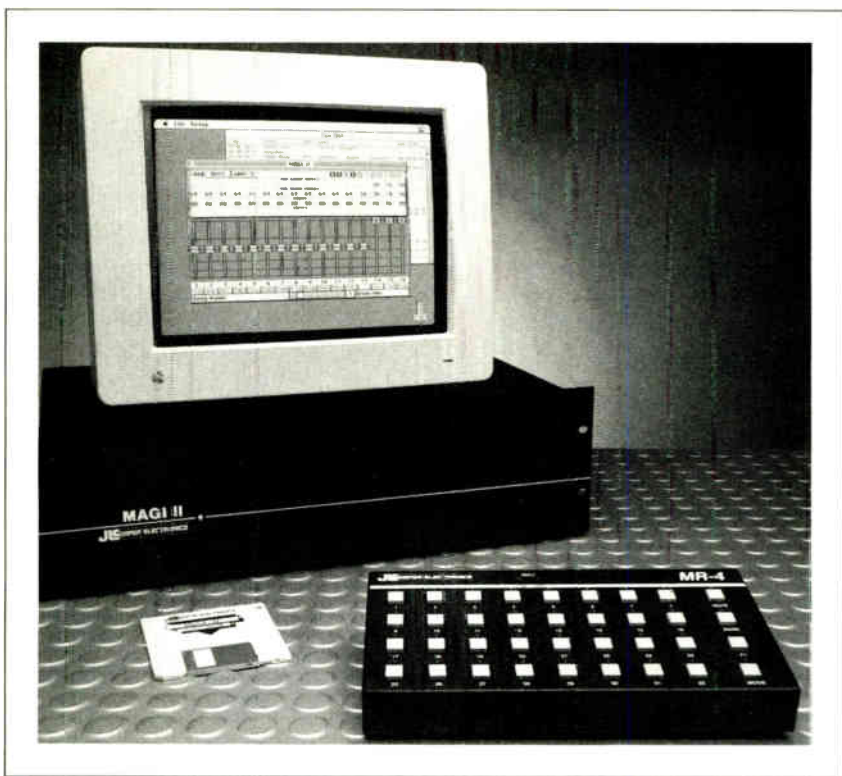
"To retain razor-sharp phase coherency," Clemens continues, "the use of digital multitrack for premixes and submix stems definitely makes a big difference. It's the *only* way to ensure that what we on the mixing stage determine to be fully mono/stereo-compatible reaches the audience in that form."

Given their wealth of hands-on experience, I asked both of these seasoned production engineers which two major technical developments have had the most effect on their day-to-day lives in broadcast post.

"Dolby Spectral Recording is a wonderful advance," Estes says. "SR encoding means that the audio will sound much cleaner when it reaches the viewing audience. There are at least *seven* generations from the source elements to an air reel. Anything that we can do to hold down the noise and top-end losses is going to make our stereo mixes sound far clearer. And our Time-Line Lynx synchronizer and motion-control systems handle all of these video, audio and mag transports. Even running at various time code references, they all lock together reliably and quickly every time we roll the master."

For Clemens, "Moving fader automation, such as the GML system we have in the Cary Grant Theater at Columbia, makes life a whole lot simpler when you are finessing a complex mix, or need to review fader moves during a pickup, for example. I also rely on outboard signal processing hardware; my current favorites are the Eventide H3000 Harmonizer, which packs a lot of useful effects into a small space, and the Lexicon 480, which provides dozens of realistic ambiences, reverbs and room simulations." ■

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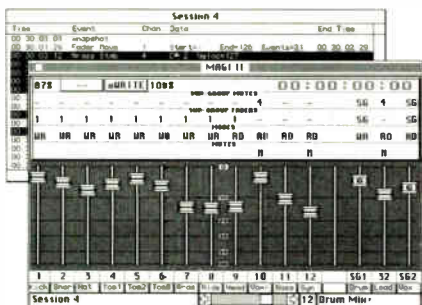


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SOUND HAS TRADITIONALLY BEEN THE POOR RELATIVE

of picture in television, but in recent years, several shows have appeared that feature sound as an equal partner. Not surprisingly, these shows are usually innovative in other ways, as well. *The Wonder Years*, now in its third year on ABC, is a perfect example. It has met with critical acclaim, consistently placed high in the ratings, won a handful of awards (for writing, direction and quality programming) and garnered two Emmy nominations for excellence in sound mixing.



Production and post-production are more highly interrelated on *The Wonder Years* than on many shows. Because of the important role sound plays in the framework, and because different stages of sound creation are overseen by different people, the show benefits tremendously from having a

single, clear-cut purpose, a litmus test for execution of everything from the most insignificant sound effect to picture edits: to let the audience into protagonist Kevin Arnold's head for a half-hour each week. "That's what we constantly convey to everyone who works for us, from the writers to the editors, because that's what makes the show

different and special," says associate producer Bruce Nachbar, who oversees the audio post.

by Amy Ziffer

A second interesting aspect of the show is the use of the Montage cuts-only, offline editing system, first introduced in 1984. The Montage is a non-linear, Betamax-driven machine that employs 17 SuperBeta decks and Bernoulli hard disks. The only information actually stored is time code and machine numbers, so nothing is printed until the final run.

Each episode of *The Wonder Years* begins with narrator Daniel Stern (*Diner*, *Breaking Away*, *Home Alone*) as the adult Kevin Arnold, looking back on his childhood during the late 1960s and early 1970s. They record to 24-track with 1/4-inch backup using a Neumann RSM 190 stereo mic, as it's a stereo show. During the pilot, many different mics were auditioned, and the Neumann was chosen because it had the right warmth.

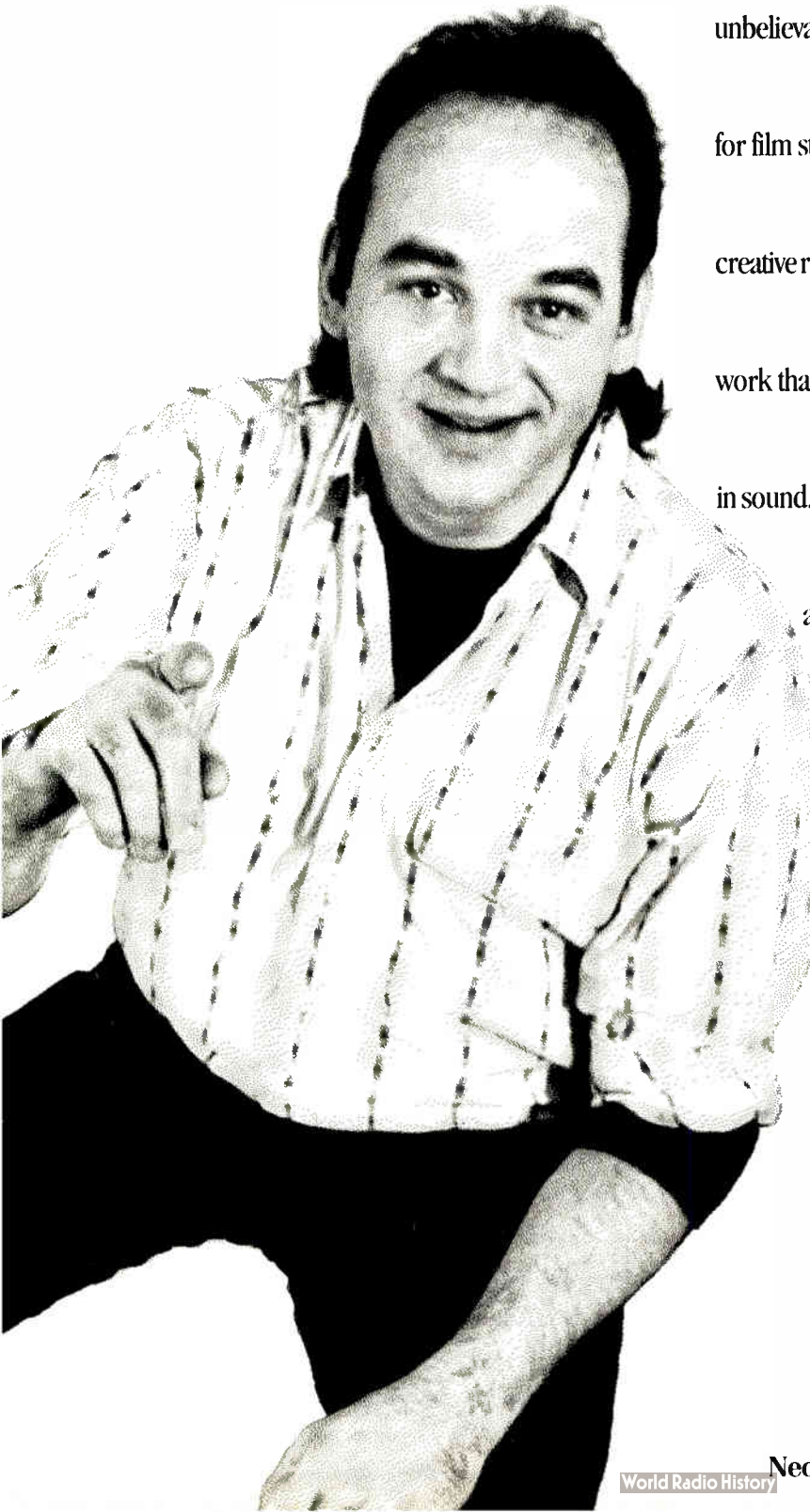
Below, the audio crew: (L to R) John Mack (music mixer); Don Sanders (music editor); Dave West (main mixer); Bruce Nachbar (associate producer); Andy D'Addario (sound mixer)



Above, *The Wonder Years'* (Clockwise from front): Fred Savage, Olivia D'Abo, Dan Lauria, Alley Mills and Jason Hervey

Production dialog is recorded to 1/4-inch stereo Nagra in 2-track mono mode, primarily using Schoeps and Beyer microphones through a modified Sonosax mixer, by production mixer Agarnennon "Aggie" Andrianos. Almost all scenes are boomed by operator Douglas Shamburger. When they use radio mics (frequently), they split the tracks, using one for the boom and the other for lavaliers, but, says Andrianos, "We always seem to settle on the boom track mixes." There are many two-camera setups in which each camera is given its own track. Andrianos' ultimate goal is to give post maximum control. "It takes a combination of set politics, hardware and good working techniques to get the job done," he asserts.

Whatever his formula, it works. About 90% of the dialog used in the final mix is from the production stage. "Aggie keeps production clean for us," Nachbar says. "I tend to go



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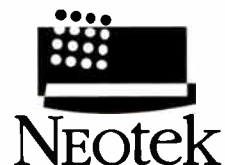
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with the school that says 'Use production as much as you can,' because you're going to get better performance and sound quality. The stage is not going to sound like the location where you shot, but there are instances when we need to change a line because something didn't come out clear or there's extraneous noise. We also try to keep looping to a minimum because we're dealing with kids. Their time is limited on the set, and we can't keep pulling them out of school to go do ADR. First and foremost on the show, we care about the kids, and for everything we do, we have to take into account how it's going to affect them."

Narration weaves in and out of the dialog, so timing is critical; because of its complexity, picture is cut to narration. Optimally, narration is done before shooting even starts so it can be loaded into the Montage system, and when the dailies start coming in, they can be cut together.

Only the highest-grade Beta tape is used on the Montage because of the stress induced from running back and forth. The show is loaded in by acts, and a series of monitors digitize information so that the operator can scroll to find the desired takes and scenes.

The online is done at Laser Pacific in Los Angeles as soon as time is available after the offline. The time code on the 3/4-inch generated by the Montage matches the 1-inch used in the online, so an edit decision list is generated from the latter, which has all the narration edits listed. That list is sent to West Productions, along with the 1/4-inch production dialog tapes and a 3/4-inch tape of stock footage used in each show. Dialog tracks used in the editorial process are transferred to 24-track with Dolby SR, and stock footage is used as the source for the sound of things like *The Newlywed Game*, Huntley & Brinkley news broadcasts, and Nixon speeches.

Burbank-based West Productions does more than just dialog and sound effects editing for *The Wonder Years*; they also handle Foley, ADR, the final mix and layback. Nachbar enthusiastically endorses their work: "Dave [West] gives us wonderful Foley. We have the kids be very quiet during shooting, and we add everything in afterwards, from car door slams to sneaker squeaks in the gym."

In cafeteria, hallway and other crowd scenes, the extras milling in the background are just mouthing their words, and walla is added later by a regular

group of children supervised by Joyce Kurtz. One of her responsibilities is to keep an ear out for words like "dude" and "radical"—expressions that weren't around in 1970 and would not be authentic.

For sound design and assembly, West uses the WaveFrame AudioFrame. "Being digital elevates the quality and gives us the speed to accommodate a fast turnaround and still be extremely creative," West says. "We can create new and different sound effects and interact with Bruce or Bob [Brush, executive producer] prior to the dubbing process."

Of course, the important role sound plays in the show pleases West enormously. "It's a show conceived before its time," he muses. "I think it's been all along what *Twin Peaks* is today."

While dialog editing is beginning, a spotting session will be held, attended by Nachbar, people from West Productions, the composer (up until this season, Snuffy Walden; now J. Peter Robinson), music editor Don Sanders from Segue (known for *The Two Jakes* and other features), Bob Brush, and producer/director Michael Dinner. Decisions about effects, music and ADR placement are made at the same

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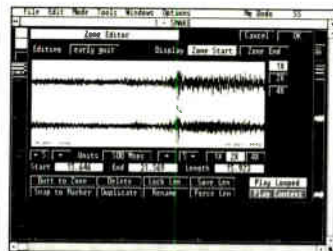
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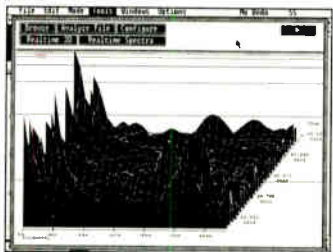
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time.

Stern and required actors are called back in for ADR-to-picture, which is generally done (including walla) in one day, and a spotting cassette is made for the composer. In past seasons, a Synclavier was used extensively for scoring. About two days before the mix, a music preview is put up, at which the composer notes suggestions to implement prior to the final mix.

In addition to the score, *The Wonder Years* relies heavily on source music. "Music instantly pulls you into a time and a mood," Nachbar explains, "and since our show takes place 20

years prior to the air date—that's the way we think of it—music is a very quick vehicle to [take you back to] what you were doing and what it felt like."

Most of the time, the masters they work with are regular commercial CDs, which are transferred to 4-track for the music editor to cut with. On occasion, vinyl records have been used, and the Prosonus NoNoise division (using the Sonic Solutions NoNoise system) has been used to remove clicks and pops.

One question that comes to mind is whether the rough quality of period recordings is as much a part of the

memory of a musical selection as the music itself, and should be respected. "It depends on the episode," Nachbar says. "A lot of times the source music is working as score, so we want it to be clean. On other occasions, we're actually happy if it's a little dirty-sounding.

"The most important thing is that the music serve the mood of the show. Narration often takes precedence, because that's what is truly leading us inside Kevin's head, and we don't want the distraction of clicks and pops."

A lot of music research is done, with the editors going through old issues of *Billboard*, buying CDs and listening to hundreds of albums. Last season, in an episode called "Mom Wars," in which Kevin takes a big step away from dependence on his parents, the song "The Circle Game" was used to bring a lump to viewers' throats. It played over home movies of Kevin as a baby with his mom.

For reasons of integrity, there is one unbroken rule with regard to source music: no sound-alikes. "The composer has done versions of songs, on occasion," Nachbar remembers, "but not sound-alikes. Everybody remembers the original songs, and they pack so much emotion that you don't want to cheat anybody out of that moment. We deal with a lot of major artists, and a lot of times they say they don't want to sell to TV shows, but they'll sell to *The Wonder Years*. We don't get turned down."

When it comes to effects, the producers exercise some selectivity in deciding whether to go for effect or realism. "Basically, we're inside Kevin Arnold's head," Nachbar explains. "Nobody's dad is that mean, nobody's brother is that obnoxious, but when you're a little kid, your dad seems that mean sometimes and your brother seems like that much of a butthead. We're looking at life through Kevin's eyes and hearing it through his ears, so the sounds can be that much bigger.

"We go for a very realistic sound, but there can be those slight exaggerations to really convey the point, because that's how you hear and see things when you're 13 years old. You're a small person in this big world, and it's coming at you! We make that very clear with a preference for very strong sounds. The sound of his bicycle, for instance—the clicking of the chain. Kevin's bicycle is a three-speed, but it makes the sound of a ten-speed, because a three-speed doesn't make any sound. But who cares? You expect to



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In the mix there may be several stereo pairs of narration tracks, ADR, walla, effects, source music and score, with maybe a couple of more 4-tracks for music and a cart machine, all being mixed to an interlocked 24-track. The mix begins early in the morning at West Productions, with Nachbar and Brush previewing the show and making notes. Brush then leaves the stage, and Nachbar mixes the narration. (Last season he did it in conjunction with former associate producer Jim Hart, who's now a producer on *L.A. Law*.) Dave West runs the Amek Angela board, while his father, Academy and Emmy Award-winning Ray West, mixes effects. Music mixer John Mack completes the team. (At press time, West was taking delivery of a custom-designed 120-input Neotek Encore theatrical stereo console, which will be in service on *The Wonder Years* by the time this appears in print.)

After the first act is mixed, Brush is sent a copy. While he's viewing it and making notes, the team goes on to the second act. Later that day, Brush returns with his notes, changes are made, Act Two is played back, and changes to it are made on the spot.

In the course of experimenting, the mix team has discovered some music techniques that transfer well to TV. "In 'Mom Wars,'" Nachbar recalls, "there's a scene where Kevin gets tackled in a football game. Reality is literally being driven home to him in slow motion, and we wanted to convey the fact that it's a big moment. Ken Topolsky, who's the producer and comes from a music background [he worked as music supervisor on *Flashdance* and *Witness*], said 'Why don't we try pre-fade echo?' It had a magnificent effect. It gave that hollow sound when you hear the grunts and groans and people hitting him.

"When we do a music slow-down—say, Kevin's listening to some song and he's really happy, and suddenly Becky Slater, his nemesis, appears in front of him—sometimes we use a Harmonizer and dial it in, but sometimes we just lean an arm into that 4-track. We'll do it both ways, depending on what's most effective."

Over the three years, the process has been honed to where it now runs like clockwork. While one show is mixing, there are another two editing, maybe a third at the spotting and online stage, and a fourth shooting. "We've gotten into that groove where everybody knows what everybody

"We go for a realistic sound, but there can be those slight exaggerations to really convey the point, because that's how you see and hear things when you're 13 years old."

wants," Nachbar says, "but you really have to keep on your toes and prioritize correctly. We try to schedule so we don't have two shows into sound post at the same time, because that would be too much for West to handle. So we spot one show after the other show is mixed. And there are hiatus weeks built in, because there are pre-empts throughout the season, so those keep things sane. Altogether, we do 24 episodes in a ten-month period."

Having ironed out the kinks means more attention this season is being given to subtleties like backgrounds. Crickets, children playing outdoors and occasional drive-bys in the street bring more life to a scene. Nachbar is now spending more time previewing effects, making sure everything is all right for the mix.

The system has worked well so far and will undoubtedly continue for the lifetime of the series. The show's creators were once quoted as having said that once disco comes in (in the show's 20 years-removed timeline), they'll take it off the air, because of a personal abhorrence for that style of music! Currently, it's got a two-year pickup, reflecting ABC's confidence in its continued popularity. But even now, while it's still on the air and exploring new ground, it's recognized as a show that has set new standards for its time. ■

Mix Los Angeles editor Amy Ziffer is a topiary wizard in-the-making.



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you need to do heavy audio, you need an audio house." Some of Videomix's work comes from public television—including post work for *Nature* and for CTW's *Sesame Street*—and for the A&E cable network. The facility also posts commercials.

To attract additional TV clients, Videomix has recently upgraded to the D-2 and Beta SP video formats. Dwork especially likes D-2 because "its audio quality is wonderful." Other upgrades include redoing one room for Dolby Surround and completely reworking the ergonomics and acoustics of another, adding a Sound Workshop board.

Equipment and individuals are equally important in attracting clients, Dwork says. "Initially, it's the person. Clients need to feel comfortable working with an engineer. But you've got to have the basic equipment the client is used to working with. We try our best to have both. There's no limit to what you *can* spend. We've reached the limits of what we can afford to spend on equipment."

New York's PowerStation, like many facilities, got into post-production through the back door. Audio-for-video

now comprises 30% of its business, with sound recording making up the balance. According to general manager Barry Bongiovi, post-production grew out of the recording side. "Over the years, clients came in and wanted to have control over their entire mix. So we got involved in film mixing on a small scale, which led us to build Studio D, a hybrid room that incorporates post-production and audio mixing."

The room has an SSL 4000 G Series 80-input console and a GE light-valve video projection system with a ten-foot screen. "Commercial clients who come in for music scoring now can move up to D for music mixing and adding dialog and effects," Bongiovi says. "We can do the dialog recording and add in effects from our library. We can use a 9600 Synclavier and a PostPro Direct-to-Disk, and do their final mix and layback to one-inch so they can leave here with a master."

Once the room was in, business grew fast. "In a year, we went from no clients to ten steady ones," Bongiovi says, "from both programming and commercials." The shows include two weekly sports series from Phoenix Communications that appear on ESPN,

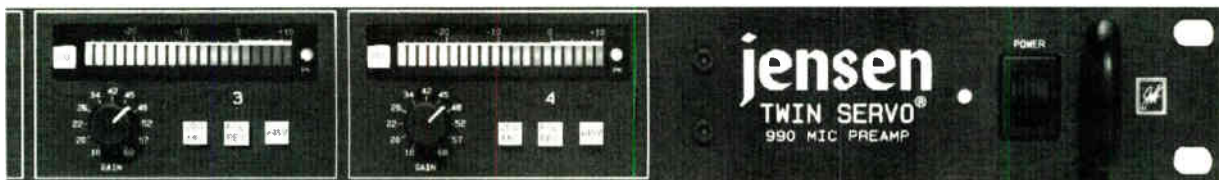
and commercial post includes work for Ogilvy & Mather, Backer Spielvogel, and Saatchi & Saatchi. "About half the clients come specifically for post-production engineer Bill Ivie," Bongiovi adds, "and half come for our reputation."

On the opposite coast, San Francisco's Russian Hill Recording reports a similar experience. Seventy-five percent of the facility's business comes from sound post-production for film and video, says studio manager Cindy McSherry. Much of the business is for commercial clients, which are usually agencies, although sometimes it is the music producer. "Services include everything," McSherry says, "starting with recording voice-over, to sound effects design, to full sound post-production, to music recording, to the final mix."

Russian Hill's high level of repeat business "has a lot to do with our stable engineering staff," McSherry adds. "Our most important engineers have been here for ten years, and they all build their clientele. Equipment is important, too, but the talent is the most important factor in attracting clients."

The equipment at Russian Hill includes an SSL 4000 console with Total

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Recall and automation, an Otari MTR-100A multitrack with switchable Dolby A and SR racks, an Otari MX-55, UREI and Yamaha monitors, and a Q.Lock synchronizing system. "For agency clients, the best thing to have is automation," McSherry says. "So many changes can occur with ads that it helps if it's easy to come back into the studio to do a remix." Russian Hill has seen no sign of a recession so far. The facility had a good fourth quarter 1990 and first quarter of 1991.

Good times also prevail at another San Francisco facility, Different Fur.

"There's no recession. We're busier and booked up further in advance than ever," says co-owner Susan Skaggs. Founded over 20 years ago by Patrick Gleeson, composer and keyboard player. Different Fur was bought by Skaggs and partner Howard Johnston six years ago. It specializes in soundtracks for TV and feature films for producers based in the Bay Area. Past work includes *Apocalypse Now*. Ongoing TV work includes the syndicated series *Unsolved Mysteries*. Commercial work includes the Infiniti car spots.

Among other systems, Different Fur boasts an SSL console with Total Re-

call, a 24-track digital Sony 3324 and a 24-track analog Studer, a 4-track, 1/2-inch machine, and a 2-track machine that can either be 1/2-inch or 1/4-inch, a Lynx synchronizer and a Sonic Solutions digital editing system.

To develop business, the facility is building a digital editing suite for its Sonic Solutions system. "It will be a good selling point," Skaggs says, "enabling digital editing and CD mastering and prep. Nowadays, a lot of people record directly to a DAT. You have to edit and sequence it, and the Sonic Solutions systems is good for that."

Skaggs believes a facility's people are important, "but it's also true that recording to picture—with such factors as synchronization and laying down time code—requires a higher degree of equipment sophistication than recording a straight music session."

To the south, in Los Angeles, one of the largest exclusively audio post facilities is EFX Systems, with a staff of 60. It was founded eight years ago by George Johnsen, who started off as a film sound effects man. As Johnsen's work progressed to larger-budget films, he discovered that "renting a dubbing theater to hear if my 300 tracks worked together was not a cost-effective way to deliver something on budget. So I started exploring multitrack technology for film."

That idea has grown into a facility that now gets business from three areas: film studios like Disney, MGM and 20th Century Fox; theme-park production for Universal Studios and others; and TV shows like *thirtysomething*, which is an all-digitally post-produced show. "At first everybody thought that digital post would be ideal for big effects shows. They didn't realize how good it would be for a small show of mostly people talking, with its extra clarity and extra quietness," Johnsen says. The facility also worked on *Final Approach*, the first all-digital motion picture, which used digital field recording for the dialog, and in which every sound is new, either recorded or created in the digital domain.

Johnsen believes that "quality is a big issue in audio post. That's why for over four years we've been exclusively digital." EFX has nine Sony PCM-3324 digital multitracks and seven NED systems, both Synclaviers and PostPros. Nevertheless, he adds, "To attract clients, you need people. Equipment is junk. It's the carpenter, not the toolbox."

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And getting the right people isn't easy. The problem today, according to Johnsen, is that "a lot of people unable to make it as musicians are trying to get into the post-production business, without understanding that the post facility is completely different. The mindset you need, even down to the point of client services, is also completely different than in the music business. Budgets become more important. The 'Okay, we're gonna get in here and overdub until we get it right' philosophy doesn't belong. That doesn't mean people aren't interested in quality. They are, but quality is an assumption."

EFX Systems has felt no recession so far, but Johnsen cautions that business could still turn soft. "Startup companies are doing things at tremendous losses just to get a credit. The majors—Todd-AO, Universal Studios, Post Group—are feeling the crunch of new competition, and to secure market share, meet payroll and pay back equipment costs, they will start to discount. Everybody will be squeezed."

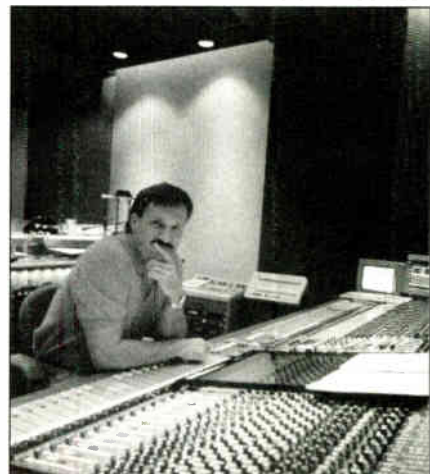
Another facility that has grown out of a one-man shop in L.A. is Studio 56. It started seven years ago in president Paul Schwartz's basement, and three years ago moved into the old Radio Recorders building on Santa Monica Blvd. Twenty percent of its work comes from TV shows like *Gabriel's Fire*, *Married People* and *Life Goes On*. Ten percent of the work is commercials for clients like American Airlines. Everything else is album work.

Studio 56's Studio A has a 60-input Neve VR with Flying Faders, two Studer A820s with SR, and TAD monitors. B has a Trident 80B, three Otari MTR-90 MkIIIs, and Studer 1/2-inch and 1/4-inch recorders. C contains an updated Neve 8028, another Otari MTR-90 and Studer recorders, and a Mitsubishi 60-inch video projector. All three rooms are tied into a 2,500-square-foot soundstage. To encourage business, six months ago Schwartz finished redesigning, remodeling and rewiring everything. He says all three rooms are booked all the time, with no recession in sight.

Some facility owners have the good fortune of being able to design their shop from the ground up. That was the case with John Ross, president and owner of Digital Sound and Picture, Los Angeles. After running the facility as Wildcat Studios, five years ago he

decided to base his expansion on digital technology, so he built a new, larger location and moved there in

PHOTO: WAYNE GORDON



Compact Video

Sound mixer David Fluhr at the Neve VRP60 in Studio D, which opened last October at Compact Video, Burbank, Calif. "We added a fourth room to accommodate long-form TV and more complex specials that require more inputs and two mixers," says Wayne Gordon, Compact account executive. About 25% of the facility's business involves film, the other 75% being long-form TV. Recent projects to pass through the room include an ABC Afterschool Special "But He Loves Me," the "George Burns 95th Birthday Special" and a Rosanne Cash special.

February 1990.

The new facility has a large Foley stage, ADR capability, and five DAWN (Digital Audio Workstation Nucleus) systems from Do Re Mi Labs, with eight tracks of disk-based recording. DAWN systems are networked throughout the facility, allowing information to be transferred from room to room. Digital sound engineers record information—be it Foley or ADR—directly to hard disk. Another set of hard disks service the mixing room. These become audio sources. The mixing console is a Euphonix Crescendo. "It's fully automated," Ross says, "but the console itself exists in a rack in the machine room, and the control surface is just a computer that speaks to the rack. The system has true complete recall, remembering every single parameter, including EQ."

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erators, Ross has seen no sign of a recession. "Since the move to the new location, we've done nine features, plus a TV series and movies of the week produced by Westgate Productions for Fox Television," he says.

log—and most are—are immediately frozen in digital once they get here, and stay digital all the way through until the very end, when they go back to analog. They like the flexibility of cutting and pasting. It's like word processing with sound."

To attract new business, Digital

another area of the building we're putting exactly the same type of room, but with 35mm."

One basic message emerging from this informal survey of audio post is that it's a good business to be in because it's getting support from three groups: producers of commercials, TV shows and feature films.

Agencies are pushing it largely because viewers are paying more attention to TV sound. "People watching TV are more aware," says Video Art's McManus. "They want to hear high-tech, high-quality commercials. Television audio took a back seat to video for a long time. But today, if we can't add that sound that grabs their attention within the first few seconds, they're gonna zap to another channel."

In features, audio post is behind the first big change in film technology in nearly a half-century. EFX Systems' Johnsen points out that film technology "hasn't changed ever since we got magnetic recording. We're still releasing in optical. The next technology shift is going to be in the release format, with digital coming in. That will expose flaws in analog recording, and digital will then spread backward



Different Fur Recording Studio, San Francisco

"Producers like it here because they can hear all the different elements before they mix, which they can't in a normal mag-type environment. They like the fact that shows shot in ana-

Sound is expanding. Right now the mixing and dubbing stage, which is set up with Dolby Surround, has 8-by-10-foot video projection. "People prefer 35mm projection," Ross says, "so in

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"For the music mix, we locked two 24-track machines with Dolby SR, a video machine, a four track, and a MAC computer to one of our two MOZARTs. MOZART is a very SMPTE-orientated mixing console" Andy Waterman, The Bakery, LA, quoted in Post magazine, November 1990.

Nowadays, time is of the essence. Real time costs money, and the ability to work in the artificial world of SMPTE time earns money. AMEK's MOZART was designed with both sorts of time in mind. Computer-assisted mixing is now commonplace but systems of real sophistication were, until the arrival of MOZART, restricted to consoles in the highest price range.

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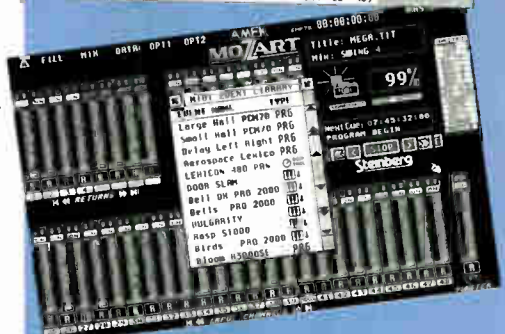
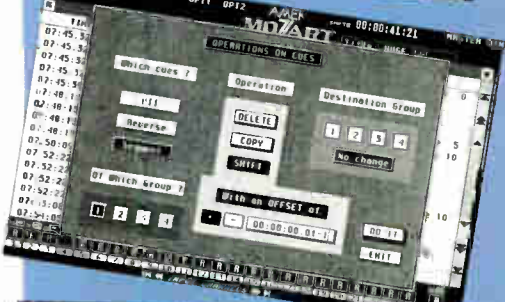
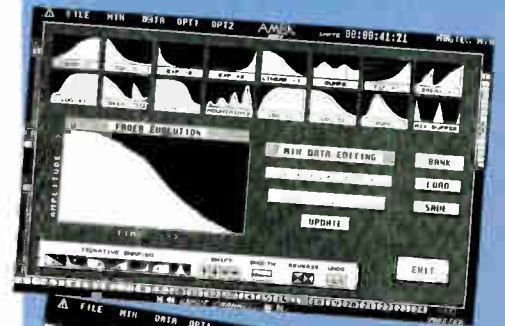
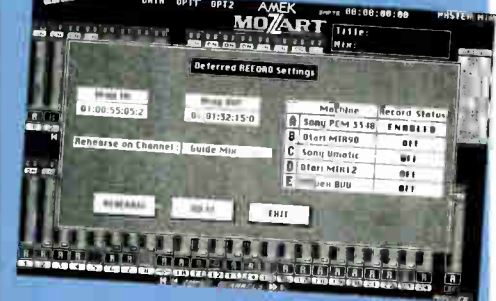
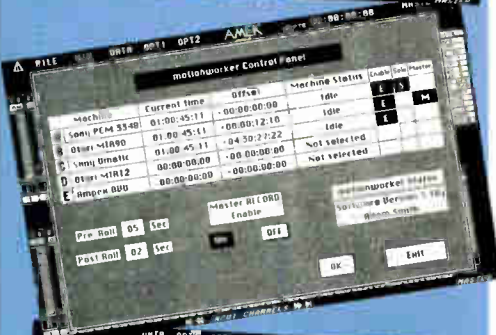
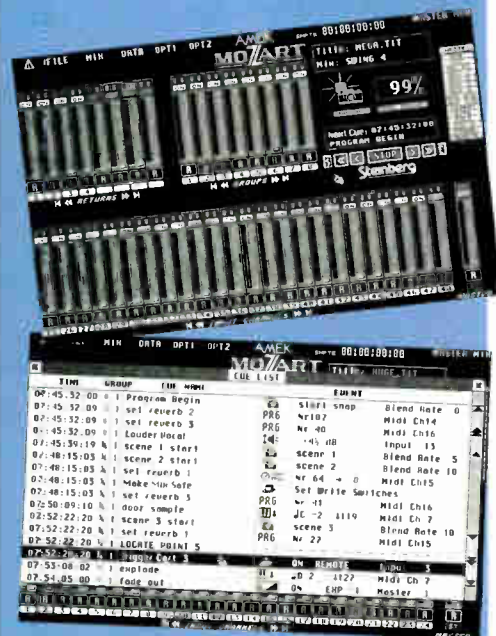
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MOZART was designed as an open-ended system. The new autolocator hard- and software expansion allows total control of multi-machine audio and video systems. The Locator panel fitted into the centre of the console provides Master Transport Controls with a full range of find, start and cycle functions. The machine control window in SUPERTRUE allows offsets, location times and pre- and post-roll parameters to be set up for multi-machine operation. Another window allows automatic, quarter-frame accurate punch in/out recording with a full rehearse function.

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to post-production and production.”

In TV programming, the growth of audio post is being encouraged by a combination of factors, including the coming of all-digital production and the increasing availability of high-quality consumer electronics equipment that can bring good TV audio into the home. ■

Post-production editor Peter Caramicas lives in Pleasantville, N.Y. He is the former editor of Millimeter magazine.

POST NOTES

Avid Moves Ahead

Before the end of 1990, Avid Technology Inc. of Burlington, Mass., sold its 100th Avid/1 Media Composer, a system said by many to be revolutionizing video editing through the number of options it lets editors see and choose from at great speed. The nonlinear, Macintosh-based device provides instant random access to digitized video source material on a computer screen, and to CD-quality audio. Producers can use the system to visually rearrange pictures; they can see and hear the results instantly. The 100th system went to Chicago's Universal Recording.

Lexicon Rising

In one fell swoop, NHK, Japan's largest broadcaster, has also become the world's largest user of Lexicon's 480L digital effects system, replacing all of its other reverbs throughout its extensive TV, radio and recording studios.

An Encore for Encore

Neotek Corp.'s new Encore console for film dubbing and TV post made its European debut at the AFS show in Paris, Feb. 19-22. Derived from Neotek's Elite console, the Encore was designed specifically for film mixing engineers, according to chief designer Craig Connally. Available with comprehensive machine control, integrated moving fader automation, and 4- or 6-track formats, it moves Neotek squarely into the post community. The first one was delivered last November to West Productions in Burbank, Calif. Encore's starting price: just under \$200,000.

DAR Reign In Spain

Mac Master, Madrid's newest audio-for-video post-production company,

reports constant work for its DAR Soundstation II Digital Audio Production System since the facility opened a few months ago. Mac Master offers audio services for agencies serving Spain's booming TV market. These include writing, production and recording of original music, and audio-for-video edit facilities.

Pyramid Branches Into Post

Pyramid Sound Recording Studio, San Francisco, having served primarily local musicians, bands and songwriters since 1987, now offers a digital audio workstation and an analog multitrack recorder locked to video and synched to MIDI. The facility has begun audio-for-video post-production with work for The Gap, Apple Computer, documentarian Lonnie Ding, and clothing outlet Headlines.

Wild About Harry

With the delivery of a fifth system from Quantel, Videosystem, the Paris post-production facility, has become the only company in the world to own five Harrys. Videosystem managing director Alain Guilot says that the company's high volume of commercial post will keep all five busy.

POST BRIEFS

Intersound Inc., Hollywood, CA, has appointed Gerard Shadrack, formerly with Harmony Gold, to production manager...**B&B Systems**, the post-production systems facility design and engineering firm based in Valencia, CA, has opened a New York office headed by Norman Schnapper...**EFX Systems**, Burbank, CA, provided post sound for the feature *The Lunatic*, the film debut of Grammy winner Lol Creme. Mixers were Ken Teaney and Bill Freesh, assisted by Tony Sereno...

Universal Recording, Chicago, completed four spots for Time-Life Books' Civil War series. Supervising video editor Tony Izzo created visual effects based on the photos used in the books, and audio design mixer Michael Mason created all the war sounds on a Synclavier, then mixed the spots using an AMS AudioFile...The **Canadian Broadcasting Corporation** has ordered a dozen Studer 963 Series audio consoles for the national radio network's Toronto Broadcast Centre. The same console has been installed at CBS in New York for production of *The Joan Rivers Show*. ■

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by Paul Potyén

TIMING IS EVERYTHING

PART 1

Last month, I got the bright idea to write about synchronization. It's something I personally want to know more about as I record more and more audio-for-video, and it's something I thought would be of equal interest to many Mix readers.

In my naivete, I may have opened Pandora's box.

As a result, this month's "Byte Beat" comes to you in three parts: "Synchronization & Machine Control" is a primer written by Gerry Block, president of TimeLine Vista Inc. "In Search of a Unified Time Base" talks about synchronization of MIDI and tapeless digital audio with analog transports, and is penned by Mark Miller, an independent consultant who until recently worked in technical support at Digidesign. The third element (below) is excerpted from an eye-opening discussion that involved George Johnsen, owner of EFX Systems (an L.A. post-production house), along with Block, Miller and myself. It took place at the January NAMM show, and what emerged is important for anyone, manufacturer or user, who is or will soon be involved in synching audio-to-video.

Miller: For me, this issue began to emerge when I was working at Digidesign with Q-sheet A/V, one of the first products that ran digital audio and MIDI off of a personal computer. In testing that product, we discovered these two types of information, digital audio and MIDI, respond differently to bad time code. Over the course of the next year-and-a-half, a variety of different products went out the door working exactly the way they were supposed to in the presence of accurate time code. Real problems started when you used bad time code. People coming at this whole thing from the lower end—from locking sequencers to tape—didn't really seem to understand the technology.

This started a personal crusade to introduce users to black burst and house sync and hiping them to the

fact that they need a solid time base. If you run this stuff off of generator-quality code, everybody's happy—it takes all of the guesswork out of it.

That's where I left off. Now, to me the big question is, "Where is that [education] going to come from?" The product literature that I usually see doesn't mention any of these issues. There's often a one-liner, like "SMPTE synchronization included!" It doesn't really get into what's involved.

Johnsen: But you do realize the problem you're describing actually has nothing to do with workstations? Workstations are just another flavor of exactly the same problem. The [bigger] problem is that people just don't understand what time code is or how to use it. The fact that time code will work at 13% off-speed and still be able to sync on some synchronizers is a really

IN SEARCH OF THE UNIFIED TIME BASE

by Mark Miller

The next major hurdle in the evolution of the personal computer as the "virtual recording studio"—the integration of MIDI and digital audio—is finally happening. The day is upon us when the personal computer is growing into a full-fledged workstation. All the major players in the sequencer market either have already or will soon provide integrated solutions. Needless to say, this has brought up some interesting issues, not the least of which is synchronization.

In the film and video world from whence it came, SMPTE serves to identify each discrete frame of video with its own unique identification number, thereby allowing a video editor to deal precisely with the smallest useful unit of video: a single frame. (See "Synchronization and Machine Control" sidebar.) When applied to audio, time code serves a similar function. It identifies each moment of sound with an absolute location.

The personal computer-based digital audio workstation (or PCBDWA, for short) turned out to be an entirely new (and strange) animal around the synchronization water hole. To understand it, a few words about tape are in order.

Tape is a linear medium. The timing of audio playback is tied to its location on the tape. When recording on multitrack tape, the individual tracks are kept in sync with each other because they are side by side and physically locked together. If the machine speeds up or slows down, all of the tracks are affected equally.

When you prepare to synchronize a center-track tape machine, you record the time code track first and then record audio on the adjacent tracks. Thus, the audio that is recorded is physically locked to the time code numbers parallel to it. When this type of transport comes under synchronizer control, the audio signal is completely ignored

—CONTINUED ON PAGE 58

neat thing, but it's also accepted as being the norm. What you're calling "bad" time code is 90% of the time code that's in the field.

Block: Including video post houses?

Johnsen: No. Video post houses are a different world. We don't experience any time code problems with what we receive from video post houses. Most time code problems occur when composers who own their own SMPTE interfaces come in and I don't know how to



Clockwise: Gerry Block, Mark Miller, George Johnsen.

use them.

Block: There are [seven] major problems with time code in broadcast operations.

Johnsen: Absolutely. The essence of broadcast operation is that you're working off of [video] sync rather than off of code. Code is used to identify a particular location on a tape—not as a synchronization medium. The synchronization of a frame of video has a leading edge pulse that says, "I'm starting a frame now," and an associated time code number that goes with that. A minute later, the time code won't necessarily have to correspond [to the video frame]. Life will go on if they don't match up. That's the biggest problem: Life *will* go on. If life failed at that point—if the signal died because the time code wasn't in sync with the video, then people would pay attention to this problem. As it exists, it's a medium where the time code is used only as an identifier. It's only a *name*

—CONTINUED ON PAGE 68

SYNCHRONIZATION AND MACHINE CONTROL:

What It's All About

by Gerry Block

Music, audio-for-TV, film, advertising, industrial. No matter what the end-product, audio production has become a time code-based industry in the last decade. And the trend toward the use of time code as a universal control mechanism is accelerating rapidly.

This is ironic for two reasons. First, time code itself was not really developed for many of the purposes to which it is now being applied (for instance, audio-only lockups); second, despite its inherent simplicity, it is probably the least understood technology you will encounter in the industry.

Video and the Need for Time Code

While much of the new technology today is based on concepts unknown in the early days of film, the techniques and requirements differ very little—they're just being encountered by other classes of users. When talking motion pictures were invented in the late 1920s, the movie industry within a few years defined, and then solved, almost all of the problems in synchronizing sound and picture, and created almost all of the production techniques in use today. The technology, of course, was not electronic. But the techniques helped spawn the entire industry as we know it.

Film machines have the virtue that, once their sprocket shafts are electrically or mechanically linked, all the separate reels move in exact synchronization at all times, regardless of speed. When the videotape recorder was invented by Ampex in 1956, it was a fantastic step forward, but with certain key exceptions: It had no sprockets, it could not be synchronized and it could not be physically edited. This was a problem because, just as with

—CONTINUED ON PAGE 63

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THE BYTE BEAT

—FROM PAGE 57, UNIFIED TIME BASE

and only the SMPTE numbers are needed to locate a particular point within the audio track. An analog tape transport, being a mechanical device, is prone to wow and flutter. Therefore, during synchronization it's necessary to slew (speed up and slow down) any analog transport to keep it in lock-step with a master deck.

There are two relevant differences between tape machines and PCBDAWs:

1) Hard disk is not a linear medium. The time it takes to locate any point on the disk is so small that the physical location of the audio on the disk becomes insignificant.

2) Digital audio playback occurs at a very consistent rate (its "sample rate"). Therefore, it tends not to suffer from wow and flutter.

When synchronizing a PCBDAW, you don't need to actually record code anywhere. The computer keeps track of timing by counting the number of samples and converting the information into hours, minutes, seconds and frames—a kind of virtual time code.

Actually, MIDI sequencers have been doing that for years. Indeed, locking a MIDI sequencer to SMPTE is about the most virtual and abstract type of transport of all. Not only do you not record *time code* into the sequence, you don't even record any *audio*.

When comparing synchronizing MIDI with PCBDAW, we again find two major differences:

1) MIDI is control information. It makes no sound and takes up very little memory. A single note-on message from the computer can generate unlimited amounts of sound from a MIDI device.

2) Unlike either analog or digital audio, the speed with which you send your note-ons and note-offs has nothing to do with the pitch of the sounds they produce. No matter how fast your sequencer triggers G# on your MIDI keyboard, it always sounds at G#. Changing tape speeds or sample rates, on the other hand, will change the pitch of the audio.

These three types of transports (analog tape, PCBDAWs and MIDI) deal with time code and audio in

very different ways. They do, however, have one thing in common. All of them are set up to perform optimally in the presence of perfect time code—that is, when one minute of SMPTE numbers always goes by in one minute of real time. The most common problems in multi-transport synchronization are caused by the introduction of imperfect time code into the system.

During synchronization, one transport is usually designated as the master. It provides the primary source of time that all of the slave transports will follow. In any system, there should be only one master at any one time, but that master can have as many slaves as you have the hardware and software to handle. Most of the time you need to start that master tape somewhere other than at the beginning. All of the slave transports will then find the corresponding spot in their audio tracks and start playing. This task, known as chasing, emphasizes how these different kinds of transports perform in the presence of imperfect time code.

Let's say that we have a video-tape striped with perfect SMPTE. We'll run that tape at perfect speed and record some sound effects to the picture using a sampler. Its audio output is recorded to both a center-track analog tape machine running under synchronizer control and to the PCBDAW. We will also record the MIDI to a MIDI sequencer locked to MIDI time code.

Now let's speed up the master (video) deck's transport so that one minute of SMPTE numbers takes only 59 seconds of real time to pass over the heads. What happens when we set all of the slaves up for playback and run the master tape?

The center-track tape machine will perform quite well in this situation. Once its synchronizer receives a time code number from the master, it will fast-forward or rewind the slave transport to find the corresponding number. (Remember that the relationship between audio and time code in this type of transport is physical and absolute.) Therefore, as long as the SMPTE numbers line up, the right section of audio will play at the right time.

Furthermore, because time code

—CONTINUED ON PAGE 61



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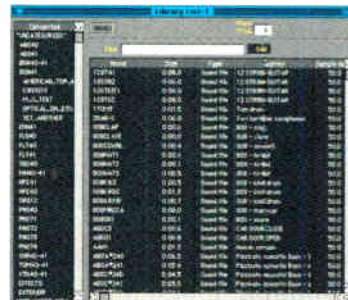
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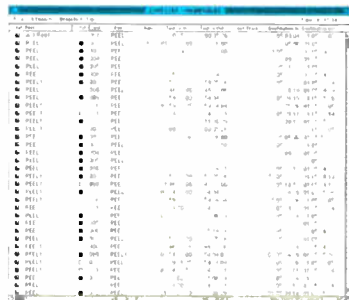
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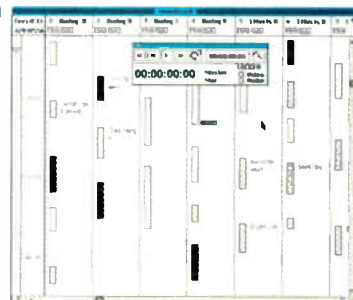
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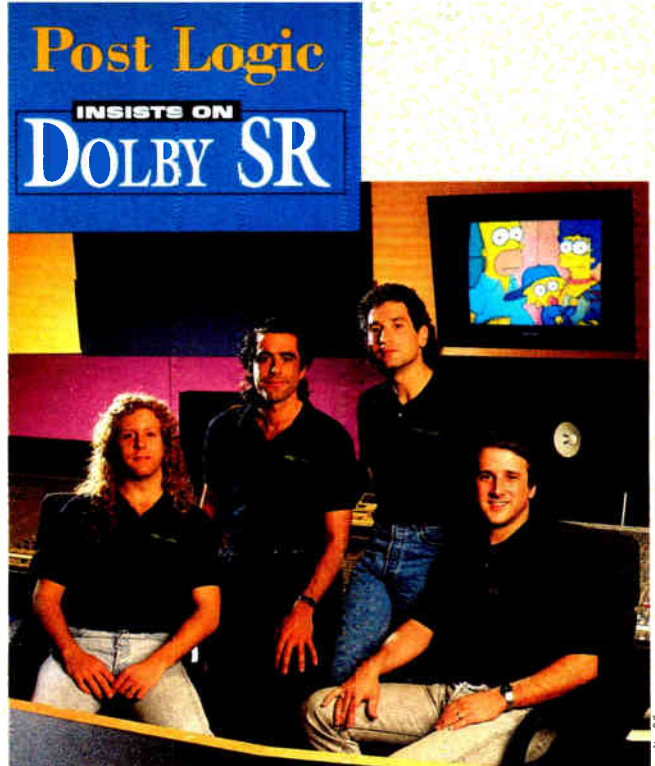
is running faster than normal, the slaved center-track machine will be sped up (slewed) by its synchronizer. Thus, its audio will play with shorter durations and at a higher pitch to keep it in sync with the master.

The first generation of PCBDAs responded somewhat differently. Since their time code was not written to disk, but calculated abstractly, they assumed that the time code they were reading was perfect. Let's say the audio track in the PCBDa is set to start at 00:00:00:00. If you start the master tape at 00:01:00:00 (one time code minute later), the computer assumes that it should start one minute worth of digital audio (or 44,100 samples x 60 seconds) into its audio track. If your master time code is running fast, with one "minute" of SMPTE numbers actually representing 59 seconds of real time, the PCBDa will bring you in at 44,100 samples x 59 seconds. Your audio track begins playing one full second ahead of the master.

The audio track will then continue to play back at its normal speed (44,100 samples/second), not at the faster rate at which the master time code is running. So, first the master will catch up, but then the PCBDa will continue to fall further and further behind. This method of synchronization is called chase and trigger. There is no slewing involved. Once the PCBDa has located its "in" point, it always plays audio back at the same speed. When you confront this type of system with bad time code, what you get, basically, is a mess.

Recent technological developments have allowed PCBDAs to compensate for imperfect time code. Continuous SMPTE Synchronization, implemented in Digidesign's Sound Designer II 2.0, is a digital signal processing (DSP) function that ensures that the rate at which audio is recorded and played back is continually adjusted to follow the master code. In our example, audio playing back from Sound Tools (with Continuous SMPTE Sync enabled) will chase to the correct spot, and then play back

—CONTINUED ON PAGE 63



Tony Friedman, Miles Christensen, James Ledner, Peter Baird, and Steve Carlton (not pictured)

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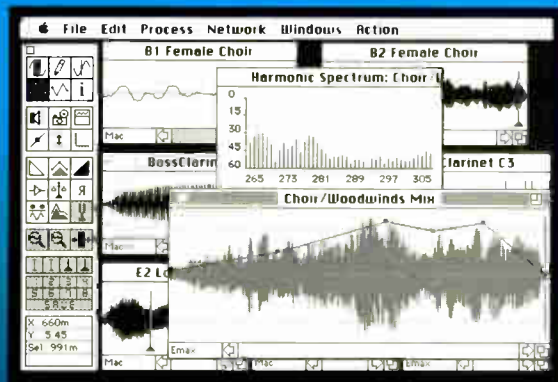


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THE BYTE BEAT

—FROM PAGE 61. UNIFIED TIME BASE

at a higher pitch and shorter duration—behaving almost identically to the audio coming from the center-track machine.

The MIDI sequencer will chase to the correct spot and then play back all of its note-ons and note-offs at an accelerated rate. All of the notes will be triggered in the correct place relative to the master deck, but without any adjustment of pitch. If you are triggering sound effects, you're probably okay. However, if you're trying to lock MIDI keyboard parts to pitch-related audio tracks, you are going to have some serious pitch problems.

It seems that the center-track machine is the least problematic, eh?

As a slave, maybe, but at the cost of time (winding tape), sound quality, non-destructive editing and many other goodies that come with tapeless digital audio and MIDI systems. Furthermore, wow and flutter make the center-track machine a prime source of bad time code. Slewing will keep this type of transport more or less in sync as a slave machine, but its own time code is suspect as a source of master code.

So I leave you with three transports in search of the Unified Time Base... ■

Until recently, Mark Miller provided technical support for Digidesign. He is now a freelance consultant, providing services in tapeless hard disk audio and synchronization systems.

—FROM PAGE 57. SYNCHRONIZATION

film production, video production often requires that the audio be recorded and edited separately.

The Evolution

There were a number of early methods of electronic synchronization. The earliest form was, of course, invented for film and was called Pilot. It was like putting electronic gear teeth on tape. A sine wave, generated during shooting by some mechanical source like a camera motor, was recorded on

—CONTINUED ON PAGE 64

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THE BYTE BEAT

—FROM PAGE 63, SYNCHRONIZATION

tape along with the audio.

The result was a sprocket-like recording that had a virtual "tooth" for every film frame. The sound recording (such as live dialog) could be transferred off the tape *back to film* by locking the "tape sprockets" with the film recorder sprocket drive motor, as if it had been recorded on film at the start. The resulting transfer would take up exactly the same amount of magnetic film as the picture. If they were laid side by side, they would be in perfect alignment. And this transfer could be done a hundred times with exactly the same result.

There was one problem: The process could be used only for

Figure 1

REGION	TV STD	MAINS	FRAME RATE
U.S., Japan, Europe	NTSC PAL/SECAM	60 Hz 50 Hz	30 Hz ("nominal") 25 Hz

transfers. The playback *speed* could be controlled, but a position (physical address) could not be identified electronically for searching,

Figure 2: "Chaos"

COUNTING RATE (HZ)	COUNTING METHOD (FRAMES PER SECOND)	DISPLAYED TIME ACCURACY	APPLICATION
24	24	real time	Motion pictures and film
25	25	real time	EBU standard for European television
29.97*	30 drop***	real time	
	30 non-drop****	0.1% slow	
30.00**	30 drop***	0.1% fast	
	30 non-drop****	real time	

* 29.97" generated by all "color television" sync generators (i.e., almost all sync generators built after 1970). This is the speed at which a "black burst" signal runs (not to be confused with "black & white"). It is a standard color signal with a "color of black". Use this as your standard frame rate unless you are an expert and have a reason not to.

** 30.00: Usually available only in "internal crystal mode" of a time code generator, or from antique (black & white) television sync generators. Don't use this non-standard speed unless you are an expert and have a good reason. This is sometimes used in conjunction with motion picture film systems.

*** Skips 108 frames/hour at regular intervals.

**** Many users prefer 30 (full frame) counting because no numbers skip in the counting sequence—even though the elapsed time accuracy is slightly different from real time.

cueing or editing.

Because videotape required addressability to allow electronic editing, the Pilot method was not a suitable solution for the new medium. In 1967, more than a decade after the invention of videotape,

EECO (an Ampex vendor) designed the first practical videotape editing system using time code. This system was based on a time code concept similar to that developed by NASA for the Apollo and Gemini space missions.

Time code had the virtue of *position addressability*. And it could be read on sprocketless tape by magnetic heads at high speeds. This method was adopted as a standard in 1971 by the Society of Motion Picture and Television Engineers (SMPTE) and then by the European Broadcast Union (EBU), resulting in a truly international standard—or, actually, standards.

SMPTE/EBU time code is referred to as longitudinal time code (LTC) because it is recorded linearly along the tape. It divides the tape

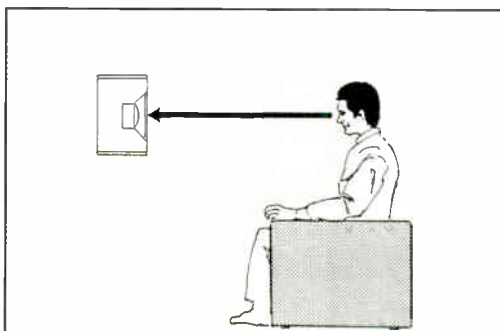
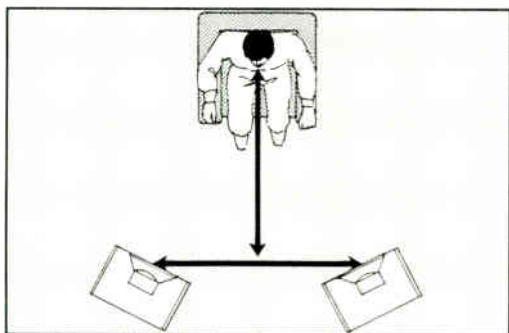
into blocks called frames and assigns each a single, unique number using an 80-bit digital bit-encoding format. The code is truly digital, but

the frequency range it occupies is in the audio range. Hence, it can be recorded on a standard audio track of an audio or videotape recorder.

The time code as put on tape is the actual time digits, each encoded

—CONTINUED ON PAGE 66

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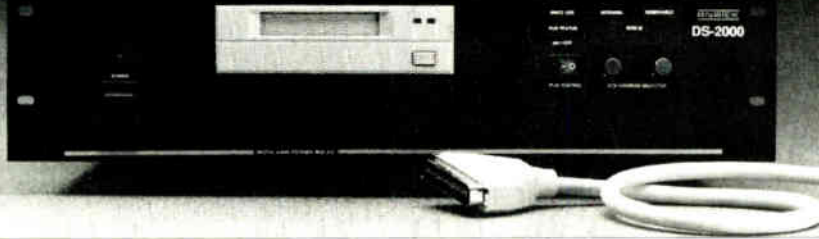
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ANALEK

THE BYTE BEAT

—FROM PAGE 64, SYNCHRONIZATION

in binary coded decimal (BCD) form. This creates the basic time clock-like format that we are all familiar with. In the various time code standards, the number of frames per second varies, but the hours, minutes and seconds are the same.

The Standards

There are two basic standards of time code (and some variations) in use today. These basic standards came about because of the differences in the types of electrical generating systems and power line frequencies in use in the U.S. and Europe. In either case, the basic frame rate was derived from one-half the power line frequency (see Fig. 1 on page 64).

Since film runs at 24 frames per second (fps) worldwide, there is also a third non-standard frame rate of 24, which is rarely used.

29.97 vs. 30

Although originally time code for black-and-white TV had a 30Hz frame rate, when RCA invented the color TV standard, the frame rate was reduced to 29.97 fps. This allowed both color encoding to and compatibility with black-and-white televisions in use, but caused time code to count slightly slower than real time (for every hour of real time, we were 108 frames short).

To correct this problem for those who wanted the time code to show true running time, a new time code counting method was developed, called drop-frame, which would skip certain numbers in the counting sequence (108 per hour) to show real time.

This "solution" has had the direct effect of confusing generations of sound and video engineers, frustrating scores of design engineers, and causing general chaos (see Fig. 2 on page 64).

When using time code, it is important to remember that there are two things time code conveys: one is the speed at which the tape is moving; the other is the frame position. The "frame rate" is another way of saying "speed," and the "type of time code" (30/DF/25/24)

—CONTINUED ON PAGE 69



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- Acoustic foam blanket reduces baffle reflections
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—FROM PAGE 57, TIMING

for this particular location. It is not the *means* for you to get from this location to that location.

And when you don't use any kind of sync at all, the problems become absolutely gigantic. A 15 ips tape recorder may be 15 ips when the reels are exactly balanced, but may be 17 ips at the front of the reel and 13 ips at the back of the reel. What is the real-time base—the one where you actually say, "Okay, this is the speed that this machine should be running"?

Block: With audio tape, the time code itself is the control track. It serves as both the position reference and also the control track. If you played that tape back the next day and you turn the Lynx Resolver on (there has to be a Lynx Resolver) [laughter] and push "play," the machine would now run at 15 ips at the beginning and 19 ips at the end. It would correct for the difference in physical speed.

Johnsen: If the machine is in "external" mode. The problem is that people don't know that they need to have the machine in "external." You're talking

about a major educational problem with people who don't run into this stuff every day.

We're going through this right now on a major show, where the composer is using a MIDI time code product to give me time code that I have to synchronize off of later. It reads as good time code, but the MIDI time code device he's using is regenerating the time code coming in off a VHS cassette with all of its attendant speed variations. Every time it sees a speed variation, it puts a hiccup in the time code. I get that time code back and it reads as valid time code—all the numbers are there, but the time base is all over the map.

Miller: Because it came from a VHS master rather than a black burst-resolved master.

Johnsen: He didn't understand that he had a problem. He just said, "Well, my box says it's coming out as good time code." Education is the key to the solution of this problem.

Block: George, how do we educate people? Should that be our job?

Johnsen: There's *got* to be some educational format. We have to educate people not only to the digital proc-

ess, but to the time code process and to using sync all the way through. You're talking about a mass industrial change.

Miller: What do you think this means now that equipment is getting farther and farther out of the studios and into the homes?

Johnsen: I think it's a bitch, because we're never gonna catch them. Because the *manufacturers* don't understand what time code is.

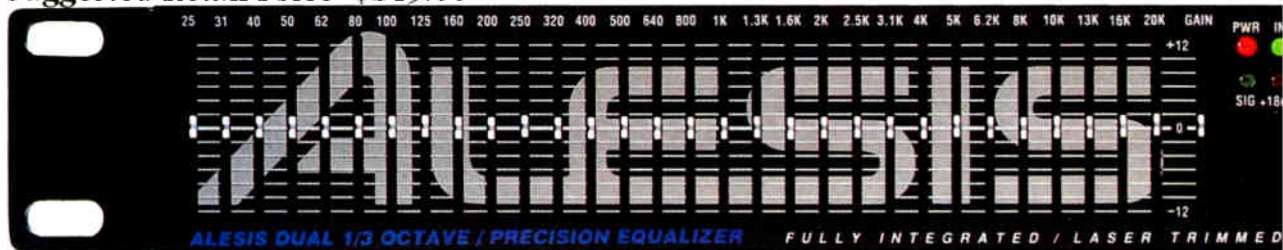
Miller: Here's an example of a way this could be dealt with. There is now a document that goes out with every Sound Designer II manual. It explains that there are two things people have to know about time code: the numbers, and how those numbers match up with real time.

Block: Real time doesn't have that much to do with it. You can have good time code that is not in real time, but it's still good and it works.

Miller: What I mean by real time is that the frame rate has in it the implication that each frame really is a certain amount of time. And that is different for all the different frame rates. [See sidebar, "Synchronization & Machine Control."]

Johnsen: I don't see how that's sig-

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nificant.

Block: Because you can do it wrong and have it work right.

Miller: Not always. On the systems that I'm talking about, which are not necessarily the ones that you are familiar with, you *can't*.

Block: You're talking about workstations, where the thing always comes out at 44.1 and when it starts, it runs at that speed and...

Johnsen:...you run into a huge problem when you have to do varispeeding and the clock is not following the time code.

Miller: Even if the clock *is* following it, you can make your digital workstation run wrong because your *time code* is wrong. It's running slow, so now the audio drops in pitch, but MIDI information is totally virtual—it's control information—so you're getting notes and note-offs and they are falling in the right place, but not changing the pitch. There's no way to track the pitch.

This is a big thing. It may not matter in the upper end of the market, but among the vast, unwashed masses, this is what's going on. You slow the tape down, the [analog] audio slows down, your digital audio coming out of your

—FROM PAGE 66, SYNCHRONIZATION

is another way of expressing the counting method. They are not always related.

30 (full-frame) and DF (drop-frame) *counting* can be chosen at will (usually with a front panel switch on the time code generator) regardless of the *speed* at which the generator runs. The combination chosen gives you either real or non-real time counting on the time code display.

Today, more and more devices that do not even use moving tape are being used for recording and

playback, and time code is still employed as the universal control signal even though it gets translated into something that is not on a linear piece of tape. Why? Because it communicates the two basics: speed and position—the two elements required to synchronize anything—and it will continue to play a permanent role in the future of audio, video and film. ■

Gerry Block is president of TimeLine Inc., a leading manufacturer of synchronization systems now based in Vista, California.

workstation slows down, but the MIDI stays right on pitch.

On the other hand, if your digital audio doesn't slow down—which is the way it worked up until a few months ago—when your time code is wrong, the thing comes in in the wrong place.

Block: You're bringing up a really important point. If you have some element in this system that will not change pitch, and other elements that

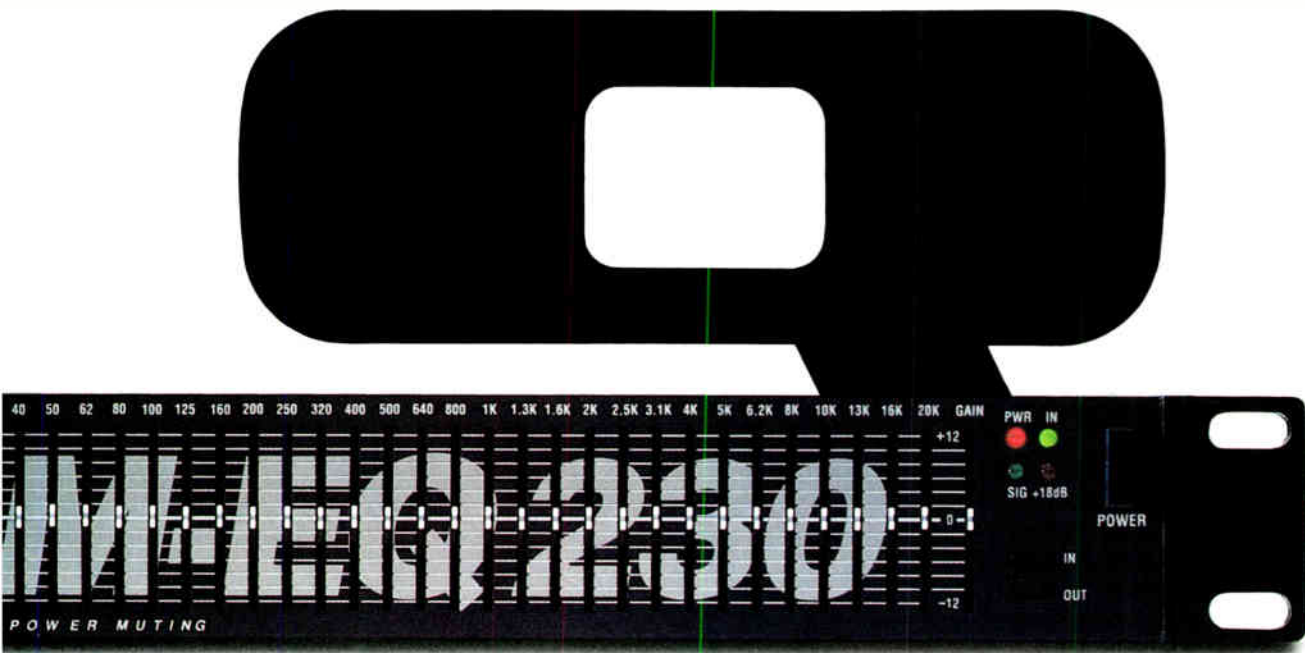
can, then you need to insure that all elements remain at the original pitch.

Johnsen: If I understand you correctly, you're saying that the event-oriented portion of MIDI—note-on and note-off—has no time base.

Miller: Well, the time base control does not track the pitch.

Johnsen: Right. If you've got a constant reference and you slow it down, everything else is constant-reference

—CONTINUED ON PAGE 185



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MARK ISHAM

COMPOSURE



Beginning with *Never Cry Wolf* in 1983, Mark Isham has scored film after film with taste, brilliant subtlety and an excellent blend of traditional and electronic instrumentation. His record career goes back to the '70s, progressing through a panorama of styles (jazz, avant-garde, neoclassical) and collaborations with artists such as Van Morrison, Was (Not Was), XTC, Patrick O'Hearn and Tanita Tikaram. Isham's music has character and quiet self-confidence. His latest solo album is

homemade obentos of teriyaki pork wrapped in shiso leaves, spinach twists, Japanese cucumbers and spicy rice balls. A sip of mineral water, and now, let's delve into the fine arts of Mark Isham (pronounced Eye-shum).

Bonzai: What's the origin of your name?

Isham: It's English. Isham means Hamlet-on-the-River-Ise, the little town of Isham up in the north, just outside of Northampton.

Bonzai: What are you working on now?

Isham: Just before you came, a young director named Michael Bortman was here. I just did a re-write for the last cue in his film *Crooked Hearts*, an A&M film with Peter Coyote and Jennifer Jason Leigh. A very intimate family drama.

Bonzai: Do you spend much time with the film people before you begin work on the scoring?

Isham: I start at various points. Some directors like me in as early as possible. I had a meeting last

night with Carroll Ballard, who is starting a new film that doesn't even begin shooting for another month. Other directors will wait until there is almost a final cut. That gets a bit tricky, because once their cut is done, the real creative side of the director's job is over. All that is left to do is approve things. So, they get real antsy, and the studio gets anxious, and all of a sudden you are under this tremendous time pressure to finish the score.

simply titled *Mark Isham*. During the scenic cruise down Sunset Blvd. to Isham's home, I refreshed myself with his *Film Music* album, a selection of scores I've often enjoyed on long drives in the country. His music is so well-aimed that there's never a rush to hit the target. There is plenty of space for the right notes to hang and shimmer.

Sandwiched between back-to-back film scores and tour preparations, he invited me to his studio. We opened

I like starting early, but you really

Isham in his home studio. Lower left is his Thunder MIDI controller.



can't do any finished work until they have that final cut, because of the timings. If they chop ten seconds out of a chase scene, you're in trouble.

Bonzai: Have you always used computers in your film work?

Isham: Yes, in the generic sense of computers, but I started scoring long before commercial, user-friendly computers had been applied to music.

Bonzai: This takes us back to your first film, *Never Cry Wolf*.

Isham: Yes, the early '80s. In those days, computer music was very young, and the real computers doing music were the big monoliths in the laboratories. But I was using sequencers and various music recording devices other than tape—anything that would serve the purpose and get the job done.

I came at it simply, when someone offered me the chance to do it. Carroll Ballard liked the way my music sounded and thought it would work to picture. It wasn't a career goal of mine to score pictures. I was much more interested in making records and being a performer, a trumpet player, just a record guy.

Bonzai: A touch of happenstance...

Isham: Yes, so I taught myself how to do it, and I still have a self-taught approach. I don't know how to do it in the traditional, supposedly technically correct way. I just have my own funny system of doing it. Computers help a lot because you can get very precise with timings and let the computer do a lot of the number crunching.

Bonzai: So, it's gotten easier.

Isham: From a technical point of view, it has gotten easier. By that, I mean faster, and I have the ability to think of more complex things, get to them quicker and find out if they're working. Without the computer, it would take a long time to build up the complexity, to create the right result and effect.

Bonzai: You are also known as a master at combining acoustic instruments with synthesized music—bringing life to otherwise cold, calculated sounds.

Isham: My background is originally as a classical musician and then as a jazz musician. And I am a performer on a very traditional acoustic instrument. I know what that is; I am very firmly rooted in the tradition of acoustic music.

I got interested in electronic music in the early '70s—Morton Subotnick and the early guys, Moog and Buchla.

I wasn't that impressed with the expressivity of electronic music, but it struck me as a diversification and enlargement of the palette of musical colors. If you look at it from an "artist" point of view, suddenly you have this entirely new spectrum of color to work with. The arrangement and orchestrator side of me was very intrigued by that.

Electronic music has advanced dramatically in the last 20 years, but I still don't think it really has the expressivity, the ability to emote as a single performer can. It takes a human being to get that emotional expression out of the traditional instruments that have evolved.

Bonzai: Do you think of electronics as an underlying bed?

Isham: I use it as the backdrop. If you have to formalize what I do, there is the backdrop and then there is the soloist, the performer, the voice in front of that. The electronics can put him in any universe that you can imagine, including the symphonic palette, the rock palette, funk—every palette of sound.

But if you want the human experience in whatever universe you've created, I still feel that the voice comes better from the traditional instruments. Not to say that electronics won't evolve to that level some day, because there have been giant strides. But if you are looking for the qualities of a single voice...as a jazz player, it's something that I am interested in. That is my background, as a trumpet player. The single heroic voice that can step out.

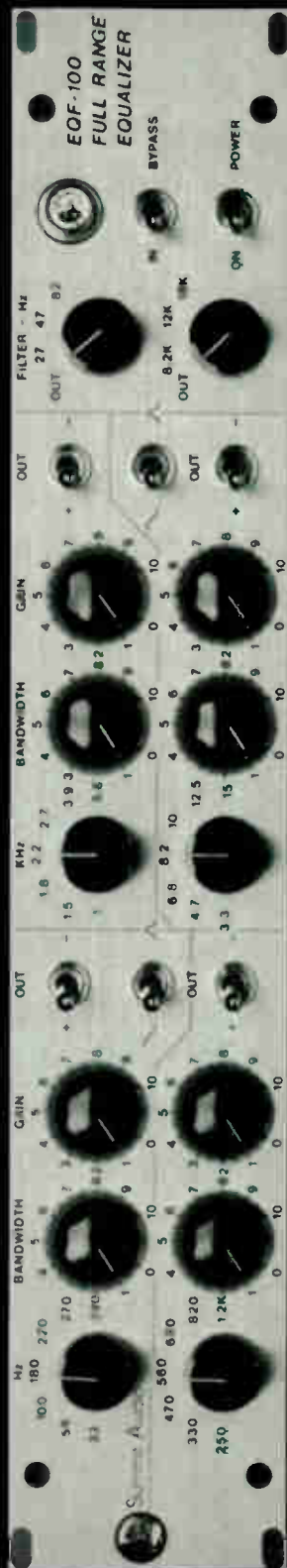
Bonzai: What drew you to the trumpet?

Isham: I love the classical music for the trumpet. That was my first attraction. My parents are both classical musicians, and my mother works professionally as a violinist in many orchestras. She would drag the kids along, and we would sit in the back of the orchestra halls while she rehearsed. I had a genuine affinity for the brass, and the trumpet specifically. It was baroque music that got me—the music of Bach, Vivaldi, Telemann. At Christmas time we would listen to Bach's B-minor Mass, the Cantatas. I was in heaven. To play trumpet in a church with a great chamber orchestra is one of the most sublime experiences.

Bonzai: This was in the New York area?

Isham: I grew up there, but then we

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LUNCHING WITH BONZAI

moved to San Francisco. I reached adulthood and became a professional in the San Francisco area.

Bonzai: Let's talk about those early years of the '70s. You were in a group called Rubisa Patrol?

Isham: That was a jazz band led by Art Lande. He's a phenomenal player, of the same caliber as Keith Jarrett and Chick Corea—that generation and mold. He started the band, a quartet, and we made several records for ECM and other labels.

Bonzai: What is the story behind ECM and Manfred Eicher?

Isham: He definitely made a change, a very big impact, on the jazz world. Manfred is European; he has a very strong European aesthetic, and to put that on jazz, which is such an American phenomenon, yielded very interesting results.

Bonzai: And then you were in Group 87?

Isham: Yes, during the '70s I was experimenting with electronics on my own and playing acoustic jazz with Art—and working at just about any job that came around. Group 87 was the first chance to do my own thing, as it were. All through the '70s, I had been working on an idea to combine the palette of electronics and the sophistication of modern jazz, but with a little more of the impact and the simplicity of rock and popular music. And keeping it instrumental.

This was at the height of fusion and people were doing this, but they were obsessed with how many notes you could play, how fast you could play—a virtuoso showdown. What I was working on with several friends was the opposite of that. We were after a classical simplicity. Along with Peter Maunu and Pat O'Hearn, we formed

this band and made our first record in 1980. It was way ahead of its time, if I can use that phrase.

Bonzai: This brings us up to the time you were about to enter the film world.

Isham: Right, so Group 87 had a record which bombed dismally [laughs]. I moved to England in 1981 and lived there for two-and-a-half years.

Bonzai: Is that where you met Carroll Ballard?

Isham: No, strangely enough, he heard my music on a tape that a friend had given to another friend who was doing the poster art for one of Ballard's films. He came to see the poster art, and my tape happened to be playing and he was looking for a composer. It was just one of those fluke things. He went to the producer and said to find out who



I was. I just happened to be visiting my parents in San Francisco when he was there, and we met.

I got the job and it changed my professional life a great deal. At that time, if you were an instrumental musician, unless you went down the straight and narrow path as a jazz player and you were really good, there

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wasn't a lot happening. You were probably backing somebody. In terms of a vocation, there wasn't much going on. For a composer, you could play the classical or new musical game, or you could try to get into film. I was still writing and playing the new musical game, recording strange electronic tapes, and all of a sudden the film world presented itself to me.

Here are people who want original music. They are not afraid for it to be challenging. In fact, a lot of directors want it to be the next "thing." They want the next unique, wonderful musical statement. They have money. You can make good money. You are given the budget to record a great product. You can hire good musicians and have a good time. I was fascinated by all this. So, I got an agent and began working as a composer.

Bonzai: You've been working steadily ever since in film, and balancing a recording career as well.

Isham: They fit together pretty well, although I have been lax in supporting the record career. The reason is that I have been offered so much to do in film, and it's hard to say no. But in the last year, I've been thinking of my original goal: to make records and perform. So, I'm trying to push the record career onto equal footing with the film work. I'll be touring in the spring to support the new album.

Bonzai: How do you subdue your solo instincts and fit your creativity to the demands of film music, which often doesn't stand out in the foreground?

Isham: You have to realize what the assignment is. You can't think of the film as a vehicle for the composer, although it can happen. The first priority is that you are a vehicle for the film's success. You are a contributor to the overall success of the motion picture. The perfect balance is to have both working together. One successful action for me is to pick the right film. Don't pick a film where you will run into trouble.

Bonzai: Do you find that the challenge of composing for someone else's vision forces you to come up with ideas that you wouldn't otherwise find?

Isham: By all means. I have learned so much in the last eight years of doing this, about music, about what creates what effect. That is one of the main reasons I continue doing films: It is a

tremendous learning experience. For example, *The Moderns* [Alan Rudolph's moody story about American writers and artists living in Paris in the '20s]. I would never have thought of writing music for violins, piano, bass, marimba and drum machine for a record. Where would that come from? And yet, when you sit down and look at the movie and think of the setting in the '20s, and the music that was popular—tango music, the cafe society music, Stravinsky is experimenting with his chamber pieces, jazz is growing, le Jazz Hot in Paris is blossoming—it becomes obvious to me: You have a little of the classical

feeling, but you have some guys who can swing on top of it. And you have the romance of the tango to help you fall in love. It becomes the perfect setting for the film.

Another example: *The Beast* is a film about the Russian-Afghan war. It became an opportunity to dig up those UNESCO recordings, Afghan music, and get a sense of what that music, that culture, is about and respond, to build the atmosphere of the film. You can learn so much.

I never intend to get specific about copying these forms of music, but to be an impressionist, an interpreter. It goes

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LUNCHING WITH BONZAI

back to picking the right film. Unless I know that I can use a voice that is mine—although I am finding that I have quite a wide spectrum of voices—it's probably a good idea that I don't get involved. Otherwise, you get into the hack writing, and I'm not interested in that.

Bonzai: Looking around your studio now, I'm wondering what your most important tools are.

Isham: I'm not a composer who can just sit down with a pencil and paper and write it out from my head. I shouldn't say I can't; I can, but there is a level of confidence I don't have. The system I've developed over the years is based very much on immediate response to hearing what I am doing. It may have evolved in this way because I have grown up with synthesizers, which allow you to mock up things beyond just hearing it on the piano. I am a composer's piano player. I can play the things I write. From a composer's point of view, I need some sort of keyboard I feel comfortable with, one that can give me various moods and sounds. I want the feel-

back in my own response to what I am doing, so that I know I am on the right track.

For years, believe it or not, my main tool was the Prophet-5, which is a fairly simplistic analog synthesizer by modern standards. When it first came out, it was the latest rage, and I still think it is one of the most musical polyphonic synthesizers ever made. There is a warmth that is wonderful, and I still use it all the time. And I have a Korg M1 workstation if I need a band in a box.

Bonzai: The computer?

Isham: The basic setup is Mac-based, and I have a fairly large assortment of gear. I'm not a digital synthesis fan at all. I don't have any. All the synthesizers I have are analog. I guess the Korg is somewhat digital, but it's not FM. And I have a couple of different samplers.

Bonzai: Do you work from videotapes of the films?

Isham: If I may sound like a promotional brochure, this is a full-service 24-track studio here. Two-inch, 24-track Otari, fully locked up to 3/4-inch video and the computer. I have a little Trident mixing console.

Bonzai: Looks like some old tube stuff

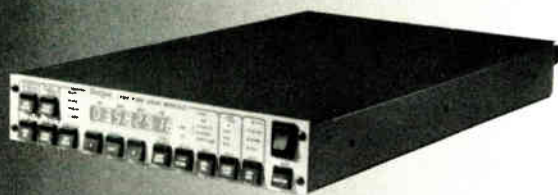
over there...

Isham: Yes, an old LA-2A tube limiter. I have an engineer, Stephen Krause, who is very good. He's worked with me on the studio, and we record directly through Focusrite modules, so the path to tape has extremely high quality. The board is only used for monitoring.

Bonzai: No gadgets that nobody else knows about?

Isham: I have one gadget which I am quite enthralled with—the Thunder. It's a controller made by Donald Buchla. You can touch these pads, or stroke them, and you basically assign them to do whatever you want. The architecture is completely open. Nothing is preset to anything. You have the entire MIDI spec, which can be applied in whatever way you want. Anything in MIDI is addressable by these pads and what the pads can do. As with most of Don Buchla's stuff, this is not consumer-friendly, something that could be used off-the-shelf by just anybody. It requires serious commitment.

Bonzai: It has an interesting ergonomic layout for the hands. It looks like a cross between a keyboard and a typewriter. Would you use this on



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stage?

Isham: Yes, the first project for Thunder is in live performance.

Bonzai: So you can astound and amaze your friends...

Isham: Right, I'll just have this floating on the stage and stroke it, and all these incredible things will happen.

Bonzai: I also see some gongs, and bells and trumpets, of course. That mute looks like a toilet-tank float.

Isham: That's actually a Harmon mute. Yes, I have an ongoing collection of ethnic instruments I like. It's funny, projects come along where they are used, but mostly I just love the aesthetics of having them around.

Bonzai: I sense a Celtic influence in your music. Am I right?

Isham: I think so. I definitely have a classical bent, and I can hear that very much. I also worked for six years with Van Morrison, a master of Celtic songs.

Bonzai: What did you do with Van?

Isham: I started off as a trumpet player in his band. He needed some piccolo trumpet and I was in San Francisco, one of the few guys who played jazz and knew rock, but also had the background in classical music and could play the baroque piccolo trumpet. I did

a track for him, and then he wanted some horns and asked if I knew a saxophone player, and I did. We [Isham and Pee Wee Ellis] became his horn section for about six years.

Bonzai: What did you learn from Van?

Isham: The power of simplicity, that if you pick the right notes, it only takes a few of them. He's the master of that. The fundamental aspect of art is that it must communicate, and Van exemplifies that more than anyone I've ever worked with. When he decides to communicate, he's just unbelievable. When he gets it right, it is *so perfect*.

When I was working with Van, '78 thru '83, it was the period of *Into the Music*, *Beautiful Vision* and *Inarticulate Speech of the Heart*. He was very interested in Miles Davis' *In a Silent Way* and Brian Eno's music. This was my area, so we would get together a lot and work on ideas. We actually did some duo concerts together with two keyboards, experimenting with the various types of instrumental music that weren't what he was used to. He was used to R&B backing him up, or folk-rock, those sort of elements. We spent a lot of time working with some of the new music ideas, Eno's minimalist

stuff, ambient music ideas as backdrops for him as a poet and songwriter. Many of those ideas showed up on the records from that period.

Bonzai: Is there anyone you would like to meet?

Isham: I would love to meet Brian Eno. He's had a tremendous influence on me. There is something similar about our tastes, what we deem as the way to do things from a sound point of view. And I can't really say that about a lot of people who use electronics.

Bonzai: Who do you look up to in the world of film composers?

Isham: My all-time favorite is Nino Rota. The *Godfather* themes are some of the most memorable of all time, but I first knew of him from the Fellini films, which is really some of the greatest film music. Funny film music is hard, because it so easily gets slapstick and loses any sort of musical quality. You start pantomiming the picture. And he had an ability to capture so much, with such a sense of humor. Humorous music is the hardest thing for me. I respect him because he did it so well, and I just love the music as music.

Bonzai: You have achieved a certain

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amount of success. Is life more comfortable now than when you were scuffling around as a young composer? **Isham:** I was thinking about that recently. I've never been a person who has strived for material wealth—it's never been a big issue in my life. The goals of my life have been in aesthetics and art.

From one point of view, a Jaguar is a very aesthetic car compared to a beat-up Chevy, and I much prefer driving a Jag. And certainly I love living in a beautiful home, but that has never been the goal. There were just as many moments of happiness before financial and material success. It really comes down to what your personal goals are.

The artist has the desire to communicate, but there is a certain responsibility in *what* you are going to communicate and the quality of that communication. Art can really enrich people's lives—that is the goal. That's where that pleasure moment comes from: You make something that satisfies your own integrity, it goes out there into the world and has an impact on people, and hopefully enriches their lives.

Bonzai: With all that in mind, do you consider yourself a success?

Isham: Well, I'm getting better at what I do. It's funny, but I work harder now than ever before. You run into people who want to be successful so they don't have to work so hard. That is the exact opposite of what has happened. Maybe I wouldn't feel this way if I weren't working in the arts, where the product itself is such a reward. It's very much connected to what my personal goals are. I'm very clear in my life about that sort of thing. Maybe a lot of people don't have that, or aren't as fortunate as I am in that sense.

Bonzai: Any last thoughts for your colleagues and those who are aspiring to a life in music? Words to the wise?

Isham: Persistence. When I look at my life and what has paid off for me, there are no secrets. The most dismal points in my life were when I chose to do musical things that weren't me—either for the money or some other reason. That got me in trouble. It all comes down to persistence and integrity. ■

Though he acts coy, editor-at-large Mr. Bonzai knows the difference between a toilet-tank float and a Harmon mute.

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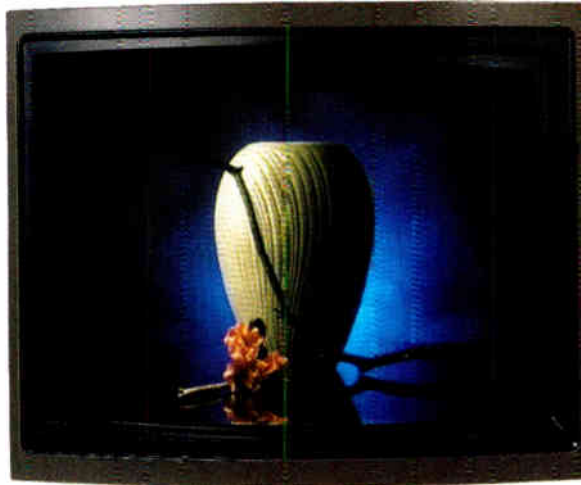
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Sound effects libraries are nothing new, going back to the early days of talking motion pictures, when major studios guarded their collections of SFX creations as closely as their plans to unveil the next matinee hero or Hollywood starlet. Fortunately, sounds could be archived for future productions on 78 rpm records, which later gave way to 33-1/3 rpm albums, and eventually reel-to-reel tape and sprocketed (full-coat and three-stripe) magnetic film.

While all of the above formats provide a method of archiving materials, the limitations of these media became all too apparent when attempting to search through stacks of records, tapes or carts, auditioning to find the “right” effect. The fragility of the media was another major concern—whether dealing with a scratched or warped LP or a broken splice occurring at an inopportune moment on a tape recorder or film dubber. Of course, every soundman’s worst nightmare come true was trying to cue an SFX LP (generally, about 50 cuts per side) during a live broadcast or theatrical event: one slight miscalculation, and the doorbell chime effect suddenly became the charge of a raging African bull elephant!

Fortunately, things changed for the better. The advent of the compact disc offered an affordable, high-density, high-fidelity stereo medium that is fairly impervious to physical damage and, best of all, a cinch to cue. It was only a matter of time until somebody came out with a CD sound effects library, and in 1985 Sound Ideas did just that, with the introduction of its Series 1000, providing more than 3,000 effects on 28 CDs. After that, the floodgates opened, and today there are dozens of libraries—literally hundreds of discs—

PHOTO: BILL SCHWOB

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With so many SFX CDs available, one problem facing many users is the logistics of dealing with the sheer numbers of discs and tracks. Many companies now offer some sort of track search/cross-reference database program with the libraries, either as an option or in addition to the printed catalog/index that comes with the library.

Third-party suppliers—such as Gefen Systems (Woodland Hills, Calif.) and Leonardo Software of Los Angeles—responded with database software that could cross-reference, control and retrieve discs from several libraries from different companies, working with the Sony CDK-006, a CD “jukebox” player with the capacity to handle up to 60 discs. Gefen recently began importing the German-made NSM CD2101-AC, a changer that holds 100 discs and features a 4- to 6-second access time, S/PDIF digital output, and the ability to control up to 16 CD changers via a single RS-232 serial port.

The popularity of CD sound effects libraries today probably stems from that same availability of affordable—yet high-quality—recording gear that spawned the project studio over the past decade. Armed with a modest recording setup, some MIDI gear and a sound effects library (or two), it is possible to do an impressive amount of film/video scoring, sweetening or radio production work, even within the confines of the smallest control

room.

Another factor in the popularity of CD SFX is the ease with which they can be manipulated in the digital domain. After loading sounds into a sampler or disk-based editing system, they can be cut, spliced, extended, looped, pitch shifted, reversed, or all of the above. Later, it is a relatively simple matter to fly these new effects into a mix, synched to SMPTE time code or triggered by a MIDI sequencer. Indeed, a sampler or workstation system also provides a handy solution to the common dilemma that occurs when you simultaneously want to use two effects from the same disc (say, seashore ambience and seagulls cawing) during a live mix.

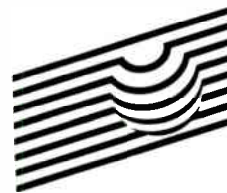
Sound effects discs also make for some creative new directions in music production. How about using a distant thunderclap for kick drum, the spurt of a beer can opening for hi-hat, and a 6-inch naval cannon for snare drum? Perhaps you could try using the hollow thunk of a mortar firing, sampled into a marimba patch. The possibilities are endless, and surely a lot of fun.

Once you've used sound effects libraries for a while, you're almost certain to want more. Either the discs you have don't have what you need, or you simply require more variety. A car door slam from a Checker Marathon doesn't sound like that of a Renault Dauphin, and ditto for Cessna and DC-10 engines, etc. One recent trend is the offering of highly specialized mini-libraries—such as the Sound Ideas “Wheels” (automotive sounds) set,

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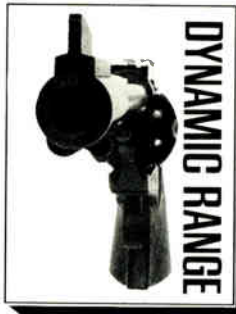
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Dorsey's "Dynamic Range" (873 gun sounds) or the Prosonus Foley Disc (footsteps)—that can be added as an adjunct to a general SFX collection. In addition, several companies are now offering discs from their libraries on an *a la carte* basis. In such a case, you can just buy what you need, whether it's weather, household, transportation, animals or other sounds.

Attuned to market requests, many SFX companies are offering longer effects for background ambience. While somewhat outside the realm of this article, another growing trend is companies providing sound effects in the CD-ROM format, ready for loading into digital samplers of all sorts. Among the companies selling CD-ROM sounds are Optical Media International (Los Gatos, Calif.), Northstar Productions (Portland, Ore.) and Prosonus.

The following is a list of some of the sound effects discs and collections available from a number of companies, with most of the CDs falling in the \$30-\$60 (each) price range. While this cost may seem somewhat steep, a decent sound effects library can be had for about the cost of a decent digital reverb—maybe more and maybe less, depending on your taste in libraries (and/or reverbs). Besides the power and flexibility of a sound effects library will probably bring a lot more business to your facility than having yet another digital doo-dad taking up valuable real estate in your outboard rack. Of course, when you consider the time required to go out and record a bunch of crazed bull elephants, perhaps the price isn't so bad after all.

All of the companies listed here will provide additional materials and/or demos of their wares; addresses are provided so you can contact the companies directly.

Associated Production Music

6255 Sunset Boulevard, Suite 820

Hollywood, CA 90028

(213) 461-3211; (800) 543-4276

Notes: "Sound-FX—The Library," is a 40-CD set priced at \$1,900; five new discs—three are a compilation from the main library, the other two are new effects—at \$60/each. APM also distributes KPM's "The SFX Sound Effects," with four CDs priced at \$60/each.

Bainbridge Entertainment

Box 8248

Van Nuys, CA 91409

(213) 476-0631

Notes: Bainbridge releases are avail-

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able through most record stores. "Living Sound Effects" are four CDs (with another due later this year) priced at \$11.98/each, but requiring a one-time, \$45/disc license if the discs are to be used commercially. Bainbridge also distributes the "Sounds of Trains" Vol. 1-4 and "Sonic Booms" CDs; recorded on the Colossus digital system, these are available for commercial use (in conventional stereo or 4-channel for IMAX or 70mm) through a license from Mobile Fidelity Productions of Nevada, (702) 831-4459.

The CBS Audio-File Sound Effects Library

CBS Special Products
51 W. 52nd Street
New York, NY 10106

Notes: Two volumes (with two CDs in each volume) of classic effects remastered from the CBS archives. Available through Mix Bookshelf, (415) 653-3307 or (800) 233-9604 and priced at \$35.98/volume.

Creative Support Services

1950 Riverside Drive
Los Angeles, CA 90039
(213) 666-7968 or (800) HOT-MUSIC

Notes: Two collections are available: MAX-EFX is priced at \$199; E-EFX, featuring electronic effects, is \$149. Both sets sell as a package for \$299.

DeWolfe Sound Effects

25 West 45th Street
New York, NY 10036
(212) 382-0220

Notes: The 11-CD set is priced at \$600; individual discs available for \$60/each.

Digiffects

Notes: This Swedish collection has been expanded recently to 34 CDs, priced at \$1,495 for the set or available individually; distributed by Firstcom of Dallas, (214) 934-2222 or (800) 858-8880; and by Gefen Systems (listed below).

Dimension Inc.

Box 1149
Okeechobee, FL 34973-1149
(813) 763-4104 or (800) 634-0091
Notes: Ten CDs of Holophonically™ recorded effects for \$600. Two new CDs offer lengthier environmental backgrounds. "Tech Effects" is \$150.

Dorsey Productions

2453 E. Virginia Street
Anaheim, CA 92812
(714) 535-3344

Notes: "Dynamic Range," two discs of guns and weapons, is \$495. "The Works" is a "competitively priced" new set of mechanical EFX, backgrounds and forests, due for release within a month.

Gefen Systems

6261 Variel Avenue, Suite C
Woodland Hills, CA 91367
(818) 884-6294 or (800) 565-6900

Notes: In addition to distributing "Digiffects" (see above), Gefen distributes the "BBC Sound Effects Library," 18 CDs priced at \$849, and the "International Sound Effects Library," a ten-CD set of vintage effects priced at \$495.

The Hollywood Edge

7060 Hollywood Boulevard #700
Hollywood, CA 90028
(213) 466-6723

Notes: "The Premiere Edition," with 20 CDs of general effects, is \$895; just out is "The Edge," a smaller collection of four CDs, priced at \$295. "Cititrax" (\$495)—a ten-CD set of urban sounds—

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and "The Premiere Edition" are also available in AMS AudioFile and NED Synclavier optical formats. In addition, Northstar Productions (Portland, Ore.) packages "The Premiere Edition" on CD-ROM or magneto-optical disc for the E-mu Emulator III.

Interlock Manufacturing Music Dept.

Box 4542
Chatsworth, CA 91311
(213) 461-2500

Notes: Interlock distributes the "Hanna-Barbera Library of Sounds" (\$200), with 232 effects on two CDs.

Manhattan Production Music

Box 1268, Radio City Station
New York, NY 10101
(212) 333-5766 or (800) 227-1954

Notes: Manhattan will unveil Volume One of its new FX library (five CDs of home, transport, office and animal sounds) at the NAB expo. Another five CDs are planned for later release.

Network Music

110 Via Frontera
San Diego, CA 92127
(619) 451-6400 or (800) 854-2075

Notes: The 50-CD "Network Sound Effects Library" is \$1,200. The company recently acquired the rights to a major motion picture library with more than 7,000 effects, to be released later this year.

O'Connor Creative

Box 5432
Playa Del Rey, CA 90296
(213) 827-2527

Notes: The "World's Greatest Sound Effects Library" is a 4-CD set priced at \$395; "Dig-Efx," a 2-CD set, is \$195. "The Craziest" is a \$145 CD of cartoon and comedy effects.

Omnimusic

52 Main Street
Port Washington, NY 11050
(516) 883-0121 or (800) 828-OMNI

Notes: "FX Series 1" is a 12-CD set priced at \$695. Work is currently underway on Series 2, slated for summer/fall release.

Producers Sound Effects Library

8033 Sunset Boulevard #289
Hollywood, CA 90046
(818) 707-EFXS

Notes: An "introductory" CD with 101 general effects is \$60. The first library release—six CDs with water, weather, traffic, crowds, trains and restaurant

sounds—is \$425 and is due out by the end of the month. Two more volumes are slated for release later this year.

Prosonus

11126 Weddington Street
North Hollywood, CA 91601
(818) 766-5221 or (800) 999-6191
Notes: "Sound Effects Volume I" (\$69.95) contains Foley footsteps on one CD. A second volume of Foley effects (door closes, body falls, etc.) is due out this summer. "Sound Effects Volume III" is an abbreviated version of The Hollywood Edge "Cititrax" on a single CD for \$69.95. Prosonus also offers a CD-ROM of effects from the Sound Ideas library for use with Digidesign's SampleCell.

Sound Ideas

105 W. Beaver Creek Road #4
Richmond Hill, Ont., L4B-1C6 Canada
(416) 886-5000 or (800) 387-3030
Notes: "Series 1000" (28 CDs) is \$950; "Series 2000" (22 CDs) is \$875—both are general effects. "Series 3000" is a 12-CD set of long ambience background for \$495. "Series 4000" (\$495) is a five-CD set of "Hollywood" effects. Also \$495, the "Lucasfilm Sound Effects Library" has industrial, nature and transportation sounds from the Lucasfilm and Sound Ideas archives on six CDs. The latest release—which begins deliveries this month—is "Wheels" (\$775), with 2,500 car, truck and motorcycle sounds (including interior ambiences) on 24 CDs.

TM/Century Inc.

14444 Beltwood Parkway
Dallas, TX 75244
(214) 934-2121

Notes: "TM Sound Effects" is an 8-CD collection priced depending on user's market size.

TRF Production Music

40 E. 49th Street
New York, NY 10017
(212) 753-3234

Notes: TRF plans to release a SFX library on CD and DAT later this year.

Valentino, Inc.

151 W. 46th Street
New York, NY 10036
(212) 869-5210 or (800) 223-6278
Notes: The digitally recorded 35-CD library is \$1,650; the analog collection is \$195 and includes eight CDs from analog source material, along with a "Voices of History" CD (vocal excerpts from political and historical figures). ■

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iber optics technology dramatically improved the quality of voice communication during the 1980s. Hum, hiss, crackles, pops, distortion and crosstalk disappeared, because the 300Hz-3,000Hz “telephone quality” analog signal was digitized, multiplexed, regenerated and error-corrected many times, and then converted back to analog only for “last-mile” transmission.

An oft-heard cliché, “You sound like you’re right next door,” is uttered even when the interconnection runs coast to coast through numerous switches and long-haul circuits. This quality is maintained even between small suburban or rural communities like Westborough, Mass., and Nevada City, Calif., a connection I have used frequently in recent weeks doing research for this article.

In the days ahead for audio recording/mixing processes and practices, this past is prologue to a most exhilarating future!

Technology for amplifying, processing and recording sound has moved forward steadily since Lee DeForest invented the triode vacuum tube. However, the audio recording industry’s intrafacility, interequipment

Fiber Optics

LIGHTING THE WAY TO NEW DIMENSIONS IN AUDIO RECORDING

transportation standard has remained shielded, twisted pairs of insulated, stranded copper wire, one signal per wire circuit.

Fiber's signal transmission characteristics are dramatically better than copper's (see sidebar). Nevertheless, within audio studio facilities, neither technical nor economic justification

for more wires) justifications are now beginning to force coax-to-fiber circuit cutovers for video signal routing, often regardless of cost penalties.

The audio recording marketplace can profit technically and economically from the television industry transmission experience. Observe especially the handling of constantly increasing numbers of program audio, intercom and ancillary data channels. Staying with traditional shielded, twisted pairs, this ever-burgeoning circuit demand creates difficult physical challenges of making space for more routing switcher levels in already full equipment racks and for more single-circuit wires in crowded cable conduits.

Multiplexing program audio, intercom and data channels on a single coax copper cable or optical fiber eliminates these two problems. Terminal equipment to accomplish that multiplexing is the "right stuff" to start a revolution in the processes and practices of CD-quality audio pickup and recording.

In a fiber-based telephone call transmission network, a single voice signal is transmitted at 56 Kbps, a rate

designated as "DS (Digital Signaling) 0." But no conversation travels over a fiber alone once it is in the digital domain. Twenty-eight of them, Time Division Multiplexed (TDM'd) together after digitizing, are designated a "DS-1" group (1.544 Mbps). Twenty-four DS-1 groups TDM'd together, 672 individual voice signal transmissions, are designated "DS-3" (44.7 Mbps). These two services are widely tarified and used for combined voice *and* computer data transmission. The DS-3 service, colloquially referred to as "45 megabit," is now also used for transmission of a single digitized "television channel" (a bandwidth-compressed NTSC analog video and two 20-20k Hz audio signals).

That plethora of DS-1 public network fiber circuits could each handle an AES/EBU standard digital program audio channel with plenty of bits left over. A DS-3 service could handle in excess of 40 digitized program audio channels, plus time code

—CONTINUED ON PAGE 93

WITH FIBER OPTIC TECHNOLOGY, RECORDING A RIO ROCK CONCERT FOR A MUSIC VIDEO COULD BE AS EASILY REMOTE-CONTROLLED AS RECORDING IT ON A HOLLYWOOD SOUNDSTAGE.

has forced the conversion of signal transmission circuits from copper to fiber, one for one. In the television industry, however, both technical (EMI/RFI pickup problems) and physical (cable conduits with no space

BY BOB PAULSON

ILLUSTRATION BY CHARLIE POWELL · PHOTOGRAPH BY LOU JONES

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Fiber Transmission Basics:

How It Works; Why It's Better

The fact that a beam of light could be conducted and confined (totally internally reflected) within a curving cylinder of transparent material was established *before* Edison and Bell, circa 1870, by British scientist John Tyndal. He used an ingenious arrangement of a candle, two beakers and flowing water to prove his theory.

Communicating over a thin strand of glass fiber is analogous to communicating by flashlight blinks. Technically, information transmission using laser technology is accomplished by regulating the flow of quantities of photons of light in an optical glass fiber, rather than the amplitude and frequency of electromagnetic waves in free space, or the quantities of coulombs of electrons flowing in a copper wire.

To transmit an amplitude-varying electrical signal over a glass fiber, its waveform varies the light output (intensity) of an LED (Light Emitting Diode) or ILD (Injection

Laser Diode) light source around a mid-brightness intensity level. If the signal is analog, the source intensity is never varied to full-on or full-off, because of the well-known hysteresis (non-linearity) characteristics common to all transduction (state-to-state energy conversion) processes.

The intensity-varying light focused onto the end of a minuscule-diameter glass wire (fiber) is transduced back to an electrical signal at the other end of the fiber by a photo(n) detector.

Fiber optic transmission has many advantages over radio and hard-wired copper transmission. The old negatives about fiber optics—fiber breaks easily; connectorizing is expensive, difficult and time-consuming; high prices of fiber and terminal equipment; and a lack of existing, installed fiber available for use—might have been true a decade ago, but are no longer valid.

Advantages include transmission immunity to artificial and natural electrical interference—EMI, RFI, electrical storms or electrical refer-

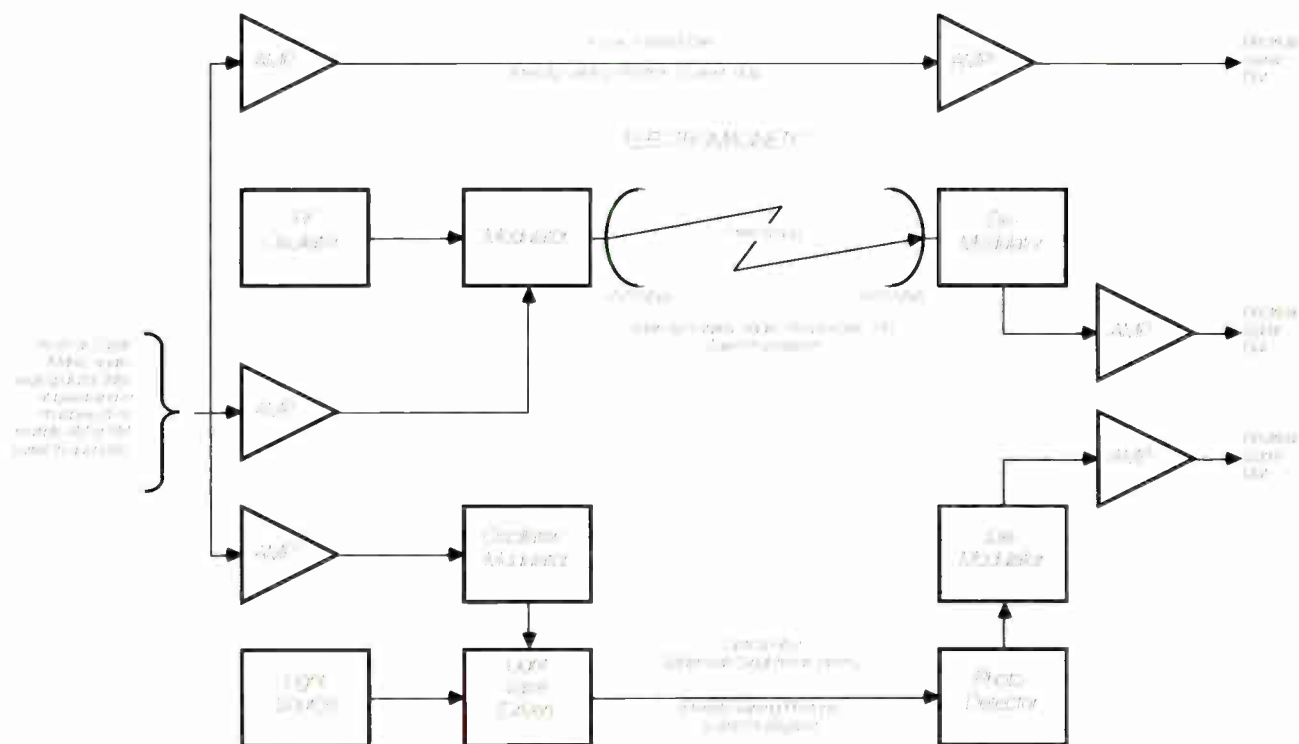
ence ground differentials. This immunity often makes fiber transmission the only acceptable alternative, regardless of installation and operations cost differentials.

Fiber also offers virtually total immunity from transmitted signal jamming and stealing. Jamming can be achieved only by physically breaking into the fiber and introducing another light source output, and stealing only by breaking into the fiber and tapping off some of the light. Because both processes involve physically tampering with the fiber, they can be detected immediately, and the transmission terminated or diverted to another route.

Compared to the multiplicity of copper twisted-pair or coaxial cables required to transmit today's television video, audio and data signal groups, a single fiber can carry dozens of multiplexed signals, translating into enormous hardware and installation labor cost savings, plus time saving and convenience, in both permanent plant and temporary transmission systems. Finally, when compared to copper's bandwidth and distance limitations in these applications, fiber transmissions have no practical limits.

—BP

Alternative Techniques for Electrical Signal Transmission



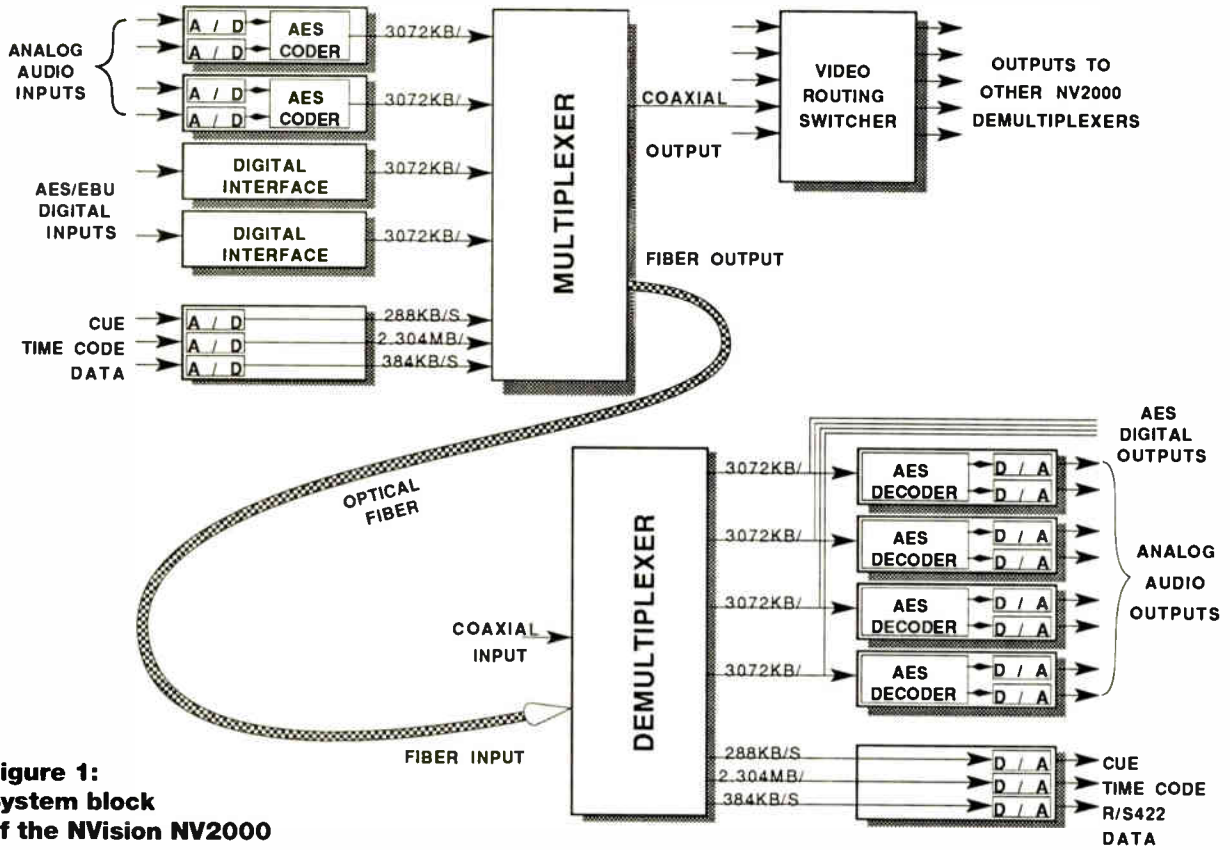
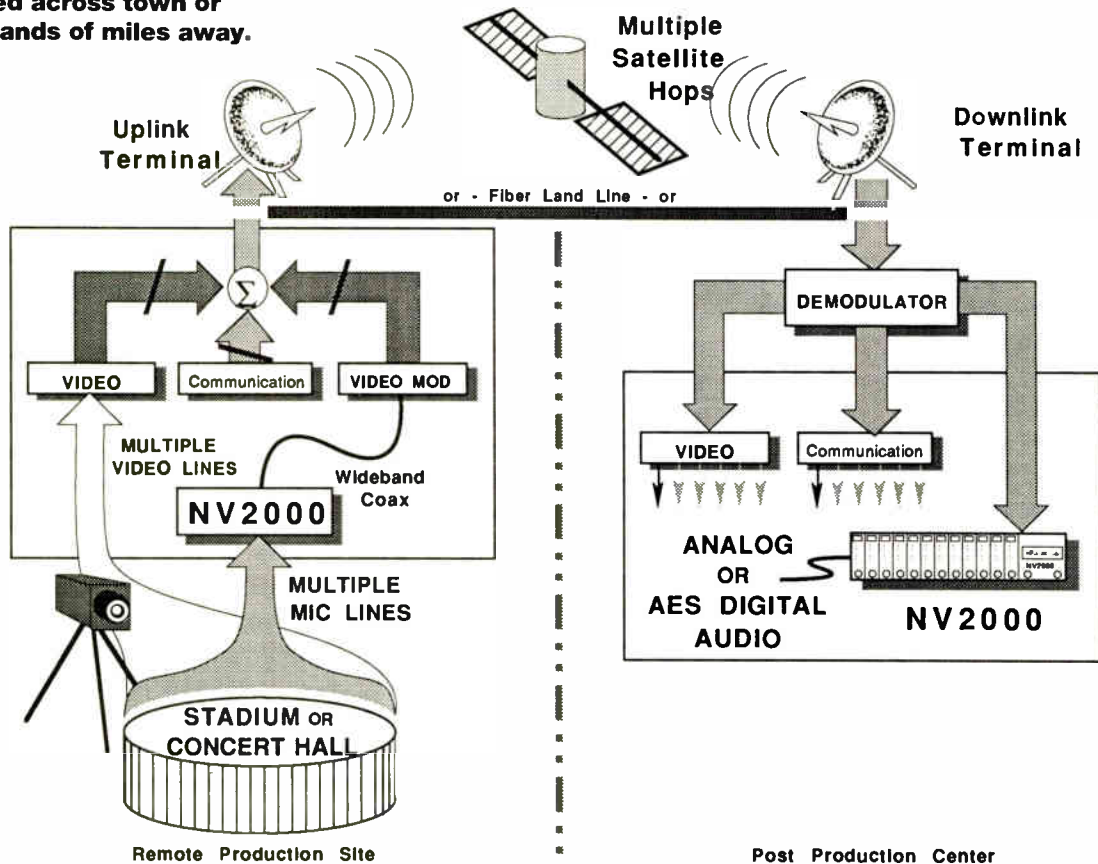


Figure 1:
System block
of the NVision NV2000

Figure 2: A fiber optic system
used for remote audio/video
production, where the
mixing or post facility can be
located across town or
thousands of miles away.



Fiber Optic System Manufacturers

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—FROM PAGE 89, FIBER OPTICS

and intercom traffic. If those telco circuits were used to transport individual mic channels from a remote site back to the inputs of your permanent studio's console and recorders, think of the money and time you could save on every remote recording project!

You wouldn't have to invest time or money in transporting truckloads of equipment and people to the site for setup, test, strike or return travel. There would be no downtime back at the studio. You'd produce better-quality masters, because monitoring of signal processing and mixing had been carried out in a familiar acoustic environment.

Taking advantage of the hundreds of thousands of kilometers of fibers carrying DS-3 signal groups of telephone traffic could eliminate this expensive, inefficient process of remote site recording. Today, countrywide, there is fiber in the ground within at least a few hundred feet of, if not laid into, every stadium, amphitheater, arena, theater, church, auditorium or concert hall where musical performances of any ilk are recorded remotely. Those fibers often carry telephone traffic and computer data related to the event being recorded. Other fibers to which they could be permanently or temporarily interconnected run past or into the "home base" buildings housing audio recording and television

industry audio recording, editing and mastering suites.

However, neither the audio companies that record those remote site sessions, nor the telephone companies that laid all those fibers in the ground, are aware that they could profit magnificently from what to me is an obvious, symbiotic relationship.

This all sounds too good to be true, you're saying. So, why hasn't it been happening?

This hasn't occurred in the past because off-the-shelf equipment to easily and economically interface and multiplex program audio, intercom and data onto a DS-3 service didn't exist. During the last year, however, the fiber alternative for both in-plant and outside-plant transmission of program audio, intercom and ancillary data signal groups has become both technically and economically attractive. In September 1990, NVision Inc., of Nevada City, Calif., made the first installation of its modular, digital domain, CD-quality, multiple-channel NV2000 audio signal transmission system at KSL-TV in Salt Lake City. The company was founded in 1988 by pioneer fiber transmission systems developer Birney Dayton, former VP of engineering at the Grass Valley Group. His first system design was GVG's Wavelink™ television transmission system, first used by ABC-TV at the 1980 Lake Placid, N.Y., Winter

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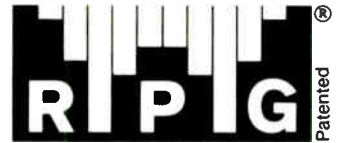
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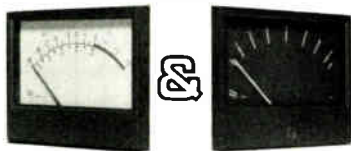
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Olympic Games.

The NV2000 system (Fig. 1) includes optional transmitter and receiver modules to interface both copper coax and optical fiber transmission media. The transmitted signal can be either analog, occupying a 6 MHz standard television broadcast channel bandwidth, or an 18.432 Mbps serial digital bit stream. The system can accommodate up to ten channels of 20-20k Hz audio, or eight channels of audio plus time code, cue and data. The signal-to-noise ratio of the demodulated channels is in excess of 110 dB, at a peak input signal level of +26 dBu. Program audio signal inputs and outputs may independently be either analog or AES/EBU standard digital formats.

Talmage Ball, KSL's VP and director of engineering, took advantage of the NV2000's transmission versatility in the design of a 20-channel system operating on a pair of fibers between the Mormon Tabernacle and the Bonneville Satellite Communications uplink site a few blocks away. The system's first operational use (October 1990) was the transmission of up to 16 channels of different languages synched with the video feeds of religious and educational programming. NVision's fiber interface wasn't ready until January 1991, so as an interim arrangement, NVision director of engineering Chuck Meyer provided two Grass Valley 3280 Wavelink fiber transmission systems, operating in their wideband video mode, to transduce the NV2000 video feeds to an optical signal. When the fiber interface became available, the NV2000 systems were interfaced directly to the fibers, and the Wavelink systems were used to transport other NTSC video/dual audio signals over other fibers in the cable.

New Dimensions in Remote Musical Event Recording

The Mormon Tabernacle has long been world-renowned for the music produced by its magnificent choir and pipe organ. Record companies from several continents regularly move equipment into the Tabernacle basement to make recordings later released as LPs, CDs, tapes and soundtracks for television programs.

"By connecting their mic feeds to the new fiber transmission system," Ball points out, "audio producers and engineers will be able to do their critical sound monitoring and mixing

elsewhere in the city, in an optimum acoustical environment.

"Or, even more impressively," he continues, "recording companies could bring only their own special mics, cables, line amplifiers and setup techs to the auditorium, and literally 'work at home' to mix and record. The need for circuits for more than 20 discrete channels could be accommodated by adding 10-channel systems as needed and interconnecting them to dark [spare, unused] fibers already in the cable."

This "remote pickup/tape at home-base" technique that Ball describes applies both to music and videotape field production (Fig. 2). Shooting a rock concert in Rio for a music video could be as easily remote-controlled as shooting it on a Hollywood soundstage.

To ensure that this "studio without walls" system functions, it isn't necessary to create any special production finesse on site. Communications between the recording site and the production staff can be established over a standard phone circuit patched to a two-way radio.

New generations of fiber-based transmission equipment could well revolutionize television and audio production/post-production processes in the 1990s. Stereo pickups of ambient sound at parades, golf matches, large stadium and outdoor cross-country athletic events, etc., can be readily mixed with on-camera and voice-over mono commentator tracks originating elsewhere. Dallas-based Lester Audio Labs beta-tested its DAS-2000 "fiber optic snake" in this application at the Seattle Center Coliseum during the 1990 Goodwill Games [see *Mix*, December 1990].

Systems such as these will quickly become *de facto* standards for live television audio production, especially as high-definition television moves from the lab to the living room. HDTV sound will then be capable of aural dimensional expansion to match the size of HDTV wide-screen pictures.

But wouldn't it be great if AES and SMPTE would team up to foster the establishment of a single audio/fiber interface standard, before we have as many of them as we now have television/fiber transmission system standards! ■

Bob Paulson is an audio & video production consultant based in Westborough, Mass. His industry experience dates back four decades.

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NEWS

FROM AROUND THE WORLD

Tokyo's Studio Jive Orders First Japanese Focusrite

The first Focusrite board in Japan has been ordered by Studio Jive, located in downtown Tokyo. The board, a 72-input Focusrite Studio Console equipped with GML Automation, will be installed in a new room designed by Sam Toyoshima. Studio Jive presently operates one studio with an Amek APC 1000 with GML automation, Sony PCM-3348 and an array of outboard equipment, including Focusrite EQs.

The facility's success in recent years warranted the opening of a second room, located in an adjacent building. Clients include a leading Japanese fusion band, Cassiopeia, who have recorded all their albums at Jive since 1984.

The console, which will be prewired for 88 inputs, is slated for installation in May.

Sonic Solution for CTS

The British Lansdowne Group has upgraded its digital editing facilities by investing in a Sonic Solutions CD Mas-



The digital editing suite at CTS Studios in Wembley.

tering System. The Sonic System has been installed in the completely refurbished digital editing suite at CTS Studios, along with new ATC monitors and Sony DMR-4000, 1630 and 1610

machines.

The Sonic Solutions hard disk workstation combines all the necessary functions for CD premastering into one system—including background loading with machine control, music editing and compiling, EQ and mixing, and PQ code editing. Utilizing a Macintosh IIfx as the host computer, the system includes a 4-into-2 digital mixer, a separate I/O rack and two high-capacity hard disks giving 150 minutes of stereo record time.

Adrian Kerridge, chairman of the Lansdowne Group, explains: "With CTS and Lansdowne offering five top studios and full music-to-picture facilities, as well as telecine and disc-cutting departments, the addition of the Sonic System to our digital editing suite is in keeping with our aim to provide complete service for our clients and offer specialist expertise in all aspects of audio production."

Radio Romania Goes Stereo with Sony

Radio Romania in Bucharest has upgraded its audio facilities with the purchase of a Sony APR-24 multitrack recorder, nine APR-5000 Series 2-track recorders, one MXP-3036E production console, two MXP-2916 broadcast consoles and a PCM-2500 DAT recorder.

Also included is an extensive range of Sony signal processing equipment and microphones. The APR-24 is paired with the MXP-3036 in a multitrack recording studio area.

Radio Romania has not re-equipped since 1953, and it was clear from the inception of negotiations with Sony personnel that station staff needed to learn about new operational methods. In order to ease the transition, Sony provided an extensive program of seminars and training sessions, both in Bucharest and at Sony Broadcast & Communications' European headquarters in Basingstoke, England. Radio Romania was scheduled to have

the new stereo service up and running 12 hours a day following installation of equipment in the first quarter of 1991.

UK Notes

Soho film post-production specialists

international TV and cinema distribution companies...**Videolondon Soundstudios**, the largest audio-for-video and audio-for-film post-production house in the country, purchased an Audio Kinetics ES.Lock system for its flagship Studio 4...**Goldcrest Tele-**

of The Hit Factory in London and the **PPS1** post-production studio on Eldon Street for BBC Radio. The busy recording studio and broadcast facility design consultancy also announced that it has moved to new premises at Pinewood Film Studios, Iver, Bucks SL0 0NH.

STUDIO SPOTLIGHT

London's Autograph Sound has carved out a unique niche in the British entertainment scene since its inception in 1973. The company designs and installs sound systems for the British theater, and records sound effects for some of the biggest and most prestigious plays on London's West End. Among the top shows Autograph has handled are *Miss Saigon*, *Les Miserables*, *Cats*, *Aspects of Love* and the recent revival of *The Rocky Horror Show*. An American branch of the company has been similarly successful.

"Through the years we've primarily been known for our sound system designs for the theater," comments Nick Gilpin, who runs the studio and doubles as an engineer. "Recently, we've put more into upgrading the recording end, so our studio is at the same high level as our live stuff." Autograph's studio is based around an 8-track DAR SoundStation II, which, according to Gilpin, "has given us great flexibility in designing effects."

"Generally, we'll start to make sound effects about six weeks before actually going into the theater. We'll make rough effects [tracks] for the director to listen to, and he'll say,

'Yeah, that's great,' or 'Let's try something else.' We'll probably end up reworking it five or six times before the audience hears it. The SoundStation lets us shift around the original elements and add things and re-edit in a way we never could before. It's so much easier than cutting little pieces of



tape. I'd say it's about 200% quicker. It's staggering how efficient it is." The effects are eventually dumped onto DAT or an Akai S1000 "and then fired from the desk [console] computer," Gilpin says.

To say that sound for theater has changed during the years Autograph has been involved with it would be a major understatement. The original production of *The Rocky Horror Show*,

for example, used just two microphones, both of which were borrowed, and a truly primitive sound reinforcement system. The new version uses 16 radio mics, both hand-held and lavalier, and three different loudspeaker installations for different applications. "I'd have to say our main problem is getting quality sound from radio mics," Gilpin notes. "We have to work within the constraints of having to hide the things in people's hair and that sort of thing, but we've gotten better at it, and the technology has improved steadily through the years."

Autograph favors Meyer speakers and Cadac desks for most of its installations. As sound for theater has become more sophisticated, the number of inputs required has multiplied. For *Miss Saigon*, 55 inputs were needed; more recently, a musical called *Children of Eden* used 84 inputs.

"Our growth sort of coincided with the boom in [Andrew] Lloyd Webber musicals, and it took off from there," Gilpin says with satisfaction. "We've had the combination of excellent people and the best technology through the years. We've managed to do quite well in our field."

Magmasters have taken delivery of two pairs of ATC's SCM200 studio monitors. A pair of SCM200 monitors have also gone to **The Mill** recording studio in Berkshire... London's **Pelican Studio** completed the first foreign language dub of a feature film using DAR's WordFit Automatic Dialogue Synchronization and SoundStation II. The Danish-to-English dub of the 90-minute drama *Dance of the Polar Bears* was contracted to Pelican by Hit Communications plc, one of the UK's major

vision also chose Audio Kinetics ES.Lock machine control and synchronization for its new audio-for-video post-production facility in Herts...

Bermuda Sound installed AudioAutomation's new Uptown 2000 Moving Fader console automation system for its 32-input Neotek Elite... **SAE London** installed another Neve 8232 console to complete that school's 24-track studio... Recent UK projects for Harris Grant Associates include the complete technical and acoustical refurbishment

European Bits & Pieces

The **Swiss Army Film Service** purchased an 8-channel DAR SoundStation II Digital Audio Production System for its recently expanded post-production facility in Bern. AFD develops and produces educational, training and public relations films and videos, A/V presentations, and computer-aided training programs for Army distribution... **Munro Associates** has appointed MEGA Audio as its agent in Germany, with responsibility for rep-

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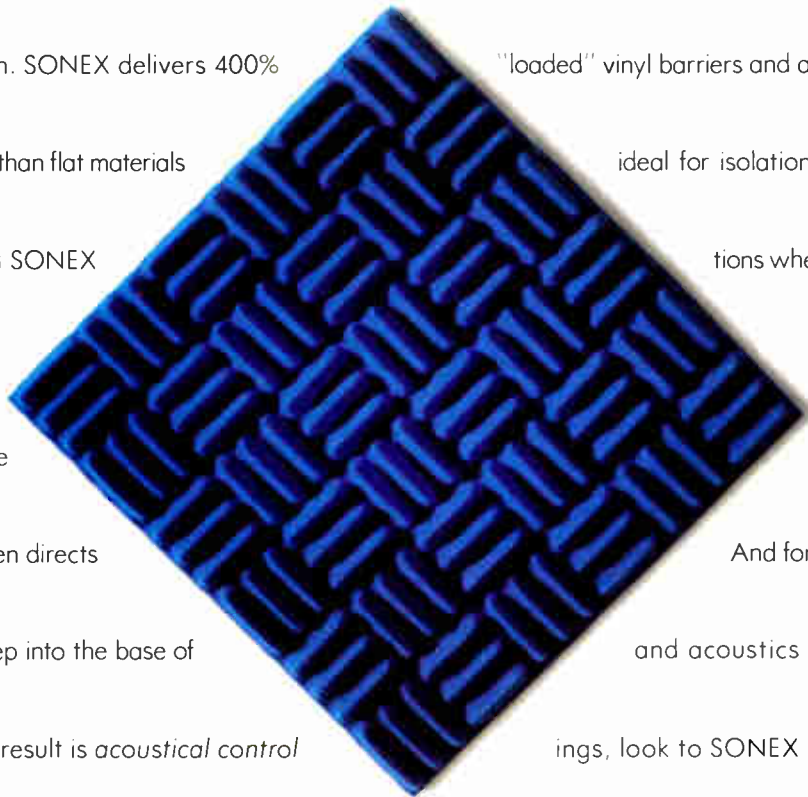
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representing the British company's acoustic consultancy and studio design services. Recent projects completed by the firm include **MG Sound**, a 48-track digital recording and post facility in Vienna; a post-production facility for **Logic Studios** in Milan, Italy; and a new 100-square-meter System Z studio for **Videaudio** in Brussels, which is designed to handle film mixing and dubbing as well as video dubbing... **SAE** finished construction of its Amsterdam school. The new studio features an Amek 2500 console and Otari MX-80 multitrack.

Pacific Rim Studio News

NHK, the Japan Broadcasting Corporation, replaced all of its analog reverberators with Lexicon's 480L Digital Effects system, making NHK one of the world's largest users of the 480L...T.C. Electronic A/S delivered 15 of its I280 stereo delay lines to **PKE Ltd.** in Kewdale, Australia for use as a broadcast telephone obscenity delay...**ARX Systems**, the Australian manufacturer of power amps, loudspeaker systems and signal proces-

sors, has appointed the following distributors: Stagecraft in the Philippines; Prosound Inc. in Taiwan; Chainford Ltd. in Hong Kong; Armonia Nova in Italy; Tal & Ton AR in Sweden; MTEC in Austria; and Etelac in France...Two DAR SoundStation II Digital Audio Production Systems have been purchased by **Video Headquarters**, a leading video post facility in Singapore...**SAE**, the world's largest audio training school, updated its Sydney facility with a Sony MXP-3036 console, Lexicon 480L, Dolby SR, Otari MX-80 32-track recorder and Adams-Smith Zeta-3 synchronizer...The Beijing International Radio & TV Broadcasting Equipment Exhibition '91 (BIRTV '91), the largest exposition of advanced radio and TV broadcasting equipment and technology in China, is scheduled to be held September 6-10, 1991, at the China World Trade Centre, Beijing. For more information, contact Business & Industrial Trade Fairs Ltd., Hong Kong, Tel: (852) 575-6333, fax: (852) 834-1171.

Canada Clips

Ottawa's **Ambience Recorders** opened the first Foley soundstage in eastern

Ontario in late November. The facility was custom-designed by internationally acclaimed Foley artist Andy Malcolm...The Canadian Broadcasting Corporation ordered a dozen Studer 963 Series audio consoles for the national radio network's **Toronto Broadcast Centre**, now under construction. The Centre is the result of longstanding efforts to consolidate all network and local radio and television facilities into one location.

Southern Exposure

The first Sony digital multitrack recorder in Latin America was purchased by **Mass Cassettes** in Mexico. Mass Cassettes has ordered a PCM-3324A, along with a fully automated MXP-3036VF, PCM-3402 DASH 2-channel recorder and PCM-2500 DAT recorder. In other Sony news, APR-24 analog multitrack machines have been delivered to **Audio Vision Studios** in Bogota, Colombia, and **Grupo Pypsa's** new recording studio in Monterrey, Mexico...T.C. Electronic A/S recently signed an agreement with **Sterling do Brasil** in Rio de Janeiro, for exclusive distribution of T.C. products in Brazil. ■

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by Dan Daley

HANDS ACROSS THE CONSOLE

The advent of the project studio has had a substantial impact on the audio recording industry. In a fairly short time, extremely good and relatively inexpensive equipment and technologies have allowed more players access to professional music production at budget levels. Project studios' ability to do all pre-production and MIDI work, basic tracks, most overdubs, many levels of vocals, and decent mix and layback capabilities has encroached upon the domain of the for-hire audio

and lower rates.

Over the course of the last few years, however, many people have found that co-existence is not only possible, but profitable. An ignore-it-and-it-will-go-away attitude toward project studios is dissipating rapidly in favor of an interaction between traditional and non-traditional studios. "I stopped fighting them," says Lou Gonzalez, owner of Quad Recording in Manhattan. "Granted, [project studios] have taken on a lot of work that



facility.

These traditional studios watched as project studios and home recording nibble away at their revenue bases, first at the peripheries, like pre-production, then at the heart of music and commercial recording. Some facilities reacted by pointing out that project studios have an unfair advantage by not having to carry the same bureaucratic burdens as businesses open to the public, an issue that still rankles many. Project studio operators responded by saying that their real advantage lay in their lower overhead

happens at the beginning of [recording] projects. But rather than fight against the tide, I've learned to accommodate my business to the other end of projects—the sweetening and mixing stages."

Gonzalez says that anything that can be done with a machine can be done in an alternative environment. And it can be done for less money. "Aiming your facility at that end of the market is a money-losing proposition at this point," Gonzalez says. "Traditional rooms will have to accommodate themselves to this fact."

His approach, given these new realities, is to build relationships with local project studios, so that when they have work requirements that exceed their own studio's capabilities, they bring it Quad's way. In some cases, Gonzalez even offers free time for the occasional jingle demo mix, with the tacit understanding that if the final gets landed, it will be recorded at Quad. "It's simply good business, I think," says Gonzalez, who also added his own MIDI room two years ago in anticipation of the shifting tide.

David Porter, president of San Francisco's Music Annex, has also seen an increase in project studio owners coming to use his facility for finishing purposes. "I look at them as offline composers," he says. "They can all do the programming and create tracks and listen back to them. But for final projects, they often need equipment they couldn't afford to own, nor would it make sense for them to own. This kind of equipment, the really high-end type, gets used every day here, so it does make sense for us."

Porter says the burgeoning interrelationship is reminiscent of Chris Stone's mothership concept with the Plant Studios on both coasts: "It would become the role of the larger studio to support the power boxes, and have the project users come in periodically when they need it."

Both Porter and Gonzalez point out that many project studios exceed their capabilities and must rely on traditional studios as backups. Gonzalez cites instances of bad time code, car horns on vocal tracks, and bleeding between tracks. "There's a problem when they tell a client they can do something they can't do," Porter says. "I see sync tracks screwed up all the time. Just because they have a 3/4-inch deck and a synchronizer, they think they can lock to picture. But it takes more than that. We end up getting those jobs as reclamation projects."

The wide variety of formats used in project studios can impede interaction, though not unavoidably. While everything's available for rental, some studios keep a variety of formats available for interfaces. For instance, Music Annex has a Fostex 1/2-inch, 16-track due to its popularity with project studio owners. At Doppler in Atlanta, owner and SPARS president Pete Caldwell also has 1-inch, 8- and 16-track decks on hand for the same purpose. "We've had some very good

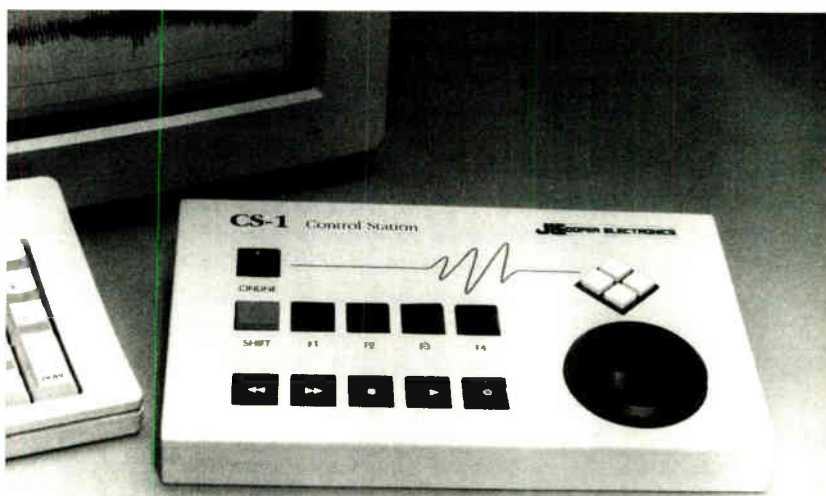
stuff come in on 8-track cassette," Caldwell says. "It's rather amazing when you realize it was mixed down here on an SSL console."

Caldwell says there's little distinction between project studios and the less-than-full-service, for-hire recording facilities he's been serving for years; both require additional mix-down facilities and larger selections of microphones and outboard processing gear. In addition, project studios also need live rooms for vocals and repair work on audio, sync and time

code tracks.

"We compete with them, but it would be foolish not to service them as well," Caldwell reflects. "To a certain extent it's a symbiotic relationship, but it's also competitive. In Atlanta it's not become as adversarial as in other places. We haven't allowed it to get to that point." Doppler and other studios—both for-hire and project—participate in ad hoc monthly meetings that help keep the air clear about relationships.

For their part, project studio owners seem to like the idea of being regarded as equals in theory, if not in capital investment. Their attitude is occasion-



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ally defensive, pervaded to a degree by a "we-can-do-it-all" attitude, buttressed by increasingly sophisticated and capable technology. But in certain areas, most agree that interaction could be beneficial to both sides.

Dennis Michaels, owner of High Tops, a project studio in lower Manhattan, figures that about 10% of his work could benefit from the larger rooms traditional studios offer. "That figure may shrink to closer to five percent in the future," he says. "But that five percent will always be there." Michaels believes that signal processing has gotten to the point where, adroitly applied, a \$500 reverb can't be distinguished from a \$5,000 unit, and software like C-Lab, with its new VITC time link, makes synchronization virtually foolproof. "Eventually, the relationship between project studios and larger rooms will be fine-tuned," Michaels says. "There'll be a more intimate relationship evolving between the best of each category."

Such an evolution could lead to what Mike Matthews of Valentine in Denver sees as "the grand project studio": a blend of the best of both into one. Valentine's dealings with the traditional studio world usually occur when the need for large vocal groups outstrips its own vocal booth's capacity, or when they go to post houses for laybacks. "Video houses get most of our interface at this point," Matthews says. "We've geared ourselves to be self-sufficient, but I think we'll see more interactivity in the future in general within the industry. One way that's happening is that other facilities hire us as a creative team for film and video music work on projects they've landed the recording aspect for. We do the work here, then slave off to their machines and finish the project there."

Interaction on certain levels will likely increase as project studios evolve. The availability of the features that larger studios offer means many project studio owners will resist the temptation to expand. This, coupled with the inherent specialization of the project studio, could lead to a stabilization in the market, and let the nascent detente blossom into a greater harmony from which everyone will benefit. ■

Dan Daley is a Mix contributing editor who is simply running out of clever bios.

by Iain Blair



TREVOR HORN

TAKES HIS STUDIO ON THE ROAD

When producer Trevor Horn was asked to come to Los Angeles to work on the score and soundtrack to the new Island Films movie *The Lunatic*, he decided that the time was right to try out his new portable home studio. So, instead of booking into a commercial studio like any other producer, Horn rented a large house in the Hollywood Hills, shipped over the equipment he needed and then set up his studio in the large living room.

"There were a number of reasons for doing the project in this rather unorthodox way," the producer explains. "I'm used to having my own studio back home in England. When the film's director, Lol Creme, asked me to come out here to work on it, I realized it was a golden opportunity to design and build my own portable home studio. That way I'd have exactly the equipment I wanted and no worries about booking studio time."

There were also economic incentives: "The last time I was here in L.A., I worked on the soundtrack for *Days*

of Thunder, and the idea of doing another soundtrack was very appealing," Horn comments. "But I also found that the cost was extremely high, and this is a very low-budget film, only around \$2 million, so it suddenly made a lot of sense to me to bring over my own studio."

Although *The Lunatic* acted as the catalyst for the completion of Horn's mobile studio, he states that he'd been experimenting along such lines for some time. "In fact, I'd already started to build a sort of mobile studio before this project happened. It seemed to me that if I could design one which you could load into a set of flight cases, I could literally travel anywhere in the world and just set up and record. So, I started to analyze what makes the difference between a good and a bad studio, and I noticed that things always go slowly in a bad studio because of the small patch bay. That was the key."

With this in mind, Horn designed the whole studio around the patch bay, which has group insert facilities with

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pre- and post-fade, and multiple sends and returns. "I actually spent more money building a customized patch bay than on the console," he points out, "because to me it was more important."

Although Horn is best known for his state-of-the-art aural sheen on albums he's produced for the likes of ABC, Frankie Goes To Hollywood and Yes, he's quick to stress that he's no tech-head. "I think people have this image of me poking around behind tons of wires, but the truth is I never really knew anything about patch bays before this project," he insists. "Then I spent several days really studying them, and it was fascinating. Now I've got this incredible patch bay, specially built by some tiny English company and the guy who used to design for SSL. It's designed so I can also engineer in the studio, because I'm not really an engineer—I never have been—and I've always had to have one with me; but with this studio, I can now do everything myself."

Horn brought in British producer/engineer Tony Phillips (who recently produced an album for Ruby Blues) and Australian Fairlight programmer Mars Lasar to engineer and program for *The Lunatic*.

"It's been a very complex job, because *Lol Creme* had a lot of different ideas for the soundtrack, ranging from orchestral themes (which can be used at the beginning and end of the film) that we've orchestrated using the Fairlight to small musical cues used throughout," the producer explains. "It's a very strange film and very difficult to score. It's the story of this madman, set in Jamaica. On the one hand, it's all very real, and on the other, it's a bit surreal."

In addition to recording all the music for the movie, Horn and his team are also recording a soundtrack album for Island Records. Even though the project is complex, Horn made sure that he kept his mobile studio setup as simple as possible.

"I bought a user-friendly desk, a DDA D-Series console, 26 into 8/24 with four stereo channels, which is extremely quiet," Horn says. "Then I gradually built the studio up from there. The joke is that it's gotten a bit bigger than I anticipated. It's ended up weighing over two tons, and it now takes 26 flight cases to transport. But

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ARTIST'S STUDIO

once I started building it, I found there were all these extras I really needed.

"I'm very pleased with the results, though. What I wanted was a complete stand-alone studio that doesn't depend on anything else. But, of course, there were problems. The mains supply was one, especially moving from England, where it's 240 volts, to the U.S., where it's 110. I powered the whole thing off of five isolation transformers and kept it at 240 volts. While I'm out here, I can also do quite a big business re-charging video cameras for the British."

For recording, Horn chose an Otari 24-track and remote recorder and a 1/4-inch Studer machine, "because

"Things always go slowly in a bad studio because of the patch bay. That is the key."

they're accurate and reliable," he says. "For mixing, I use three sets of monitors—a pair of Meridian self-powered speakers, a pair of Yamaha NS-10s and a set of Auratones. For mics I'm using Neumann U87s.

"In terms of keyboard equipment, the Fairlight is probably the single most important piece of equipment I'm using," he notes. "We can get any sound we want from it. We're also using a MIDI Moog, a Yamaha TX802, a MIDI Temp, a Roland MKS-50, and Oberheim Matrix-1000 and Super JX. To augment the Fairlight, I use several keyboard modules, including the A110, [E-mu] Proteus, Korg M1R and [Roland] D-550. We also have two dbx 160X units, a UREI Teletronix and an SPC SMPTE Reading Device."

For samplers, Horn has equipped the studio with the Akai S-1000 (external and internal hard disks and CD-ROM), as well as an Akai MPC60 sampler/sequencer. He also keeps a Macintosh running Digidesign's Sound Tools system, which he uses for sound editing.

The producer says that his mobile studio has at long last given him "total freedom." So why has it taken him so long to put the idea into practice?

"I just never bothered with home

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studios before now, for various reasons," he states. "I always had access to state-of-the-art studios, and home studios just seemed so unsophisticated by comparison. But two or three things have radically changed my opinion in recent years. The first thing is the advent of some really professional digital recording systems that are good quality, such as the Yamaha 8-track and the Akai 12-track. They're both portable, and they're both as good as any kind of mastering you can get anywhere. Also, hard disk recording in the form of this Digidesign Sound Tools system is fantastic for sound editing.

"All of these advances made me think it'd be great to design an environment that wasn't exactly like a traditional studio, but which I could use anywhere I wanted to record projects. The other reason is that I recently built another studio at Sarm West Studios in London, which is the room I was meant to spend the next year in recording. But then I rented it out to someone else, and then another producer also wanted to use it, and suddenly I was homeless. So, I figured it was definitely time to build this current operation. The great advantage to this home studio, which I call Studio 5, is that you can go anywhere in the world and rent a house and set it up and start working. In fact, other people already want to rent it out."

In addition to the *The Lunatic*, Horn has also been busy producing a new British artist called Seal. "Right now, I'm doing a remix of his new 12-inch single called 'Crazy,' and I'm having a lot of fun with it," he adds. "In fact, I've done so many edits in five minutes of music that if I was doing it analog, it would probably take me over a week to finish. This really allows me to use the digital editor to its fullest extent."

What's next for Horn? "After I finish *The Lunatic*, I'm going to produce the album for Seal, and then I'm not sure," he says. "I don't have any of my own projects right now, as I'm really quite tired and I need a bit of a break. The problem is that this studio is so self-sufficient, every time I think of going to some desert island for a holiday, I can't help thinking I can also bring the studio along, too." ■

Iain Blair is a Los Angeles-based freelance writer.

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NEW PRODUCTS



◀ COOPER LOCATION SOUND MIXER

The CS-106+1 from Cooper Sound Systems of San Juan Capistrano, Calif., is a compact, rugged and high-quality DC-powered mixer designed for location recording applications. Features include six inputs (with space for an extra channel or stereo module with M/S decoder), three main outputs (+4dBm balanced XLR and Tuchel for direct Nagra interfacing), three monitor outputs with tape returns, Jensen transformers, P&G faders and gold-plated switches and connectors. Frequency response is stated as 20-20k Hz (± 5 dB), with a full-bandwidth EIN rating better than -128 dBu.

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APHEX COMPELLOR™ 320

Aphex of Sun Valley, Calif., announces the Model 320 (\$1,350), a new version of the Compellor compressor/leveler/limiter, which features dual monaural circuitry that can be used as two separate mono channels or two stereo modes (leveling link only, or compression and leveling link). The original Compellor was available as a stereo unit only. In addition to program-dependent, intelligent control of gain control parameters and a minimal audio path, the Model 320 features remote control capability, $-10/+4/+8$ reference level switching, and front panel controls for high/low leveling speeds, peak limiter defeat and metering select (input/output/gain reduction).

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AUDIX HIGH-RESOLUTION MONITORS

Designed for listening in the near-field are the HRM-1 monitors from Audix of Pleasanton, Calif. Available in black or natural oak finishes, the HRM-1s are a two-way design with a polyamid dome tweeter and a 6.5-inch polypropylene cone LF driver with 1.5-inch voice coil. This woofer, combined with a rear-vented 16x10x7.25-inch cabinet, offers a 150W power handling with low-frequency response said to be -3 dB at 48 Hz. The speakers are sold in matched, mirror-image pairs, and a neoprene faceplate reduces diffraction effects. ◀

Circle #279 on Reader Service Card

SHURE VP64

The VP64 from Shure (Evanston, Ill.) is a dynamic omnidirectional microphone designed specifically for handheld use in audio or video production and sports or news gathering operations. The mic features a dynamic element, with a neodymium magnet providing an extremely high output; its frequency response has an upper midrange presence rise for improved vocal clarity and a bass roll-off to minimize boominess and reduce LF background noise.

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ELECTRO-VOICE ▶ RE27N/D

Intended for instrumental and vocal miking applications is the RE27N/D (from EV of Buchanan, Mich.). This new dynamic mic combines EV's N/DYM and Variable-D technologies to provide a product with a hotter, wider bandwidth sound with all the advantages of the RE20. Besides its improved neodymium capsule, the RE27N/D features internal shock-mounting and selectable multifrequency equalization.

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STUDER D740 CD RECORDER A

Unveiling at this month's NAB show is a self-contained CD recorder from Studer. The unit records to write-once optical discs, said to be fully compatible with Red and Orange Book CD standards and playable on any CD player. An internal PQ editor automatically generates a TOC with track numbers and exact running times. Studer plans to distribute blank discs, and system deliveries are slated for late this summer.

Circle #280 on Reader Service Card

OEHM AUDIBLE VU METER

Designed for blind or visually impaired engineers, the SKVU-1 from Oehm Electronics, Hayward, Calif., is a precision instrument that conveys information about audio levels, producing an audible tone when levels reach any desired threshold. After that point, the tone changes pitch, to indicate the amount that the threshold (adjustable from -16 to $+6$ dB) is exceeded.

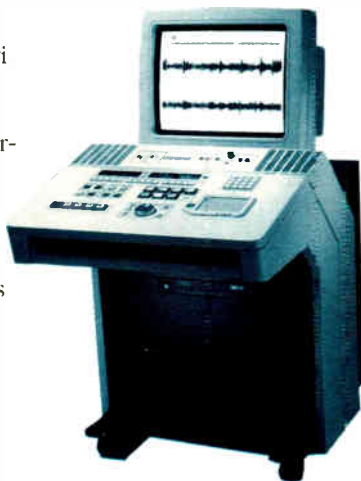
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OTARI DDR-10 DISK ► RECORDER/EDITOR

The DDR-10 Professional Digital Audio Disk recorder/editor from Otari of Foster City, Calif., uses an integrated work console with familiar recorder-style transport controls, jog/shuttle wheel and a 19-inch high-resolution monitor. Also within the console are Apogee filters on the digital converters, +4dBm balanced analog I/O, AES and S/PDIF digital ports, MIDI in/out through, a 345MB hard disk (over 30 stereo minutes at 44.1 kHz) and 5MB of RAM. DSP functions include pitch shift, graphic and parametric EQ, time compression/expansion, sample rate conversion, dynamics control, crossfades, mixing and merging.

Circle #282 on Reader Service Card



SSL ULTIMATION

Unveiled at the Paris AES show is the "Ultimation" (Ultimate Automation) System from Solid State Logic, whose U.S. offices are in New York City. Designed as an enhancement to its G Series consoles, Ultimation is said to combine the best of moving fader and VCA automation systems, allowing the engineer to decide between the two. Unique dual-path circuitry (VCA and analog) offers the ability to update fader moves without the use of complex subgrouping software—the most appropriate audio path is micro-processor-selected according to the operational needs of the engineer. Other features include servo-controlled Penny & Giles faders, 1/4-frame accurate cuts, simple thumbwheel grouping, and the ability to read existing G Series mix data. Ultimation is available as an option on new G Series boards or can be retrofitted to any console using the G Series computer.

Circle #284 on Reader Service Card

SIAT™ SYSTEM

Now available through U.S. distribution from Schmid Telecommunications of New York City is the Short Interval Audio Test (SIAT) system. Operation is simple: The SZ316 unit generates a 5-second tone pattern through the audio path; this tone automatically triggers the companion SZ346 test device, which analyzes and prints out results of any one of ten pre-selected audio parameters from SIAT's 19 available tests. Stereo or mono testing capabilities include absolute level, diminished level, dynamic noise (S/N), expanded noise, THD, second and third harmonic distortion, IMD, stereo crosstalk, gain-frequency response, and interchannel gain and phase difference.

Circle #283 on Reader Service Card

MARANTZ PMD222

Designed for high-quality mono cassette recordings in the field is the PMD222 from Marantz of Aurora, Ill. The PMD222 is a three-head, dual-speed (1-7/8 or 15/16 ips) recorder in a compact 2x9x6.5-inch metal chassis. Features include DC or AC operation, XLR mic input (with switchable built-in electret condenser mic), high/lowcut filters, modular telco I/O jack, -10/-20dB mic attenuation, ±20% pitch shift, onboard limiter, ALC or manual level control, VU meter, and memory rewind. The deck is priced at \$399; a nicad DC pack is optional.

Circle #285 on Reader Service Card

BSS DPR-404 COMP/DE-ESSER

The DPR-404 from Brooke-Siren Systems (a division of AKG, San Leandro, Calif.) is a one-rackspace unit offering four channels of compressor/limiter and HF de-essing functions. Each channel includes a variable-ratio comp/limiter featuring the proprietary BSS "progressive knee" characteristic, providing soft knee, over-easy musicality at low ratios, and varying to hard limiter protection at max settings. Attack/release times are continuously regulated by the incoming audio signal, and an auto mode allows greater flexibility in treating sources. The de-essing sections offer smooth sibilance control with an LED display that indicates the correct amount of processing.

Circle #287 on Reader Service Card

SOUNDCRAFT SPIRIT ▼

The Spirit line of mixers from Soundcraft of Northridge, Calif. is available in studio (16x8x2 or 24x8x2) and live (8x3, 16x3 and 24x3 with an 8-channel expander) versions, and they feature Neutrik connectors, Alps faders and an integrated armrest. The studio Spirit models use an in-line design that accommodates 8- to 24-track recorders for the small commercial studio or home recordist, while the live mixers are suitable for touring, clubs and permanent installations.

Circle #286 on Reader Service Card



TAC B₂

The B₂ from Amek/TAC of North Hollywood, Calif., is a new 4-bus console designed for smaller sound reinforcement and video post applications. It features balanced inputs, busing and outputs, 4-band semi-parametric EQ, six aux sends and four stereo effects returns. Video post versions are available with serial and parallel edit controller interfaces for AFV work. Consoles are available in 8x4x2, 16x4x2 and 28x4x2 configurations, and include rails for rack-mounting or drop-through into studio furniture.

Circle #288 on Reader Service Card



AKG MICRO LAVALIER

AKG Acoustics of San Leandro, Calif., has added the C 407 mic to its Micro-Mic Series of miniature condenser mics. The omnidirectional C 407 features a vocal-flat-tering frequency response and its 0.3-inch capsule is ideal for on-camera applications. The mic is available in two versions: The C 407 (\$145) has a special XL-type connector containing a preamp/phantom power adapter; the C 407B (\$100) terminates in a mini-plug for use with a wireless body pack.

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RMS MODULAR STUDIOS

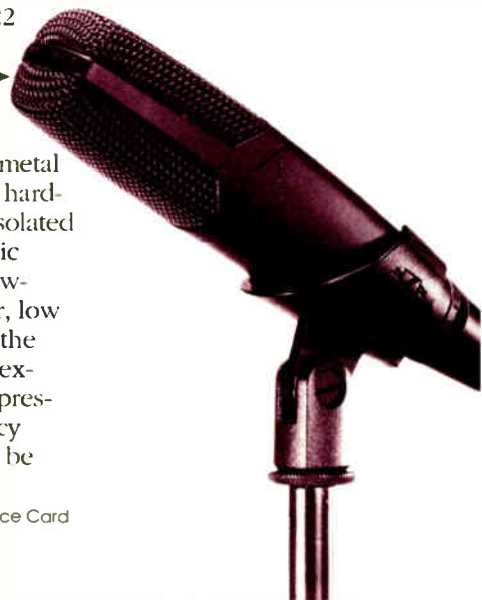
Results in the Management of Sound (North Hollywood, Calif.) has announced the RMS Modular Studio, a complete, acoustically tuned and isolated control room that is designed to be transported and set up anywhere. Features include floating floors, interlocking wall and ceiling panels, bass traps, diffusers, cable runs, air plenums, sound door, and front soffit to house video and audio monitors.

Circle #290 on Reader Service Card

SENNHEISER MD-422

Suitable for studio, stage and broadcast applications is the MD-422 dynamic cardioid microphone from Sennheiser of Old Lyme, Conn. The MD-422 features all-metal construction (with a hardened steel basket), isolated spring-suspended mic element, five-step low-frequency attenuator, low handling noise, and the ability to reproduce extremely high sound pressure levels. Frequency response is stated to be 30-17k Hz.

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HOT OFF THE SHELF

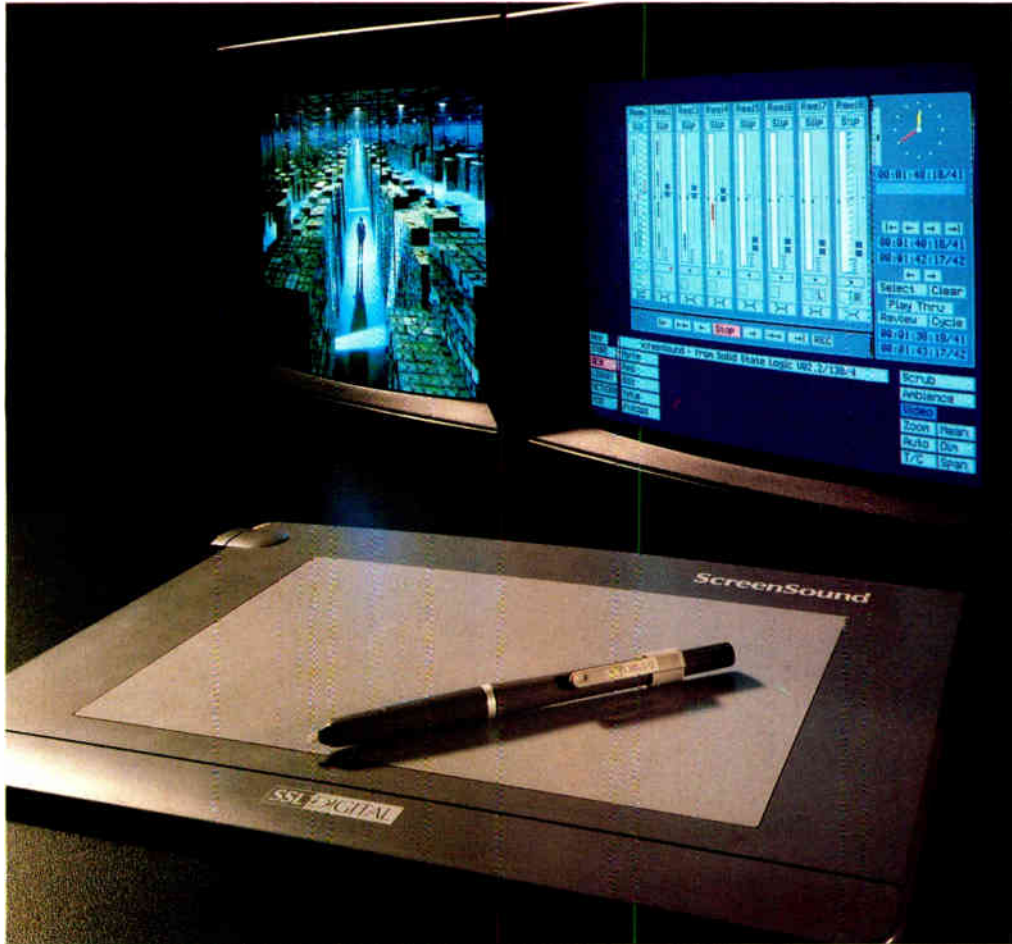
Optical Media has released the acclaimed Denny Jaeger Master Violin Library (previously available only for the Synclavier) on CD-ROM for Akai, E-mu, Ensoniq, Korg, Kurzweil and Roland samplers, and for the Digidesign Sample-Cell card. A demo audio CD is available. OMI also has launched a new line of low-cost, high-performance CD-ROM players. For the inside track, call (408) 395-4332...The popular Tascam MSR-16 1/2-inch, 16-track recorder is now available with Dolby S noise reduction and carries a list price of \$8,499; the original MSR-16 with dbx Type I NR is \$7,499... **How to Service Your Tube Amp** (\$69.95) is a fully illustrated, 274-page text and 75-minute video that covers all aspects of guitar amp maintenance, modification and repair. Available in music stores or through the Mix Bookshelf: (415) 653-3307 or

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The **Digital Dynamics ProDisk-464** (4 to 64-track) disk-based audio recording and editing system has been enhanced with new operating software (free to registered owners) that increases speed and flexibility. Also, a new DSP option adds digital EQ, reverb, delay and mixing functions. Call (516) 271-5600 for details...A catalog of **Simpson Electric's Mercer low-cost test equipment** (VOMs, DMMS, frequency counters, sweep/function generators, logic probes and more) can be yours by calling (708) 697-2275... **Chromalux pure white light bulbs** (25-150 watts, in frosted, clear, reflector and fluorescent types) simulate full-spectrum daylight and are said to reduce eyestrain, eliminate console glare and improve the aesthetics in the studio. Available through Westgate Enterprises, (213) 478-1954...The ESE line of

seven **IRIG B time code products** (generators, readers, converters and large displays) are described in a brochure available by calling (213) 322-2136...The **Caig DeOxidizer Pen** is a convenient way to apply Cramolin™, a fast-acting solution that improves conductivity and cleans contacts on batteries, switches, jacks, plugs, sockets and card edge connectors. At your local dealer, or call (619) 743-7143...**Digidesign's Random Access Audio** by David Miles Huber (\$4.95) is a 77-page introductory book on computer-based digital audio. Call (415) 688-0600...The 1991 **Tektronix Television Products Catalog** has 200 pages of TV gear, test and measurement equipment, including portable oscilloscopes and audio test devices. Available through Tek sales reps or by calling (800) TEK-WIDE or (503) 627-4697. ■

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dialogue and effects to be laid back to picture and synchronised to the exact video frame.

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AES/EBU interfacing keeps digital audio transfers free of analogue distortions and losses, preserving the highest audio integrity through to the final format.

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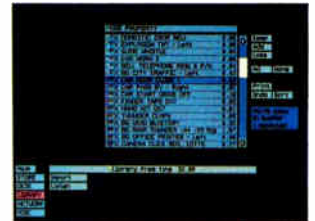
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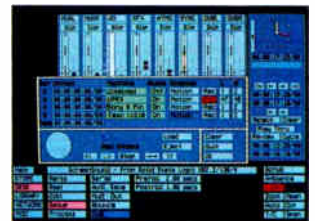
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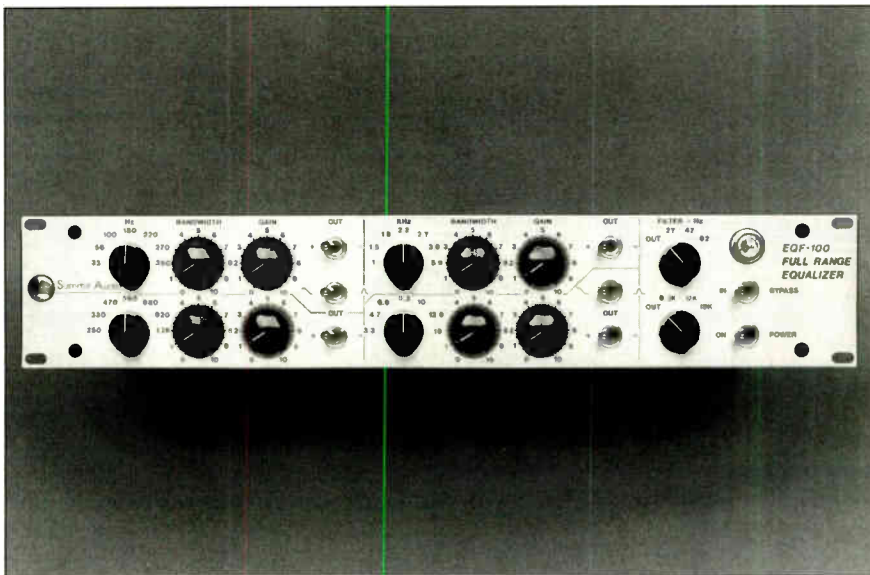
CRITIQUES AND COMMENTS

Summit EQF-100 Tube Equalizer

S If there's a single word that sums up the direction of pro audio in the 1990s, it must be "retro-tech." The hottest trend these days is REAL guitars, drums and even percussion and horn sections performed by actual musicians. Having survived the digitized, MIDI-fied and over-quantized '80s, producers and engineers are turning back to basics. One interesting aspect of all this is that among the most prized posses-

gain losses caused by the passive sections. Components in this hybrid design include three 12AX7 tubes, four discrete 990 operational amplifiers, ten integrated circuits and four transistors.

Housed in a two-rackspace enclosure, the EQF-100 is a full-range equalizer, with high and lowpass filters and four overlapping bands, each with a choice of seven switch-selectable frequencies. Independent bypass switching is provided for each band, along



sions in many studios are vintage tube microphones and signal processors, including mic preamps, compressor/limiters and equalizers.

This rekindling of interest in vacuum tube equipment has spawned a new generation of signal processors that emulate classic gear or provide new approaches combining the best of modern technology with an aurally pleasant tube sound. The EQF-100 from Summit Audio is one example of the latter design philosophy at work.

The EQF-100 incorporates a passive equalizer, followed by a tube amplifier that compensates for any

with continuously variable bandwidth control, and gain boost/cut ranging from +19/-25 dB, depending on the bandwidth selected. The device offers about ± 7 dB of control at the widest bandwidths, and the LF/HF bands can be switched from peak/dip to shelving mode.

Operationally, the EQF-100 is a cinch. The electronically balanced (pin 3 hot) XLR input and output can accept balanced or unbalanced +4dBm lines. One thing to keep in mind is the need to maintain adequate ventilation above and below the unit, although the EQF-100 runs fairly cool when compared to tube power amplifier designs.

The front panel is logical, with all controls clearly marked, so there's no need to spend hours poring over the user's manual. Just plug in and go. The only thing that may not be readily apparent is the functioning of the overall bypass control, which takes the EQ out of the audio path, although the signal remains routed through the amplifier section at all times. This lets the engineer send a signal through the amplifier for a subtle "warming" effect, even in cases where no equalization is required. Of course, the same end could be reached by individually switching all six filter sections to their "out" positions, but the bypass switch makes it happen much easier.

Rather than the usual EQ gain control where the 12 o'clock position marks a zero gain change (with boosts or cuts made by rotating the knob clockwise or counter-clockwise), the EQF-100 uses standard rotary pots. The control is marked on an arbitrary 1-10 scale, since the maximum amount of cut (-7 to -25 dB) or boost (+8 to +19 dB) can vary widely depending on the bandwidth selected. The function of the gain control is determined by a three-way switch (boost, EQ section bypass, or cut)—a feature that I really liked once I got used to it. First, the entire rotation of the control is available for making gain adjustments, which allows for more subtle adjustments. Second, I have always found it easier to locate troublesome frequencies by using equalizers in a boost mode to make the problem more apparent, and then—with reverse logic—using the EQ in a cut mode to eliminate the offending band. This three-position switch seemed to make corrective equalization happen quickly.

The construction is top-notch throughout, from the selection of the 1/4-inch slab of aluminum used on the front panel to the discrete 990 op amps tucked inside. Interestingly, I've noticed more and more "studio" tube gear being taken on major sound reinforcement touring rigs, and Summit has added such amenities as spring-loaded tube shields and PC

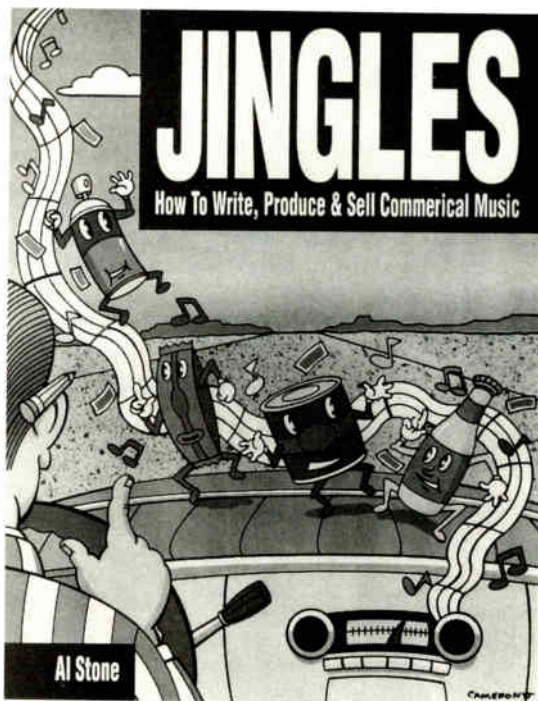
boards mounted on two bars of 1/2-inch square aluminum stock that run the entire width of the unit.

However, the best part about the EQF-100 is its sound, which is rich, full, musical and quite flexible, handling a variety of typical studio equalization chores (male and female singers, narrative voices, drums, cymbals and guitars, both electric and acoustic). Unfortunately, tube signal processing can become an addictive habit; after using the EQF-100 for a couple of weeks, I was hooked. While the unit's \$2,200 tag may seem somewhat high (until you check what many antique Pultec units are commanding), the Summit EQF-100 is a solid, world-class performer that is worthy of consideration by the serious user.

Summit Audio Inc., Box 1678, Los Gatos, CA 95031; (408) 395-2448.

Jingles: How To Write, Produce And Sell Commercial Music

In this new text, producer/jingle writer Al Stone offers a capsule guide to the entire process of writing, producing and selling advertising music, from the basic concept on through delivering the final product. Among the topics covered are finding business, working



with ad agencies, typical jingle structures (hooks, lyrics, melodies), dealing with new clients, contracts, licensing and copyrights, and the perils and pitfalls of setting up a small jingle production studio in the home.

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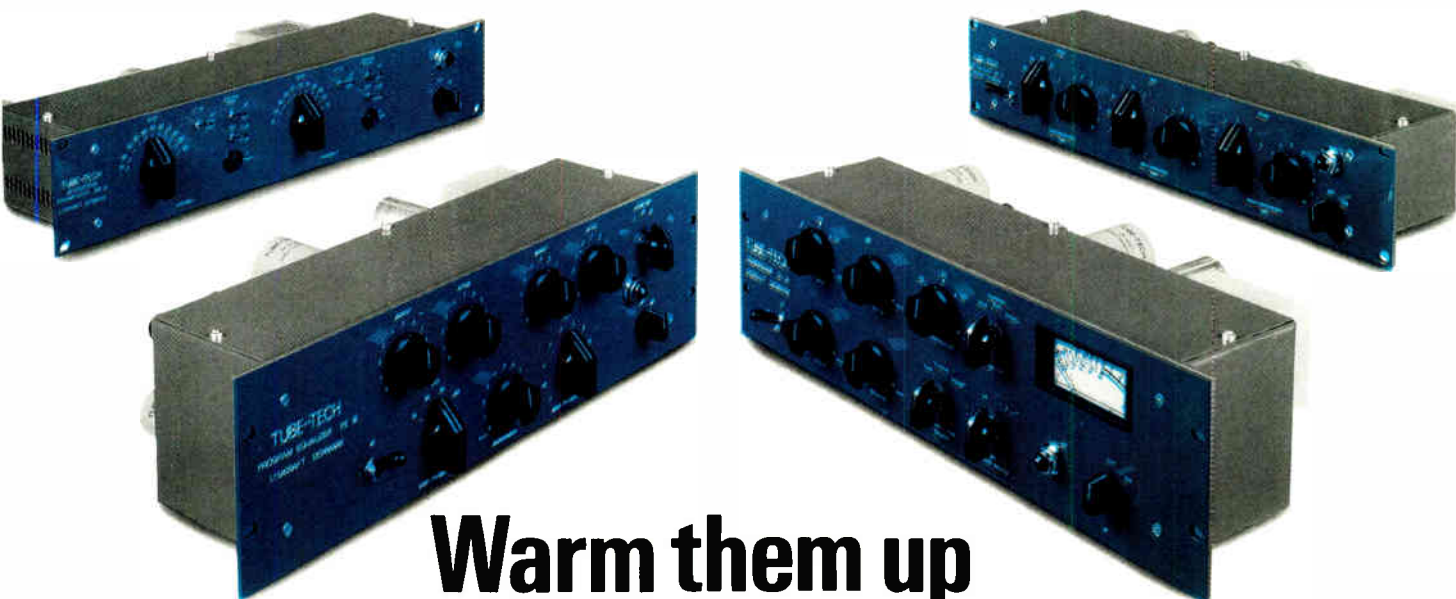
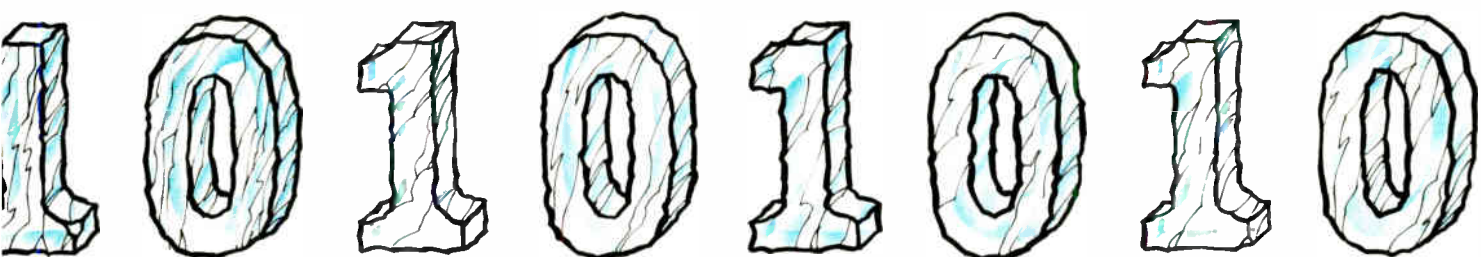
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One chapter is presented in a step-by-step, workbook-style approach to give readers practice in developing their own jingles based on seven real-life scenarios. And like Stone's earlier book (*A Complete Business Plan for the Small Studio*), *Jingles: How to Write, Produce and Sell Commercial Music* includes samples of promotional material, letters and flyers that should help the would-be jingle writer get started.

Jingles: How to Write, Produce and Sell Commercial Music is priced at \$18.95 and is published by Writer's Digest Books, 1507 Dana Avenue, Cincinnati, OH 45207. It is also available through Mix Bookshelf, (415) 653-3307 or (800) 233-9604.

Popless Voice Screens

A definite refinement over the age-old trick of stretching a nylon stocking over a coat hanger (as a way to control breath pops and sibilant consonants)

is the line of microphone accessories from Popless Voice Screens. Designed to maintain acoustical transparency while minimizing "p" and "s" sounds,



Popless Voice Screen

the Popless Voice Screens are available in several versions, 4- and 6-inch diameters, and various mounting configurations.

The top-of-the-line PVS-6wc and PVS-4wc models (\$89) use a straight rod/gooseneck combination that fits into a rubber "donut" joint on the stand

clamp, thus decoupling the screen from the mic and stand. This allows up to 30 inches of adjustment, so the screen can accommodate nearly any mic and stand combination. A gooseneck version (PVS-6c/4c), without the rod or isolation mount, is \$63, and the company also offers a 4- or 6-inch screen only (with a 5/8-inch standard mic stand mount) for \$37.

In session with a variety of vocalists, the Popless Voice Screen met its claims, providing sonic transparency while still affording protection from vocal blasts and sibilance. If you're looking for a high-tech solution to an age-old problem, check these out.

Popless Voice Screens, 716 Pennington Street, Elizabeth, NJ 07202; (908) 527-0767. ■

Now in his tenth year with Mix, George Petersen still lives with his wife and two dogs in a 100-year old Victorian house on an island in San Francisco Bay.

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by Guy DeFazio

TANNOY SYSTEM 10 DMT REFERENCE MONITORS

Why would Tannoy, one of the world's leading suppliers of reference monitors, decide to abandon the successful SGM Series for a completely new design that bears no physical or mechanical resemblance to its predecessor?

The use of a coaxial driver can be traced to the company's previous monitor series, but that is the only similarity. A die-cast chassis forms the framework for the dual-concentric. An open approach to casting construction



"We had to outdo ourselves," said a Tannoy representative. "Even though our SGM Series has gained widespread popularity, we still think that things can be improved upon."

And improved upon they have. The new System 10 DMTs have achieved some impressive sonic characteristics using some very non-standard driver/cabinet materials. And at \$1,500 a pair, they retail for several hundred dollars less than Tannoy's previous dual-concentric trump card, the SGM-10s.

utilizes vented rear suspension for improved thermal cooling and reduced risk of resonant air cavities. The 10-inch mid/bass speaker is made of a non-traditional (plastic) polyolefin material.

The 25mm HF unit consists of a duralumin (an aluminum/magnesium alloy) diaphragm suspended by a polyamide surround. The HF unit utilizes a separate magnet assembly for easy field replacement and sports a glossy gold diffraction ring that pro-

vides phase-adjusted HF propagation. To maintain absolute tolerances, a \$76 HF replacement unit comes as a complete package, including diaphragm, magnet and phase guide.

A 2.3kHz first-order crossover network delegates the appropriate frequencies to each driver. The System 10 crossover is a minimalist network of high-quality, air core inductors and film capacitors. With the exception of their textbook-style crossovers, the System 10s incorporate a highly innovative system of materials and components.

Tannoy engineers used different construction materials to optimize mechanical resonance isolation. They affectionately refer to their new design approach as Differential Material Technology. DMT incorporates specific non-resonant materials in driver surrounds and driver mounts, as well as special adhesives and absorbent couplings on the cabinet's internal bracing, to eliminate unwanted speaker resonances.

The 22x14x11-inch cabinet is constructed from a high-density "space-frame" with rounded corners and edges.

The frame supports and physically decouples the medium-density fiber, twin-laminated walls of the cabinet. Internal cross-bracing, acoustic wadding, the crossover components and the dual-concentric driver combine with the cabinet to bring the System 10 in at a hefty 42 pounds. The 35-liter internal volume of the twin-ducted DMT cabinet proved to be worth its weight in low-frequency extension and definition.

The rear connection panel has separate gold-plated binding posts (with non-standard-width banana plug ends) for both the woofer and tweeter, allowing for bi-amping or bi-wiring. For a single amp with single cable wiring, there is a gold-plated bar that straps the posts together. Also on the rear panel is a simple sliding-bar adjustment providing ± 1.5 dB of HF shelving action above 2 kHz (the upper crossover range). The treble adjustment proved to be a simple and effective feature.

Prior to running test measurements on the System 10s, I "broke the cones in" by feeding them a 251Hz sine wave for several hours (with just enough power for moderate cone travel). Then, in the interest of adding practicality to the speaker's initial loosening-up pe-

riod, I fed the System 10s everything from Aaron Copeland to The Tubes for several hours (sometimes at more than moderate cone travel).

Finally, confident that the new speakers' cone resonance had been exercised enough, my frequency response and sensitivity tests were within ± 0.5 dB of Tannoy's published specs. The phase and AC resistance measurements were also consistent with those provided in Tannoy's product literature. Once satisfied that the speakers met published performance specs, I took off my plastic pocket protector, put my measurement equipment aside, and proceeded to subject the System 10s to a variety of prerecorded playback tests.

Listening to familiar CDs on the System 10s was a pleasurable experience. The overall smoothness of the frequency response and the clarity of their imaging brought new definition to some elements of my reference CDs. The low-end response was much tighter and much clearer than I had expected, my expectations based on previous experiences with Tannoy SGM-10s.

The high-frequency response had an "air" of openness and smoothness

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(and any other loudspeaker buzzwords you can think of) that gave an impressive depth and dimension to the exposed elements of less-dense program selections. The smooth top end lets you hear more of the spatial characteristics of natural and/or artificial room sounds, enabling the System 10s to have a "natural" sounding response. Of course, the term natural (when referring to loudspeaker performance) is relative to the laws of physics and the inherent limitations of two point-source electromechanical transducers. But that is a whole different subject.

The weakest characteristic of the System 10's frequency response is in the 2kHz midrange region. Not surprisingly, this is in the general vicinity of the crossover. Crossover frequencies are chosen at the point where driver response begins to reach optimal lower limits (in the case of tweeters) and optimal upper limits (in the case of woofers). Keeping in mind the combined low- and high-frequency driver non-linearities that every two-way loudspeaker design must accommodate, sculpting an accurate frequency/phase response around a crossover is somewhere between black magic and a minor miracle. Crossover designs and driver construction are typically guided by response trade-offs that ultimately result in the least objectionable combination. Considering Tannoy's minimalist crossover network, the midrange response of the System 10s is impressive.

That said, the audible artifacts around 2 kHz were most noticeable on certain vocal timbres. I use the term "certain" to illustrate that the coloration is subtle enough to not be completely objectionable. The relative level of the 2kHz distortion is most prominent at louder operating levels and seems to command the most attention during extended diaphragm excursions.

In general, the midrange response of the System 10s is not difficult to predict and is certainly not out of line for most two-way, near-field reference monitors in today's market. In fact, among many popular near-fields in use today, midrange colorations are taken in stride and have become trusted references. If you know what's there, you know what to do with it. By comparison, the System 10's midrange is superior in overall smoothness and definition.

Don't let the System 10's (larger than your average near-field) size deter you

from setting them on your console meter bridge. They perform equally well in either near-field or mid-field applications. After trying them in both arrangements, I was comfortable with the mid-field setup (sitting on stands approximately eight inches behind the console), but being a creature of habit accustomed to working on near-field or primary monitors, I preferred the near-field positioning.

I found the System 10s related very well not only to the differing physical environments of several studios, but also to the variety of subjectively tuned and tweaked primary monitors in those rooms. The ability to accurately switch between near-fields and primary soffited monitors is an extremely attractive attribute of these speakers. The System 10's low-end definition makes the transition exceptionally well.

Working with engineer/producer Paul Klingberg (Cheap Trick, Earth Wind & Fire, Cher) on an album mixing project for Toshiba/EMI artist Miho Morikawa, I found the System 10s comfortably non-fatiguing after a week of 12-hour mixing sessions. Additionally, the minimal amount of equalization added to the mixes during mastering reinforced my confidence in the System 10's accuracy. There were no surprises when listening to the mixes through mastering engineer Bernie Grundman's custom Tannoy primary monitors.

Several days later, I brought the System 10s to Bernie's mastering room where we used a 1/2-inch analog master of Anita Baker's *Fairy Tales* to evaluate the speakers. As a consistent user of Tannoy monitors since 1968, Bernie has followed the evolution of their various monitor series. Comfortable with the overall performance of the System 10s, he preferred the +1.5dB HF shelving position. He added, "The trend today is to mix very brightly, and the smoothness of their high-end might cause some people to add too much top end to their mixes. The +1.5dB position seems to translate better to what I'm used to." On Anita's song, the treble adjustment brought improved clarity to the brighter percussive parts, without making the sibilance of her voice or the timbre of the cymbals too harsh.

Doug Sax, an L.A. mastering engineer who, in addition to running a successful mastering facility, builds custom crossovers for the now discon-

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tinued Tannoy SGM Series, had this to say about the System 10s: "I built a simple crossover to try to correct the midrange, but was unsuccessful. I don't have much to complain about except the midrange. The bass is stunning and the high-end is very fine." For those owners of Tannoy SGMs with stock crossovers, you owe it to yourself to check out Doug's mod. Whether stock or modified, the SGMs remain markedly different from the System 10s when it comes to overall performance. System 10s excel in low-end definition, high-end extension, overall response smoothness and driver efficiency.

Engineer/producer David Cole (Richard Marx, Roger McGuinn, Boys Club) and I set the System 10s next to his longtime reference Tannoy PBM-8s. The extended low-end response of the System 10s was no surprise, nor was their superior imaging compared to the non-concentric PBM-8s. While David wasn't ready to abandon his trusted PBMs in the middle of mixing Bob Seger's latest album, his repeated comment on the System 10's low-end response was "wow."

My session time with the System 10s also included two separate Synclavier tracking projects. The 100kHz, 16-bit Synclavier drum samples used on a record tracking session showed off the System 10's transient response extremely well. The 70-watt Bryston 2B amplifier pushing the System 10s was within Tannoy's 30-150W amplifier power recommendations and proved adequate for this application. The other session, an ambience-intense sound effects building project, showcased the speaker's smooth, extended high-frequency response. From the trickling sounds of a small brook, to the lush depths of a flourishing rainforest, the "air" of the System 10s came to life.

The Tannoy System 10 DMTs have earned my endorsement as a serious contender in the ever-expanding reference monitor market. They have proven to be efficient, accurate and musical references. Tannoy engineers have successfully delivered a product that stands out in the near-field reference monitor crowd. ■

Guy DeFazio is an L.A.-based recording/mixing engineer whose recent album project, The Simpsons Sing The Blues (Geffen), broke the two-million mark and is still going strong.



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by Paul Tingen

THREE TENORS IN CONCERT

HOW TECHNOLOGY HELPED PAVAROTTI, DOMINGO AND CARRERAS HIT THE TOP OF THE CHARTS

T

he scene is Rome, Italy, July 7, 1990. It's a hot, moonlit night. The famous Roman ruin of Caracalla is filled with 6,000 opera lovers who've paid astronomical fees to witness the first-ever-together performance of the world's most famous opera tenors: Jose Carreras, Placido Domingo and Luciano Pavarotti. At the same time, 800 million viewers and listeners worldwide are connected via satellite TV and radio.

The concert is a few minutes underway, and Decca engineers John Pellowe and Philip Siney and producer Christopher Raeburn are sweating in the Fleetwood Mobile, making a direct broadcast mix and recording the concert at the same time. Elsewhere, their colleague, engineer Jimmy Lock, is taking care of the live PA. mix and the stage monitor mix.

*(L to R) Domingo,
Carreras,
conductor Zubin
Mehta, Pavarotti*





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To their relief, the wind has just died down, so there are no howling noises on the microphones. Two Mitsubishi 850 digital 32-track recorders are purring in the background of the mobile, the sound is excellent and Carreras is singing well. Everything seems in perfect order and Pellowe and Raeburn are about to sigh with relief.

And then suddenly...what's that rumble in the distance? Seconds later, a jumbo jet flies straight over the open air concert venue. The 200-person-strong symphony orchestra and the singer are completely overpowered, despite the P.A. Carreras manages a smile, gallantly blows a kiss to the sky and carries on. But in the mobile, they're tearing their hair out. Hadn't Rome air traffic control been instructed to keep planes off that flight path? If this carries on, the concert will be a disaster and they can throw their multitrack tapes in the dump, if it's not too late already.

Yet, three weeks later a record is released and it proves amazingly successful. As of mid-February 1991, the recording of the concert is still topping the U.S. classical charts. *In Concert*, or *Three Tenors*, as it's also called, has sold more than 5 million copies worldwide, making it the best-selling classical record, CD and video ever. And on the CD there are no jumbo jets to be heard, although there's a little bit in the background on the video. It's a far cry from the deafening rumble on July 7th. How can this be? Has purist Decca committed forgery? Is the recording "live" in the same way that a lot of pop records are "live"—with a multitude of overdubs and trickery added later in the studio?


Jimmy Lock, senior recording engineer, was the man

And then
suddenly a jumbo jet
flies over the open air
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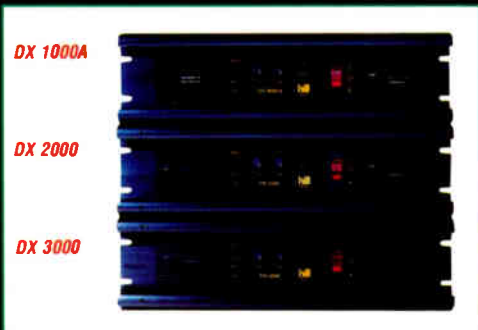
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responsible for the overall sound of the project, including radio, TV, P.A. and recording. One cold January morning, he sits together with Tony Griffiths (general manager of the Decca Recording Centre), Christopher Raeburn and John Pellowe in Decca's Kilburn studios. They're explaining how they did it—not just getting rid of the jumbo jet, but the whole thing. Recording such a massive concert in the open air setting and getting it to sound good and natural is an impressive achievement in its own right, let alone unidentifiable flying objects or, well...crickets.

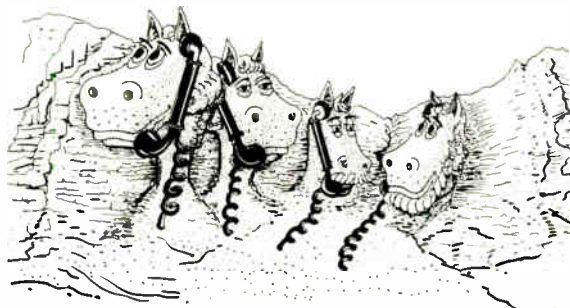
"For some in the audience, they were louder than the playing," Jimmy Lock laughs. "The moment the trees were lit up they came alive, thinking it was daylight." Yet, no crafty edits were done on the crickets. They were, as the four gentlemen explain, "part of the atmosphere." And the whole point of recording this concert was to preserve the unique, sultry summer night atmosphere of an open air concert.

Decca had acquired the rights to record the concert several months before, not on the strength of being the highest bidder, but because the four artists (the three tenors plus conductor Zubin Mehta) had all worked with Decca before. They also felt most comfortable when this eminently reliable company dealt with such technical details as placing microphones, getting the sound right, and cutting it to vinyl, video and CD.

Organizing these details required extremely hard work and involved solving many headache-inducing problems. The recording team arrived in Rome five days before the concert, and started work the next day. While the orchestra and tenors were rehearsing off-site in the Rome opera house and meeting with Raeburn about the musical side of the program, Pellowe, Siney, Lock and Griffiths were setting up and testing the equipment. They had three main problems: first of all, the sheer size of the orchestra (there were actually two orchestras put together, resulting in a total of 200 players); secondly, the open-air acoustics; and lastly, the wind. John Pellowe remarks, "Three or four nights before the concert, the wind was so strong it was knocking music stands over. It was just howling through, and we were very worried."

Special measures were taken to combat that problem. Dr. Carl Wudtke at Schoeps developed pop shields

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especially for this event, but, as Lock points out, "They minimized the problem, but they didn't get rid of it." The team resorted to doubling up microphones and putting them at different angles, so that if the wind blew from one direction and put a mic out of action, another might still be usable. To be entirely sure, they used *three* mics on each of the singers. Put together with the enormous size of the orchestra, this strategy resulted in a total of 54 microphones being used.

"It was a double symphony orchestra, and sometimes parts were split," Lock says, "so we had to double-mic the sections. Also, as sound doesn't travel well in the open air the way it does in a reverberant hall, you need much more cover. We close-miked, with mics three or four feet away from the instruments, rather than the usual six feet."

All microphones used were Schoeps: MK4s on the vocals, and a mixture of MK4s and MK21s on the orchestra. "It's better to use a conformity of the same mics in this situation," Pellowe notes. "You know what each one does and therefore have a standard, which remains the same throughout. You haven't got different patterns of frequency responses all over the place."

Pellowe's task of coping with 54 inputs was nevertheless unnerving. He had to make two mixes simultaneously: a stereo mix for broadcast, and a 32-track mix for the Mitsubishis, using a 40-input Raindirk and a 30-input Trident. There was no automation. The only help he had was from Raeburn, who gave him cues from the score, and Siney, who operated the two Mitsubishi machines squeezed into the van. Pellowe didn't use any compressors or limiters, which might baffle pop engineers used to automation and all manner of outboard gear to keep a mix under control.

Usage of compressors and limiters was, according to Pellowe, "categorically out of the question" for the live mixes, as well as the for the later studio mix, and levels were balanced by riding the faders and by the excellent microphone techniques of the three tenors. "The only compression I applied was on the finished broadcast mix," he comments, "which I compressed to the EBU specifications for

—CONTINUED ON PAGE 182



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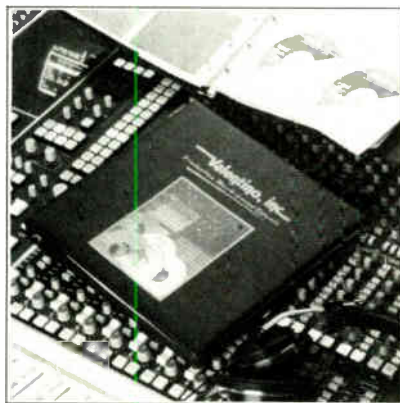
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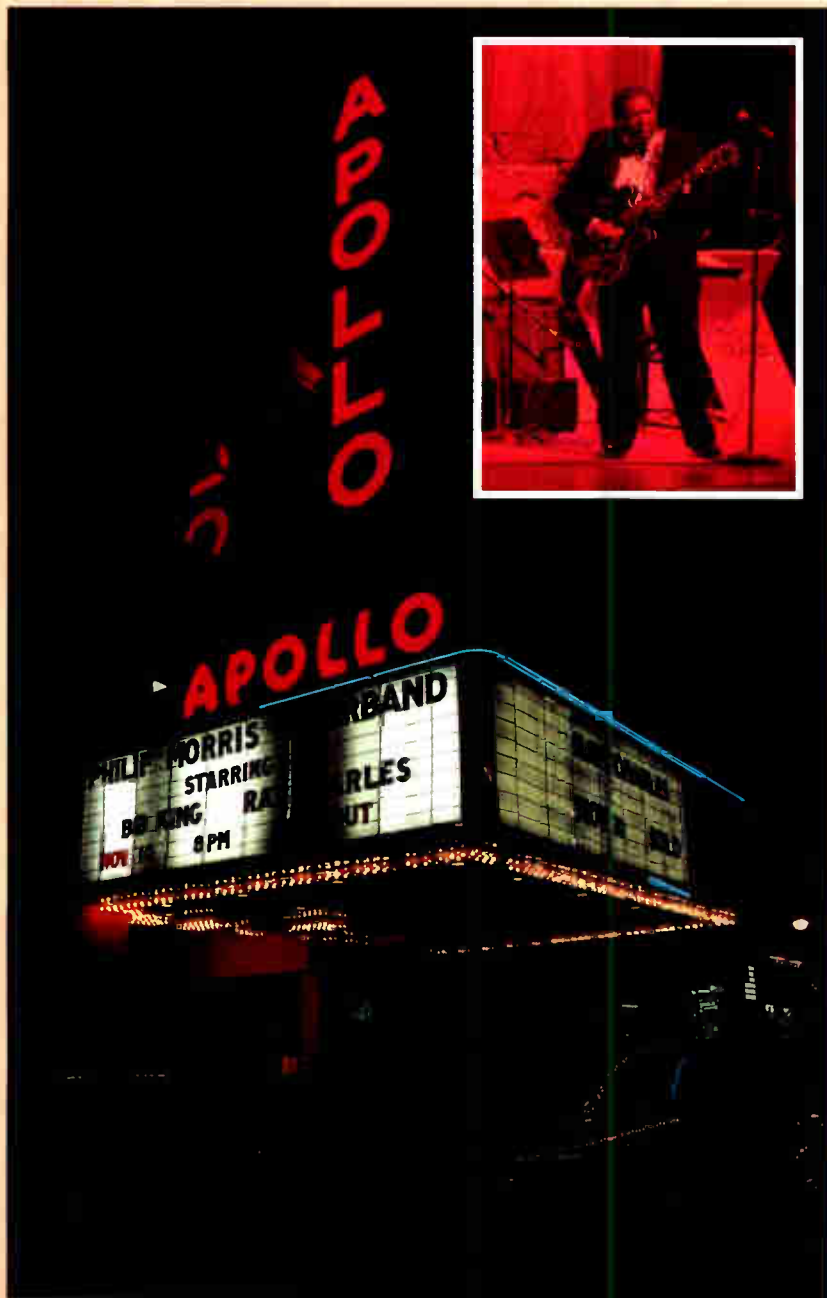
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by David (Rudy) Trubitt

HARLEM'S APOLLO THEATRE

CHANGING WITH THE TIMES



PHOTOS: MORRIS LANE

The Apollo may be the best-known theater in the world. Since its founding nearly 60 years ago, a successful debut at the Apollo has launched many careers. Although the Apollo fell on hard times in the late '70s, the early '80s found the completely renovated theater sporting a full video production facility. Numerous TV specials and the weekly *Showtime at the Apollo* require both broadcast audio and live sound for the audience. The theater is in the midst of designing a completely new house sound system, but that's not unusual—the Apollo's been concerned with upgrading its live sound since its inception. A press release marking the theater's 1934 christening noted:

"The opening of the 125th Street Apollo Theatre will mark a revolutionary step in the presentation of stage shows. High-fidelity RCA sound equipment, the same used by Radio City Music Hall, and an innovation in public address systems, has been installed, and we feel certain that the 125th Street Apollo Theatre will be an entertainment edifice that Harlem will take pride in showing off to the neighborhood communities."

In the early days, the stage manager ran the sound system from backstage. Norman Miller (alias Porto Rico) was one of the theater's first soundmen, and also the originator of one of the Apollo's trademarks. One amateur night, Rico chased a particularly poor act off the stage with a starter pistol, beginning a tradition that continues to this day, albeit without firearms. Fortunately, ejecting failed acts is no longer the responsibility of the sound crew, currently headed by Howard A. Pearl. I recently spoke with Pearl and studio manager David Miles, and we began with the subject of the theater's renovation.

"Percy Sutton spent \$21 million to renovate this facility, right down to re-gold leafing all the original detail around the proscenium," Miles says. "This is the

heart of Harlem, and it really represents the community. This is a world-renowned facility, and we have to be at a technical level that is unmatched. Black-owned facilities, unfortunately, get twice the scrutiny, and we've got to have our act together. We have a very professional team of people who produce shows here, and we must have the equipment to match. We were also fortunate in that the city was really behind us in the renovation of this facility. Cooperation between the contractors and the city was critical. Everyone was concerned about the future of the building, which is an international landmark for the city. Through everyone's cooperation, we were able to do a quality upgrade."

The Apollo is more than just a 1,480-seat theater. It includes four floors and a basement, all tied together with an extensive network of cabling, patch bays and SMPTE time code. The basement holds the green room, along with



David Miles, Apollo Theatre recording studio manager (left); Howard Pearl, chief audio engineer, concert department

sound and light tech areas, house amplifiers, telephone land lines and the theater's power distribution system. The theater itself shares the first floor with the lobby, load-in area and storage space. Offices fill the second floor, many of which are available to visiting production companies' staff. The third floor, once

filled with dressing rooms, now houses a complete 3,500-square-foot soundstage with 22-foot ceilings and patch bays connecting it to the fourth floor, which contains the main audio control room. Finally, a 400-square-foot live room sits adjacent to the control room.

Most of the current house sound equipment was installed in the early '80s, according to Pearl. "Our P.A. at this point consists of a Yamaha PM3000 house console, Turbo TMS-3s and Renkus subs, Crest power amps, BSS crossovers, and Audioarts EQ. But music has progressed since this system was installed. At the time, they invested in good equipment, but with rap and reggae and all the current things we're working with now, the P.A. doesn't seem to have the bite and power that we need.

"What we're hoping to do," Pearl continues, "is design a system that will make the theater both acoustically sound and sonically perfect for every type of music we bring in, because the

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Apollo has an incredible range of styles that come through here, from Nancy Wilson to the O'Jays to the Temptations."

Miles concurs: "We are looking to upgrade our live system entirely. I've had several discussions with JBL, Soundcraft and Mike Oltz of J.B. Anthony & Co., all of whom are interested in helping us design a system that will really meet the acoustic needs of the Apollo. I've heard their new gear and was totally impressed. We'll probably use Soundcraft 8000s for both house and monitor, and the new [JBL] line of cabinets. I went to a recent demo at SIR, and this stuff is warm, it's accurate, it's got punch—they almost blew me through the back wall!"

"We're also talking about flying the P.A.," Pearl adds. "Our boxes are not flown; we've got them on stage and in the balcony. We've been working with people to come up with a way to fly the P.A. that will work *with* the hall. It's a three-tiered hall that was created for acoustic performanc-

es—it was a burlesque house. We've done plays where all we use is a few shotgun and PZM mics just to catch the throw, because the acoustics of the hall are beautiful. A P.A. for this place needs to be tailored properly, because we always want to use the balance of the hall."

A flown system will be even more desirable in certain situations, according to Pearl. "We just did a 32-track digital recording of an opera by Julius Hemphill. I was the recording engineer for that. We had to make a recording and use the P.A., yet the orchestra was in front of the P.A. boxes. In a situation like that, feedback is going to be a real problem. We had six lavalier mics and a ton of Crown JLM-100s. These mics were waiting to squeal—actually coming up in my headphones and begging, 'Please let me squeal!'"

Communication is essential for any team that must meet the needs of both broadcast and house sound. "We try to have a harmony here," Pearl says. "You'll

find a lot of situations where monitors are always fighting the house. This is a team effort, from the guy upstairs to the guy coiling cables. The house works hand in hand with the stage, and all our levels work hand in hand with the guy upstairs. We have a little rule—everybody follows everybody." Miles adds, "To maintain communication, we keep a tech who floats between the downstairs theater scene and upstairs. If we have problems, we like to get them solved immediately. In terms of levels, we generally take what Howard sends us. If we need some more, we try to find a way to work around it."

"In a TV situation we try to keep it as quiet as possible," Pearl adds, "because I have six, sometimes eight audience mics all around the theater. When you listen to the show, you hear a ton of audience response. After three years of doing the show, I finally found a way to audience-mike it properly and get the proper throw. We tried a bunch of differ-



ent things—we even tried the new Crown stereo PZM—but I was happiest with AKG 451s with CK1 caps for the orchestra and the mezzanine, and two Neumann KMR82 shotguns in the balcony. The angle of the microphone gets me that big fat sound, and then we run it in stereo. You can actually feel the spatial harmony of the theater itself.” The audience mics also pick up sound from the house system, and are often mixed into the broadcast mix to provide additional ambience.

Most of the live music on *Shouttime at the Apollo* comes from The Frank Owens Band. Pearl explains: “We have a couple of monitor runs hard-wired to the pit where we put the band. I just run them through some Renkus wedges and a little sidefill.” He notes that most visiting musical groups appearing on the show work with taped backing tracks and live mics, due to the number of acts shot each day.

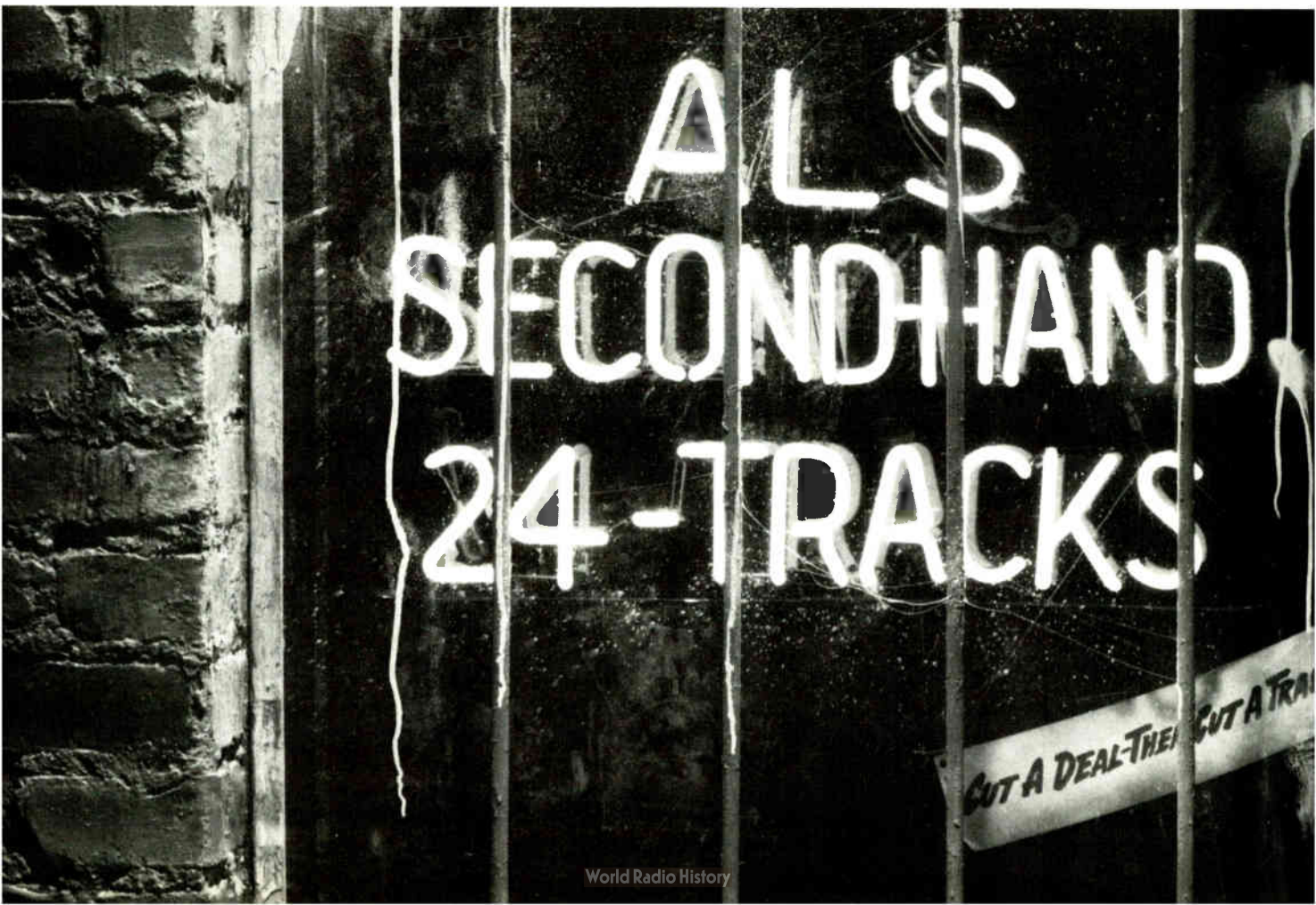
“We’ll do live turntables and

live microphones, but most of the acts come in with tracks” Pearl adds. “But we did Patti LaBelle live straight to TV, which is usually unheard of in this kind of situation, because you have so many acts coming in, you have an audience there, and you’re trying to record—it’s very difficult. With Patti, we had to determine exactly what her needs were both for monitors and house, and how many instruments we were going to do. We also had to figure our turnaround time to get her off, her band struck, and the next act on so we could continue taping the show. The acts come in the morning, last to first, so the last setup we do before taping is the first setup we shoot. We run through the blocking of the show, check out our audio, and that day Patti was the first act. Typically, we’ll tape for two or three days, and then they go back and post-produce it.”

The theater makes extensive use of wireless mics, and Pearl has strong opinions on the sub-

ject. “I’ve tried a lot of wireless microphones, and my favorite microphone is the Cetec Vega. I’ll scream its glories to anybody. When you have a live house to deal with and people who have to listen to what’s going on, and not scream, ‘I can’t hear! I can’t hear!’ you need a mic that has a good amount of sensitivity, a lot of gain, and can take the rigors of this kind of usage. The Cetec Vegas just come across better, and they didn’t pay me to say that!”

Audio from the stage and house ultimately makes its way to the theater’s fourth floor, where a full audio and video control room awaits. Miles explains: “The live dates are done out in the theater, and Howard Pearl handles the entire live audio side, for both the house and the monitor. We take a split off the house box, or we can matrix it off the PM3000 back through the lines upstairs. Howard also does a send that goes upstairs to the audio control facility. We can send any of these down to 1-inch video, 24-track analog



or 32-track digital. This really started with our amateur nights, which we used to videotape before the major renovations in '82. Then pros started using the theater for videos—Barbra Streisand, Whitney Houston, U2. The hall was rented out for video only, and they used Nagra playbacks, until they realized that they could walk out of here with 2-inch, 2-track, and 1-inch video masters—anything that they needed.

"We've had a studio for the past two or three years," Miles continues, "but it was mainly just audio-for-video, mostly for *Showtime at the Apollo* and a few specials here and there. It was not used as an audio-only facility at all." To change that, an additional \$750,000 renovation was undertaken, adding a Neve VR 60 with Flying Faders, a new live room, and a new MIDI system. "Last summer we stopped everything and totally rebuilt the fourth floor," Miles remembers. "At this point, I can compete with anybody in New York City, and be-

cause we are a full audio and video production facility, people are not required to bring a truck in. As a result, we're the only black-owned facility that I know of that is capable of doing the various projects we do here." The studio is also equipped with a Mitsubishi X-880, an Otari MTR-90, and a brand new MTR-15 1/4-inch with center-track time code. "It's so new that nobody else even has a manual," Miles quips.

With the upgrades, the studio has also taken steps to broaden its client base. "We have advertising companies coming up here now doing jingles; historically, it's been impossible to get them out of midtown," Miles says. "We've also been doing live dates out of our room for the first time, with some of the top New York studio musicians."

Besides *Showtime*, the Apollo plays host to other regular and one-off events. A recent example was a B.B. King/Ray Charles concert, shot for broadcast over the New Jersey Network, and a

digital release of the B.B. King portion of the show by GRP Records. And every Monday through Thursday mornings, the theater plays host to a live radio broadcast, *The Gary Bird Show*, carried over WLIB. "I run two mixes: a mix to the house and a mix back to radio through the PM3000," Pearl says. "I send a mix-minus, a program mix and an intercom line through the matrices of the 3000. These go to the radio station at 801 Second Avenue through trunk lines. They send me back audio from live phone calls to the station—it's a talk show, sort of like *Geraldo* on the radio. People call in, there's audience participation. We can't run a delay because I have to monitor the show live, so we go straight to the air with no delay."

On occasion, the theater's live system is augmented by outside equipment. One recent case was the New York premiere of Quincy Jones' *Listen Up*. Miles explains, "We set up a special Dolby sound system inside, and the record

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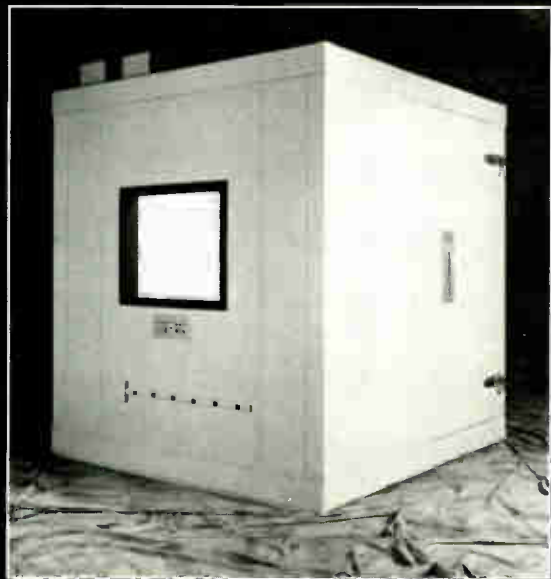
LIVE SOUND

company rented the school-yard across the street. They put up a tent with two stages and a dance floor for a catered dinner for 800 people. The entertainment consisted of the Miles Davis Band, the Quincy Jones Orchestra, James Ingram, Patti Austin, Tevin Campbell, Chaka Khan, Nino Tempo, George Duke, Herbie Hancock and others." See Factor was contracted to provide sound for the tent's two stages. They responded with two Yamaha PM3000s, a 16 monitor mix Ramsa board, Meyer monitors and MSL-3 mains, UPA delays, and "every mic known to man."

Miles was surprised to discover no plans had been made to carefully record the event. "Their plans were limited to, 'Well, we'll put it down on a DAT—it's just a party for Quincy.' And I was like, 'Wait a minute—500 feet from here you're going to have all this talent and you're not going to record it?' Howard and I had four hours to put together a crew and run lines across the street. We took a split across the house system and ran up four flights of stairs, and got the performances on the 32-track digital machine." See Factor's Mark Friedman comments, "It was one of those long, long days, but it sounded great, and everyone was happy."

The Apollo has a long history of supporting the community that supports it. That tradition continues, as Miles explains: "I run an intern program here where we take people out of engineering school, particularly minority students who don't get the chance to get into a facility, to get hands-on experience. New talent was discovered here, and we want to expand that tradition from just performers to production staff and producers." ■

David (Rudy) Trubitt is a well-respected journalist with determination and damn fine shoes.



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ERIC CLAPTON PHOTO: RON DELANY

SOUND CHECK

by David (Rudy) Trulsi

Quest for the Perfect Limiter

Clair Brothers (Lititz, Pa.) has completed development, test and manufacture of a proprietary compressor/limiter system dubbed the Coherent Transfer System. Designed specifically for use with Clair's S-4 and S-4 Series II boxes, all functions, including amplitude, phase and delay correction, are implemented in the analog domain. Clair spokesman Greg Hall cited improved audio quality as the rationale for bucking the digital processing trend, noting the unit's 121+ dB dynamic range, .003% harmonic distortion (input to transformer-isolated output, with limiters in

circuit), and 100k bandwidth. Improved phase accuracy of analog circuitry over digital processing with anti-aliasing filters was



also noted.

While development of the CTS system began three-and-a-half years ago, genesis of the device dates back ten years to when the

company began a quest for the perfect limiter, according to circuit designer Ron Borthwick. "We needed a limiter that wouldn't do anything unless it was needed," he says. "Our VCA was designed from ground up to be used as a protective device, and the fact that it did not have to provide gain was very helpful."

Prototype CTS systems have been touring for more than a year, and finished units are on the road with Robert Plant, Sting, Paul Simon, Debbie Gibson and Bob Dylan. The company has no plans to offer the device commercially, but does expect to produce enough units to refit all its systems by spring.

Renkus-Heinz Sponsors Design Seminar

Renkus-Heinz (Irvine, Calif.) took advantage of the winter NAMM gathering of sound reinforcement personnel and held its second International Sound System Design Seminar immediately after the show closed its doors. About 175 designers, contractors and consultants, a third of whom were from overseas, attended the two-and-a-half day event, according to company spokesman Carl Dorwaldt.

Following a keynote address by Syn-Aud-Con's Don Davis, such diverse topics as the EASE electro-acoustic simulation software, processors, speakers and subwoofers, and European issues were covered. In addition to talks by Renkus-Heinz staff, many outside speakers participated. A unique approach to flying hardware was shown by Andrew Martin of ATM. Don Davis demonstrated a revealing technique for measuring time and frequency domain signals in three dimensions. Computer control of amplifiers and measurement systems were covered by Bill Raventos of Crest and Mike Klasco of Ariel, respectively. The seminar also included a tour of the company's facility and a listening test of the company's C-1A loudspeaker system at UC Irvine's Barclay Theater.

The event has been held once every two years, but the company is considering holding annual events, alternating between European and domestic venues.

A Lesson In Sound Government

Pro Media of El Sobrante, Calif., provided sound for California Governor Pete Wilson's inaugural ball held at the Arco sports complex in Sacramento. The black-tie affair had its share of speechmakers, but Pro Media's John Monitto also had to meet the various needs of the Sacramento Symphony, Wayne Newton, The Kingston Trio, soprano Julia Migenes and others. All bases were covered by two house consoles, a Yamaha PM3000 and a Soundcraft 8000, with a

Ramsa 840 for monitors. The Soundcraft was dedicated to the symphony (mostly using Schoeps mics), leaving the PM3000 to handle the speakers and other musical acts.

Monitto noted: "When the artist speaks, we pay more attention to all seats being covered, as opposed to a concert, where coverage matters, but not as much." To that end, two clusters of ten Meyer MSL-3s were flown to provide intelligible sound for the 6000+ revelers. Minor EQ and

the physical presence of the attendees suppressed the room's desire to sound like the basketball arena that it is.

NEWS FLASHES

Audio Analysts (Plattsburgh, NY) is on the road supporting a variety of acts, including New Kids on the Block, Billy Joel in Australia, Johnny DeVillie, Bell Biv DeVoe, Keith Sweat and the Moscow

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H.F. Power • 150W continuous power
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Circus, to name a few... In anticipation of growing demand for its services, Bernhard Brown (Dallas, TX) recently picked up 52 lift motors, ranging in capacity from one-half to two tons. Company spokesman Bill Hosch noted that industrial clients are increasingly concerned with an uncluttered stage, and the new motors will certainly help in that department. Recent industrials for the company included a Florida event for pharmaceutical giant Eli Lilly... LD Systems (Houston, TX) was busy New Year's Eve with a sell-out show for hometown guy Clint Black at the 18,000-seat Summit Arena. Two PM3000s were used, one for the headliner, and another for the evening's opening acts. LD Systems used its own 2x4 cabinets, a two-box, four-way system using JBL components driven by Crest amplifiers. The Summit's 360-degree seating required LD to hang a delayed cluster in the room along with a flown rearfill. At the midnight hour, 13,000 balloons came a-tumbling down amid the tumult of confetti cannons and assorted pyrotechnics... Speaking of New Year's Eve shows, Sound on Stage (Brisbane, CA) covered 11 events on the last night of 1990, including a sellout for the Red Hot Chili Peppers at the San Francisco Civic Auditorium... Quickbeam Systems Inc. of Albuquerque, NM, hit the stage with Los Lobos and Steve Earle less than 12 hours after an emergency call to provide sound for the event. Fortunately, the 'Beam's Apogee system was available that night, and the early December show went on without a hitch... TAC consoles girdled the globe in 1990, touring with Phil Collins, Metallica, Motley Crue, AC/DC and Kiss. The company was also tapped to provide consoles for the 1990 Asian Games, as well as the upcoming '92 Winter Olympics. ■



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SOUND REINFORCEMENT NEW PRODUCTS

◀ **BEYER TG-X WIRELESS**

Beyer (Hicksville, N.Y.) has incorporated the capsule from its TG-X 480 Tour Group Series microphone into a new cost-effective wireless system, featuring a true diversity receiver. Also available in pocket (with Beyer MCE 5.16 lavalier) and guitar versions, the series operates in the VHF band

from a single 9-volt battery. The NE 170 receiver features auto-mute squelching, 1/4-inch and XLR outputs and dual chassis-mount antennas (with remote antennas available optionally).

Circle #296 on Reader Service Card

PEAVEY PC4-XL DIGITAL LIMITER/CROSSOVER

Peavey (Meridian, Miss.) has upgraded its PC4-X programmable digital crossover. The new version PC4-XL now offers four independent, linkable limiters, along with the flexibility of configurable frequency-dividing (2-/3-/4-way mono, 2-way stereo, or 3-way mono with an additional low-, mid-, high- or full-range output). Other features include up to 650 ms of delay at the balanced inputs, individual driver-alignment output delays (adjustable in 20.8µs, 1/4-inch steps), 24-bit internal processing, 64-times oversampled ADCs and memory for 99 setups.

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**QSC EXPANDS EX**

Following on the heels of the flagship model EX 4000 pro power amplifier (720W/channel into 8 ohms), QSC of Costa Mesa, Calif., has added four new models: EX 2500 (500W/channel), EX 1600 (400W/channel), EX 1250 (275W/channel) and the EX 800 (175W/channel). All EX products feature protective limiters to prevent excess clipping, and all models incorporate QSC's proprietary Open Input Architecture™ for interfacing with control systems. The rear panel has XLR/barrier strip inputs, 5-way binding post outputs and Neutrik "Speakon" jacks, as well as access for installing input transformers, changing XLR polarity, paralleling inputs or mono bridging. The amps' surface-mount technology reduces space requirements, resulting in easier servicing and a lighter-weight product. Retail pricing for QSC's EX Series is as follows: EX 800, \$948; EX 1250, \$1,198; EX 1600, \$1,498; EX 2500, \$1,898; and EX 4000, \$2,298.

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McCAULEY ▶ 18-INCH DRIVER

The Model 6254 from McCauley Sound (Puyallup, Wash.) is an 18-inch extended LF loudspeaker with a power handling of 900 continuous watts and a frequency response of 25-1.5k Hz. The \$386 woofer weighs 29 pounds and features an interchangeable magnet assembly for quick field servicing.

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**TURBOSOUND TXD-560**

The TXD-560 from Turbosound (Pleasant Valley, N.Y.) is a full-range, 3-way enclosure incorporating passive second- and third-order crossover networks. The speaker's wide dispersion characteristics are said to produce a cohesive, natural sound that is phase- and amplitude-aligned, thus eliminating the need for compensating electronics. The HF drivers can be rotated 90° for use in horizontal or vertical applications; the TXD-560 is priced at \$1,795; a load-certified flying frame is optional.

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by Craig Anderton

NAMM

NEWS AND NOTES

Two days before the Winter 1991 National Association of Music Merchants convention opened its doors, the war with Iraq began. Despite the ominous backdrop, exhibitors and attendees tried to adopt a "business as usual" attitude, although the TVs in various

fourth quarter of this year, ADAT features 16-bit linear digital resolution, 40-48kHz sampling, punch-in/out, variable speed control, sync-to-SMPTE and approximately 45 minutes of recording on an S-VHS tape. Up to 16 ADATs can be slaved for a total of 128 digital

tracks, with sync accuracy said to be within one sample.

At a projected price of \$3,995 (under \$8,000 for a 16-track system), ADAT should dramatically reduce the cost of digital recording. Alesis also showed the QuadraVerb GT, a QuadraVerb with an analog front end of guitar effects, and the D4 drum module, which has analog trigger inputs and over 400

drum sounds in a 1U rack package.

Speaking of drum modules, E-mu introduced Procussion—a Proteus-



NAMM hotels served as a constant reminder that all was not well outside the walls of the Anaheim convention center.

The importance of the show was magnified for two reasons: first, uncertainty over whether it would be wise to go to the Frankfurt Musik Messe (within the first few days of the war, European travel bookings dropped precipitously), and second, the abrupt cancellation of the Summer NAMM show. 1991 will be a one-show year, so if companies wanted to get the word out, the Winter show was it.

As with the past few years, there wasn't much that was truly revolutionary, but there were some major developments and improvements, as well as a few genuine surprises. Such as...

The biggest buzz of the show was Alesis' announcement of ADAT, an S-VHS-based, 8-track digital audio tape recorder. Scheduled for delivery in the



style, 1U rack-mount with 1,000 drum and percussion sounds—at a press conference featuring the hot MIDI band D'Cuckoo. E-mu also stressed its commitment to the Emulator III product line by announcing the Emulator IIIx rack-mount expander module, due the second half of 1991. Its standard ver-

With the Gulf War only two days old, there was more than casual interest in Deering's line of "fighter plane" guitars.

PHOTOS: GEORGE PETERSEN

We've paved the road to Center Track Time-Code

sion has 8 megabytes of RAM and is expandable to 32 MB; SCSI, MIDI, AES/EBU digital and RS-422 interfaces; eight polyphonic outputs and 32 audio channels, which can be configured as 16 stereo voices or 24 mono voices.

On the synth front, Roland's JD-800 turned a few heads by including—gasp!—a front panel with sliders and switches rather than a Spartan collection of calculator-style buttons. Priced around \$2,800, this should be a programmer's delight, since parameters can be adjusted in real time. And for those who covet an S-770 sampler yet are nervous about price, the S-750 is very similar, but foregoes the internal hard drive. Fortunately, a SCSI port lets you add a hard drive, CD-ROM, or optical drive as needed. Oberheim, now a division of Gibson, showed an interesting rack unit that looks suspiciously like the classic Oberheim SEM analog synth module with extra features and updated circuitry. Details are sketchy as to price and availability.

Korg showed a rack version of the Wavestation, which improves upon the original by including an audio input so you can create any type of waveform you want.

Although deliveries won't begin until this summer, Kurzweil offered a sneak preview of the K-2000, which uses Variable Architecture Synthesis Technology (VAST). Based on the proprietary "Calvin & Hobbes" VLSI chip set, VAST provides a software-configurable approach to synthesis that—according to Kurzweil—combines 16-bit linear sample playback (20kHz bandwidth) with FM, L/A, subtractive, additive, linear predictive and other synthesis techniques. Features include onboard signal processing, four outputs, 3.5-inch high-density disk drive and large LCD; pricing is expected to be in the \$3,000 range.

Peavey's big surprise was the DPM SP, a \$650 sample playback unit with high-density disk drive, SCSI and expandability up to 32 MB with standard 1 meg SIMMs (there are no internal sounds). Other features include four polyphonic audio outputs, 16-voice polyphony, multitimbral operation and response to poly aftertouch. Just to prove its point, Peavey demoed the SP

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MI UPDATE

with a 28MB Bosendorfer piano sound from the Prosonus sample library that had no looping at all.

On the software front, Nigel Redmon has been a bit of a hero in the MIDI community for releasing his HyperMIDI utilities into the public domain. Now HyperMIDI 2.0 is available as a full-bore commercial product from EarLevel Engineering of Torrance, Calif. HyperCard 2.0 is supplied, but it can also be used in conjunction with HyperCard

Dr. T's Beyond 2.0) and is now available for the IBM as well as the Mac.

Opcode announced Studio 5, a new MIDI interface designed to counter



The Kurzweil K-2000 ships this summer.

MTP, which handles a whopping 240 MIDI channels by providing 15 independent MIDI outputs. Price and delivery date are not yet firm, but

power users with lots of multitimbral synths will want to keep an eye on this one. Also new: OMS, an operating system that defines all MIDI gear used in the studio—interface port, channel, ID, etc.—so that when using



Roland's JD-800 brings knobs back to synthesis.

Version 1.2 or later, HyperMIDI provides the MIDI routines needed to create librarians, virtual mixers, MIDI analyzers, and other interactive MIDI stacks—programming “for the rest of us.” For those who want something a little simpler than Opcode's brilliant Max software for writing MIDI utilities, HyperMIDI 2.0 is the ticket.

Mark of the Unicorn showed Digital Performer, its answer to Opcode's Stu-

other Opcode products like universal librarian Galaxy and the Vision sequencer, you need only select the instrument and the program takes care of the housekeeping. Also, Track Chart at \$179 is a unique piece of “studio management” software that provides an onscreen chart of track activity, as well as cues to aid mixdown engineers, musicians, etc. The chart can be printed out for reference during a mix.

Speaking of studio management, the SMP-16 (\$999.99) from Anatek of North Vancouver, B.C., Canada, integrates a 16x16 MIDI-controlled audio patch bay, 7-in/8-out MIDI patch bay, and SMPTE reader/generator in one box. The company's ATF-15 is a 15-amp, 2 nanosecond response time, AC



With an audio input, Korg's Wavestation Rack can be a synthesizer or signal processor.

power processor that attenuates spikes and sells for \$299.95. The \$8,999.99 DS-2000 provides 640 MB of internal storage with a 15 millisecond average seek time and is teamed with a DAT-based, 1.3MB removable storage system for backup. Sounds like some-

other Opcode products like universal librarian Galaxy and the Vision sequencer, you need only select the instrument and the program takes care of the housekeeping. Also, Track Chart at \$179 is a unique piece of “studio management” software that provides an onscreen chart of track activity, as well as cues to aid mixdown engineers, musicians, etc. The chart can be printed out for reference during a mix.

thing designed with hard disk recording in mind.

Ever had to sync to a videotape that wasn't striped with SMPTE? Check out the Syncman Pro for \$599.95 from Midiman of Pasadena, Calif. It not only converts SMPTE to MTC, Direct Lock (Performer) or Song Pointer) but can also sync to a few seconds of longitudinal time code on a VCR's audio track at the beginning of the tape, and thereafter sync to the video frame re-draw signal. You have to restart from the beginning each time to pick up the SMPTE reference, but then again, you don't have to use a track for sync. For Foley work, the unit also stores up to 768 MIDI hits and their corresponding SMPTE times.

The Hot Toy of the Show Award

definitely goes to Yamaha's QY10, a \$399 "songwriter's machine" with 8-track/8-song sequencing, drum and instrument sounds, mini-keyboard, auto-accompaniment and a whole lot

you get home, you can dump your work via the MIDI out. I've wanted a machine like this for years and I'm glad it's here.

This is my last "MI Update" for the time being. I'd like to give my deepest thanks to David Schwartz, Hillel Resner, George Petersen, Blair Jackson and Paul Poyten for providing a "home" for all these years, and understanding my need to branch out into other endeavors. It has been a great honor to be part of *Mix* and have the opportunity to work with some of the finest



Yamaha's QY10 is a workstation-in-a-pocket package.

more—all in a case the size of a VHS cassette! The wide selection of sounds is amazingly good: I predict a lot of musicians will spend their time on airplanes writing songs with the QY10 (it can be battery-powered) instead of watching some dumb movie. When

people in *any* business.

Craig Anderton has written several books on musical electronics, as well as played on, mixed or produced nine albums. He is the editor-at-large for Guitar Player magazine.

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by Philip De Lancie

DIGITAL CABLE AUDIO

OPPORTUNITY OR THREAT FOR THE RECORD INDUSTRY?

The rise over the last decade of cassettes and CDs as prerecorded music formats has brought unprecedented attention to the manufacturing side of the music business. With DAT and DCC joining the fray, everyone from average consumers to top industry executives is wondering what the future holds for music distribution to the masses.

While opinions are varied, most share the unspoken assumption that consumers will continue to purchase physical objects, manufactured by record companies, that carry within them stored audio information. That's a safe bet, but it's not the only conceivable scenario. The delivery of digital audio to consumers via cable or broadcast raises the possibility that at some point far in the future, consumers may not actually have to own tangible software.

For those who make and sell prerecorded music products, the implications of such a change in music delivery methods are alarming. And because the question of how music reaches consumers involves big bucks not only for the

record industry, but for broadcast and cable interests as well, it has become an increasingly divisive issue. The U.S. Copyright Office has been soliciting comments from interested parties.

In a statement issued December 19 summarizing its recommendations to the Copyright Office, the Recording Industry Association of America pointed out four areas of concern: digital cable audio, pay-per-listen cable, digital audio broadcasting (DAB) and "celestial jukebox" systems for downloading music to consumers via satellite. The RIAA said, "No one stands to be more exploited by these new technologies than the recording industry."

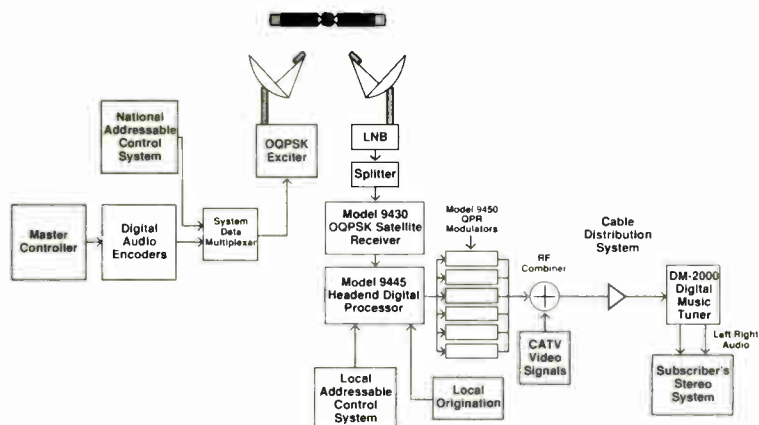
Particularly galling to the RIAA is the fact that while subscribers are to be charged for the services (except in the case of DAB, which is digitally transmitted radio), "the purveyors have no clear legal obligation to compensate record companies or artists." That's because royalties mandated under U.S. law for the commercial exploitation of a piece of music go to the copyright owners of the composition, but not

to the artist and record company who perform and own a particular recording of that composition. The RIAA has used the imminent introduction of digital cable audio systems as an opportunity to renew its long-standing call for a "performance royalty" like that found in many other countries.

Another RIAA concern is that "the new services will provide an overwhelming inducement to tape at home." It urged the Copyright Office to recommend legislation requiring the accurate transmission of digital subcodes, thereby maintaining whatever copy protection these codes afford. It also suggested "restrictions on the transmission of whole albums or multiple cuts from a single album or artist."

The RIAA recommendations, including the call for a performance royalty, are intended to apply to both broadcast and cable delivery of digital audio. The proposals were vehemently opposed by the National Association of Broadcasters in its own comments submitted to the Copyright Office on January 8. But that doesn't mean that the NAB

Fig. 1: Scientific Atlanta's cd-x system delivers up to 160 CD-quality audio channels via satellite to cable headends, then retransmits them to subscriber homes.



The basic DM-2000 Digital Music Tuner from Scientific Atlanta. Also available is an optional expanded-function remote controller (not shown), which includes an LCD readout that displays the name of the artist, song title, label and catalog number as the tune is playing.



is standing shoulder-to-shoulder with cable audio entrepreneurs. The organization has its own strong objections to satellite-delivered cable audio, arguing that a loss of local control over programming is contrary to the public interest.

It's too early to say if the RIAA will achieve the political protections it seeks. But even if it does, underlying fears may remain. The RIAA has stated that digital transmission "could end up being a more convenient source of music delivery than record stores." Does that reflect genuine record industry concern about losing control over music distribution, or is it just rhetoric to marshal support for political goals?

It seems unlikely that digital radio would have a profound effect on prerecorded music consumption. Radio programmers want to deliver the largest possible audience to advertisers for exposure to commercial messages. That makes for a far different listening experience than uninterrupted listening to a favorite album.

Digital cable audio, however, allows much finer tuning of the delivered music to the tastes of the subscriber than DAB. And it seems to hold the potential for greater customizing of services for subscriber convenience. So maybe the RIAA's fears of cable are justified in the long term.

Two digital cable music services, Digital Cable Radio and Digital Planet, are already operating in limited markets, providing service to subscribers through cable television operators. Ironically, Digital Planet carries a channel that, ac-

cording to *Billboard*, is sponsored by RIAA member Capitol Records and plays only that label's music.

A third service, offered by Beverly Hills-based International Cablecasting Technologies, is on the verge of introduction. ICT's interest is primarily in the programming side of the business, leaving the provision of system hardware to equipment manufacturer Scientific Atlanta. In keeping with this musical orientation is the record industry background of CEO Jerold Rubinstein, a former chairman at both United Artists Records and ABC Records. In the following interview, ICT's controller, Jeff Demma, discusses ICT's Digital Music Express (DMX) service, and the question of digital cable audio's possible threat to the record industry.

Let's begin with a general description of Digital Music Express.

Digital cable audio can be defined as the delivery of music in digital form via satellite and cable to consumers' homes for decoding and playback through their stereo systems [Fig. 1]. You deliver digitized audio signal via satellite to a cable operator. The operator is required to have a certain set of "headend" equipment—a processing system that receives the signal and modulates it so that it may be sent through coaxial cable to individual subscribers. The subscriber is outfitted with a tuner—about the size of a standard cable television converter—which decodes the incoming music service into an analog signal. That output goes into the auxiliary inputs on the subscriber's home stereo system.

Tape & Disc News

DADC Doubles DAT Duplicators

Digital Audio Disc Corporation, the largest U.S. CD replicator, has announced its intention to become a major supplier of prerecorded DATs. The company has added gear for direct printing on DAT shells, and will be increasing its complement of Sony DRD-100 real-time duplication decks to more than 100. By effectively doubling DAT capacity to between 600,000 and 700,000 annually, DADC hopes to become the largest U.S. DAT duplicator.

Reached at the company's plant in Terre Haute, Ind., president Jim Frische says that DADC has "been receiving more inquiries, so we want to increase our capacity. Also, since we do real-time, we want to have enough machines to reduce our turnaround time." Frische wasn't saying which labels will account for the projected increase in DAT duplication, noting that "in many cases we have confidentiality agreements with our clients."

Whatever the source of the demand, it's apparently not great enough at this time to spur a move from real-time to high-speed duplication, though high-speed video systems, such as the Sprinter from DADC's parent, Sony, are thought to be adaptable to DAT. "Sony has the capability to do that when DAT becomes a mass market that can

—CONTINUED ON PAGE 154

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What level of fidelity will the system deliver?

Of the three competing digital cable audio technologies about to enter the marketplace, DMX is the only true CD-quality signal meeting the Sony/Philips standard. The sampling rate is 44.1 kHz, with 16-bit resolution.

Will subscribers buy or rent the necessary hardware?

All of the associated hardware for both operators and subscribers will be made and distributed by Scientific Atlanta. Generally, the cable operator will provide the tuner as part of the subscriber's monthly service fee.

What will subscribers be paying for basic DMX service, and what will they be getting?

We're suggesting a retail price of \$7.95 to \$9.95 month, but cable operators will determine their own pricing and promotional strategies. What we provide is an additional means of music distribution to the consumer. It will be one of the broadest and most well-programmed sources of music that has ever been offered.

The service will include 30 channels of different music formats [Fig. 2]. That will give people the ability to access a massive library of music—much more than they would ever have the opportunity to hear via broadcast or personal libraries. And, depending on their local cable operator, they also will have the opportunity to receive the audio portion of their video programs via digital, rather than analog, transmission.

An optional feature of the service will allow the end-user access to information on the artist, label, song title, album title and catalog number of a selection as it's playing, all without any voice-overs, introductions or commercials. The information will be part of the digital signal that is delivered to the consumer's home. It will be readable at the press of a button via an LCD screen on a hand-held remote control. The cross-promotional



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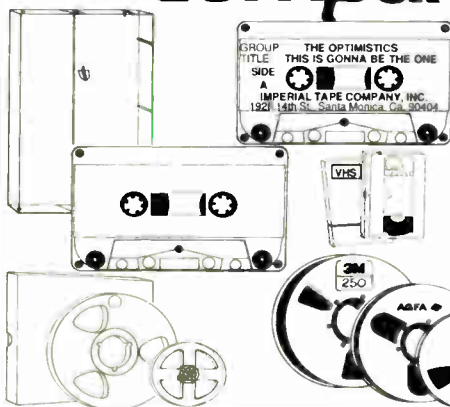
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Fig. 2

possibilities are incredible, because the record companies, via an 800 number or mail order, will be able to give the consumer the ability to immediately place an order for what they've just heard.

We will also offer pay-per-listen events such as concert recordings or recordings of albums that may not be available at record stores. So we allow people access to music that they cannot otherwise get. These are royalty-paid, negotiated services, meaning we negotiate a royalty deal with the record company or the artist to provide the program to consumers who are interested in paying a fee for taping it.

You describe this pay-for-taping concept as something applicable only to music not otherwise available. Do you foresee a time when record companies accept such an arrangement for their entire catalogs? In other words, might your technology someday lead the labels to conclude that they don't necessarily need to sell objects, like pre-recorded CDs or cassettes, in order to sell music?

I don't think that was management's intention in putting this company together. Digital cable audio may become an additional form of distribution, but not something that would wipe out existing sales of prerecorded music formats. And if something like that were going to develop, it wouldn't be tomorrow. That kind of thing is quite a ways off. One thing to realize is that we are talking about a universe of roughly 50 million cable homes out of a quarter-billion people in the U.S. So there is a substantial market out there that cable, for various reasons, cannot tap today.

What kind of reaction have you gotten to DMX from within the record industry?

We've really designed the service to be "record industry friendly." But four or five years ago, when we started this business, it was not very well received. However, I believe from talks we've had with people in the industry that some of them are starting to see that digital cable audio doesn't have to be

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viewed as a threat to music sales, but as an enhancement, giving them the ability to distribute more music to more consumers for less cost and with incredible cross-promotional ties.

Record industry wariness toward both digital cable audio and digital audio broadcast stems largely from the fear of increasing home taping. Is that a valid concern?

I really don't think the average consumer out there is waiting for this, thinking: "I can't wait till digital cable is available 'cause I'll never have to buy another album as long as I live." It's no different than when the VCR was introduced, and the movie industry fought and fought, saying that the VCR would erode their revenues. Quite the opposite has happened. It has provided another form of distribution and incremental sales, and that is what I believe DMX will do for the record industry.

So you don't subscribe to the idea put forth by the RIAA that piping

CD-quality music into people's homes by cable or broadcast makes it more likely that they will tape rather than buy?

First of all, we're not providing people with a level of quality beyond what the average consumer can already produce at home with a CD player and a CD. We're just expanding the breadth of the programming that will be available to them. We do realize that when you start telling people what's going to be coming up, it could be seen as an invitation to home copying, especially when you provide a signal of such high quality. So we will not pre-announce the music, nor will we be providing preprinted play lists, though I know for a fact that one of our competitors will.

Another thing to remember is that DMX is different from digital radio because we can control whether or not we provide a digital signal directly to the consumer. We're providing a digital signal to our tuner, which normally gets converted to analog before it reaches the subscriber's stereo system.

However, Scientific Atlanta has designed the hardware so that the digital signal, including SCMS copy protection, could be made available to individual subscribers in connection with pay-per-listen events. The chip in the tuner that enables the digital output may be controlled on a tuner-by-tuner basis, based on serial number, from our central studio in Douglasville, Georgia, or by cable operators. So there is the capability of providing a digital output, but it's an area that we are approaching very cautiously. We wouldn't make that available without having a full understanding with the record industry, because we don't intend to step on anyone's feet in this business.

The NAB has strongly denounced the RIAA's call for a performance royalty. Is it safe to assume that cable interests are also opposed?

I'll reiterate that we have always seen ourselves as a friendly affiliate to the record industry, not a competitive threat. We have already had discussions with various bodies,

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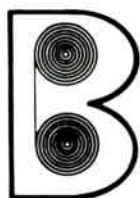
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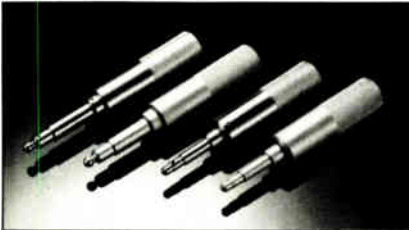
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TAPE & DISC

like the RIAA, covering these kinds of issues, because we don't intend to go into the market without listening to valid points of view. But any time there is a new arena, everyone jumps in asking for more than they think they can get. Ultimately, everyone will have to come to some agreement as to how the business is going to operate. It's a process of negotiating a reasonable fee or rate or royalty, with no one losing out on something that is rightfully due them.

What's the plan for launching the service?

We have initial market launches scheduled for the end of March. We've been successful in negotiating affiliation agreements with some rather large cable operators over the past few years, so we have access to a base of about 17 million subscribers. We'll begin offering the service to selected cable systems, and each month we will add more and more systems.

Do you already have agreements with record companies to take advantage of the music identification and ordering information that can be displayed on the remote?

Signed agreements? No. Initially, we will get into the market with just our core product, which is the music. But we believe that some of those additional features will be available to consumers later this year.

We are actually in the process of developing a number of different synergistic lines of business. We've discussed our ideas with a variety of companies, all the way from stereo manufacturers to record companies. For instance, one thing we'd like to do in the future is integrate our hardware into a stereo system, letting people receive the service without having a separate tuner. Something like that might add \$75-\$125 to a stereo system at retail. We have a manufacturer that is extremely interested in doing that.

Of course, before these other ideas can be implemented, we need to demonstrate the success of the core service in the market. Based on market research done in

the last six months, we're looking at somewhere in the neighborhood of 39% of those cable subscribers polled who were likely or very likely to add a service like ours if it was available. So there appears to be a very high degree of interest in this kind of a digital cable audio product. ■

Tape & Disc editor Phil De Lancie is a mastering engineer at Fantasy Studios, Berkeley, Calif.

—FROM PAGE 149, TAPE & DISC NEWS

support that type of technology," Frische says. "But there hasn't been a recognition that the volume in the near term is going to be of that size."

Commenting on the effect of Philips' proposed Digital Compact Cassette (see "Tape & Disc," January 1991, and "Insider Audio," page 15 in this issue) on DADC's plans, Frische explains that "as a manufacturer, we respond to market needs. Even though we are a Sony subsidiary, all formats are of interest to us. If the market needs DCC as well as DAT, then it's our manufacturing challenge to provide what the market wants."

Meanwhile, Sony has announced the consolidation of its worldwide entertainment companies, including DADC, under the umbrella of Sony Software Corporation, based in New York City. Among other operations to be incorporated into the newly formed enterprise are the various labels of Sony Music Entertainment (formerly CBS Records), direct marketer Columbia House and Columbia Pictures Entertainment. Sony Software will also coordinate and develop software business related to CD-ROM and future formats.

**CEDAR/Harmonia
Mundi Declicker**

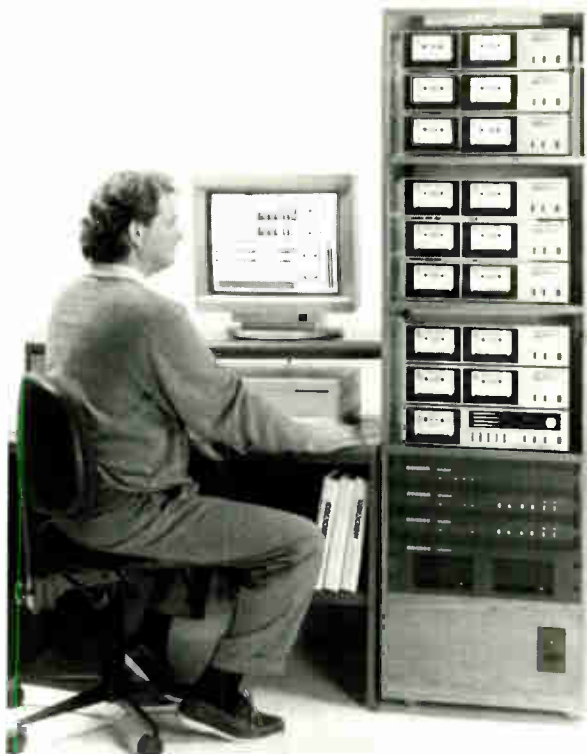
CEDAR Audio has joined Harmonia Mundi Acustica in offering a real-time declicking module for Harmonia's BW102 digital signal processing system. The real-time declicking feature, used for removing scratches, clicks and pops from audio program, was previously available only as part of CEDAR's PC-based digital audio workstation. Adaptation of the

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technology to Harmonia's system will allow existing BW102 owners to add click removal capability for about \$35,000 (two single-channel modules), far less than the price of a complete CEDAR system.

A prototype of the new module was demonstrated at January's MIDEM show in Cannes, France. According to CEDAR engineer Dave Betts, the unit was "very successfully received. It works, and it's ready to be sold."

Another planned implementation of the declicker is a 2-channel, 19-inch rack-mount version. "We're starting on that now," Betts says. "We don't have a prototype for it yet. As far as ins and outs, it will at least have AES/EBU, though it may also have others. The human interface will consist of one twist knob for setting the scratch threshold, which determines how many scratches it is going to remove. With a high threshold it will only do the large scratches. If you lower the threshold, it will do more and more scratches, but there is a limit to how

many can be done in real time. Beyond that, you have to use the PC-based system.

"The display will probably be a simple LCD of the threshold numbers," he continues. "The unit will also have a three-way switch. In 'bypass,' the signal comes right back out immediately. In 'standby,' the data is delayed by the amount of the processing time (about one-half second), but not actually processed like it is in 'on.' So you can use 'standby' and 'on' to compare before-and-after processing." Betts was unable to provide information on the rack unit's expected pricing and availability.

Rock Against Iraq

Twenty thousand cassettes, featuring the song "Stand Up," were donated to U.S. soldiers serving in Operation Desert Storm. The music is performed by "rock and metal" group Wizards, whose lead vocalist, Jan Alan, is vice president of Burlington Audio/Video Tapes. Cassette shell manufacturer Shape Inc. joined with BASF in donating ma-

terials for the project, while Senator Daniel Moynihan arranged for its distribution to the troops.

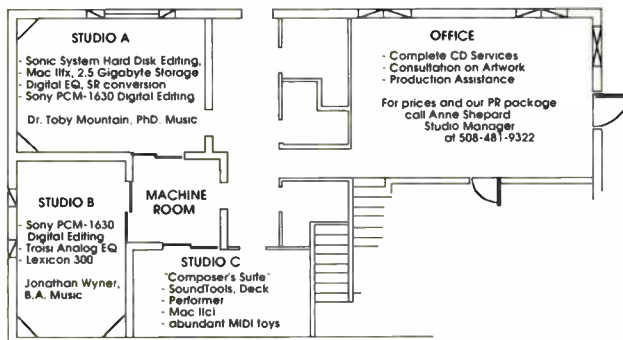
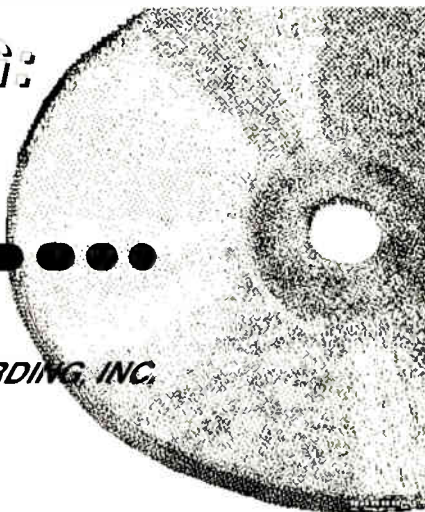
SPLICES

National Tape Corporation purchased the assets of the Tapetronics cassette duplication plant in Detroit, for many years the main manufacturing facility for Motown Records. Selected equipment from the plant will be moved to NTC's Nashville facility to increase capacity and reduce turnaround...prototype systems of Boston has developed an IBM PC/compatible-based system for simultaneous automated testing of real-time cassette duplication deck performance. "TDOS" cards and software, in conjunction with digitally controlled switchers, allow the computer to scan banks of machines as they play alignment tapes, and then generate reports on the performance of individual decks. Up to 64 TDOS expansion modules may be used to check a potential total of over 2,000 decks...Sonic Solutions of San Francisco announced the sale of a Sonic System,

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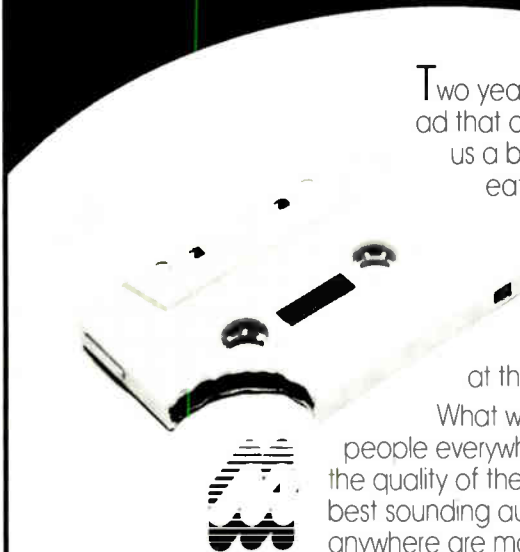
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equipped for digital editing and CD premastering, to Abbey Road Studios in London. The deal brings Sonic to 100 systems delivered worldwide, and it is the third system purchase for Abbey Road. The studio, which currently has one system outfitted with Sonic's NoNoise module, plans to add the option to a second machine later in the year...

Alpha Records of Fort Lauderdale, FL, entered the duplication market with the purchase of a 1500 Series high-speed duplication system, including a master and two slaves, from **Versadyne** of Campbell, CA. The company also purchased a King 790 loader, Scandia 670 packaging machine and Apex printer/inserter. Versadyne also reports action in the South American market, with recent sales to **Recortec SRL** in Argentina and **Industria Fonografica** in Paraguay. **Lyrec** (Skovlunde, Denmark) delivered a P-2000 loop bin master and two slaves to **Simon Stable Promotions** in Launton, England. Two more slaves slated for delivery later in the year will bring annual capacity at the company to 1 million... **San Francisco's Rocket Lab** reports mastering activity for Neil Young and Shrapnel Records by Paul Stubblebine, while John Acoca has been working on projects for The Residents and Maria Muldaur... **Duplication Equipment Brokerage** of Englewood, CO, announced the delivery of a Roldex Imprinter to **Herbert Ono** of Honolulu, HI... **SKC America** (Mt. Olive, NJ) introduced a new grade of VHS videotape for use in Thermal Magnetic Duplication (TMD). The tape, a 100% chrome formulation on a newly developed proprietary film base, is now available after more than a year of testing... **Laser videodisc recording services** are now available in Northern California at video duplicator **Diner + Allied**. The company has taken delivery of a Model 610A recorder from **Optical Disc Corporation** of Santa Fe Springs, CA. Both 30-minute CAV and 60-minute CLV discs will be offered, with 24-hour turnaround in quantities of up to ten. ■

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C O A S T

L.A. GRAPEVINE

by Amy Ziffer

The biggest news of the month is, unfortunately, sad. After 22 years of operation (on Third St. until 1986, and on Sycamore since then), Record Plant is going the way of the dinosaurs: It will be closing its doors February 28. Over the years, the studio has hosted everyone from the Rolling Stones to Guns N' Roses. The irony is that it is a financially successful operation that was booked all the way through June.

Record Plant was acquired by Chrysalis in 1988 from Chris

—CONTINUED ON PAGE 160

Producer/engineer Quincy Jones III at Echo Sound's Studio B doing club and hip-hop remixes on his father's smash hit "Back on the Block" for Warner Records, with engineer Bob Morse assisting.



SESSIONS & STUDIO NEWS

VIDEO & POST ROUNDUP

TimeSteps Productions is a unique video and film production house operating out of West Orange, New Jersey. Principals Marilyn Petrokubi and Rob Lieberman are known for their award-winning corporate and documentary production. With over ten years experience as a stock footage researcher, Petrokubi founded TimeSteps initially to create historical retrospectives for Fortune 500 clients. After Lieberman joined forces, TimeSteps expanded to serve a full range of corporate clients.

"We try for a 'cinematic' approach to industrial and corporate subjects," Petrokubi observes. "Using crossover directors, DPs and editors from feature films and music videos, we go for a stylized treatment."

With interests in things related to "technology, art and business," Lieberman is an eclectic producer who can shrewdly package a show as easily as he can compose the score. "It's an advantage to understand both sides as a film producer and composer," Lieberman states. "Both technically and creatively, it helps to clarify the process."

Recent clients at TimeSteps include Ortho Pharmaceutical Corporation, Johnson & Johnson, AT&T and Ebasco Construction. TimeSteps uses outside facilities for both film-to-tape and post-production, while maintaining both MIDI and offline operations in-house.

Newcomer Digipix Editorial is a random-access offline editing service located on 42nd Street in New York City. They use the Avid/1 Media Composer in conjunction with a 3/4-inch offline suite to post a variety of film and

video projects. According to owner Leslie Levy, projects run the gamut of "commercials and music videos to long-form documentaries, and everything in between."

Levy describes the Macintosh-based Avid editing system as "what word processing is to typing—a fully digital system—not recording to videotape but capturing data and media on a computer hard drive. Therefore, making numerous versions of a project (or trying various ideas) does not degrade



Dr. John at the piano with Larry Peters (L) & David R. Mitchell (R) at Ultrasonic Studios (New Orleans). The commercial was posted at Video Park (Baton Rouge, LA).

the quality of the image. It is extremely fast because there is no shuttling time or re-recording, and it has complete flexibility to organize and sort a database of images."

Cyndi Lauper's music video of the

C O A S T



Peter Baird (left) and Tony Friedman (right) at the new Neve VRP 60 at Post Logic Sound Studios (Hollywood). Recent Post Logic projects include ADR for *The Simpsons*, an on-air promotion for *The Fox Comedy Hour* and music sessions.

title song from Roger Waters' *The Wall* was recently cut at Digipix: "Another Brick in the Wall" was edited by Victor Mignatti on the facility's Grass Valley 41 editor. "The Tide is Turning," a companion video from the deconstruction of the Berlin Wall, featuring artists such as Joni Mitchell and Van Morrison, was also done at Digipix. Both PolyGram projects were produced by New York-based Image Pie Productions. Other music videos done at Digipix include *Perfect Gentleman*, produced by Maurice Starr with editor Bill Pappas; and *EU*, directed by Kim Watson for Black & White Television and edited by Patrick Gambuti Jr.

ParkSeward, president of Video Park

Inc. (Baton Rouge, LA), reports they won 18 out of 21 Addy Awards for television advertising from the Advertising Federation of Greater Baton Rouge, as well as being named the small business (one to 25 employees) of the year by *The Baton Rouge Business Report*. Recent projects at Video Park include a video from Wynton Marsalis' piano player Marcus Roberts, entitled *Deep in the Shed*. Jim Gabour directed Roberts' hour-long video, which was digitally recorded on-location and laid back to D-2 master in L.A. A Popeye's commercial for the Garfield-Linn ad agency of Chicago was also posted at Video Park: Dr. John composed and recorded the "Love that Chicken" jingle at Ultrasonic Studios in New Orleans with producer Larry Peters of Buckholtz Productions and Garfield-Linn's creative director David R. Mitchell.

Video Post and Transfer, located at 2727 Inwood Road in Dallas, is gearing up for the

N.Y. METRO REPORT

by Dan Daley

John Storyk recently wrapped up a couple of local jobs. The TEC Award winner did a major renovation of the Manhattan School of Music's recording facility, lobbies and lounge areas. The redone studio has a 400-square-foot control room adjacent to a 1,000-square-foot recording/performance hall. Storyk also did new post-production suites and lobbies for Howard Schwartz Recording.

A combination of war and recession has squeezed things all over. But one big player in the corporate audio niche has found several ways to cope. Jon Brielle of Brielle Music in lower Manhattan, who built his Mozart-equipped studio to handle the growing corporate-event music business, has had good response

—CONTINUED ON PAGE 164

Lawrence Taylor, of the world champion New York Giants, was at BMG/RCA working on the Children's Television Workshop's "Square One" program. LT (shown here throwing a block on the faders) will host an instructional program on math.



PHOTO: CHUCK PULIN/STAR FILE

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—FROM PAGE 158, L.A. GRAPEVINE

Stone. Studio manager Rose Mann, who has been with Record Plant off and on since 1976, says the closure is the result of Chrysalis deciding to concentrate on Air Studios, their facility in England. "We don't fit into their plans," she said.

There are hopes that a buyer might materialize in time to prevent the studio's demise, so the situation might be very different by the time this column makes it to print. Otherwise, the equipment will be sold piecemeal and then the building will go on the block. Many an engineer started out at Record Plant, and will be sorry to see one more bit of Hollywood's musical history laid to rest.

On a more positive note...Audio Engineering Associates of Pasadena and ASC Video of Burbank have merged into one as yet unnamed organization that will operate out of ASC's expanded location. ASC Video President Mark Chatinsky and AEA founder Wes Dooley feel that the complementary expertise of AEA and ASC staff will position the new company uniquely to take advantage of what Dooley calls "the trend toward integrated systems, with computer-controlled editing of audio and video."

Cowabunga! Over at Village Recorders, one of the first projects to get a taste of the new Neve VR 60 console with Flying Faders automation in Studio D was *Teenage Mutant Ninja Turtles II!* Like me, you're probably wondering if in the sequel Raphael gets psychiatric help, but they weren't spilling the beans. Music for the movie was being recorded and mixed there, while over in Studio B, Dangerous Toys (Sony/CBS) with producer Roy Thomas Baker and engineer Bill Wittman tried out a new VR 72.

On the other side of town, fleet commander Craig Huxley took The Enterprise one more step toward his goal of "boldly going where no studio has gone before" by upgrading not just two, but three, consoles and adding a host of other equipment to the studio and its companion rental operation, Audio Affects. "We're watching a lot of other facilities retrench, and we've gotten a lot of positive feedback lately on our

—CONTINUED ON PAGE 161

future of video post-production: digital. Company president Neil Feldman says, "We will offer true all-digital post-production [addressing both video and audio with online editing]."

VP&T has installed an impressive array of new technology, including a full-function Abekas A-82 composite digital switcher delivered in early January. The new switcher is now at the heart of an online edit suite, which is free of analog conversion. To further exploit the advantages of digital videotape formats, VP&T handles all post with its proprietary dream™ (Digital Real-time Editing & Audio Mastering) system.

Around since the mid-'70s, Editel San Francisco (formerly OnePass) recently had Randy Sparks design their control room so that they could really hear the music from their audio-for-video suites.

The majority of business at Editel is advertising: Ketchum Advertising, Chiat-Day, GBS, and FCB are all clients.

Vance Walden, staff audio mixer at Editel, reports the following activity: An American Playhouse Special, on which picture and sound editor Vivien Hillgrove (*Amadeus*, *The Right Stuff*) worked with Editel on lists of dialog, music, Foley and effects that were all kept on the AudioFile; "Challenge of The Seas," 30-minute documentaries on environmental conservation from producers Hardy Jones and Julia Whitty; and a recent corporate video for Sun Microsystems—a video wall—which involved a wall of 16 TVs running three separate videos. Walden's task was to mix audio to the videos.

The Music Complex of Millbrae, CA, specializes in post-production audio for film and video, including sound

—FROM PAGE 160, L.A. GRAPEVINE

improvements, so we decided to plunge ahead," he says of the acquisitions.

Studios B and C now house SSL 4080G boards. C was also improved through the addition of a live recording area designed by George Augspurger, who is now supervising the expansion of B. When complete, Studio B will have a separate machine area and lounge. Studio A, meanwhile, was outfitted with a Neve VR 72 with Flying Faders that Julian Lennon is currently doing his next album on, with Bob Ezrin producing.

Audio Affects' exhaustive inventory was expanded by the addition of six Dolby SR 24-unit racks, a Lexicon 300 and an Akai S1000 sampler. Other purchases for the studio include 24 TC Electronic programmable equalizers, three Mitsubishi X-86HS digital 2-track recorders, and four Sony 3348 digital 48-track recorders. The Sonys make The Enterprise unique: They now have the most Sonys under one roof in the world.

Loyola Marymount University (L.A.) will be offering three courses on film sound in their Recording Arts Program: "Sound Design," "Production Sound" and "Post-Production Sound." For more info, phone them at (213) 338-4575.

DARRYL CASEINE. Darryl, it was only a matter of time before the gremlins crept in. But you wouldn't

have gotten your name in big letters if I hadn't accidentally given your job to someone else when I mistakenly reported in February that Dave Devore is the studio manager of Encore Studios. In the real world (outside this column), Dave Devore holds that position at Sound Castle, where Darryl was formerly studio manager. Darryl now manages Encore and has since leaving Sound Castle three years ago.

While I'm on the topic of mistakes, back in January some crossed wires and a typo or two led to errors in my report on Stephen Bray's Saturn Sound. Michael Verdick was mistakenly referred to as Michael Berdick, and Morgan Martin, who was not involved in Saturn's design, had his name reversed in one instance to read Martin Morgan. The studio is wholly owned by Stephen Bray; Michael Blum did all of the studio's wiring and rents Studio B (Titan). In case it was not clear, all the facility's iso booths and the live recording area are accessible from any of the three control rooms. Lastly, the free field control room design should have been credited to Vincent Van Haaff at Waterland Design. Lawrence Construction handled (what else?) construction. Sorry, guys!

Send studio news to Amy Ziffer, c/o *Mix* magazine, 19725 Sherman Way, Suite 380, Canoga Park, CA 91306, or call (818) 567-1429 or fax (818) 709-6773. ■

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effects designing and editing, Foley and original scoring to picture. Co-owner **Kelly Bryarly** has been given an expanded contract to provide original music for *Marty Stouffer's Wild America*, which is shown on PBS. Other Music Complex clients include Domino's Pizza and Kraft Foods.

If you are looking for a way to learn more about film and video production as well as enjoying summer on the Maine coast, then look no further than **The International Film & Television Workshop** in Rockport, Maine. The summer school offers more than 100 one- and two-week courses for working professionals and those just beginning careers in film, television and video. For more information, contact The Film Workshops at (207) 236-8581, or fax (207) 236-2558.

The sound for *The Godfather: Part III* was mixed with a TimeLine Lynx synchronization system at Zoetrope Studios' post-production facilities in Napa Valley, CA...**Music Works** in Hollywood, FL, completed work on "Do the Buckleup"—a 60-second jingle...**Virginia Arts Music Production** (Charlottesville, VA) completed music scoring and sound effects for 12 TV spots commemorating the bicentennial of Washington, DC. Ten of the spots feature original music by **R. Paul Brier**, composer and owner of Virginia Arts. **Jeff Bieber**, of Washington's WETA, was in charge of production, with **Richard Thomas** acting as executive producer...**Yessian Music Inc.** (Farmington Hills, MI) scored a new arrangement of the '50s classic "Shake, Rattle and Roll" for Frigidaire's newest

SPARS

B E A T

by **Jon Dressel**

"It was an intense, serious and exhausting experience. It was worth every minute and there were no holds barred." Sound like the description of the last session you were involved with? Possibly, yet these words are actually a description (from Pete Caldwell of Atlanta's Doppler Studios) of the last SPARS Digital Audio Workstation Conference.

This May 18 and 19 the third annual SPARS Digital Audio Workstation Shootout will be held in Orlando, Florida. This will be a forum for the major manufacturers of DAWs, as they face-off for a technical shootout under the auspices of the Society of Professional Audio Recording Services. The conference will take place at the Penta Hotel and will include workstations from AMS, DAR, Digidesign, Lexicon, NED, Otari, Roland Pro Audio, SSL, Studer and WaveFrame.

On Saturday, May 18: The day-long meeting will include in-depth presentations by the manufacturers, a working lunch and a dinner with cocktails. In the evening, participants will have the opportunity to try the gear themselves and meet with the manufacturer's rep.

On Sunday, May 19: The day will begin with the panel discussion, "Digital Audio Workstations: The Near Future." This will be a comprehensive look at what this technology holds for us over the next few years. There were many unanswered questions raised about the future technology at the last DAW conference. Many of these questions dealt with the potential of a standardization for data exchange between systems. Another area of inquiry was the ability of the workstations to not only import, but to have the capability of exporting some type of event placement protocol. These and many other areas of concern will be addressed. Following the panel discussion there will be more hands-on demonstrations of the equipment and the chance to speak with the manufacturers.

We hope that you will join us for what will probably be the most talked about audio technology event of the year. To make your reservation or for more information, please contact SPARS executive director Shirley Kaye at (407) 641-6648. ■

Jon Dressel is a SPARS director and president of Jon Dressel & Associates, a consulting firm for the recording and music industries.

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campaign. The :30 spot was produced by Dan Yessian and engineered by Tony Campana for Shelly Berman Communications of Columbus, OH... Music a la Carte of Miami, FL, reports a production in a wide range of styles: A 17-minute film for Dolphin Cruise Lines required an original classical score for most of the film and such styles as calypso, reggae, flamenco and mariachi,

as well as sound design for the ports of call on the cruise. The classical pieces were composed by Rene and Yvette Barge, who also programmed part of the synthesized segments of the film...

SOUTHERN CALIFORNIA

Rickie Lee Jones was at Topanga Skyline (Topanga Park) cutting tracks with producer David Was for her new al-

bum. Engineer/producer Greg Penny was at the console with Luis Quine assisting... At Ground Control Studios of Santa Monica, David Foster and John Barry were in mixing two singles from the movie *Dances With Wolves* for Epic Records, with ace engineer Humberto Gatica and assistant Alejandro Rodriguez... Eric Burdon, Robby Krieger and Brian Auger were in at Valley

—FROM PAGE 159, N.Y. METRO

to selling time in the room to outside clients, including a recent Billy Cobham record done there.

He's also making more use of the musical and programming capabilities of his staff, including producer/bassist Paul Guzzone and drum programmer/writer Kash Monet. "We do more writing in-house, use fewer outside musicians and find ways to make sparser productions sound just as full," Brielle says. "We've become a hybrid operation: not just a studio and not just a production company. New York is particularly competitive and has so many niches, and that's how we've been able to respond." Brielle also

has a novel method of tracking how the local industry is doing: "I talk to the piano tuners. They know what's going on all over town."

At Greene Street Recording, owner Steve Loeb has initiated a management company—Greene Street Management—to rep his staff engineers, whom he said already contribute considerably to the studio's bottom line by bringing in non-spec in-house projects. The program is presently limited to Greene Street console jocks, like Roddy Hui, but Loeb may consider expanding to outside engineers in the future.

dBm Technical Services is now the authorized warranty repair cen-

ter for Vega's wireless products. dBm is only the second Vega repair center in the country and the only one in the Northeast region. The company also recently completed installation of four sound effects post-production studios at ABC-TV. dBm manager Marty Straus says he's looking to expand his maintenance operations into the broadcast field locally. "Broadcast is still a big part of New York's audio technical base," he says. "Broadcast companies are now modernizing their audio with stereo TV and Dolby Surround systems, and they need people familiar with the latest equipment to help with that modernization." ■

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Center Studios (Van Nuys) working on pre-production for concert dates...In Pasadena, Sound Chamber Recorders had Mark Isham and Steve Krause in working on the soundtrack to the film *Point Break*...At M'Bila Recording Studio in Hollywood, Kim Basinger was working on the track "Reach Out for Me" with Robert Brookins producing, Mitch Gibson engineering and Scott "Sweetdaddy" assisting...

NORTHEAST

Media Recording (West Babylon, NY) reports Vampyre Circus, an acid/industrial band, were hard at work recording the "most bizarre music ever to be put to tape." Members of the band, Void and Slave, engineered the project...Red Rodney was at Giant Recording Studios (NYC) recording and mixing his new album *Red Alert* with Peter Darmi engineering, Bob Beldon producing and Shinji Nishikubo assisting...Also in Manhattan, Murder By Television blocked 20 hours to lay down 24 tracks of solid rock at Crystal Sound Recording. Carl DeVino engineered with assistance from Todd Childress and Bruce Robertson...The Hellbenders were mixing at Iris Sound, of Royersford, PA, with Louisiana producer Al Tharp...Bon Jovi bandmember Richie Sambora recently was at New York City's Marathon Recording, tracking his upcoming solo album for PolyGram Records. Neil Dorfman produced and engineered, Jose Fernandez assisted on the project, and Jeff Bova programmed much of the record...Also in the "town so nice, they named it twice," producers George Winston and John Robbins were at Krypton Studios compiling over 30 hours of unreleased music by the late, legendary New Orleans piano wizard, James Booker. Johnny Byrn was the post-production engineer on the project...

SOUTHEAST

In Nashville, T. Bone Burnett was cutting tracks with engineer John Hanlon on his self-produced album for Columbia...Isaac Hayes was at Master Sound Studios (Atlanta) recently to record a modern arrangement of "Amazing Grace." The cut was produced by Hayes and engineered by Bret Richardson...Down in the Gatorsvilleness of Gainesville, FL, Pro Media Studios reports Gumbi Ortiz, well known as percussionist for Al DiMeola, completed work on his album, *So Now You Know*, with Bon Jovi drummer

Tico Torres on one cut...At 3 Alarm Recording in Memphis, TN, Chuck Irwin co-produced and engineered tracks for a Doyle Newmyer project. Backing Newmyer was a crack unit of Memphis session stars including Buzz McIntyre on guitar and Sandra Messinger providing background vocals...

NORTH CENTRAL

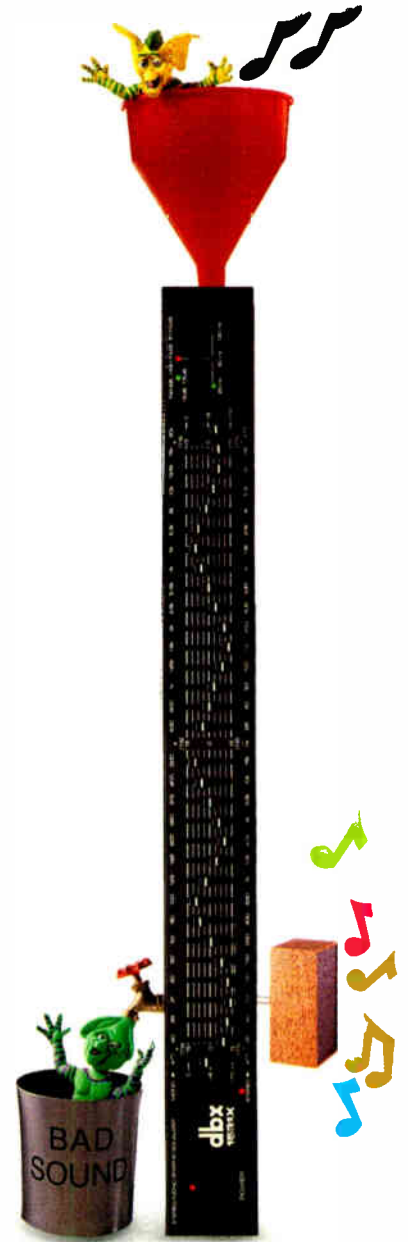
Canada's number one rapper, Maestro Fresh Wes, completed tracking at W.A.M.I. Sound in Scarborough, Ontario. Shawn and Kevin McKenzie produced, while Robert Digioia engineered with assistance from Robert White...Chicago's Paragon Recording Studios had Chicago R&B artist Paul Franklin recording side two of his 12-inch single "Havin' a Party" with "Hot." Mark Richardson and Jon Herrmann engineered...On a concert stop in Fort Wayne, IN, Warrant recorded a special acoustic version of their newest release "I Saw Red" with Barry LaBov at LaBov and Beyond Music Production Inc...Alternative music producer Steve Albini followed his recent sessions with the Pixies at The Chicago Recording Company (Chicago) with projects for Urge Overkill and Poster Children...

NORTHWEST

Up Seattle way, Ann and Nancy Wilson of Heart went to Lawson Productions' Studio A to record a song for the upcoming compilation album to benefit the Pediatric AIDS Foundation. The Wilsons join the company of Paul McCartney, Bob Dylan, Meryl Streep, Sting and Peter Gabriel in contributing their music to the project...In San Francisco, Fuzz Factor was recording their new Island Records release with engineer/producer Joe Blaney and assistant engineer Andy Taub...Patti LaBelle was at The Plant Recording Studios of Sausalito, CA, doing vocals on Michael Bolton's upcoming album for Columbia. Walter Afanasieff produced, Dana Jon Chappelle engineered and Manny LaCarruba assisted...Up in Arlington, WA, Marley's Ghost finished mixing their country album *Ghost Country* with first engineer Daniel Protheroe and assistant Neville Pearsal...Poolside Studios (San Francisco) was the site for the audio post-production on "Canyonlands," the fourth video in a series of 12 stress-management tapes for Mindsources Productions of Tucson, AZ. Original

—CONTINUED ON PAGE 184

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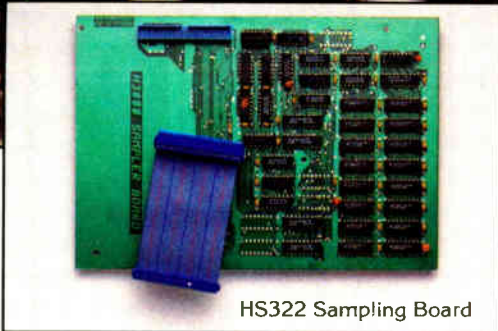
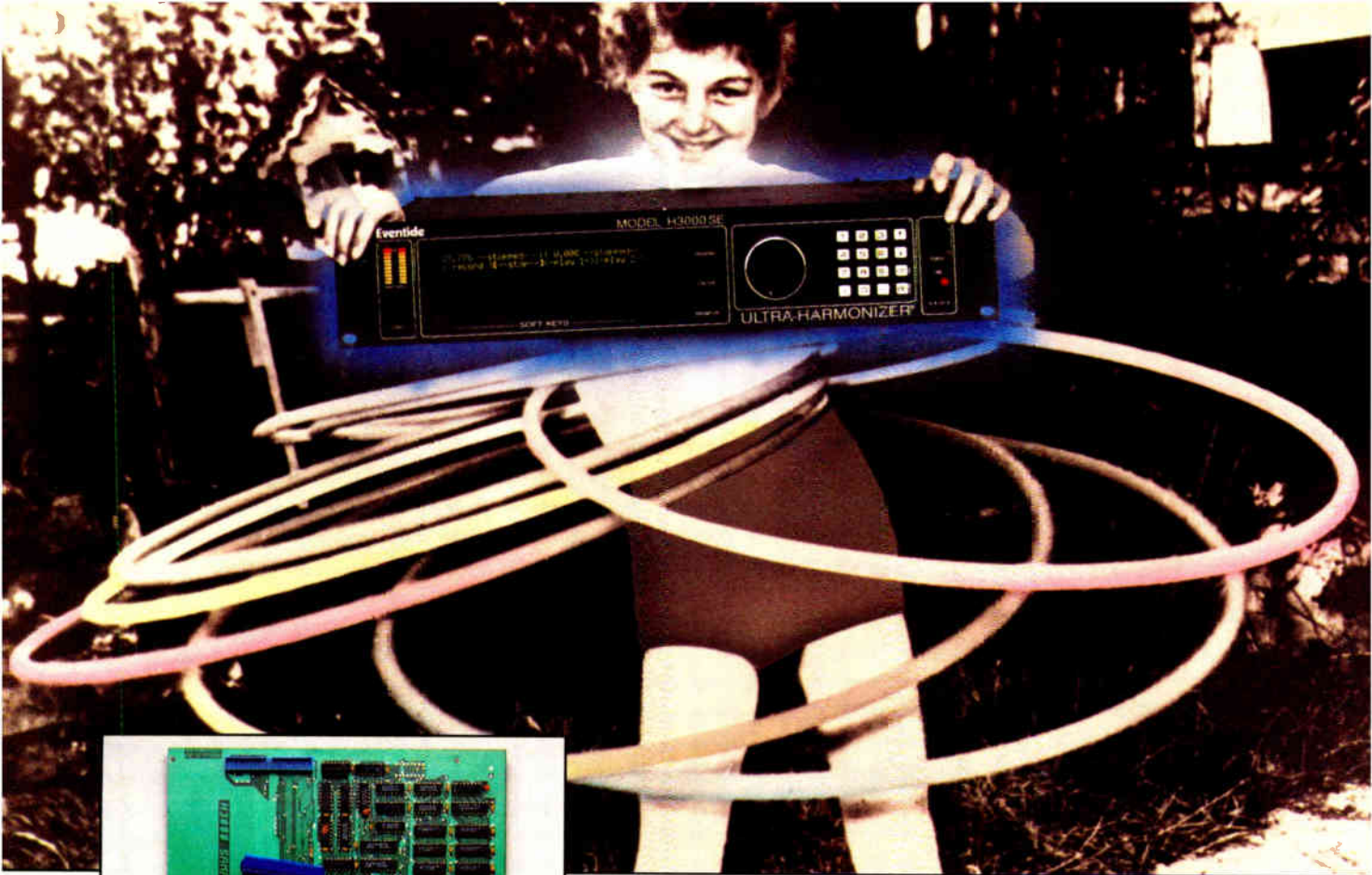


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Information in the following directory section is based on listing applications mailed earlier this year and was supplied by those facilities listed. *Mix* claims no responsibility for the accuracy of this information.

Personnel, equipment, locations and rates may change, so please verify critical information with the companies directly.



Construction on the new Studio A at Atlanta's Crawford Audio Services was completed last November. The John Storyk-designed room was built specifically as Crawford's music mixing room, one of five studios in the post-production complex. Shown are the 40-input Neve 8128 console with Necam 96 automation and the custom-designed monitoring system, which uses JBL and Dynaudio components. The rear wall features wide-band fractal diffusors designed by Peter D'Antonio. **Photo:** Joe Paban.



CONTENTS



169	NORTHEAST U.S. FACILITIES
172	SOUTHEAST U.S. FACILITIES
174	NORTH CENTRAL U.S. FACILITIES
175	SOUTHWEST U.S. FACILITIES
178	SO. CALIFORNIA/HAWAII FACILITIES
176	NORTHWEST U.S. FACILITIES
181	OUTSIDE U.S. FACILITIES

Upcoming Directory Deadlines:

Recording Schools, Seminars & Programs: **April 16, 1991**

Pacific Rim Facilities: **April 16, 1991**

Facility Designers & Suppliers: **May 16, 1991**

Southern California, Southwest & Hawaiian Studios: **June 17, 1991**

Mix listings procedure: Every month, *Mix* mails listing applications to recording studios and/or other vital facilities and services for the recording, sound and video production industries. There is a nominal charge to list a **Briefcase Listing** (name, address, contact) and an **Extended Listing** (equipment, credits, specialization and photo or logo). If you would like to be listed in a *Mix* Directory, write or call the *Mix* Directories Department, 6400 Hollis Street #12, Menlo Park, CA 94028; toll free 800 344-1111.

ADVERTISERS INDEX & READER SERVICE PAGE

PAGE	READER SERVICE NUMBER	ADVERTISER	ACTION FAX #
180	001	Ace Music Center	
66	002	Acoustical Solutions	
136	003	Acoustic Systems	
105	004	Adams-Smith	(508) 568-0404
176	005	Advance Recording Products	
82	006	Akai (S1100)	
123	007	Akai (A-DAM)	
125	008	Akai (DD1000)	
104	-	AKG Acoustics	(415) 957-1070
19	009	Alesis (1622 Mixer)	
68-69	010	Alesis (M-EQ 230)	
87	011	Alesis (QuadraVerb)	
53	-	Amek	(818) 508-9788
8	012	Ampex	
146	013	AMP Services	
IFC	014	AMS Industries	
66	015	Anatek	
32	-	API Audio Products	
172	016	The Art Institutes	
128	017	Sam Ash Professional	
145	018	Audio Action	(818) 845-8039
176	019	AudioForce	
107	020	Audio Images	(415) 957-1531
28	021	Audio Precision	
40	022	Avalon Design	
151	023	Boynton Studio	
179	024	Brainstorm Electronics(213)	475-7570
17	025	Bryston	(215) 628-2970
153	026	Burlington Audio/Video Tapes	(516) 678-8959
122	027	Business & Industrial Trade/Pro Audio Asia	
183	028	Caig Laboratories	(619) 743-2460
55	029	David Carroll Electronics	
171	030	Caruso Music	
164	-	Carvin	
177	031	CCS Printing	
59	032	CDA Computer Sales	
50	033	Center for the Media Arts	
63	034	Cipher Digital	
140	035	Clair Brothers Audio Systems	
139	036	Community	(215) 874-0190
175	037	Conservatory of Recording Arts and Sciences	(602) 277-6552
34	038	J.L. Cooper Electronics (Magi II)	(213) 822-2252
101	039	J.L. Cooper Electronics (CS-1)	(213) 822-2252
78	040	Cooper Sound	
41	041	Crown	(219) 294-8329
136	042	CT Audio Systems	
106	043	Current Computer Technology	
30	044	D & R USA	
93	045	D.A.T.—Audio Gallery	(213) 829-0304
63	046	The DAT Store	(213) 470-6176
161	047	dbx (263X)	(415) 957-1070
163	048	dbx (150X)	(415) 957-1070
165	049	dbx (1531X)	(415) 957-1070

PAGE	READER SERVICE NUMBER	ADVERTISER	ACTION FAX #
20-21	050	DDA	(516) 420-1863
35	051	DIC Digital Supply	
141	052	Digidesign	
IBC	053	DigiTech	
160	054	Disc Makers	
61	-	Dolby	
84	055	Dorsey Productions	
52	056	Drawmer	
118	057	Dreamhire	
106	058	EAR Professional Audio/Video	
85	059	East West Communications	
143	060	Electro-Voice	
152	061	Europadisk	
166	153	Eventide	
65	062	Fostex	
64	063	Full Compass	
184	151	Full Sail Center	(407) 671-1112
78	064	Gefen Systems	
121	065	Gold Line Loft	(203) 938-8740
27	-	Harrison/GLW	
126	066	Hill Audio	
102	067	The Hollywood Edge	
182	152	The Hollywood Film Music Library	
98	068	illbruck	
151	069	Imperial Tape Company	
129	070	Institute of Audio Research	(212) 677-6549
137	071	JBL Professional	
47	072	Jensen Transformers	
145	073	JRF	
155	074	Magnetic Sciences	(201) 579-6021
162	075	KABA Research & Development	
180	076	Killer Tracks	
108	077	Klarity Cassette	(207) 873-3924
46	078	Kurzweil Music Systems	
42	079	Leonardo Software	
172	080	Leo's Professional Audio Systems	(415) 652-6575
175	081	ListenUp Professional	
170	082	MacBeat	
49	083	Magna-Tech Electronic	
174	084	Manhattan Production Music	
177	085	Markertek	(914) 246-1757
74	086	Martin Audio Video	
79	087	Maxell	
120	088	Midas	(516) 420-1863
74	-	Mix Magazine	
157	089	Music Annex Duplication	
160	090	Musicians	
94	091	National Sound and Video	
38	092	Neotek	
54	093	Neutrik	
1	-	Neve	
60	094	New England Digital (NED)	
156	095	Northeastern Digital Recording	
84	096	Omni Music	
83	097	ORIX Leasing Service	

PAGE	READER SERVICE NUMBER	ADVERTISER	ACTION FAX #
7	098	Otari	(415) 341-7200
62	099	Passport	
67	100	Peavey Electronics	
154	101	Producers Tape Service	
130	102	Professional Audio Systems (PAS)	
31	103	Professional Audio Services & Supply	(818) 843-5754
86	104	Promusic	
58	105	Pygmy Computer Systems	
122	106	The Recording Workshop	
179	107	Rhythm City	(404) 233-1581
174	108	Rocket Lab	
26	109	RPG Diffusor Systems	
93	110	RPG Diffusor Systems	
24	111	Saki Magnetics	
48	112	Sanken	
94	113	Selco Products	
95	114	Shure	(708) 866-2279
11, 113	-	Solid State Logic (SSL)	
170	115	Sonocraft	
12-13	-	Sony Business & Professional Group	
BC	-	Soundcraft	
109	116	Sound Ideas	
43	117	Soundtracs	
18	118	Spatial Sound	
102	119	Sprague Magnetics	
4-5	120	Studer Revox	
99	121	Studio Consultants	
114	122	Studiomaster	(714) 524-5096
71	123	Summit Audio	
75	124	Sunn	
72	125	Sweetwater Sound	
73	126	Switchcraft/Raytheon	
33	127	Sync Sound	
22	128	Tannoy	(519) 745-2364
132-133	129	Tascam (M-3700)	
134-135	130	Tascam (MSR-24)	
127	131	Thoroughbred Music	
90	132	3M Corporation	
182	133	Thrifty Electronics	
76-77	134	TimeLine	
183	135	The Toy Specialists	
146	136	TRF Music	
14	-	Trident	
116-117	137	TUBE-TECH	
39	138	Turtle Beach Systems	
86	139	27th Dimension	
173	140	UCLA Extension	
129	141	Thomas Valentino	
51	142	Valley International	(615) 370-5907
154	143	Vertigo Recording Services	
173	144	Videomix	
108	145	Walters/Storyk Design Group	
157	146	Washington Professional Systems	
171	147	Woodworx Audio Enclosures	
25	148	Yamaha Professional Audio	
147	149	Yorkville	
150	150	Zoom	

MIX

ACTION FAX

Use this form to contact advertisers in this issue immediately. All advertisers and some Fax numbers are listed in the Ad Index above. Photocopy this page if you need additional copies of this form.

Advertiser _____ Adv. Fax#(_____) _____

Name _____ Title _____

Company _____

Address _____

City _____ State _____ ZIP _____

Tel# (_____) _____ Fax # (_____) _____

Please send additional information about _____ as seen in Mix. Please send

this information by Return Fax Mail Please have a salesperson contact me.

FOR MORE INFORMATION

about products and services in this issue of MIX:



Circle the Reader Service numbers that correspond to each advertisement or editorial item in which you are interested. (Maximum 20 numbers.)



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Pittsfield, MA 01203-9900

ISSUE: APRIL 1991
CARD EXPIRES: AUGUST 1, 1991

Name _____ Phone (____) _____

Company _____ Title _____

Address _____

City _____ State _____ Zip _____

1 Please check the ONE category that best describes your company's primary business activity:

- 01. Recording Studio (including Remote Trucks)
- 02. Independent Audio Recording or Production
- 03. Sound Reinforcement
- 04. Video/Film Production
- 05. Video/Film Post-Production
- 06. Broadcast/Radio/Television
- 07. Record Co.
- 08. Record/Tape/CD Mastering and/or Mfg.
- 09. Equipment Mfg. (including rep. firm)
- 10. Equipment Retail/Rental
- 11. Contractor/Installer
- 12. Facility Design/Acoustics
- 13. Educational
- 14. Institutional/Other (please specify)

2 Please check the ONE category that best describes your job title or position:

- 15. Management-President, owner, other manager, etc.
- 16. Technical & Engineering-Engineer, editor, design engineer, etc.
- 17. Production & Direction-Producer, director, etc.
- 18. Sales & Administration-Sales representative, account executive, etc.
- 19. Artist/Performer-Recording artist, musician, composer, and other creative functions
- 20. Other (please specify)

3 Please check the statement below that best describes your role in the purchasing of audio, video and musical equipment, supplies and/or services:

- 21. Recommend the purchasing of a product or service
- 22. Specify makes, models or services to be purchased
- 23. Make the final decision or give approval for purchase
- 24. Have no involvement in purchasing decisions

4 What is your company's annual budget for equipment, supplies and services? (check one)

- 25. Less than \$50,000
- 26. \$50,000-\$149,999
- 27. \$150,000-\$249,999
- 28. \$250,000-\$499,999
- 29. \$500,000 or more

5 This inquiry is for: (check one)

- 30. Immediate purchase
- 31. Files/future purchase

6 Where did you get this copy of Mix?

- 32. Personal subscription
- 33. Recording studio/Production facility
- 34. Audio/Video retailer
- 35. Newsstand
- 36. From a friend or associate

7 In which of the following locations does your audio/video production take place? (check all that apply)

- 37. Commercial (Public) Production Facility
- 38. Private (Personal) Production Facility
- 39. Corporate or Institutional Facility

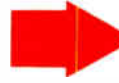
001	031	061	091	121	151	181	211	241	271
002	032	062	092	122	152	182	212	242	272
003	033	063	093	123	153	183	213	243	273
004	034	064	094	124	154	184	214	244	274
005	035	065	095	125	155	185	215	245	275
006	036	066	096	126	156	186	216	246	276
007	037	067	097	127	157	187	217	247	277
008	038	068	098	128	158	188	218	248	278
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016	046	076	106	136	166	196	226	256	286
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ISSUE: APRIL 1991
CARD EXPIRES: AUGUST 1, 1991

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City _____ State _____ Zip _____

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013	043	073	103	133	163	193	223	253	283
014	044	074	104	134	164	194	224	254	284
015	045	075	105	135	165	195	225	255	285
016	046	076	106	136	166	196	226	256	286
017	047	077	107	137	167	197	227	257	287
018	048	078	108	138	168	198	228	258	288
019	049	079	109	139	169	199	229	259	289
020	050	080	110	140	170	200	230	260	290
021	051	081	111	141	171	201	231	261	291
022	052	082	112	142	172	202	232	262	292
023	053	083	113	143	173	203	233	263	293
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026	056	086	116	146	176	206	236	266	296
027	057	087	117	147	177	207	237	267	297
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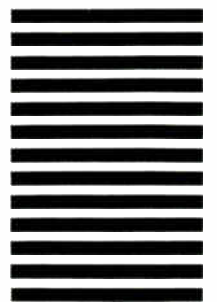
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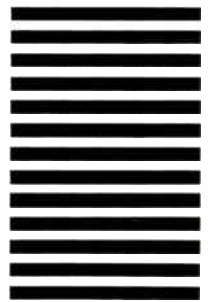


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VIDEO PRODUCTION & POST PRODUCTION

NORTHEAST

Connecticut, Delaware, Maine, Maryland,
Massachusetts, New Hampshire, New Jersey,
New York, Pennsylvania, Rhode Island,
Vermont, Washington, D.C.

ALL AMERICAN COMPOSERS LIBRARY C/O D.S.M. PRODUCERS INC.; *VFP, APPV*; 161 W. 54th St.; New York, NY 10019; (212) 245-0006. Owner: S. Bader, president; D. Kaufman, VP; K. Wiseman, CPA. Manager: S. Bader, J. Chaleff.

AUDIO VISIONS; *OLVP, APPV*; 7 Rockford Rd., Ste. 29B; Wilmington, DE 19806; (302) 651-7955. Owner: David C. Lock. Manager: David C. Lock.

AUDIO-IMAGES INC.; *VFP, OLVP*; 200 James Pl., Ste. 305; Monroeville, PA 15146; (800) 927-8850. Owner: David J. Stana.

CHROMAVISION; *VFP, VPP/E*; 119 W. 22nd St.; New York, NY 10011; (212) 463-8997. Owner: Bruce Testa, Eric Sternbach. Manager: Robin Berkowitz.

CLARK PRODUCTION ASSOCIATES

215-434-6363

CLARK PRODUCTION ASSOCIATES INC.
Allentown, PA

CLARK PRODUCTION ASSOCIATES INC.; *VFP, VPP/E, OLVP, APPV*; 601 N. 6th St.; Allentown, PA 18102; (215) 434-6363. Owner: Gary C. Snyder. Manager: Sharon Kozden/Jim Secret. **Video Tape Recorders:** (3) Sony BVW-75, (2) Sony BVW-65, Sony BVU-950, (4) Sony VU-7600. **Video Monitors:** (6) Ikegami TM-20-9-20". **Switchers/editors:** Grass Valley 200, Grass Valley 100, Sony SEG-2550. **Video Cameras:** (2) Sony BVP-7 CCD, Sony BVP-70 CCD, Sony BVW-300 CCD. **Synchronizers:** Cipher Digital Shadow. **Video Effects Devices:** Ampex ADO-100 w/Warp. **Audio Recorders:** Otari 5050 Mk III. **Audio Mixers:** Sony MPX-29, Yamaha 8x2. **Other Major Equipment:** Abekas A-42 still store. Rates: Call for rate sheet. **Specialization & Credits:** Clark Production Associates specializes in providing location and post-production support services to producers. Our complete location packages and online editing will guarantee a "no excuses" production. Our Betacam packages are personally owned and maintained by an owner/engineer with over ten years of broadcast experience. High production value packages include Sachtler tripods, Arriflex lighting, film-style matte boxes and Tram and Schoeps microphones. Our field engineers and tape operators exhibit a "can do" attitude that will ensure your production's success. Commitment to quality continues throughout the editing process. The flexibility of two online Betacam suites draws both

rave reviews and return visits from satisfied clients. An added benefit is our SMPTE interlock multitrack audio sweetening with original music scored to picture and a digital library of over 150 SFX and music CDs. If "quality" and "commitment" top your list of production needs, call the professional.

DESTINY CORPORATION; *VFP, VPP/E, OLVP, APPV*; 376 Silas Deane Highway; Wethersfield, CT 06109; (203) 721-1684. Owner: Dana Rafiee. Manager: R. Michael O'Brian.

**NY'S PREMIER
OFFLINE FACILITY**

AVID NON-LINEAR SUITES
GVG 4 MACHINE 3/4" SUITE
FILM TO TAPE TO FILM
PAL OR NTSC

- DON LEVY •
- BASIL PAPPAS •
- LESLIE LEVY •

220 EAST 42ND ST.
NEW YORK, NY 10017
212 • 972 • 3400

DIGIPIX EDITORIAL
New York, NY

DIGIPIX EDITORIAL; *VFP/E*; 220 E. 42 St.; New York, NY 10017; (212) 972-3400. Owner: Leslie Levy. Manager: Kristen Huntley. **Specialization & Credits:** Complete post-production services for music videos, including package deals. Complete digital editing. Credits include Cyndi Lauper, Perfect Gentlemen, Pink Floyd, EL plus a variety of commercials, long-form programs and corporate video. Edit in PAL for high-quality European distribution.

D-V-X INTERNATIONAL VIDEO® DIVISION OF DEMO-VOX® SOUND STUDIO; *VFP, VPP/E, OLVP, APPV*; 1038 Bay Pidge Ave.; Brooklyn, NY 11219-6009; (718) 680-7234. Owner: Demo-Vox® Sound Studio Inc. Manager: Frank and Laura Grassi.



EDITEL/NEW YORK
New York, NY

EDITEL/NEW YORK; *VPP/E, APPV*; 222 E. 44th St.; New York, NY 10017; (212) 867-4600. Owner: Banta Corporation. Manager: Jill Debin-Cohen. **Switchers/editors:** Editing: (5) online, (2) multiformat and (2) offline editing suites. D-1 and D-2 recorders. Abekas A-60 and A-62 digital disk recorders. Grass Valley 300 and 200 switchers. Digital effects with three ADO's and three Kaleidoscopes. Chyron 4100 and Laird character generators. Non-linear editing. **Video Effects Devices:** Two digital suites with Paint Box, Harry, Harry Tracks, Encore, Kaleidoscope and D-1 recorders. Wavefront and Alias 3-D animation systems. Sony Mavigraph Printer and Matrix color graphics recorder for output to film. Quantel Mirage. Full-service design, storyboard and production. Shima Seiki Hi-Res print design and retouching system. **Other Major Equipment:** Suite #1 features a Synclavier/PostPro SD digital audio system for sound design, editing and mixing. Music composition and production. Sony PCM-1630. Digital sound effects libraries. Voice record-to-picture. Suite #2 features an SSL 6000 E stereo video system—a fully automated recording and mixing console with 32 inputs, a Sony 3324 digital, 24-track machine and Studer A-827 analog, 24-track machine. Digital sound effects libraries. Sony PCM-1630. 35mm dubbers online with mix-to-picture capability. Dolby on all machines. Voice record-to-picture. Film-to-tape: Three suites with Rank Cintel Flying Spot Scanners, Sunburst and da Vinci color correctors, X-Y-Zoom, Ultimatte 6, electronic and mechanical pin registration, KeyCode, sync-smart and Abekas A-42 frame store.

ELECTRONIC FIELD PRODUCTION SERVICES INC.; *VFP, VPP/E, OLVP*; 8 Burr St.; Boston, MA 02130; (617) 524-5823. Owner: Jim Macallister. Manager: Ernest Urvater.

GREG EPLER-WOOD/FILM & VIDEO; *VPP/E, OLVP*; PO Box 871; North Bennington, VT 05257; (802) 442-8868.

GALLAUDET UNIVERSITY TELEVISION; *VFP, VPP/E, OLVP, APPV*; 800 Florida Ave., NE; Washington, D.C. 20002; (202) 651-5115; FAX: (202) 651-5124. Owner: Gallaudet University. Manager: Ron Reed. **Video Tape Recorders:** Sony DVR-10 D-2, Ampex VPR-80 1", (3) Ampex CVR-75 Betacam SP, Ampex CVR-65 Betacam SP. **Video Monitors:** (2) Sony PVM-1944, (3) Sony PVM-1344, (4) Sony PVM-1910. **Switchers/editors:** Bosch Mach1, Grass Valley 1600 3-K, Video Media Mickey II Interformat. **Video Cameras:** (2) Ampex CVC-50 CCD Camcorders, (3) Sony M-7 CCD, Sony DXC-3000 CCD. **Synchronizers:** Adams-Smith 2600, (2) J.L. Cooper PPS-100. **Video Effects Devices:** Ampex ADO-100, CEL Maurice. **Audio Recorders:** Otari 5050 8-track, (2) Panasonic AG-7500 VHS Hi-fi. **Audio Mixers:** KIA Electronics XZ-100, Yamaha M916. **Soundstages:** Gridded 40' x 60' with Strand Century dimmer board, gridded 40' x 25'. **Other Major Equipment:** Xscribe real-time captioning system, IBM captioning system, CPC computerized teleprompter, NewTek Video Toaster. Rates: Available on request.

GARRETT FILMS INTERNATIONAL; *VPP/E, OLVP, APPV*; Box 353, RR #3; Bernville, PA 19506; (215) 488-7552. Owner: R.E. Garrett. Manager: C. Garrett.

HBO STUDIO PRODUCTIONS; *VPP/E, APPV*; 120A E. 23rd St.; New York, NY 10010; (212) 512-7800. Owner: Home Box Office Inc. Manager: Ralph Fumante, VP studio operations. **Video Tape Recorders:** (12) Ampex VPR-3000 1", (25) Ampex VPR-2B 1", (4) Sony DVR-1000 D1, (25) Ampex VPR-300 D2, (10) Sony BVW-75 Beta SP, (30) JVC 1/2" VHS, (30) Sony 5600 3/4". **Video Monitors:** Barco HR-51, Shima Seiki in graphic environments. **Switchers/editors:** Grass Valley 200 and 300 in analog environment, CMX 3600 systems in all environments, Grass Valley Kadenza video processor in component digital suite, GVG composite digital switcher in D2 edit suite. **Video Cameras:** (3) Ikegami 323 in Studio A, Sony BVP-7 Betacam in Studio B. **Synchronizers:** Adams-Smith 2600. **Video Effects Devices:** (4) Ampex ADO 3000, Ampex ADO 100, Grass Valley Kaleidoscope with Kurl, Ampex A53D with Warp. **Audio Recorders:** Otari MTR-100 24-track, Otari MTR-12 2-4-track.

—LISTING CONTINUED ON NEXT PAGE

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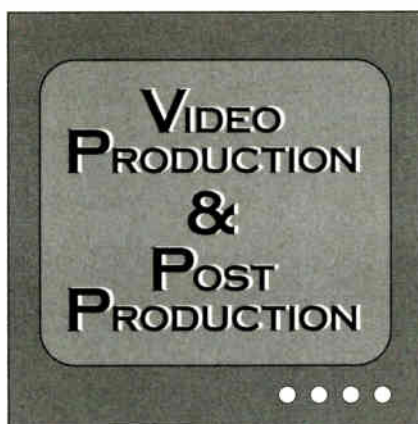
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AMS Audiofile. Audio Mixers: Solid State Logic 6000 in post-audio suite, Neve 72-input consoles in video editing suite and Studio A. Soundstages: Studio A: 36'x42'x16" with hard cyc and control room. Studio B: 20'x20'x10" insert stage. Other Major Equipment: (2) Quantel Paint Boxes, Quantel Harry with Kaleidoscope, Abekas A60 and A64 digital disk recorder, Abekas A42 still store, Chyron 4100 character generators, Interactive Motion Control camera stand, videotape standards conversion, satellite transmission. Rates: Send for rate card.

HELIOTROPE STUDIOS LTD.; VPF, VPP/E, OLVP, APPV; 21 Erie St.; Cambridge, MA 02139; (617) 868-0171. Owner: Boyd Estus, James Griebisch. Manager: Suzanne Sobert, production coordinator.

INTERFACE VIDEO SYSTEMS INC.; VPF, VPP/E, OLVP, APPV; 1233 20th St. NW; Washington, D.C. 20036; (202) 861-0500. Owner: Tom Angell. Manager: Eise Reeder. Video Tape Recorders: (4) Ampex JPR-3 1", Ampex UPR-300 D-2, (7) Ampex UPR-60/UPR-75 Betacam SP. Video Monitors: Mitsubishi 32", Ikegami 19". Switchers/editors: (2) Ampex ACE-200, Ampex ACE-25, AVC-22 Century, (2) CDL 4860, Ampex Disk Series, Abekas A-62 recorder/player. Video Cameras: (3) Ampex 50 CCD, Mitchell 35mm film camera. Video Effects Devices: (2) Ampex 3000 ADO Series, Ampex 1000 Series ADO w/digital. Audio Mixers: Lexicon Opus digital audio system. Soundstages: 50' x 30' stage w/3-wall cyc and Interactive Motion control w/35mm Mitchell camera, 35' x 42' stages w/75' hard cyc. Other Major Equipment: U-Series Paint Box, Classic Paint Box w/Harry and Encore, interactive motion control with video camera, interactive motion control with 35mm camera, Wavefront 3-D animation computer, Avid & Mediacomposer digital offline.

JERSEY COAST VIDEO PRODUCTIONS; VPF, VPP/E, OLVP, APPV; 15 N. Wood Ave.; Linden, NJ 07036; (908) 862-6254. Owner: Dan Devaney, Craig Smith. Manager: Craig Smith.

LION AND FOX RECORDING INC.; APPV; 1905 Fairview Ave. NE; Washington, D.C. 20002; (202) 832-7883. Owner: Hal Lion, Jim Fox, Sally Lion. Manager: Rick Starkweather.

MEDIA DIMENSIONS INC.; VPF, VPP/E, OLVP, APPV; 1850 York Rd. Ste. G; Timonium, MD 21093; (301) 561-4550. Owner: Gary Bassford, John Gaburick.

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THE MIX PLACE INC.
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THE MIX PLACE INC.; APPV; 663 5th Ave.; New York, NY 10022; (212) 759-8311. Owner: John M. Quinn, president.

MICHAEL MOSER/MEDIA; VPP/E, OLVP; 2000 P St. NW, Ste. 301; Washington, D.C. 20036; (202) 293-1780; FAX: (202) 775-2443. Owner: Michael Moser. Video Tape Recorders: Ampex CVR-35 Betacam, Sony BVU-5 Betacam, Sony 5800-5850 U-matic editing system, Sony BVU-110 U-matic, JVC CR5000U. Video Monitors: (3) Sony 5"8"8" high-pitch, Hitachi BW, Hitachi portable waveform (w/battery). Switchers/editors: RM-440 system (listed above). Video Cameras: Sony BVP-70, Ikegami HL-79EAL, JVC KY-2000. Video Effects Devices: Laird Telemedia character generator (in edit system). Audio Recorders: B&O cassette play/recorder (in edit system), TEAC 1/4" stereo reel-to-reel. Audio Mixers: Shure M267, TEAC mixer w/equalization (in edit system). Other Major Equipment: Full set of location lighting including Mole & Pepper Fresnels, lanero open-faced quartz, softlights, booms, flags and stands, lavaliers and shotgun mics by Tram, Sony, Electro-Voice and Sennheiser. Rates: Field production \$800/day; offline editing \$55/hr w/operator; \$35 w/o operator.

National SOUND

NATIONAL SOUND
 New York, NY

NATIONAL SOUND; 460 W. 42nd St.; New York, NY 10036; (212) 279-2000; FAX: (212) 947-6439. Owner: National Video Center/Recording Studios Inc. Manager: Jennifer & Peter Fish. Specialization & Credits: Four mix-to-picture suites, including full MIDI capability, NED PostPro S/D with Synclavier 3200, 24- and 48-track music studios and PCM-1630 digital audio transfers. Complete stock music and SFX libraries. Original music scoring for TV, radio, film, commercial and corporate productions, with an experienced, award-winning staff. National Sound focuses on the creative, with composers and engineers who perform mix-to-picture, sweetening and ADR in digital and analog formats. Their backgrounds include numerous television themes and commercials, Emmy-nominated children's songs, #1 singles and compositions for the Olympic Games. Our clients include the major networks, corporations, ad agencies and production companies, who rely on National Sound for complete audio post at the same location as a state-of-the-art video production/post facility. This connection allows a project to be posted from start-to-finish with a unique, creative continuity.

OTTERSON TV INC.; VPP/E, OLVP; 251 W. 30th, Ste. 14W; New York, NY 10001; (212) 695-7417. Owner: William Ottersen.

P&P STUDIOS INC.; VPF, VPP/E, OLVP, APPV; 109 Forest St.; Stamford, CT 06901; (203) 359-9292. Owner: John R. Fishback. Manager: Aldena J. Leonard.

PHOTOMAGNETIC SOUND STUDIOS; APPV; 222 E. 44th St.; New York, NY 10017; (212) 687-9030. Manager: Beverly Dichter. Video Tape Recorders: (2) Sony BVH-2000, (8) Sony BVU-800. Video Monitors: Ikegami, Sony. Synchronizers: (30+) Adams-Smith 2600. Audio Recorders: Studer and Otari 24-track, 8-track, 4-track and 2-track. Audio Mixers: (4) Neve V Series, AMS Audiofile. Other Major Equipment: (35) Magna-Tech 35mm/16mm players and pick-up recorders, Magna-Tech 35mm/16mm interlock projector.

POST PERFECT; VPP/E; 220 E 42nd St., 2nd Fl. South; New York, NY 10017; (212) 972-3400. Owner: Carlton Communications. Manager: Keith Gordon, dir. of operations. Video Tape Recorders: (18) NTSC 1" w/Dolby, (2) Pal 1", NTSC 1" w/PCM Audio (digital), Pal 3/4", (23) NTSC 3/4", (6) NTSC Betacam SP, (10) SP 3/4", NTSC Betacam, (7) NTSC D-2, (2) PAL/NTSC VHS, (2) Pal D-2, PAL/NTSC D-1. Switchers/editors: (3) online edit suite each w/Grass Valley 300 (customized), Abekas A-62, CMX 3600, Chyron Supercribe and 4100. Interformat edit suite w/GVG 200 and system 3600 with Scribe Infnit! and 4100 character generator. Pal 1" and D-2 edit suite with Scribe Infnit! and 4100 character generator. Video Cameras: Ikegami HL-79 EA motion control, (4) Ikegami ITC-550 B&W high-resolution title, Sony XC-007P Pal color title camera, (7) Sony CCD-X77 NTSC B&W title cameras, Sony CCD-X77 PAL B&W title camera. Synchronizers: (4) Tektronix 110S frame. Video Effects Devices: Grass Valley Kaleidoscope w/Kurl 4 channels. Audio Recorders: (4) Studer ATR 1/4", Otari 24-track, Nagra

T, (5) Nakamichi cassette decks. **Audio Mixers:** (3) Neve custom 16 x 4, (4) Neve custom 8 x 2, GVG AMX 170S. **Other Major Equipment:** Digital production suite w/Quantel Paint Box/Harry/Kaleidoscope, Paint Box suite w/Quantel Paint Box, (3) Wavefront 3-D graphic system, (2) color correction suite w/da Vinci color corrector and Rank Cintel telecine, IMC motion-control animation stand. **Rates:** Call for rates.

PRODUCTION MASTERS INC. (PMI); VPF, VPP/E, QLVP, APPV; 321 First Ave.; Pittsburgh, PA 15222; (412) 281-8500. Owner: David Case. Manager: Amy Kersnick—manager.

RBV RECORDING AND VIDEO; VPF, VPP/E, QLVP, APPV; 920 N. Main St.; Southbury, CT 06488; (203) 264-3666. Owner: Jack Jones, Evan Jones. Manager: Marjorie Jones.

RODEL AUDIO SERVICES; APPV; 1028 33rd St. NW; Washington, D.C. 20007; (202) 338-0770. Owner: Rodel Productions Inc. Manager: Renee Funk.

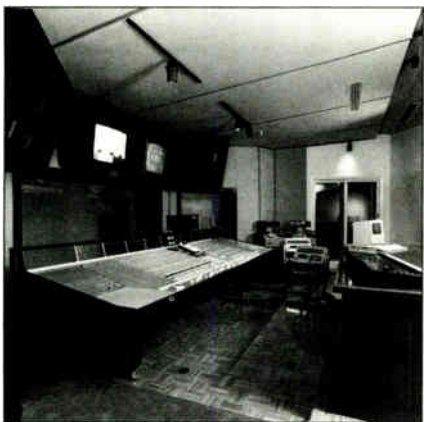
HOWARD M. SCHWARTZ RECORDING INC.; APPV; 420 Lexington Ave., Rm. 1934; New York, NY 10170; (212) 687-4180; FAX: (212) 697-0536. Owner: Howard M. Schwartz. Manager: Beth Levy. **Video Tape Recorders:** (6) Sony VP-2000 and VP-3000 1", (12) Sony/JVC 3/4", (6) JVC Super VHS, (3) Sony DVR-10 D-2, Sony Beta SP, Sony 850, 950, 870, 970 3/4". **Video Monitors:** (6) Sony 25", (6) Videotek 21", (4) Sony 32". **Synchronizers:** (4) Adams-Smith AV-2600, (3) ECCO MQS-103. **Audio Recorders:** (2) Sony 3348 multitrack digital, (5) Sony 3324 multitrack digital, (7) Studer/Otari 824 MTR-90 24-track, (4) Sony/Panasonic DAT, Studer 827, (2) SSL Screen Sound, (20) Otari MTR-10 CCTC, (4) Studer 820 CCTC 1/4". **Audio Mixers:** (2) SSL 6000G, (6) Sony MXP-3000 automated, SSL 4000-G. **Other Major Equipment:** Center channel T/C, Magna-Tech dubbers and PU recorders w/6-track Dolby, Dolby SR, satellite digital uplink/downlink stereo, SFX libraries and Foley room, (12) stock music libraries, Sound Design.

SHEFFIELD AUDIO-VIDEO PRODUCTIONS; VPF, VPP/E, QLVP, APPV; 13816 Sunnybrook Rd.; Phoenix, MD 21131; (301) 628-7260. Manager: Nancy Riskin, Richard Van Horn.

SMA VIDEO INC.; VPF, QLVP, VPP/E; 84 Wooster St.; New York, NY 10012; (212) 226-7474.

SNOW SOUND; QLVP; 441 Baileyville Rd.; Middlefield, CT 06455; (203) 349-8211. Owner: Brad Snow. Manager: Robert Neumann.

SOUND ON SOUND RECORDING INC.; APPV; 322 W. 45th St.; New York, NY 10036; (212) 757-5300; FAX: (212) 757-5816. Owner: David Amlen. Manager: Zack Davis.



SOUND TECHNIQUES INC.
Boston, MA

SOUND TECHNIQUES INC.; APPV; 1260 Boylston St., Ste. 204; Boston, MA 02215; (617) 536-1166; FAX: (617) 536-4446. Owner: Sound Techniques Inc. Manager: Lance Duncan—president, Jim Anderson—vice president, Rick Sweetser—post-production. **Video Tape Recorders:** Sony BVH-3100, Sony BWV-70, (4) Sony VO-5850. **Video Monitors:** (2) Sony PVM-2530, Sony PVM-2030, Sony PVM-1942 O. **Switchers/editors:** Solid State Logic Screen Sound, Digidesign Sound Tools, Time Line/SSL System Supervisor. **Synchronizers:** (5) TimeLine Lynx. **Audio Recorders:** (2) Sony 3324A digital, Sony APR-24 analog, Otari MX-70 w/dbx. **Audio Mixers:** Neve V 36, SSL 4056 G w/Total Recall. **Soundstages:** Studio A: 37'x21', Studio B: 30'x17', Studio C: 10.6'x7'. **Other Major Equipment:** Allen and Heath Sabre console w/MIDI muting 32x16. (6) analog 2-track recorders of various makes, (5) digital 2-track recorders of various makes, Magna-Tech M 10036-4 film recorder/dubber. **Rates:** \$110/hour-\$325/hour. **Specialization & Credits:** Sound Techniques Inc. brings a new standard of audio post-production for video to the New England area. Its new location in Boston's Back Bay houses three studios that offer picture lock-up capability via the TimeLine Lynx System, so that virtually any sound-to-picture task can be accomplished, be it scoring,

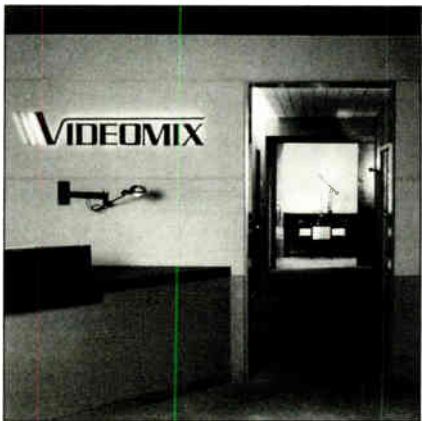
sound effects editing, ADR, Foley or final mix. Central to this system is the SSL ScreenSound, a powerful tool for editing and mixing of soundtracks to picture. Multitrack digital (up to 48 tracks), 24 analog, 16-track analog and all the common 35mm and 16mm mag-film formats are also available through a machine room that is central to all three studios. Offering original compositions and sound design, notable clients include CFM TV, Digital, General Electric Lotus, Polaroid, Seagrams and USA Today on TV to name a few.

SYNC SOUND INC.; APPV; 450 W. 56th St.; New York, NY 10019; (212) 246-5580. Owner: Bill Marino, Ken Hahn. Manager: Sherril Fernandez. **Video Tape Recorders:** Sony BVH-2000 1" w/Dolby, Sony BVH-2830, Sony D-2, Sony BVU-850SP, VHS Hi-fi, Betacam SP. **Video Monitors:** (2) Panasonic 100" video projection system, Sony. **Switchers/editors:** (5) AMS AudioFiles w/4-hour memory, NED PostPro. **Synchronizers:** Proprietary edit system allowing lockup, edit rehearsal and editing to subframe accuracy of all audio, video and digital machines, CMX-compatible auto conform. **Audio Recorders:** Sony PCM-3324 24-track digital, Sony PCM-1630 2-track digital, F1 and R-DAT digital, Otari MTR-90 w/24-/16-/8-track heads, Otari MTR-20 4-track, center-track TC, stereo and mono Nagras, MTM 16/35mm magnetic film recorder, Nagra IV STC, AMS AudioFiles, PostPro, cart machines, Nakamichi audio cassettes. **Audio Mixers:** SSL 6000 G Series automated w/stereo modules, SSL 4000 E Series automated, Sony MXP-3036. **Other Major Equipment:** Lexicon 224X w/LARC, Dolby SP 24, Dolby CAT 43, Dolby SR, Dolby Surround mixing, Neve stereo limiter, dbx subharmonic synthesizer, Tube-Tech PE-1B, Sontec EQ, AMS 15-80, Yamaha DX7, Roland EQ, Ellison noise reduction, Eventide H3000. **Rates:** Call for information. **Specialization & Credits:** In 1991 Sync Sound expanded its facility with two additional AMS AudioFile editing rooms, a fourth mixing room with a NED PostPro system, dub room and kitchen to complete the new area. Sync Sound is a full-service, audio post-production house, ready to meet your audio needs with experience and enthusiasm. Our facilities are specifically designed to accommodate editing and mixing to picture (digital or analog), dialog replacement, Foley, overdubs to picture, sound effects design, audio sweetening and Dolby Surround mixing. Sync Sound also provides technical consultation, Nagra and Mag dubs, an extensive SFX library and videotape laybacks.

TEL-E-VUE PRODUCTIONS; VPF, VPP/E, QLVP; Box 217; Ferndale, NY 12734; (914) 292-5965. Owner: Paul Gerry. Manager: Pat Gerry.

TOWNHOUSE POST-PRODUCTION; VPP/E; 1449 N St. NW; Washington, D.C. 20005; (202) 462-EDIT. Owner: John J. Prescott. Manager: Mark W. Bindrim.

VIDEO LABS CORPORATION; VPP/E; 15237 Display Ct.; Rockville, MD 20850; (301) 217-0000. Owner: Carl Montuon. Manager: Harry Zalewski.

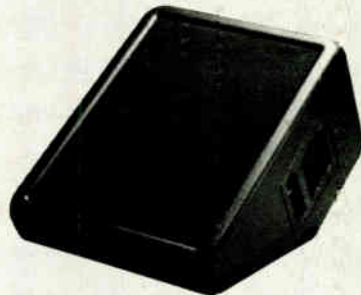


VIDEOMIX
New York, NY

VIDEOMIX; APPV; 123 W. 18th St.; New York, NY 10011; (212) 627-7700. Owner: CP Sound Inc. Manager: Kathleen Spellman-Krause. **Video Tape Recorders:** Sony DVR-10D2, Sony BWV-75 Beta SP, (2) Ampex VPR-6, (5) JVC 850 3/4". **Video Monitors:** Ikegami TM-20, (2) Mitsubishi 35". **Synchronizers:** (2) Soundmaster 8 machine "Smart Sync" systems. **Audio Recorders:** (3) Otari MTR-90 24-track, (7) Otari MTR-12 2-/4-track, Otari MX-70 16-track. **Audio Mixers:** Sony MXP-3000 w/automation, Amek Mozart w/automation, SoundWorkshop 34 w/automation. **Other Major Equipment:** Digidesign Digital Workstation, 4-track online interlock 1635 Mag, D-20 online DAT recorder, Dolby SR on all recorders. **Specialization & Credits:** Certified Dolby Surround all-Tannoy room. Audio-for-video post-production specializing in SFX, laugh tracks and music scoring. World's finest SFX collection, all major music libraries. Full audio duplication and fulfillment capability. Interformat audio/video/multitrack/Dolby/dbx dubbing. International multilanguage tracks—our secret specialty.

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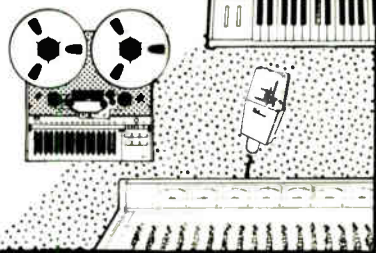
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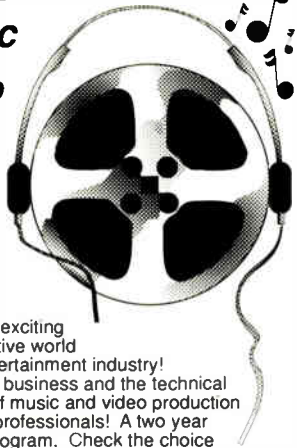
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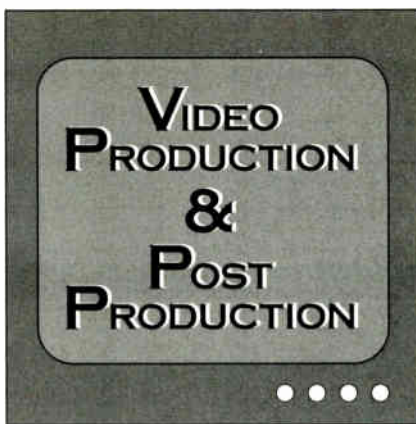
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THE VIDEOHOUSE INC. (TVI); VPF, VPP/E, OLVP; 975 Greentree Rd., Ste. 200; Pittsburg, PA 15220; (412) 276-0497. Owner: Ron Bruno. Manager: Chuck Morse.



SOUTHEAST

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ALLEN-MARTIN PRODUCTIONS INC.; VPF, VPP/E, OLVP, APPV; 9701 Taylorsville Rd.; Louisville, KY 40299; (502) 267-9658. Owner: Ray Allen, Hardy Martin. Manager: Bill Porter.

ARDENT TELEPRODUCTIONS INC.; VPF, VPP/E, OLVP, APPV; 2000 Madison Ave.; Memphis, TN 38104; (901) 725-0855. Owner: John Fry, Robert Williams. Manager: Joe R. Dyer, VP. Video Tape Recorders: (3) Hitachi HR-200B 1", (3) Sony DVT-10 D2, Ampex CVR-75 Beta SP, Sony BVV-5 Beta SP. Switchers/editors: Grass Valley Group 200-2, CMX 3600 controller. Video Cameras: (2) Hitachi SK-91, Ikegami EC-35, Sony BVP-50, Amiflex SR1IE. Synchronizers: Adams-Smith Zeta-3, TimeLine Lynx. Video Effects Devices: NEC System 10 3-axis DVE. Audio Recorders: Mitsubishi X-850 digital, (2) Mitsubishi X-800 digital, (3) Mitsubishi X-80 digital, Mitsubishi X-86 digital, (2) MCI JH-24 analog, (3) MCI JH-110 analog. Audio Mixers: Mitsubishi Westar 44x24, Solid State Logic 6040E 40x32, Neve V 40x48. Other Major Equipment: Verigo 3-D animation and Paint system, Fairlight Series III computer music instrument, Studer Dyaxis audio workstation.

ATLANTA VIDEO PRODUCTION CENTER INC.; VPF, VPP/E, OLVP; 1570 Northside Dr. NW, Ste. 240; Atlanta, GA 30318; (404) 355-3398. Owner: Joseph Gora, president. Manager: Lloyd Horton.

AUDIO PRODUCTION CENTER; APPV; 3838 Oakcliff Industrial Ct.; Atlanta, GA 30340; (404) 242-7678. Owner: Salvatore Nappo. Manager: Salvatore Nappo.

CALUGER VIDEO GROUP; VPP/E; 237 French Landing; Nashville, TN 37228; (615) 255-2792. Owner: Corporation. Manager: Debbie Wamsley.

CENTURY III AT UNIVERSAL STUDIOS; OLVP, VPP/E, APPV; 2000 Universal Studios Plaza; Orlando, FL 32819; (407) 354-1000. Owner: Ross M. Cibella. Manager: Pam Lapp, dir. of sales & mktg.

CINEMA EAST; VPF, VPP/E, OLVP, APPV; 5859 Biscayne Blvd.; Miami, FL 33137; (305) 757-5859. Owner: Charles Allen. Manager: Adam Rogers.

CRAWFORD POST PRODUCTION; VPP/E, APPV; 535 Plasamour Dr. NE; Atlanta, GA 30324; (404) 876-7149. Owner: Jesse Crawford. Manager: Steve Davis.

DIXIELAND PRODUCTIONS INC.; VPF, VPP/E, OLVP; 3440 Oakcliff Rd., Ste. 104; Atlanta, GA 30340; (404) 458-1168. Owner: Richard Rex. Manager: Glen Fisher. Video Tape Recorders: (3) Sony BVH-2000 1", (2) Sony BVW-75/70 Betacam SP, Sony BVU-820 3/4, Sony BVW-35 Betacam SP. Video Monitors: (5) Tektronix 650-HR, (3) Sony PVM-8020. Switchers/editors: Grass Valley 300 group, Grass Valley 1600 group, Grass Valley 41 group. Video Cameras: (3) Sony BVP-330A, Toshiba PK-60. Synchronizers: Evertz Emulator 7100N-BVX. Video Effects Devices: Ampex ADO 2000. Audio Recorders: Otari MTR-10. Audio Mixers: Harrison Pro-7. Soundstages: 50'x60'x16'. Other Major Equipment: RCA telecine film transfer unit TK-29.

DOPPLER STUDIOS INC.; APPV; 1922 Piedmont Cir.; Atlanta, GA 30324; (404) 873-6941. Owner: Pete Caldwell. Manager: Bill Quinn.

IMAGE RESOURCES INC.; VPP/E, OLVP; 4545 36th St.; Orlando, FL 32811; (800) 393-4300. Owner: Bob Brook. Manager: Randy Noble. Video Tape Recorders: (2) Sony BVM-75 Betacam SP editors DT, (2) Sony BVM-65 Betacam SP player DT, (2) Sony BVW-35 Betacam SP portable, (3) Sony VO-8800 U-matic 3/4 SP portable. Video Monitors: Sony PVM-1910 19" production monitor, Sony PVM-8020 8" field monitor, Sony PVM-1341 13" production monitor. Switchers/editors: Sony BVS-3200, Sony BVE-910 controller, JVC KM-2500. Video Cameras: Sony DXC-M7 3 CCD, Sony BVW-300 Betacam SP CCD, Sony DXC-3000 3 CCD, Ikegami HL-79EAL. Video Effects Devices: Sony DME-450 digital effects. Audio Mixers: Sony MXP-290 8-channel. Other Major Equipment: Inscrubber graphics titling/special effects, Sony M-7 2,3,4-camera rack, Sony 3/4" SP editing fly package, Sony Betacam SP editing fly package.

KNOWLES VIDEO INC.; VPF, VPP/E, OLVP; 2003 Apalachee Pkwy., Ste. 206B; Tallahassee, FL 32301; (904) 878-2298. Owner: Karl Knowles. Manager: Guy Kathe.

LOUISVILLE PRODUCTIONS/BCG INC.; VPF, VPP/E, OLVP; 520 W. Chestnut; Louisville, KY 40202; (502) 582-7744. Owner: Edward W. Tonini, L. Douglas Keeney.

MUSIFEX INC.; VPF, VPP/E, OLVP, APPV; 2701-C Wilson Blvd.; Arlington, VA 22201; (703) 525-6476. Owner: Frank Maniglia, Jr., pres.; Craig Maniglia, VP. Manager: Guinevere Meyer.

NATIONAL TELEPRODUCTIONS INC.; VPF, OLVP; 5022 50th Way; West Palm Beach, FL 33409; (407) 689-9271. Owner: R.M. Peterson. Manager: Mary F. Eddy.

NEW RIVER STUDIOS; APPV; 408 S. Andrews Ave.; Fort Lauderdale, FL 33301; (305) 524-4000. Owner: New River Productions Inc. Manager: Virginia Cayia.

PLATINUM POST; VPF, VPP/E, OLVP, APPV; 3300 University Blvd.; Winter Park, FL 32792; (407) 671-1111. Manager: Tink Abraham. Video Tape Recorders: (3) Ampex VPR-6 1", Ampex CVR-75 Betacam SP, Sony VO-9800 3/4" U-matic SP. Video Monitors: Ikegami TM20-9, (3) Ikegami TM14-9, (8) Ikegami PM9. Switchers/editors: CMX 330A, Ampex Vista. Video Cameras: (2) Sony DXC-325 CCD, (4) Ikegami 730A, Ampex CVR-507 Betacam CCD. Synchronizers: Adams-Smith Zeta-3, (3) TimeLine Lynx. Video Effects Devices: DSC Illusion, Chyron RGU2. Audio Recorders: (2) Otari MX-552-track w/center SMPTE, Otari MTR-12 4-track, (2) Otari MTR-100 24-track. Audio Mixers: Neve VR-60, Sony 2000. Soundstages: 30x35. Other Major Equipment: NED 8-track Direct-to-Disk recording system, NED Synclavier System w/32 polyphonic/32 FM voices and 32MB RAM, NED Synclavier System w/32 polyphonic/16 FM voices.

PLAZA VIDEO PRODUCTIONS; VPF, VPP/E, OLVP, APPV; 5197 Seven Springs Blvd.; New Port Richey, FL 34655; (813) 372-8414. Owner: Mark E. Wilson. Manager: Tim W. Cowan.

THE POST GROUP AT THE DISNEY-MGM STUDIOS; APPV; Roy O. Disney Production Center; Lake Buena Vista, FL 32830; (407) 560-5600. Manager: Ivan Bernstein. Audio Recorders: (4) Sony 3324-A 24-track digital, Otari MTR-9011 24-track, (3) Sony 5000 2-track, (2) Sony PCM-3402 2-track, (2) Nagra 2-track. Audio Mixers: SSL 5000M 96 input w/ moving fader automation, Total Recall & instant reset, Sony MXP-3000 36-input. Other Major Equipment: Quantec room simulator, Publison Infernal machine 90, T.C. Electronic 2290, Lexicon 480L.

THE POST GROUP AT THE DISNEY-MGM STUDIOS; VPP/E; Roy O. Disney Production Center; Lake Buena Vista, FL 32830; (407) 560-5600. Manager: Ivan Bernstein. Video Tape Recorders: (11) Sony BVH-2000 1", (7) Sony BVW-65 & 75 Betacam, Sony DVR-1000 D-1, (9) Sony DVR-18 D-2. Video Monitors: (6) Sony BVM-1910. Switchers/editors: (2) Grass Valley GVG-300, Grass Valley GVG-200, (3) CMX 3600 edit systems. Video Effects Devices: (3) Compositum by Digital Effects w/Abekas A-64, Paint F/X systems by Digital Effects, Grass Valley 2-channel Kaleidoscope with Kuri, Abekas A-62 digital disc recorder. Audio Mixers: (4) Sony MXP-2000 12-channel. Other Major Equipment: Chyron 4200, Ultimatte V, telecine suite w/Rank Cintel.

PRIME TIME VIDEO PRODUCTION SERVICES INC.; VPP/E, OLVP; PO Box 8218; Pembroke Pines (Fort Lauderdale), FL 33312; (305) 584-7744. Owner: David Louis Berlan. Manager: Charles Mayer—director of marketing.

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PRODUCTION PLUS
Birmingham, AL

PRODUCTION PLUS; VPF, VPP/E, OLVP; 1710 29th Ct. South; Birmingham, AL 35209; (205) 879-2853. Manager: Jerry Flippen. **Specialization & Credits:** Versatility is the key in a post-production facility like Production Plus. Our goal is getting the most out of a suite while creating a very productive atmosphere for the client. With this concept Production Plus also adds a versatile, creative work force to guarantee absolute quality. Production Plus offers two interformat suites with Betacam, Betacam SP, 3/4, 3/4 SP and 1". Whether it be offline in the B suite on 3/4 and Betacam or the post-production in Suite A on Betacam SP and 1" with the Sony 9000 edit controller, the key is the final product... quality. Sure, there are digital effects, switchers, character generators and other necessities. Field production is also available with the Sony BVP-7 on a Betacam SP recorder. Clients in the past include Phillip Morris, CNN—Sports South, Miller Brewing, Alabama Museum of Natural History, Subaru South and many local and regional independent agencies and producers. If production or post-production is required in the central Alabama area, Production Plus would like to help. For rates and more information contact Jerry Flippen at (205) 879-2853.

STUDIO CENTER; 6157 NW 167th St., Ste. F-4; Miami, FL 33015; (305) 944-2911. Owner: Studio Center. **Manager:** Craig Powell.

VIDEO IDEAS PRODUCTIONS; VPF, VPP/E, OLVP; 4762 Hwy. 58, Ste. G; Chattanooga, TN 37416; (615) 894-2677. Owner: Jerry Waddell, Martha Knight. **Manager:** Jerry Waddell, Martha Knight.

VIDEO PARK INC.; VPF, VPP/E, OLVP; 11316 Pennywood Ave.; Baton Rouge, LA 70809; (504) 292-0840. Owner: C. Park Seward. **Manager:** Dennis Callahan. **Video Tape Recorders:** (4) Ampex VPR-80, (3) Ampex VPR-300, (2) Ampex CVR-70/75, (2) Sony BVU-800. **Video Monitors:** (3) Ikegami TM2015, Sony & Panasonic (various). **Switchers/editors:** Grass Valley 200 w/151 editing system, Abekas A82 digital w/151 editing system, Grass Valley 100 w/ACE Micro Editing System. **Video Cameras:** (2) Ikegami 357, Ikegami HL-79, (2) Ampex 3A. **Synchronizers:** Ampex Lynx. **Video Effects Devices:** (2) Ampex ADO-2000. **Audio Recorders:** Studer A810. **Audio Mixers:** Harrison Pro-7, Graham Patton 800 digital ESAM. **Other Major Equipment:** Aurora 280 paint/animation system, Wavefront 3-D animation system, Insert studio 38x32x19.

VIDEO TAPE ASSOCIATES; VPP/E, APPV; 1575 Sheridan Rd. NE; Atlanta, GA 30324; (404) 634-6181; (800) 554-8273. Owner: Ken Chambliss. **Manager:** Mike McNally. **Video Tape Recorders:** (8) Sony & Ampex, (21) Apex VPR-2B and -3 1", (19) Sony 3/4" & 3/4" SP, (8) Sony Betacam & Betacam SP, (27) JVC VHS & S-VHS. **Video Monitors:** (+/-20) Sony color, (+/-100) Conrac, Sony, JVC, Panasonic and Tektronix B&W. **Switchers/editors:** (4) Fastack online systems, VTA proprietary system, Montage offline system. **Video Cameras:** (2) Ikegami HL-55. **Synchronizers:** BTS Shadow. **Video Effects Devices:** 4 channels of ADO/Abekas A62 digital, Alias/2 & digital F/X graphics systems. **Audio Recorders:** (3) Nagra-T2-track, MCI JH-110, Otari 1050, Sony R-DAT. **Audio Mixers:** MCI 24-track 36x24, Lexicon Opus digital workstation w/Emulator III. **Soundstages:** 20'x40' Insert stages. **Other Major Equipment:** (2) Rank Cintel Mark III 4:2:2 w/da Vinci color correctors, Animatics suites, satellite uplink/downlink system.

VISION DESIGN TELEPRODUCTIONS; VPF, VPP/E, OLVP, APPV; 5401 Corporate Woods Dr., Ste. #500; Pensacola, FL 32504; (904) 484-6480. Owner: WKRG TV Inc. **Manager:** D. H. Long Jr. **Video Tape Recorders:** (3) Sony BVH-2000 1", Sony BVH-3000 1", (4) Sony BVH-3100 1", (2) Sony BVW-75 Beta SP, Sony BVW-40 Beta, Sony BVU-800 3/4". **Video Monitors:** (2) Sony BVM-1900 19", (8) Ikegami PM 9-5 9", (8) Hitachi VM-910AU 9". **Switchers/editors:** (2) GVG 41M edit systems, GVG 200, (2) GVG 300. **Video Cameras:** (4) RCA TK-47 studio camera w/teleprompter, (4) Sony BVP-5 Betacam SP, (2) Ikegami HL-79D. **Synchronizers:** Cipher Digital Phantom II.

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Video Effects Devices: (2) NEC DVE System 10, (2) Chyron Superscribe. **Audio Recorders:** Tascam 58 8-track, (2) Otari MX-55 2-track with time code. **Audio Mixers:** (2) Graham-Patten 6*2, Soundcraft Series 500 16 in/8 out. **Soundstages:** 55x70x16 Strand Mantrex lighting, 40x40x20, 40x40 Ultimatte Blue Cyc. **Other Major Equipment:** Ultimatte 4, Remote production truck/1" (4 camera, Sony switcher), Colorgraphics Artstar 3-D, Silicon Graphic/Thompson Digital 3-D.



NORTH CENTRAL

*Illinois, Indiana, Iowa, Kansas, Michigan,
Minnesota, Missouri, Nebraska, North Dakota,
Ohio, South Dakota, Wisconsin*

ADMARK INC.; VFF, VPP/E, OLVP, APPV; 3630 SW Burlingame Rd.; Topeka, KS 66611; (913) 267-4712. **Owner:** Sondra and Barry Busch. **Manager:** John Kuefler, Dale Hammer.

ANGEL FILMS COMPANY; VPF, VPP/E, OLVP, APPV; Rt. 1, Box 69; New Franklin, MO 65274-9998; (314) 698-3900. **Owner:** William H. Hoehne, Jr. **Manager:** Linda Grotzinger.

AUDIO ART RECORDING STUDIO INC.; APPV; 403 S.W. 8th St.; Des Moines, IA 50309; (515) 282-3223. **Owner:** Dr. James Skinner, Patrick McManus. **Manager:** Keith Brown, chief engineer.

AUDIO-RABIUS INC.; APPV; 5408 N. Main St.; Dayton, OH 45415; (513) 277-6868; FAX: (513) 275-1296. **Owner:** John H. Rabius. **Manager:** Mike L. Pummell. **Video Tape Recorders:** Ampex VPR-5 1", Sony VO-9850 w/TC 3/4" SP, Panasonic AG-6300 VHS. **Video Monitors:** Sony PVM-13420, Kodak LC500 projection. **Synchronizers:** (2) ADX Systems ADX-25 turbolock. **Audio Recorders:** Otari MX-55T-M, Otari MX-50, Otari MX-5050 2SHD, Otari MX-5050 8SHD, Tascam 70-4, Tascam A3340. **Audio Mixers:** Conneaut Audio Devices Maxcon 32-16, Tascam 5B+3A. **Soundstages:** 10'x10' insert/ADR, 5'x7' narration. **Other Major Equipment:** Wave-Frame AudioFrame digital workstation; includes 8-track disk-based recording, 16-voice sampler/sequencer, 16-channel digital mixer. **Rates:** Please call for latest rates.

BEACHWOOD STUDIOS; VPF, VPP/E, OLVP, APPV; 23330 Commerce Park Rd.; Beachwood, OH 44122; (216) 292-7300. **Owner:** Pete Vrettas. **Manager:** Nicki Buyaki, Joel Soloway, George Sipe.

BUSBY PRODUCTIONS; VPF, VPP/E, OLVP, APPV; 1430 Locust St.; Des Moines, IA 50309; (515) 244-0404. **Owner:** Busby Burnell. **Manager:** Busby Burnell, Don Flannery.

CHAPMAN RECORDING STUDIOS; APPV; 228 W. 5th St.; Kansas City, MO 64105; (816) 842-6854. **Owner:** Chuck Chapman.

CLASSIC VIDEO INC.; VPF, VPP/E, OLVP, APPV; 5001 E. Royalton Rd.; Cleveland, OH 44147; (216) 838-5377. **Owner:** Bob Anderson, Jerry Patton. **Manager:** Jerry L. Patton. **Specialization & Credits:** A full-service production facility for studio and remote production, multiple format editing, audio sweetening, duplication and syndication plus language translations, international standards conversions and closed captioning. Special features include: 60'x70' studio with 3-wall cyclorama. CCD cameras for studio and remotes. Five-ton feature grip truck with many extras. Panther camera dolly with 360-degree super jib arm. Offline edit suite with E.D.L. Three deluxe online edit suites with digital video effects and multi-machine formats including D-2, Betacam SP, Mil. 3/4" SP and 1". Full scenic design and construction. 3-D animation. Classic productions include prime-time broadcast series: David Frost: *The Next President* and *Talking With David Frost*; corporate sales and training presentations for: Firestone, Sherwin-

Williams, Little Tikes, American Greetings, BP America; broadcast programs and commercials for: Consumer Direct, Progressive Insurance, Cleveland Cavaliers and many others.

CPI; VPF, VPP/E, OLVP; 804 N. Milwaukee St.; Milwaukee, WI 53202; (414) 291-9666. **Owner:** James Kagan. **Manager:** Cindy Peschong.

CRAWFORD POST PRODUCTION INC.; VPP/E, APPV; 2675 Scott Ave., Ste. G; St. Louis, MO 63103; (314) 535-3999. **Owner:** Jesse Crawford. **Manager:** Bill Watson. **Video Tape Recorders:** (8) Ampex VPR-6, (2) Ampex VPR-2B, Sony BVH-3100. **Video Monitors:** (6) Barco CVM-51, (4) Ikegami TM-19. **Switchers/editors:** (2) Ampex Century, Ampex Vista, Grass Valley GVG-100, (2) Ampex Ace 200 Turbo, Ampex Ace Micro, Grass Valley 5100. **Video Cameras:** (2) Ikegami HL-279, Sony BVU-1A, (2) Sony DXC-325. **Synchronizers:** (4) Time-Line, (2) Evertz. **Video Effects Devices:** Ampex ADO-2000 3-channel, Abekas A-53D, Abekas A-62. **Audio Recorders:** (2) Otari MTR-12-2 w/TC, (2) Studer A-62, Sony JH-24, (2) Fostex D-20 DAT. **Audio Mixers:** (3) Graham-Patten 16-2, MCI JH-600 automated. **Soundstages:** 65'x47'x28' w/(2) Connected Cyc w/54'. **Other Major Equipment:** New England Digital 16-tr PostPro, Rank Cintel Film Transfer w/da Vinci color correction, (2) Silicon Graphic platforms running Wavefront 3-D animation, Ampex AVA-III paint system, (2) 386s PC running Lunina & Crystal 3-D.

INNERVISION PRODUCTIONS INC.; 11783 Borman Dr.; St. Louis, MO 63146; (314) 569-2500. **Owner:** Busch Creative Services Corp. **Manager:** Mike Stroot, VP, Gen. mgr.

INSTANT REPLAY VIDEO AND FILM PRODUCTIONS INC.; VPF, VPP/E, OLVP, APPV; 1349 E. McMillan St.; Cincinnati, OH 45206; (513) 569-8600. **Owner:** Terry Hamad. **Manager:** Terry Hamad, Judith Osborn.

LFIPRODUCTIONS; OLVP; 2605 Yeager Rd.; W. Lafayette, IN 47903; (317) 463-2396. **Owner:** Blade Communications. **Manager:** Ken Gardner.

MARX PRODUCTION CENTER; VPF, VPP/E, OLVP; 3100 W. Vera Ave.; Milwaukee, WI 53209; (414) 351-5060. **Owner:** Robert Marx. **Manager:** Tom Deming.

NORTHWEST TELEPRODUCTIONS INC.; VPF, VPP/E, OLVP; 4455 W. 77th St.; Minneapolis, MN 55435; (612) 835-4455. **Owner:** Public Corporation. **Manager:** Robert Mitchell, president.

OPEN STAGE INTERNATIONAL INC.; VPF, VPP/E, OLVP, APPV; 7345 N. Ridge Blvd.; Chicago, IL 60645; (312) 743-7041. **Owner:** Dan & Angela Jelesco. **Manager:** Angela Jelesco.

PM PRODUCTIONS; APPV; 16900 W. 8 Mile Rd., Ste. 140; Southfield, MI 48075; (313) 559-9450. **Owner:** P. Martin Liebman. **Manager:** P. Martin Liebman.

POSTIQUE INC.; VPP/E; 23475 Northwestern Hwy.; Southfield, MI 48075; (313) 352-2610. **Owner:** Bernie Green, president. **Manager:** Mary Suzanne Patek, VP. **Specialization & Credits:** As a full-service video post boutique, Postique's services include film-to-tape transfer, editing, 2-D and 3-D graphics, special effects design and motion control. Postique's telecine suite features the Bosch FDL60, Sunburst TT color correction including the tape-to-tape option, Bosch's ESO/DSA for image stabilization, Kaleidoscope for X-Y repositioning and special effects and Nagra-T audio. Postique offers editing with the Avid or a Callaway 3/4" offline system. Two online suites feature editing on D-2, 1" and Betacam SP. Online special effects gear includes Kaleidoscope with Kurl, two channels of ADO 3000, and an Abekas A64 Digital Disk Recorder. Postique graphics equipment includes the Quantel V Series Paint Box, the Abekas A64, the Vertigo 3-D animation system and the IMC 2-D Animation Stand.

STUDIO M; APPV; 45 E. 7th St.; Saint Paul, MN 55101; (612) 290-1453. **Owner:** Minnesota Public Radio. **Manager:** Craig Thorson.

TRIO VIDEO; OLVP; 700 N. Sangamon; Chicago, IL 60622; (312) 421-7060. **Owner:** Jack Walsh/Gary Meagher. **Manager:** Debra Zouvas. **Specialization & Credits:** Remote television production company, featuring 4 trucks, well-suited for all on-location production needs. TRIO has been specializing in sports, entertainment and corporate TV for the past nine years. Offering experienced crews with our state-of-the-art equipment, TRIO will help make your production a success. Debra Zouvas, production manager.

In the January *Mix*, we listed an incorrect phone number for Tinderbox Productions, a 4-track studio in Seattle. The correct number is (206) 323-5066.



In January's Northwest Directory, we failed to mention that Little Wings Arboretum Recording of Portland, Ore., has a customized Blamp 1642 mixing console.

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**UNIVERSAL
RECORDING CORPORATION**
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UNIVERSAL RECORDING CORPORATION; VPF, VPP/E, APPV; 32 W. Randolph, Ste. 1400 and 1500; Chicago, IL 60601; (312) 201-3150 (audio); (312) 855-1919 (video). Owner: Morris Kalish, Murray Allen. Manager: Audio: Murray Allen, Video: Tony Izzo. **Video Tape Recorders:** (11) Sony BVH-2000/BVH-1100, (4) Sony Belacam/SPBW-75, (4) Sony BVU-800 3/4", Bosch B-Format 1". **Video Monitors:** Multiples of Sony 12" and 19" high-resolution and R-G-B; Ikegami, Bosch and others 12"-19" etc., (14) Sony monitors. **Switchers/editors:** GVG 200, GVG 300, (3) GVG 1600, (3) AMS AudioFile, (3) PostPro, (3) Synclavier. **Video Cameras:** (3) Harris studio cameras w/Cannon lens, Ikegami HL-79, Hitachi CCD Chip camera. **Synchronizers:** (20) BTX Softouch, (2) TimeLine. **Video Effects Devices:** (3) ADO 2000-3000 Series w/concentration, (2) A-62 (100 second), (2) Ampex ESS, AVA Paint Box, GBF DVE, (2) Scribe Superscribe. **Audio Recorders:** (37) Magna-Tech, (20) 2-/32-track digital, (55) analog. **Audio Mixers:** Neve, SSL, Harrison, Sony, ADM, Ramsa. **Soundstages:** 40x60x20 w/full grid and dimmer package, 40x40x20 w/full grid and dimmer package, make-up rooms, men's and women's dressing rooms, producer's space. **Other Major Equipment:** Sony video projectors, ADR, optical disc—WORM—optional transfer, Symbolics 3-D computer graphic system, uplink and downlink. **Rates:** \$200-\$500/hour. **Specialization & Credits:** Mannheim Steam Roller *Fresh Aire #7*; Time-Life Books, *Uncle Buck*, *Man-o-War*. Full live transmission or cut-in via uplink. Also tape roll uplink. VHS dubbing capabilities. Rank Mkllic film-to-tape, SC-to-SC, 16mm or 35mm—positive or negative.

VAUGHN DUPLICATION SERVICES; VPP/E; 7951 Computer Ave. S.; Minneapolis, MN 55435; (612) 832-3150. Owner: Don Drapeau, gen. mgr. and VP. Manager: Doug Otzenak, nat'l sales mgr.

VIDEO ARTS STUDIOS; VPF, VPP/E, OLVP, APPV; 1440 4th Ave. N.; Fargo, ND 58102; (701) 232-3393. Owner: Art Phillips. Manager: Art Phillips.


SOUTHWEST
*Arizona, Arkansas, Southern Nevada,
New Mexico, Oklahoma, Texas*

BUSINESS IMAGES; VPF, VPP/E, OLVP, APPV; PO Box 161293; Austin, TX 78716; (512) 454-7388. Owner: Claude Mathews.

CEREUS RECORDING; APPV; 1733 E. McKellips #7; Tempe, AZ 85281; (602) 990-8163. Owner: Allen Moore. Manager: Phoenix Regalton.

COOK SOUND AND PICTURE WORKS; APPV; 4801 Woodway, Ste. #355W; Houston, TX 77056; (713) 960-8222. Owner: Dwight Cook. Manager: Bill Wade.

DUKE CITY STUDIO; VPF, VPP/E, OLVP; 4121 Cutler NE; Albuquerque, NM 87110; (505) 884-5151; (800) 225-6185. Owner: H. Jay Lefkowitz, president. Manager: Chad Chavez (camera), Louis Thompson (lighting & grip). **Video Tape Recorders:** Sony BVW-60, Sony BVW-65, Sony BVW-75, Sony BVW-25, Sony BVW-35, Sony BVH-3100, Sony BVH-500, Sony BVU-110, Sony BVU-950, Sony BVU-5, Sony BVU-1, Sony DVR-10. **Video Monitors:** (3) Ikegami TM 19-9, (5) Videotek 13" color, (15) Panasonic 9" B&W, (4) Sony BVM-1310. **Switchers/editors:** Intergroup 902, Grass Valley 100CVN, Grass Valley 51EM, Grass Valley IPS100, Grass Valley 200, Abekas A-82. **Video Cameras:** (2) Ikegami HL-79EAL, (2) Ikegami HL-79DAL, Ikegami HL-95B, (2) Ikegami HK-357, (4) Ikegami HL-55, Cannon C120, Sony BVP-350. **Video Effects Devices:** (3) Abekas A-53D w/Warp, Abekas A-62, Abekas A-72, Chyron 4200 EXB. **Audio Recorders:** Nagra,

Tascam 4-track. **Soundstages:** 60x40, 18' ceiling, hard cyc, 400-amp power, dressing room, makeup room, prop room, production offices. **Other Major Equipment:** 16' 4-cam remote truck, RTS intercoms, Arriflex film equipment, Cetec Vega wireless intercom, grip trucks, Fisher camera dollies, Tulip Crane, BeBee generators, full Matthews grip equipment, LTM HMI lighting, Mole lighting.

INSIDEOUT POST PRODUCTION; VPF, APPV; 4986 S. Pearl St.; Las Vegas, NV 89120; (702) 454-2493. Owner: Mark David Peabody. Manager: Mark David Peabody.

METROPOST; VPP/E; 501 N. IH-35; Austin, TX 78702; (512) 476-3876. Owner: T.P.F.V. Group Inc. Manager: Vincent Hollister—VP sales, Jeff Sharpe—director of operations.

PRODUCTION MASTERS INC. (PMI); VPF, VPP/E, OLVP, APPV; 834 N. 7th Ave.; Phoenix, AZ 85007; (602) 254-1600. Owner: David Case.

PYRAMID TELEPRODUCTIONS INC.; 6305 N. O'Connor LB 6, Bldg. 4 Ste. 103; Irving, TX 75039-3510; (214) 869-3330; FAX: (214) 869-2039. Owner: Lee Martin, president; Bob Schiff, VP. Manager: Nick Nicodemus, general manager. **Video Tape Recorders:** (4) Sony DVR-10, (10) Sony BVH-2000/2500, (7) Sony BVU-800/820, (3) Ampex CVR-75, Ampex CVR-35, Ampex CVR-5 camcorder, Sony BVU-110, (3) Ampex VPR-300, (9) Ampex VPR-2B, Ampex VPR-3. **Video Monitors:** (9) Sony BVM-1900. **Switchers/editors:** (3) GVG 300, GVG 100, GVG 51, (2) GVG 41, Ampex Century 215. **Video Cameras:** (2) Ikegami 357A, (4) Ikegami 79-EAL, Ampex CVC-50 w/ccu, (2) Sony CCD DXC-3000. **Synchronizers:** (4) TimeLine Lynx, (3) Cipher Digital/BTX Shadow, Alpha Boss Audio controller. **Video Effects Devices:** Abekas A-62, Abekas A-53D w/Warp and key channel, (6) ADO (2 channels w/Concentrator and Infinity), Abekas A-42, Sony BVX-30 digital noise redux, (4) Chyron Scribe CG. **Audio Recorders:** Studer A800 24-track, (2) Studer A800 B-track, (3) Studer A810 2-center time code, Studer A820 2-center time code, (2) Technics 2-track, (2) Otari 2-track, (2) Sony. **Audio Mixers:** SSL 4000E 34 x 32, (2) Sony/MCI 618, Studer 169, Graham Patten 612. **Soundstages:** Audio control room 25x27, audio stage (adjacent to audio control) 28x35, (2) video soundstage: #1 29x29x30x36, #2 60x100. **Other Major Equipment:** Graphics: Quantel Paint Box, Wavefront 3-D animation; Audio: Studer A725 CD player, (2) Dynamax DTR-100 broadcast cart, (10) SFX set-ups, Magna-Tech 600 16/35mm mag dubber, 1- to 4-track; Production: 20' bobtail remote diesel truck w/GVG 16001L switcher, Chyron 4100EX CG (1 channel), GVG processing, Yamaha RM916 audio console, dbx noise redux, full RTS intercom/IFB, teleprompter. **Rates:** Available upon request.



**SCOTSDALE
CONFERENCE RESORT**
Scottsdale, AZ

SCOTSDALE CONFERENCE RESORT; VPF, VPP/E, APPV; 7700 E. McCormick Pkwy.; Scottsdale, AZ 85258; (602) 991-9000. Owner: Scottsdale Conference Resort. Manager: Brian Court. **Video Tape Recorders:** Sony BVU-950, Sony BVU-920, (4) JVC CR-850U, (3) Sony VO-5850. **Video Monitors:** Sony PVM-1220, (10) JVC TM-R9U, (2) Sony PVM-5310. **Switchers/editors:** Grass Valley 1600-IL, Grass Valley Model 100, Convergence 204 editor. **Video Cameras:** (3) Sony DXC-M7, Ikegami HL-79 DAL, Ikegami ITC-730. **Synchronizers:** (2) Adams-Smith System 2600. **Video Effects Devices:** Grass Valley DPM-100 w/recursive memory and E-mem. **Audio Recorders:** Otari MX-70 16-track, Otari MTR-12CT w/center-track time code, (2) Otari MX-5050 B0II 4-track. **Audio Mixers:** TAC Scorpion 24x16, Soundcraft 600 16x8. **Soundstages:** 17x21x14, 76x76x14. **Other Major Equipment:** Complete dark room, multi-image staging and production, laser light shows. **Rates:** Call. **Specialization & Credits:** Specializing in video production, post-production audio-for-video, sound effects, audio production and original music composition. Located in luxurious resort setting with golf, tennis, complete health spa and fitness center with easy access to Sunbelt activities.



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VIDEO MEDIA PRODUCTIONS—DIVISION OF VISUAL COMMUNICATION INC.; VPF, VPPIE, OLVP; 2727 W. Southern Ave.; Tempe, AZ 85282; (602) 966-6545. Owner: James Rinkenberger—president. Manager: Ann Bonanno.

VIDEO POST & TRANSFER INC.; VPPIE, APPV; 2727 Inwood Rd.; Dallas, TX 75235; (214) 350-2676; FAX: (214) 350-8342. Owner: Neil Feldman. Manager: Jaxie Bryan. Specialization & Credits: New facility, convenient to Dallas Love Field Airport. Digital Video Masters offer clients superior post-production capability using new digital technology. VP&T teleline features Rank Cintel's MkIII-C w/Digiscan 4, Accom D1 still store, Accom D1 noise reduction, Encore Video Industries PRISM SCC, Steadifilm, Nagra T-audio sync-up and Ultimatte 5. Transfers direct to all formats. Graphics/paint/animation: 5 suites, including DF/X "Composum" digital paint/production system and Vertigo Series 9 workstation-based 3-D animation. New online suites feature CMX OMNI editors, Abekas A-82 D2 switchers, two-channel GVG Kaleidoscopes w/KURL and Combiner, ADO w/Concentrator and Infinity, proprietary dream™ computer-based, all-digital audio editing/mixing/sweetening/processing system, Abekas A-72 CGs, (2) Abekas A-6Cs, Abekas A-62, (9) Sony DVR-18 D2 deck, Sony DVR-1000 (D1), (9) Sony 1" decks, (6) BVW-75s, (2) BVU-850/SPs and a Pesa Series 5 routing system.

BVU-950 SP. Video Monitors: Sharp XM-1300, (2) JVC TMR-9U, Sony PVM-1344Q. Switchers/editors: CMX 3100B, Grass Valley 100 w/linear key. Video Cameras: Sony BVW-505, Ikegami 730-A. Video Effects Devices: Abekas A-53-D w/Warp, Pinnacle 2040 (DVE, Paint, 3-D). Audio Recorders: (2) Otari MX-5050B, Digidesign Sound Tools, Opcode Studio Visions, (2) Sony PCM-2500 R-DAT. Audio Mixers: (2) Soundcraft Delta B-200. Soundstages: 20 x 20 video, 12x17 audio. Other Major Equipment: Abekas A-72 digital C.G., Pinnacle 2040 paint/3-D animation, Studer Dyaxis 320 disk-based audio editing system. Rates: \$150 to \$275. Specialization & Credits: Avid Productions offers many services for the video professional. For production, these include directors, camera operators, grips and gaffers—the artists who paint the frames of video with light and color. The scene may require a helicopter, a crane, a dolly, or just a tripod. Using resources efficiently is our forte'. In the area of editing, experienced hands anticipate your commands. The precise manipulation of frames, the careful placement of voice and music—this is the realm of Avid's edit suite. Equipment includes CMX 3100B, Grass Valley Group 100, A72, A53-D, Betacam SP to D-2. Graphics: Make text move, use icons, create backgrounds that sparkle and 3-D objects that reflect a world of chrome. Warp, burst and fly your way to places where only the computer can travel. Communicate with precision and clarity (Pinnacle paint system with 3-D animation, Abekas A72 CG and backgrounds).

ROBERT BERKE SOUND; APPV; 50 Mendell St. #11; San Francisco, CA 94124; (415) 285-8800; FAX: (415) 285-8847. Owner: Robert Berke. Manager: Mark Escott. Video Tape Recorders: Sony BVH-1100 1", (4) Sony BVU-800 3/4", BVW-70 Betacam SP. Video Monitors: (17) Sony. Synchronizers: (5) Cipher Digital Shadow, (2) Otari EC-101. Audio Recorders: (3) Otari MTR-90, (9) Otari MTR-10, (2) MX-5050, Cyber-Frame 8-track digital workstation. Audio Mixers: Audiotronics 700, Sound Workshop 34B, (2) Soundcraft 600. Specialization & Credits: Robert Berke Sound Production & Recording specializes in post-production audio for TV, radio and multi-image. Our new state-of-the-art facility features one of the most versatile and sophisticated audio-for-video computer systems in Northern California and includes multimachine synchronization, event control and electronic audio editing. Our thousands of music and sound effects selections, digital reverb and effects devices, and our highly experienced and creative staff make us a valuable production resource.

BGTV; OLVP; One Amphitheatre Parkway; Mountain View, CA 94043; (415) 541-0800; (415) 967-3000. Owner: Bill Graham Presents Inc. Manager: Stephen B. Paine.

KEN CARLTON RECORDING; APPV; 11240 Hwy. 41; Madera, CA 93638; (209) 431-5275. Owner: Kenneth W. Carlton. Manager: Ken Carlton. Video Tape Recorders: JVC 8250 3/4", Sony 5600 3/4", Sony 5000 3/4" player, (4) various VHS 1/2" machines. Video Monitors: (5) Sony (various). Synchronizers: (3) Soundmaster 5 3-machine system. Audio Recorders: Otari MTR-90 24-track, Otari MTR-10 2-track, Otari MTR-12 w/center track TC, (3) Panasonic SV-3700 & SV-255 DAT. Audio Mixers: Sound Workshop Series 34 w/ARMS II and 32-channel. Soundstages: Main room used for ADR & Foley 22x24, (2) iso room 5x10/8x10. Other Major Equipment: CD library, Studer CD player, complete MIDI sequencing setup (M.O.U. Performer), MIDI rack w/ Kurzweil 250, Yamaha, Roland, etc. Complete array of outboard processors & effects: Eventide, Lexicon, dbx, UREI, ADR, Drawmer, etc. Mics: Neumann, AKG, Sennheiser, EV, etc. Rates: \$75/hr for 24-track sync-to-3/4" video, \$60/hr for audio only.

JAMES DANIELS PRODUCTIONS; VPF, VPPIE, OLVP, APPV; 299 California Ave. #306; Palo Alto, CA 94306; (415) 325-8574. Owner: James Daniels. Manager: Bruce Kaphan.



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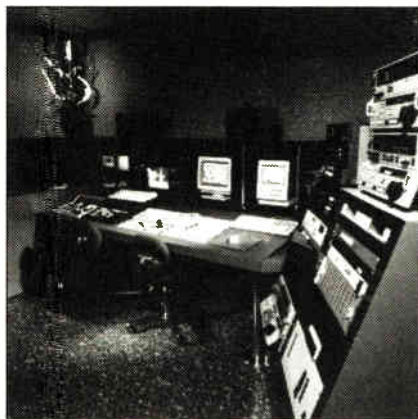
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ALLERICE TELEVISION COMMUNICATIONS; VPF, VPPIE, OLVP, APPV; 426 5th St.; Eureka, CA 95501; (707) 445-3922; FAX: (707) 445-3922. Owner: Esmaa Martin-Shull. Manager: Esmaa Martin-Shull.

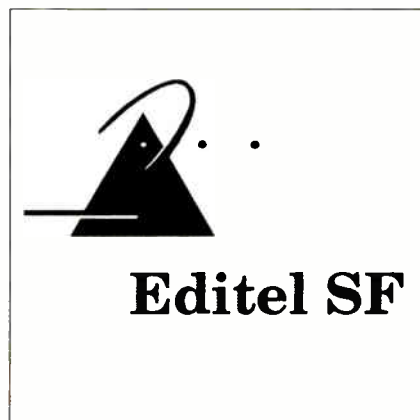
AMERICAN PRODUCTION SERVICES; VPF, VPPIE, OLVP, APPV; 2247 15th Ave. W; Seattle, WA 98119; (206) 282-1776. Owner: Conrad Denke. Manager: Eric Denke.

AVALANCHE RECORDING STUDIOS; APPV; 10650 Irma Dr. #27; Northglenn, CO 80233; (303) 452-0498. Owner: Avalanche Recording Studios. Manager: Linda Warman.



AVID PRODUCTIONS
 San Mateo, CA

AVID PRODUCTIONS; VPF, VPPIE, OLVP, APPV; 235 E. Third Ave.; San Mateo, CA 94401; (415) 347-3417. Owner: Henry Bibao. Manager: Chris Craig. Video Tape Recorders: Sony DVR-10 (D2), Sony BVW-75 SP, Sony BVW-65 SP, Sony



EDITEL—SAN FRANCISCO
 San Francisco, CA

EDITEL—SAN FRANCISCO; VPF, VPPIE, OLVP, APPV; #1 China Basin Bldg.; San Francisco, CA 94107; (415) 777-5777. Owner: Jack Schaeffer, president. Manager: Jan Cohn, director of operations. Video Tape Recorders: All Sony: D-2,

1", Beta SP, 3/4", D-1. Switchers/editors: GVG 200/300. Synchronizers: Lynx. Video Effects Devices: GVG Kaleidoscope, Ampex ADO. Audio Recorders: Otari MTR-90, Studer A-810. Audio Mixers: Sony MXP-3000, Graham Patten D/SAM. Other Major Equipment: Quantel Paint Box/Harry/Encore, AMS AudioFile Plus, IMC Motion Control, Rank Cintel Mark III C, da Vinci 4:2:2 digital output color correction, Dubner color correction. Rates: Call for rates. Specialization & Credits: Complete video post-production services, including film-to-tape transfers with Rank Cintel Mark III C telecine, 4:2:2 digital output, da Vinci and Dubner color correction, Steadi-Film pin registration and Ultimatte 6, Abekas-A64. Compositing: CMX 3600 edit suites with Sony D2 composite digital DVRs. Ampex VPR-3s/Zeus, Betacam SP, Kaleidoscope and ADO digital effects, Abekas A-62 digital disk, and Abekas A-72 character generator. Quantel Paint Box, Harry Encore with Sony DVR-1000 D1 component digital DVRs, 3/4" offline with CMX list management, audio sweetening with AMS AudioFile digital audio workstation, automated Sony MXP-3000 audio console, 24-, 8- and 2-track multitrack ATRs under Lynx control, Emulator II digital sampling, random access sound effects library, Dolby noise reduction, large announce booth with Foley pits, laybacks to any format, complete film and video, single and multi-camera production services including sound stage and grip truck. Contact Client Services for more information.

FOCUSED AUDIO
San Francisco, CA

FOCUSED AUDIO; APPV: 544 Natoma; San Francisco, CA 94103; (415) 626-9777. Owner: Jeff Roth. Manager: Jeff Roth. Specialization & Credits: Focused Audio continues to be a leader in creative audio-for-film and video. Having produced over 100 soundtracks for broadcast and cable television, as well as numerous features and documentaries, Focused has moved into the '90s with a brand-new facility. Four control rooms and three recording spaces have been carefully designed and equipped with the best audio tools available today. All rooms are SMPTE-locked to picture and can access any of our available recording formats: 24-track w/Dolby SR, 16-track or digital hard disk. Through our main machine room, the appropriate control room, recording space and recording format can be configured easily for any project. Engineers with expertise in feature film and television sound, CD-1, music and radio work are available to put this facility to work for you.

HYDE STREET STUDIOS; APPV: 245 Hyde St.; San Francisco, CA 94102; (415) 441-8934. Owner: Michael Ward. Manager: Susie Foot.

JAMSYNC AUDIO PRODUCTIONS; APPV: 190 El Cerrito Plaza, Ste.152; El Cerrito, CA 94530; (415) 236-7354. Owner: Rick Hill. Manager: Rick Hill.

KVIE VIDEO
Sacramento, CA

KVIE VIDEO; VPF, VPP/E, OLVP, APPV; 2595 Capitol Oaks Dr.; Sacramento, CA 95833; (916) 929-5797. Owner: KVIE Inc. Manager: Rick Potrikus. Specialization & Credits: KVIE Video is ready to assist our clients through all phases of production. Our services include electronic field production, multi-format online post-production, audio production, audio-for-video post-production, computer graphics and a 50'x70' modern studio with 18' grid. Our online suite is equipped with a Calaway MkII editor, which controls (3) Ampex VPR-6 1" machines and (3) Sony Beta-SP machines, an Ampex VISTA switcher, ADO 2000, ESS-3 Still Store with graph .u.cs compose, dual-channel Chyron Infinite! with Logo Compose and Advance Font Create options. Otari center-track ATR and copy stand with CCD camera. The audio production suite has a 36-in, 24-out TAC Matchless audio console and Cipher Digital audio editor, which controls an Otari 24-track ATR, a pair of Otari center-track ATRs and a 1" or Beta-SP VTR. For more information, call Suzanne Day or Rick Potrikus at (916) 929-5797.

MAGNETIC IMAGE VIDEO INC.; OLVP; 1294 Lincoln Ave.; San Rafael, CA 94901; (415) 456-7900. Owner: Harris Cohen, Larry Kenworthy. Manager: Larry Kenworthy. Video Tape Recorders: (4) Sony BVW-35, (2) Sony BVW-25, (3) Sony BVU-5, (2) Sony BUW-110. Video Monitors: (10) Sony BVM-8021, Sony BVM-1310, (2) Sony PVM-2030. Switchers/editors: Grass Valley 1600 ILCV. Video Cameras: Sony BVW-400, Sony BVP-70, (2) Sony BVW-300, (2) Sony BVP-50, Sony BVP-7, (3) Ikegami HL-79 EAL, (2) Sony BVP-330A. Wide angle lenses: Fujinon (5.5 to 48), (7) Fujinon (7 to 49), (2) Fujinon (6.5 to 23), Sony MXP-21, (6) Shure FP32. Other Major Equipment: Component Flypack multicamera switcher package, (10) documentary lighting kits. Rates: Call for quotes.

MUSIC ANNEX AUDIO POST PRODUCTION; APPV: 69 Green St.; San Francisco, CA 94111; (415) 421-6622. Owner: Music Annex Inc. Manager: Michelle LeComte. Video Tape Recorders: Sony 5850, Sony DVR-10 digital, Sony BVH-110 C type, (3) JVC CR850U 3/4" U-matic, Sony BVU-800. Video Monitors: (6) Sony color monitors. Synchronizers: Soundmaster editing systems, (4) Audio Kinetics editing system. Audio Recorders: (2) Otari MTR-90 24-track, MCI JH-114 24-track, Otari 5050 MKIII 8-track. Audio Mixers: (2) Amek 2500, Amek 2520, Amek Scorpion. Other Major Equipment: New England Digital Synclavier 9600 w/MIDI package, New England Digital Post Pro tapeless, 16-track hard disk recorder. Specialization & Credits: Music Annex, now incorporating SRO, is San Francisco's most comprehensive audio post-production facility. We also feature original music and sound with our Green Street Music and Sound division. Credits include: Colossal Pictures, Pillsbury, Pacific Data Images and MTV. We have also contributed to feature films, including *Henry and June*, *Dim Sum* and *XYZ*.

NORTHWEST VIDEOWORKS INC.; VPP/E, APPV: 1631 S.W. Columbia; Portland, OR 97201; (503) 227-7202. Owner: Wayne Ahrendt—president. Manager: Doug Barry. Video Tape Recorders: (3) Sony DUR-10 (D2), (6) Sony BUW-75 (Betacam SP), Sony DUR-1000 (D1), (3) Hitachi HR-230 1". Video Monitors: (3) Ikegami, (3) Sony. Switchers/editors: CMX 3600 (editor), Abekas A82 (switcher), Sony 900 (editor). Video Cameras: Sony BUP-7, Sony BUW-300, Ikegami HL-79D. Synchronizers: (3) Adams-Smith Zeta-3. Video Effects Devices: Abekas A82, Digital Effects Compositum. Audio Recorders: Otari 24-track MX-80, Otari MTR-10 1/4" C.T. time code, Tascam DAT DA 30. Audio Mixers: Soundcraft TS 12 (automated). Soundstages: Foley stage, music studio, voice booth. Other Major Equipment: Lexicon 480L (digital effects), E-mu Emulator E-max (sampler), Roland Rhodes 660 (synthesizer), Abekas A72 non-synch character generator. Rates: \$325/hour—online, \$125/hour—sweetening, \$75/hour—audio production.

PACIFIC VIDEO RESOURCES; VPF, VPP/E, OLVP: 2339 Third St., Ste. M4; San Francisco, CA 94107; (415) 864-5679; FAX: (415) 864-2059. Owner: Jim Famey, Steve Kottton, John Zimmerman. Manager: Mike McRoberts.

PRODUCTION CITY; VPF, VPP/E, OLVP, APPV: 100 Ebbtide; Sausalito, CA 94965; (415) 331-7257. Owner: Alan Shulman. Manager: Toni Bowes.

PRODUCTION WEST INC.; VPF, VPP/E, OLVP, APPV: 1001 S. 24th St. West; Billings, MT 59102; (406) 656-9417. Manager: Jim Abel.

BILL RASE PRODUCTIONS INC.; VPF, VPP/E, OLVP, APPV: 955 Venture Ct.; Sacramento, CA 95825; (916) 929-9181. Owner: Bill Rase. Manager: Bill Rase.

ROCKET RENTALS; VPP/E, OLVP, APPV: 51 Federal St. #100; San Francisco, CA 94107; (415) 495-2297. Owner: Nancy Evans, David Haynes. Manager: Fred Baysinger.

RUSSIAN HILL RECORDING; APPV: 1520 Pacific Ave.; San Francisco, CA 94109; (415) 474-4520. Owner: Jack Leahy, Bob Shotland. Manager: Cindy McSherry.

STUDIO CENTER SAN JOSE; VPF, VPP/E, OLVP, APPV: 434 S. First St.; San Jose, CA 95113; (408) 993-1040. Owner: Centerpoint Communications Group Inc. Manager: Jerry McReynolds.

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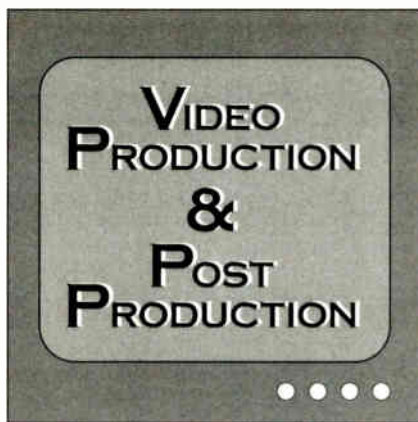
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TOTAL VIDEO CO.; *VPP/E, OLVP*; 432 N. Canal St. #12; South San Francisco, CA 94080; (415) 583-8236. Owner: Aldo J. Panattoni. Manager: John Hall.

VIDEO ARTS INC.; *VPP/E*; 185 Berry St., Ste. 5400; San Francisco, CA 94107; (415) 546-0331. Owner: Kim Salyer. Manager: Michael Warch.



SOUTHERN CAL/ HAWAII

AARON & LE DUC VIDEO PRODUCTIONS; *VPF, VPP/E, OLVP, APPV*; 2002 21st St.; Santa Monica, CA 90404; (213) 450-8275; FAX: (213) 396-8265. Owner: Greg Le Duc. Manager: Greg Le Duc.

ADVANTAGE AUDIO INC.; *APPV*; 1026 Hollywood Way; Burbank, CA 91505; (818) 566-8555. Owner: Bill Koepnick, Jim Hodson. **Video Tape Recorders:** Ampex VPR-6, Sony VO-9800. **Video Monitors:** Sony 1042Q (10" diagonal) video projector. Sony 1342-Q, Pioneer SDP-503P (50" rear projection). **Switchers/editors:** (2) Digidesign Sound Tools recording/editing system. **Synchronizers:** Adams-Smith 2600. **Audio Recorders:** Otari MTR-100, Otari MTR-12, Sony 2500 DAT. **Audio Mixers:** Otari Sound Workshop Series 54/46, Studer 921. **Soundstages:** A: Dubbing 17x33 (25' ceilings), B: Foley 17x20 (22' ceiling)—12 surfaces incl. water, C: Editing 11x13. **Other Major Equipment:** Dolby SR/A on all analog tape, DiskMix 3 moving fader automation, KRK 15A-01, 1002 and 703 audio monitors, Stiga Professional ping-pong table. **Rates:** Call for rates.



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ANDERS MEDIA PRODUCTIONS
Carson, CA

ANDERS MEDIA PRODUCTIONS; *VPF, OLVP*; 1502 E. Carson St. #14; Carson, CA 90745-2319; (213) 830-5333. Owner: Andy Anders. Manager: Lisa Anders.

ASSOCIATED PRODUCTION MUSIC; *APPV*; 6255 Sunset Blvd., Ste. 820; Hollywood, CA 90028; (213) 461-3211; (800) 543-4276. Owner: Screen Gems/Zomba. Manager: Bill Brooks; Georgia Robertson, editor.

AUDIO RESOURCE HONOLULU; *APPV*; 1084 Young St.; Honolulu, HI 96814; (808) 526-3733. Owner: Tony Hugar. Milan Bertosa.

AUDIO SUITE; *APPV*; 1110A W. Glenoaks Blvd.; Glendale, CA 91202; (818) 241-9090. Owner: Eric Sclar. Manager: Kevin Lange.

BEXEL CORPORATION; *VPF, OLVP*; 801 S. Main St.; Burbank, CA 91506; (818) 841-5051. Owner: David G. Trudeau. Manager: Justin Paxton.

WALLY BURR RECORDING; *APPV*; 1126 Hollywood Way, Ste. 203; Burbank, CA 91505; (818) 845-0500. Owner: Wally Burr. Manager: Elen Burr.

CHACE PRODUCTIONS INC.; *APPV*; 7080 Hollywood Blvd.; Hollywood, CA 90028; (213) 466-3946. Owner: Rick Chace. Manager: Robert Heiber. **Specialization & Credits:** Stereo re-mastering with Chace Surround Stereo. Proprietary equipment that creates true stereo even from composite sources. Titles include: *Rocky Horror Picture Show, Gone With The Wind, Yellow Submarine, Giant* and hundreds of others. Archival and sound restoration specialists with proprietary equipment for optical soundtrack transfers, featuring the Chace Optical Sound Processor for negative optical tracks. Digital audio room for music and effects track construction and augmentation. Digitally create music and effects tracks from composite sources.

CREATIVE MEDIA RECORDING; *APPV*; 11105 Knott Ave., Ste. G; Cypress, CA 90630; (714) 892-9469. Owner: Tim Keenan. Manager: Ed Berger.

DEVONSHIRE AUDIO/VIDEO; *APPV*; 10729 Magnolia Blvd.; North Hollywood, CA 91601; (818) 985-1945. Owner: David and Delores Mancini. Manager: Kelle Creamer. **Specialization & Credits:** New Dolby Surround room of TV, film or music. Currently mixing the new Heart live album and video, with an Ozzy Osbourne album also scheduled for Dolby Surround mixing. Live action post credits include *Hull High, Evening Shade, Talk Radio, Darkbackward*, Plymouth, etc. Animation post credits include DIC—such shows as *Captain Planet, GI Joe, New Kids on the Block, Wizard of Oz, Super Mario Three*, also Hanna-Barbera's *Bill and Ted's Excellent Adventure*, just to name a few. We specialize in audio-for-video, sweetening, mixing etc. Extensive sound library plus experienced mixers and editors.

DIGITAL SOUND & PICTURE; *APPV*; 2700 S. La Cienega Blvd.; Los Angeles, CA 90034; (213) 836-7688. Owner: John Ross. Manager: Nancy Ross.

D.L.H. STUDIOS; *VPF*; 5664 Tower Rd.; Riverside, CA 92506; (714) 683-8258. Owner: Dennis Hocking.

EDITROID; *VPP/E*; 3000 Olympic Blvd., Ste. 1550; Santa Monica, CA 90404; (213) 315-5050. Owner: LucasArts Editing Systems. Manager: Jill Stanton.

EFX SYSTEMS; *APPV*; 919 N. Victory Blvd.; Burbank, CA 91502-1633; (818) 843-4762; (213) 460-4472; FAX: (818) 848-0706. Manager: Paul Rodriguez, general manager; Sue Coplin, director of sales. **Specialization & Credits:** Digital audio post-production for television and film. The most comprehensive and advanced digital audio equipment from New England Digital and Sony. Award-winning mixers and editors fluent in sprockets and electronics. Facilities include edit and pre-lay; ADR/Foley; television mixing and a fully digital, THX-approved film dubbing stage. Recent credits: features *Talk Radio, Torch Song Trilogy, Heart Condition, Waiting for the Light, To Sleep With Anger, Book of Love, The Rapture, Television: Thirty-something, Dark Justice, The Days and Nights of Molly Dodd, Hull High*. Non-theatrical: SR-71 film being shown at the Smithsonian; Cranium Command for Disney World; Universal Studios Tour—Florida, Puroland—Japan.



THE ENTERPRISE RECORDING STUDIO
Burbank, CA

THE ENTERPRISE RECORDING STUDIO; *VPP/E, APPV*; 4620 W. Magnolia Blvd.; Burbank, CA 91505; (818) 505-6000; FAX: (818) 980-4840. Owner: Craig Huxley. Manager:

Thom Brown, Video Tape Recorders: Sony BVH-3000 1", (3) Sony XBR 25", Sony BVU-850 3/4". Synchronizers: (15) TimeLine Lynx, (2) TimeLine Lynx controller head. Audio Recorders: (3) Mitsubishi X-880 32-track, (7) Studer A820 24-track, (6) Otari MTR-90 MkIII 24-track, (2) Studer A820 2-track, (7) MTR-12 2-track 1/4" w/center-track time code. Audio Mixers: Neve VR 72-channel w/complete recall and Flying Faders, (2) SSL G Series 4000 80-channel. Other Major Equipment: (4) Synclavier super w/optical, (4) NED 16-track direct-to-disk PostPro w/edit view and time compression.

FACE BROADCAST PRODUCTIONS; VPP/E, 115 N. Hollywood Way, Ste. #101; Burbank, CA 91505; (818) 842-9081. Owner: Ron Malvin.

525 POST PRODUCTION; VPP/E, APPV; 6424 Santa Monica Blvd.; Hollywood, CA 90038; (213) 466-3348. Owner: Steve Hendricks. Manager: Jerry Cancellieri.

GROUP IV RECORDING; APPV; 1541 N. Wilcox Ave.; Hollywood, CA 90028; (213) 466-6444; FAX: (213) 466-6714. Owner: Angel L. Balestier. Manager: Lisa Burrowes, studio manager; Bud Fanton, client services. Specialization & Credits: This legendary scoring facility (*Cheers, Sibling Rivalry, Back To The Future I, II, & III*, etc.) is now expanding its audio expertise into the field of video-sweetening. Studio "B" and the "Pablo" room offer a state-of-the-art combination of pre-lay, ADR, Foley and mixing for all film and video formats (incl. mag interlock). Telecine, streamer, and dailies are also available. On soundstages we have "Angel's Flight", a unique, intimate night club set, built within Studio A's scoring stage. The "club" is hard-wired to the control room's Neve V-series 60-input console, with Flying Faders automation.

INTERSOUND INC.; VPP/E, APPV; 8746 Sunset Blvd.; Los Angeles, CA 90069; (213) 652-3741. Owner: Ahmed Agrama. Manager: Kent Harrison Hayes.



POST LOGIC INC.
Hollywood, CA

POST LOGIC INC.; APPV; 1800 N. Vine St., Ste. One; Hollywood, CA 90028; (213) 461-7887. Owner: Miles Christensen. Manager: Miles Christensen. Video Tape Recorders: Sony DVR-10 D-2, (2) Ampex VPR-6 1", (3) JVC 850 3/4", Sony BVU-950 3/4", Sony BVU-800 3/4". Video Monitors: (3) Mitsubishi 35", Mitsubishi Projection TV. Synchronizers: (4) Adams-Smith A/V with 2600 modules, (2) Adams-Smith Zeta-3. Audio Recorders: (6) Otari MTR-90 II 24-track, (2) Otari MTR-20 4-track, Otari DTR-900 32-track, Otari MTR-20 2-track, (2) Otari MTR-12 2/4-track, Otari MX-5050 2-track. Audio Mixers: SSL 6072 G with 2 computer stations (Studio A), Neve VRP 60 with Flying Faders (Studio B), SSL 6042 E with G computer (Studio C), Neotek Elite 32x26 (Studio D). Soundstages: Studio A: 28'x23', Studio B: 24'x21', Studio C: 19'x15', Studio D: 19'x10', Foley Stage: 24'x17', four Foley pits, projection TV. Other Major Equipment: New England Digital Synclavier suite w/96 voices, 96 meg RAM, 32 outs, direct-to-disk w/16-tracks and optical storage. Noise Reduction: Dolby SR on all 24-track machines, Dolby 363 (6 channels). Specialization & Credits: Post Logic invites you to pre-lay and mix in style at one of the most comprehensive audio post facilities on the West Coast. Whether you prefer SSL, Neve or Synclavier, analog or digital, coffee or espresso, we've got it. Perhaps you need to do ADR or Foley—we have a full Foley stage with four pits. With our intelligent selection of outboard gear, microphones, digital machines and Dolby SR, your project will always sound superb; with mixers like Jamie, Steve, Tony, Paul and Peter, you'll come in on time and on budget. You've heard our work on all four networks and we consistently dominate the industry with number one music videos and the best in sitcoms, specials, episodics, features, etc. Combined with killer client perks and parking, you can't touch this!

**PREMERE INC.; VPF, VPP/E, APPV; 5130 Klump Ave.; North Hollywood, CA 91601; (818) 506-7714. Owner: Subsidiary of Solo Cup Company. Manager: Robert Perry. Video Tape Recorders: (16) Sony BVH-2000, (8) Sony BVW-75,
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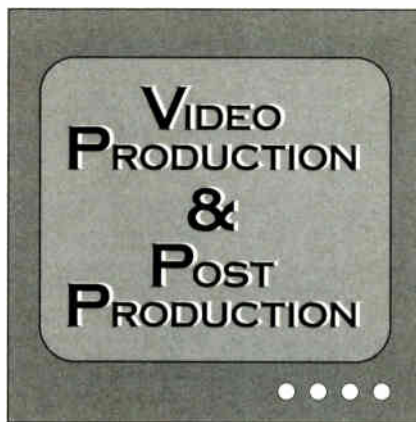
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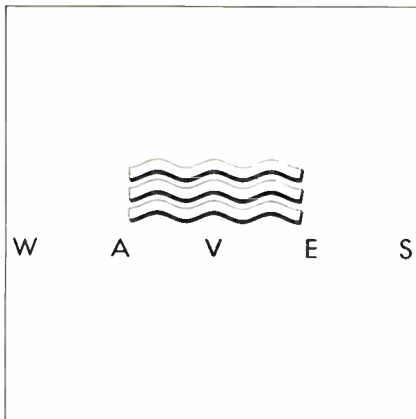
(17) Sony BVU-800. **Video Monitors:** (10) Sony PVM-1910. **Switchers/editors:** (4) GVG 300, GVG 200, GVG 100. **Video Cameras:** (3) Ikegami HL79E. **Synchronizers:** (6) CMX 3400A. **Video Effects Devices:** (2) Ampex ADO 300, (2) Abekas A53D warp. **Audio Recorders:** Sony 3324 digital 24-track, Studer A800 analog 24-track, (4) Ampex ATR-104 4-track/2-track (1 w/center track time code), Studer A80 4-track, Sony 1630 digital audio processor, Sony 2830 1" video w/PCM audio, Akai S1000 HD digital sampler w/Roland A8 keyboard controller, (2) Nakamichi MR-1 cassette deck, Sony CDP-3000 Professional CD player. **Audio Mixers:** API custom 40-input by 24-output, 10-input by 2-output mixing console. **Soundstages:** 40 x 27 with 22' CYC. **Other Major Equipment:** (4) CD sound effects libraries, (5) CD production music libraries, complete microphone collection, (2) Chyron 4100EXB, Sony BVX-30.

ROCK SOLID PRODUCTIONS; VPF, VPP/E, OLVP; 801 S. Main St.; Burbank, CA 91506; (818) 841-8220. Owner: David Griffin. Manager: Darin Kerby.

SCREENMUSIC; APPV; 11700 Ventura Blvd.; Studio City, CA 91604; (818) 985-0900. Manager: Denny Densmore.

THE SOUND VENDORS INC.; APPV; 10707 Magnolia Blvd.; North Hollywood, CA 91601; (818) 985-9774; FAX: (818) 985-9792. Owner: Larry Gonhue. Video Tape Recorders: Sony BVU-800, Sony VO-5800, Sony BVH-2000 1". **Video Monitors:** Proton BT-S1300 25", (2) Panasonic. **Synchronizers:** Otari EC-401C Universal resolver. **Audio Recorders:** Otari MTR-90 II 16-/24-track, Otari MTR-121 4-track, Otari MTR-12C 2-track. **Audio Mixers:** Harrison Raven 20x24. **Other Major Equipment:** BTX Cypher 6000S, BTX Softouch 4793, Lexicon 200 digital reverb, (2) dbx 160X compressor/limiter. **Rates:** \$250 per laydown/layback, \$175 per pre-lay, \$275 per sweetening.

VIDEO-IT INC.; VPP/E; 5000 Overland Ave., Ste. 6; Culver City, CA 90230; (213) 280-0505. Owner: John & Feisa Kohan-Mattick. Manager: Kassi Crews.



WAVES SOUND RECORDERS
Hollywood, CA

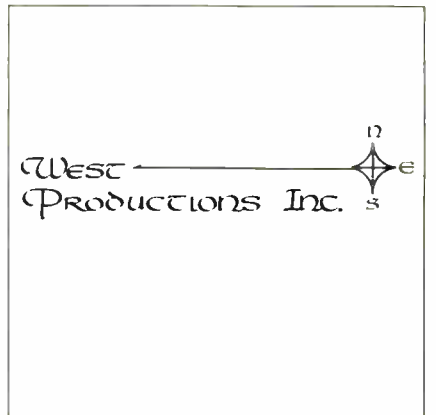
WAVES SOUND RECORDERS; APPV; 1956 N. Cahuenga Blvd.; Hollywood, CA 90068; (213) 466-6141; FAX: (213) 466-3751. Owner: Stewart Sloke, Bert Berdis, Alan Barzman. Manager: Maurice Leach. Video Tape Recorders: Sony BVH-3000 1" w/Tektronix Waveform/Vector monitor, (2) Sony BVU-800 3/4", (3) Sony VO-7600 3/4", (3) Sony VO-5600 3/4", Panasonic AG1950 1/2" VHS, Sony SL-HF8600 1/2" Beta. **Video Monitors:** Barco CVM-51, (5) Sony, Conrac. **Synchronizers:** TimeLine Lynx, Audio Kinetics Q-Lock 3.10. **Audio Recorders:** (2) AMS AudioFile digital system, Studer A810 TC-PIL-FM, Sony/MCI JH-24 24-track, (2) Sony/MCI JH-110C

8-track, (2) Sony/MCI JH-110C 4-track, (7) Sony/MCI JH-110C 2-track, (5) Panasonic/Sony R-DAT. **Audio Mixers:** (2) Sony MXP-3000, Sony MXP-2000, Soundcraft 600. **Other Major Equipment:** Magna-Tech MR-10036-4 4-stripe 35mm recorder, (6) Magna-Tech MD-2036 single-stripe 35mm dubber, Grass Valley sync generator, (4) Dolby A 361 NR unit, Sony, Lexicon, Yamaha, UREI, JBL, Neumann, AKG, Sennheiser, dbx, Orban, Alesis, Akai, Technics, Crown, Hafler, Symetrix, Denon, Dorrrough, Sontec, EV, Revox, Shure, Loftech, Sound effects libraries: Sound Ideas, FX, BBC, Elektra, Audio Fidelity, Network, Valentino, Bainbridge (in CD format); Hanna-Barbera, Elektra, Network, Audio Fidelity, BBC (in LP format). **Music libraries:** KPM, Bruton, Sonotone, Themes, JW, Koka, Soundstage, Capital, Dewolf, Network, Cavendish, Fows, Parry, Selected Sound, Major, Valentino, Airforce, Conroy, Boosey Hawkes; (13) sound effects library/8 in CD format, (18) music library/14 in CD format.



WEBSTER COMMUNICATIONS
Los Angeles, CA

WEBSTER COMMUNICATIONS; VPF, VPP/E, OLVP, APPV; 607 N. Ave. 64; Los Angeles, CA 90042; (213) 258-6741. Owner: Van Webster. Manager: Chimi Onat. Video Tape Recorders: (3) Ampex 60/65/70 Betacam SP, (2) Sony BVU-800 3/4", Sony BVU-850 3/4", Sony BVU-110 3/4". **Video Monitors:** Ikegami 14", Panasonic 19", (6) Panasonic 8". **Switchers/editors:** A.C.E. Arena, EECO EMME. **Video Cameras:** Hitachi Z-31, Hitachi SK-F3 Betacam SP. **Synchronizers:** Adams-Smith 2600. **Video Effects Devices:** DSC Illusion DVE. **Audio Recorders:** 3M 79 24-track, Sony 1610 2-track digital, Studer B67. **Audio Mixers:** MCI 428B, Interface Electronics 100 8x4. **Soundstages:** 40x30x12 plus grip package. **Other Major Equipment:** 3M 3600 character generator, CMX compatible edit list, digital audio services, CD sound effects library, in-house grip and lighting equipment, large selection of audio equipment and accessories for video sweetening. **Specialization & Credits:** Webster Communications is a full-service video and audio production company serving the entertainment industry for more than 21 years. Experience ranges from corporate video to entertainment programs to broadcast commercials. Clients include WEA Corp., Warner Bros. Records, Cema Distribution, Elektra Entertainment, NARM, VSDA, The Compact Disc Group and RIAA.



WEST PRODUCTIONS INC.
Burbank, CA

WEST PRODUCTIONS INC.; APPV; 2921 W. Olive Ave.; Burbank, CA 91505; (818) 841-4500. Owner: George (Ray) West, David West. Manager: David Rawlinson, VP. Specialization & Credits: West Productions is a full-service audio post-production facility dedicated to delivering top-quality product at a competitive price. The latest in sound technology is fully utilized, be it digital (Waveframe digital workstations), analog

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WGF BROADCAST VIDEO; VPF, VPP/E; 2214 Artemis Pl. (Olympic & Barrington); West Los Angeles, CA 90064; (213) 478-0360. Owner: Bill Frankel.



OUTSIDE U.S.

CINAR STUDIOS INC.; VPP/E; 1207 St. Andre; Montreal, Quebec, H2L 3S8 Canada; (514) 843-7070; FAX: (514) 843-7080. Manager: Barbara Parker. Video Tape Recorders: (2) Sony BVH-2000 1", Sony BVH-2830 PCM Sound. Video Monitors: Conrac 6550, (4) Sony PVM-8220, (3) Sony PVM-13429. Switchers/editors: GVG 100, Sony BVE-900, Edit Lister. Synchronizers: Adams-Smith Zeta-3. Audio Recorders: Studer A810. Audio Mixers: Sony MXP-29. Other Major Equipment: Chyron SuperScribe, Ensemble TC-402 TBC controller, JVC BR-7030U duplicator, Skotel (MTC) TCG-80N, (2) JVC CR-850 3/4.

MASTER'S WORKSHOP; APPV; 306 Rexdale Blvd., Ste. 7; Rexdale, Ontario, M9W 1R6 Canada; (416) 741-1312. Owner: Division of Magnetic Enterprises Inc. Manager: Bob Predovich.

MASTERTRACK LTD.; APPV; 35A Hazelton Ave.; Toronto, Ontario, M5R 2E3 Canada; (416) 922-4004; FAX: (416) 922-8634. Owner: Ken Burgess. Manager: Andy Condon.

MCCLEAR PLACE RECORDING AND POST-PRODUCTION STUDIOS; APPV; 225 Mutual St.; Toronto, Ontario, M5B 2B4 Canada; (416) 977-9740; FAX: (416) 977-7147. Owner: Robert K. Richards. Manager: Jane Rowan.

MEDIA HOUSE PRODUCTIONS INC.; 1174 Winnipeg St.; Regina, Saskatchewan, S4R 1J6 Canada; (306) 359-0977; FAX: (306) 569-2240. Owner: B.A. Solilo/Media House Ventures Inc. Manager: Bruce A. Solilo. Video Tape Recorders:



**MEDIA HOUSE PRODUCTIONS INC.
Regina, Saskatchewan**

Sony BVW-70 Betacam SP, Ampex CVW-65 Betacam SP, Ampex CVW-75 Betacam SP, Ampex VPR-1C 1" C-format, (2) Pana-onic AG7510 S-VHS, Panasonic AG7500A S-VHS. Video Monitors: Sony 1342, Panasonic CT-1030. Switchers/editors: Ampex Vista 8, Ampex ACE 25 edit controller, Pana-onic AG SW800, Panasonic AG A800 edit controller. Video Effects Devices: Ampex ADO 100, Sony DME-450. Audio Mixers: Sony MXP-290, Tascam M-208. Other Major Equipment: Ampex ESS-5 still store, Sony UY-T55 video scanner, EMC-2 editing machine. **Specialization & Credits:** Media House, located in central Canada, is a video posting facility dedicated to serving the production community. Producers may perform accurate offline editing in our EMC-2 non-linear suite, do industrial program online cutting in our A/B roll S-V suite, or utilize the Betacam SP A/B roll suite, or utilize the Betacam SP A/B roll suite complete with ADO, still store, character generator, Vista switcher and ACE controller for broadcast programming. Our copyright department can help you with the clearance of materials, and then the producer can have the final program mass-duplicated by our tape duplication department. For the finest of quality at affordable rates, come check us out.

PINEWOOD STUDIOS; APPV; 1119 Homer St.; Vancouver, BC, V6B 2Y1 Canada; (604) 669-6900. Owner: Pinewood Recording Studios Ltd. Manager: Geoff Turner.

SOUNDS INTERCHANGE; APPV; 49 Ontario St.; Toronto, Ontario, M5A 2V1 Canada; (416) 364-8512. Owner: Supercorp. Manager: Peter Mann.

STUDIO PLACE ROYALE INC.; APPV; 640 St. Paul W. (6th Floor); Montreal, Quebec, H3C 1L9 Canada; (514) 866-6074. Owner: S. Brown & Normand Rodrigue. Manager: S. Brown. Video Tape Recorders: Sony/MCI JH-110 1" layback, JVC 3/4" VCR, (3) JVC 1/2" VCR, Sony Betacam SP. Video Monitors: (2) JVC, (4) Sony, (2) Hitachi. Synchronizers: (2) Soundmaster w/CMX. Audio Recorders: (2) Otari MTR-90, MX-80 24-track, Otari MX-70 8-track, (3) Otari MTR-12 1/4" CTTC, MX-55, Dyaxis Digital Record/Edit. Audio Mixers: (2) Amek Angela 32 i/p. A&H Syncon 24 i/p, Soundcraft TS12. **Soundstages: 25 x 15 Foley. **Other Major Equipment:** Samplers, sound editing and signal processing, all SFX CDs, over 20,000 cuts production music, Dolby SR. Rates: \$80 to \$150/hr.**

WEST 11TH AUDIO; APPV; 822 11th Ave. SW, Ste. 306; Calgary, Alberta, T2R 0E5 Canada; (403) 265-0258. Owner: L.J. Williamson. Manager: Chris McIntosh.

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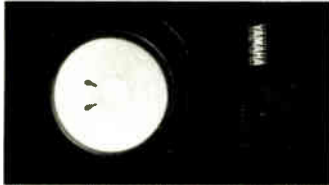
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—FROM PAGE 129, TENORS

the satellite networks. That was all. The singers were brilliant, they related their level balance to their monitors. And Christopher cued me all the time from the score."

The only bit of outboard gear used was a Lexicon 224. "Because it wasn't in a hall, we needed to give it a little bit of ambience," Pellowe adds. "But I only applied [it] very sparsely."

The 32-track mix and digital recording of the concert was, of course, completely effect-free. Decca had rented two Mitsubishi 850s for the event, since their own two machines were already being used elsewhere. Why *two* Mitsubishis? "The second Mitsubishi was used as parallel and backup," Pellowe says. "We had to stagger them, because it was a long show. We started one five minutes after the other, so when the leading machine ran out, we quickly changed tape, and during that time we ran them simultaneously because of the risk of tape damage afterwards or of one machine packing up. For projects of this prestige, you don't run just one machine if you can avoid it." Decca safeguarded their recording to the extent that they also flew the multitrack tapes back in two different airplanes for "absolute security."

Lock, Siney, Pellowe and Raeburn started mixing the tapes at their Decca studios on the 9th, two days after the performance, using their own Mitsubishi 850, a modified Neve desk, the Lexicon 224, and Decca's self-designed 2-track digital master recorders and editors. The master tape of the concert, well over an hour long, was ready on the 11th, a speed that would leave many pop engineers baffled and frightened.

It turns out that Decca's long-standing commitment to digital played a crucial part in the speed and effectiveness of the mix and the edits. However, rather than programming a computer and passing a mix hundreds of times until they got it right, Decca engineers manually mixed down the concert in sections. Each section was passed to Matthew Hutchinson, their audio/video editor, who put the sections together, matching the sound to the edited videotape. Decca's own three-machine digital editor was his magic wand.

"With three-machine editing, you

The
master
tape of the
concert was
ready in two
days, a speed
that would
leave many
pop
engineers
baffled.

can get much more sophistication," Griffiths explains. "There are two playback machines and one record machine, plus a Zeta-3 synchronizer to link the whole thing together and to picture. With two playback machines you can do a lot of cross-editing that wouldn't otherwise be possible."

The team had recorded some of the music during a rehearsal in Caracella the day before the concert and, Raeburn explains, "used that material to work away small mistakes and problems, like tiny little orchestral slips, introductions, or when an artist croaked or got a word wrong. If we had commercial coverage we usually managed to correct those things by inserting a little bit of that into the concert master. For CD, we did straight musical back-and-forth editing between the concert and re-

hearsal recording of the final medley. Obviously, for video we couldn't do that, because the singing wouldn't have been in sync with the lips of the singers anymore."

It now also slowly becomes clear how they managed to get rid of the jumbo jet. "It was a real miracle," Lock explains, "because the only bit of the rehearsal recordings we had full coverage of was 'Il Lamento di Federico,' Carreras' opening aria during which the plane came over. That was the only aria where he sang out and which he did sing in full."

What Hutchinson did was replace the affected part of the concert recording with the rehearsal mix. For the CD and record, this was relatively easy, but for the pictures (again for reasons of lip sync) it was quite a different matter.

Here Hutchinson was confronted with the seemingly absurd task of manipulating the performance to match the visuals, while at the same time putting the jet rumble back in!

"I took the jet out," the editor recalls, "but then the pictures didn't make sense anymore, because Carreras was looking at the sky and reacting to the plane. The only answer was to put some of the jet noise back, but not as loud as it had been before. So, I made a copy of the concert jet version, rolled off all the top, synchronized it and added it in at a low level."

"The problem with the rehearsal version," Hutchinson continues, "was that Carreras sang with different timing. Some of the notes were shorter, so I had to extend some high notes to fit the picture. I made a gap at the end or in the middle of a note and repeated what went just before it."

Griffiths stresses that, despite all this technical trickery, people, not machines, are the all-deciding factor. "This goes all the way from the artists to the editing engineers," he says. "The real key to our success is the skill of our people. It's the extensive experience of our recording engineers—that 100,000 hours of editing experience—which has solved every problem you could possibly think of. That, complemented by our digital machinery, has been a main contributing factor to the success of this record."

It also illustrates the wisdom of Carreras, Pavarotti and Domingo in going for quality, rather than bucks. ■

Paul Tingen is a London-based writer who frequently contributes to Mix.

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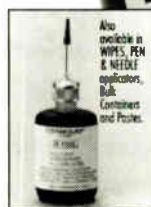
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—FROM PAGE 165, COAST TO COAST

music and Foley effects were composed and performed by Timothy North, Desmond Shea, and Poolside's David E. Nelson, who also engineered the sessions...

SOUTHWEST

Village Productions (Tornillo, TX) reports the following activity: new age artist **Mark Moore** finished mixing his new album for Voyager Records, produced and engineered by Neil Henderson; and jazz artist **Billy Townes** was tracking his latest release... **Funkenstein's Lab** (Dallas) had RCA recording artist **Robert Broward** in mixing his new R&B album, *Soul Food Cafe* (a Stax Records-sounding band) laying down tracks, and acoustic rock band **Step Family** recording two songs...

STUDIO NEWS

Sound Productions, in Emporia, KS, purchased a 36-channel Soundcraft Delta 8 console from Uncle Bob's Music in West Allis, WI... **NRG Recording Services** has expanded its location at 7222 Hinds Ave., North Hollywood, CA, to include a pre-production/rehearsal soundstage. Recent clients at NRG include L.A. Guns, Thomas Dolby and Island recording artist **Fontaine...** **Clockwork Soundstudio** (Cleveland) recently purchased a D&R Avalon Series Console... **Rose Studios**, located in Lemont, IL (a suburb of Chicago) recently installed a 32-channel Soundcraft 3200 console... **Full Sail Center for the Recording Arts** will be giving a behind-the-scenes look at the entertainment industry with their new "Dreams Across America" tour. The ten-city road show consists of an entertaining and educational evening produced by Full Sail and featuring guitarist/songwriter/vocalist **Adrian Belew** and motion picture industry giant **Walter Von Huene**. Here is the "Dreams Across America" tour schedule: March 25, Daytona Beach, FL; March 28, Detroit; March 29, Columbus, OH; March 30, Cleveland; March 31, Pittsburgh, PA; April 2, Boston; April 3, New York City; April 4, Philadelphia; April 5, Baltimore/DC; April 6, Norfolk, VA; April 7, Charlotte, NC. For more information, contact Full Sail at (407) 679-0100.

Send your sessions and studio news to sessions editor **Jeff Forlenza**, c/o *Mix* magazine, 6400 Hollis Street, #12, Emeryville, CA 94608. ■

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Boy,
was it
loud.



—FROM PAGE 69, TIMING

shifted because the time base is changed, so the MIDI note-on and note-off information is not related to the time base.

Miller: Yes, it is. It'll get farther apart or closer together. It's only partially related. Now, as you said before, the problems are not coming from the video post-production world. But using the example of the way video post houses are run is the only way I've been able to explain the problem to the people who go out and buy these products and can't make them work. The product isn't really broken. It actually works, but their *situation* is broken. If you go into a video post house, everything has an absolute time base. It has to if you're going to lock up video machines. Before those places open their doors to the public, they take care of this dirty business. That is the opening routine in a video post house.

Johnsen: Well, there's a big difference between standards and practices and operational necessity.

Miller: Right. When people call tech

support on an issue like this, there's no Band-Aid—no quick fix. All you can tell them is, "This is what you can do to your *system* to make this stuff work. This is *how* it works. Here's an environment [a video post house] where you've really got to have this together. If you don't have it together, you're going to start getting black bars in the middle of frames of video, and all kinds of problems."

Johnsen: The problem is the essential resistance you're going to get from the people who are working in their garages. What you're saying is that it's going to cost them money in two ways: First, they have to put out money for the equipment, and second, in order to do it right, they have to do it slower.

Miller: These things are true. Believe me, I know how angry people get when you tell them that. There's got to be some kind of resolution to this. In my opinion, this whole thing is about to get a lot worse.

Block: I think one solution is literally for a light to come on if there's something wrong. In the next generation of equipment, perhaps there could be an indicator—push a couple of buttons to see what the problem might be.

Miller: The market is going to generate the need for this. Today the market for people who are buying synchronization systems is *this* big [cups hands]. The people who own sequencers and computers are *this* big of a market [spreads arms]. There's lots more of them, and they're going to buy this stuff and they're not going to be able to make it work right.

Johnsen: These guys [spreads arms] are going to have a real problem. They're going to have to deal with these guys [cups hands].

Miller: That's very true.

Johnsen: Does anybody want to buy a facility? I don't even want to be in town when this starts happening.

♦ ♦ ♦ ♦

The conclusion of this discussion will take place in next month's "Byte Beat," as the roundtable participants will be joined by Will Eggleston, Lexicon product specialist, and Dave Oppenheim, founder of Opcode Systems. ■

Stay tuned for more about this Pandora's box, this rat's nest, this can of worms. Meanwhile, associate editor Paul Potyten will be thinking of more trite expressions to refer to this topic.

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FEEDBACK

TEC Largesse

Thanks to *Mix* magazine for your generous contribution to the Hearing is Priceless campaign. Your donation of \$14,625 from the 1990 TEC Awards enables us to further educate both teens and adults in protecting their hearing.

As you know, over the past four decades the House Ear Institute has achieved worldwide recognition as a pioneering research and educational facility. However, it is the acknowledgment we receive from friends such as you that has enabled us to pursue our research and the international dissemination of knowledge through fellowships, workshops and seminars.

With your support, we are eager to face the challenges of a new decade in our new building. The House Ear clinic leases space from the Institute, enabling clinicians and researchers to easily consult and work together for the better care and treatment of those with hearing and balance disorders.

John W. House, M.D.
President, House Ear Institute
Los Angeles, CA

The Degradation Situation

In the December 1990 issue of *Mix*, Bernie Grundman makes two statements about digital recording with which we disagree.

In the first, he claims that *all* digital-to-digital transfers audibly degrade the signal. It is fundamental that two digital recordings that sound different must differ numerically. We recently copied 100 seconds of digital audio through 23 generations on our Sony 3324A. We then read the generations onto hard disk and compared them using software of our own design. Through all but one transfer, all samples were identical; one generation had a burst of interpolations that lasted less than half-a-second. Our experience with DATs is

that the errors, though more frequent, also come in the form of short, widely spaced bursts of interpolation. It is hard to see how this kind of error could cause loss of "ambience, depth and the naturalness in the high end" over an entire recording. We feel that transfers exhibiting such behavior were made on equipment that was not working correctly. In the interest of determining the nature of the differences that Mr. Grundman is hearing, we would be glad to use our software to compare two digital generations that he feels differ audibly.

Second, Mr. Grundman claims that "sampling a 15,000-cycle waveform three times a second [is] not enough. You get only an approximation of what's there..." This is not correct. Because the analog signal entering the ADC is bandlimited to below the Nyquist frequency, the DAC can reconstruct the original waveform exactly, even *between* the sample values. This misconception may arise because on most digital editing systems with visual displays, the sample values are connected with straight lines, making high-frequency sinusoids look jagged indeed. We do believe there are significant issues of fidelity to be addressed in the field of digital audio, for example, converter nonlinearity, sampling jitter, quantization noise, and anti-aliasing/imaging filter design. Problems with one or more of the above may be to blame for the deficiencies Mr. Grundman hears.

Andrew Duncan
Douglas Evans
Musical Archives Foundation
Studio City, CA

Earplug Endorsement

I am surprised by Albert Leccese's remarks in January's issue regarding earplugs and relative SPLs. I can't believe that he would think that 116 dB at the house position is "com-

fortable." OSHA standards say that 115 dB can only be tolerated for 15 minutes or less per day. That's hardly what I would call "comfortable." Furthermore, the issue of wearing earplugs goes further than simply needing to turn it down.

I mix concerts and the like six nights a week, and I get exposed to quite a bit more than the average concertgoer, who may go to a concert once a month. What is tolerable for them would certainly cause me damage in the long run. The other reason I wear earplugs is that, regardless of level, the ear will compress over a period of time, and by the end of the show, if I haven't worn them, my ears are no longer able to make important decisions regarding the mix—decisions the audience and the band alike expect me to be able to make.

I will continue to wear earplugs, I will continue to hear, and I will continue to keep my concert levels reasonable. And if other engineers want to work for more than three or four years, I suggest they do the same.

Craig Patterson
PM Engineering
Evergreen, CO

Trident's Connection

I just finished reading the "Hollywood Connection" article in your January issue. I think the coverage of this topic is important.

We would like to bring to your attention the omission of our company in this article. Trident (a major manufacturer of audio consoles for 20 years) has been incorporating multipin connectors since the mid-'70s, and switched to Elco connectors on the Vector console approximately two years ago.

Phil Wagner
Vector Product Manager
Trident Audio USA
Torrance, CA



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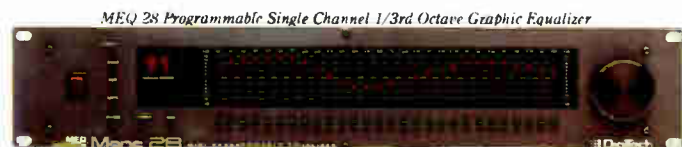
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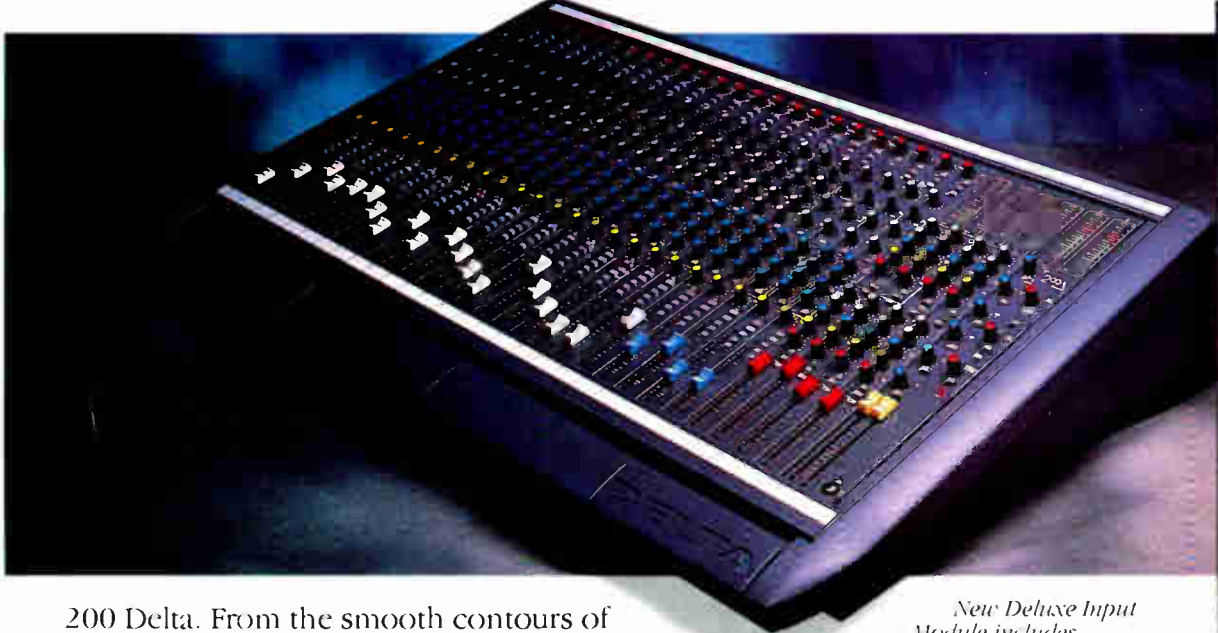


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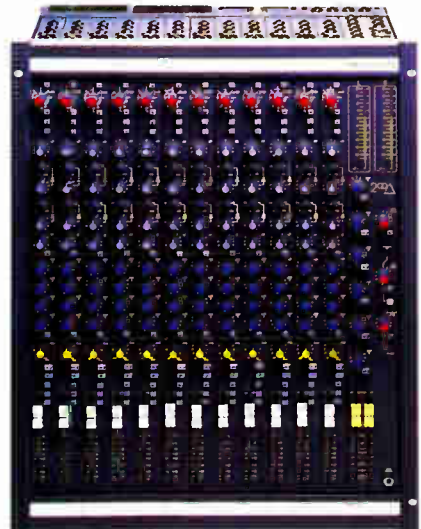
200 Delta. From the smooth contours of its sleekly styled shell to the advanced circuitry that delivers unprecedented performance, Delta is the compact console of the nineties. Expanding on the modular versatility of its 200 Series predecessors, Delta incorporates many innovations unique to Soundcraft. Advances in low profile console design that go well beyond the obvious restyling.

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New Deluxe Input Module includes expanded 4-band EQ with two mid sweeps, high pass filter and post-fader direct output. The rackmount Delta, shown below in a 12x2 version using Deluxe Inputs, can be expanded to 24x2 using Dual Line Inputs. Both the streamlined consoles and rackmount models are built to withstand the demands of recording and sound reinforcement.



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